

Rent Burden in the Housing Choice Voucher Program

Multi-Disciplinary
Research Team



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Executive Summary

The Housing Choice Voucher (HCV) program, the nation's largest tenant-based rental assistance program, is designed to reduce housing cost burdens for qualifying low-to-moderate income households. For those participating in the HCV program, the U.S. Department of Housing and Urban Development (HUD) awards housing assistance payments (HAPs) through local public housing agencies (PHAs) that cover the difference between 30 percent of a household's adjusted gross income and a payment standard that reflects the cost of renting a standard quality housing unit. In theory, HCV recipients should not spend more than 40 percent of their income on rent while participating in the program, yet research finds that many HCV participants still experience housing cost burdens in excess of this threshold. Some evidence suggests that the scarcity of affordable rental housing in areas where HCV participants desire to live may be one factor contributing to higher housing cost burdens. Other possible explanations include variable income streams that do not keep pace with adjustments to HAPs, poor program compliance monitoring on the part of local PHAs, or rising utility costs that are not offset by utility allowances.

This report examines trends in housing cost burden for HCV participants between the years of 2003 and 2015. We examine cross-sectional data in each of these years and conduct a cohort analysis of those participants who initially leased a unit in 2003 or 2008. We find that housing cost burdens for HCV participants have risen since 2003, and the year-to-year changes in housing cost burden roughly approximate trends in the recent housing market cycle. Housing cost burdens have been particularly high for those earning the lowest incomes. Households headed by females, nonelderly persons, non-Hispanic Black persons, and persons without a disability were more likely than other households to exhibit severe housing cost burdens. Participants living in larger single-family homes have experienced higher cost burdens than those living in other housing types. These trends have played out unevenly across geography. Housing cost burdens have been highest in the South. During the housing boom, rural areas saw the highest housing cost burdens. When the market fell into decline, cost burdens fell in all areas, but as the market began to recover, severe cost burdens rose in metropolitan areas, due largely to the relative increase in housing cost burdens within suburban areas. Residential segregation and the limited availability of good neighborhoods offering units for HCV participants at affordable rents also shape housing cost burdens. During an era when insufficient affordable housing is being built and affordable rental units are becoming more scarce, much of the housing cost burden faced by HCV participants is attributable to renting units above local payment standards, combined with changes in income that do not keep pace with rising rents.

Introduction

The housing cost burdens of U.S. renters are reaching historic highs. According to JCHS (2016), the number of households spending more than 30 percent of their income on rent rose by 3.6 million between 2008 and 2014, and the number of households spending more than 50 percent of their income on rent rose to a record high of 11.4 million. According to U.S. Department of Housing and Urban Development's (HUD's) 2015 *Worst Case Housing Needs* report, of the approximately 40.3 million U.S. renters in 2013, 24 percent are severely housing cost burdened, spending more than 50 percent of their income on rent. These high housing cost burdens fall most heavily on renters who earn the lowest incomes. Of those earning less than 30 percent of the Area Median Family Income, 62 percent are severely cost-burdened (Steffen et al., 2015: table A-1A).

The Housing Choice Voucher (HCV) program, the nation's largest tenant-based rental assistance program, is designed to alleviate these high housing cost burdens for qualifying low-to-moderate income households, while also expanding housing choice in a wider variety of neighborhoods that offer beneficial economic and social opportunities. For those participating in the HCV program, HUD awards housing assistance payments (HAPs) through local public housing agencies (PHAs) that cover the difference between 30 percent of a household's adjusted gross income and a payment standard that reflects the cost of renting a standard quality housing unit (McClure, 2005).

This report examines trends in housing cost burden for HCV participants between the years of 2003 and 2015. We examine cross-sectional data in each of these years and conduct a cohort analysis of households that initially leased up in 2003 and 2008. Our research aims to identify the household, housing unit, and geographic factors associated with housing cost burdens in the HCV program and provide policy recommendations for ways to reduce the prevalence of high housing cost burden among HCV-assisted renters. The report begins with a discussion of relevant literature addressing housing cost burden in the HCV program, followed by a more detailed discussion of the data and methods, a discussion of findings pertaining to seven specific research questions, and a conclusion that summarizes the findings and policy implications.

Background

Although the HCV program is designed to lower the cost of rental housing for participating households, some evidence suggests that many HCV participants still face high housing cost burdens. McClure (2005) found that 38 percent of HCV participants in 2002 spent more than 31 percent of their income on rent and utilities, and 17 percent spent more than 40 percent of their income on rent. Williamson (2011) examined data from a sample of about 38,000 households residing in Florida's Low Income Housing Tax Credit (LIHTC) properties and found that about 35 percent of LIHTC residents receiving vouchers spent more than 30 percent of household income on rent. Leopold et al. (2015) conducted a more recent (2013) analysis of HUD administrative data and find that 42 percent of HCV recipients earning extremely low incomes spent more than 30 percent of income on rent. This 42 percent was highest among all HUD's programs, including the Moderate Rehabilitation program, project-based Section 8, other multifamily programs, and public housing.

Because HCV program rules prohibit participating households from spending more than 40 percent of their income on rent at initial lease up, why do so many HCV participants still face high housing cost burdens? Many households choose to spend as much as 40 percent of their income on rent to obtain housing that is higher quality, larger, or in more desirable neighborhoods. If higher cost burdens are associated with improved neighborhood quality, then a HCV recipient's realization of these benefits may be a positive policy outcome. Even short-term gains in access to certain local public goods, such as high-quality schools, may yield long-term gains in a child's future economic opportunities and well-being. However, if these initially higher cost burdens persist or rise over time, as rents rise relative to household incomes, households may be unable to remain in the neighborhood to take advantage of beneficial neighborhood amenities. Because there is no cap on the percentage of income that can be spent on housing costs after initial lease up, HCV participants are at risk of incurring higher housing cost burdens over time if rents increase or if utilities rise above the HUD utility allowance. Furthermore, some HCV participants may lose their jobs or experience a decline in income after initial lease up even if rents remain stable. Although HUD adjusts tenant payments upon annual reexaminations, these adjustments may not keep pace with changes in income if income streams vary from month to month.

Certain types of households may be more likely to incur higher housing cost burdens than others. McClure (2005) found that among all HCV recipients, housing cost burden is particularly high for single-parent female-headed households, larger families with children (who need larger units), and recipients with extremely low incomes. It is possible that low-income families with children are more strongly "tied" to location, due to reliance on local social networks for social support and financial assistance (Dawkins, 2006). Likewise, non-White households may experience housing market discrimination, limiting their ability to move to adjust housing costs. This latter explanation is consistent with McClure's (2005) finding that households headed by African-Americans are more likely than other households to spend more than 40 percent of their income on rent.

Supply-side conditions may also influence households' ability to reduce housing cost burdens on residential mobility. Pendall (2000) found that households receiving tenant-based rental assistance are more concentrated in distressed neighborhoods when those neighborhoods have a higher concentration of rental housing, despite such households' tendency to avoid neighborhoods with very low rents. Another factor is landlords' reluctance to participate in the HCV program. Unless states or localities have adopted legislation prohibiting the discrimination against those receiving tenant-based assistance, landlords' participation in the HCV program is voluntary, and many landlords choose not to participate due to perceived administrative barriers or other considerations (Freeman, 2011). Local land use regulations substantially restrict the development of affordable rental units for moderate-income workers by ensuring that developers profit only by constructing luxury housing. White et al. (2016) show, however, that development of economical, unsubsidized rental housing is feasible by presenting a case study of how Sarasota and Manatee Counties in Florida accommodated cost-effective design standards and streamlined approval processes.

Additional factors may be due to local PHAs' discretionary decisions on setting local preferences for admission and enforcing compliance with HUD program rules. Local PHAs may also prioritize admission to households that are more or less likely to incur higher housing cost burdens over time. The Quality Housing and Work Responsibility Act of 1998¹ (QHWRA) expanded the discretionary authority of local PHAs and set threshold requirements for the incomes of those newly admitted to HUD programs. Since 1998, PHAs have been required to ensure that 75 percent of new voucher holders have incomes no greater than 30 percent of the Area Median Income (AMI) and that all households spend no more than 40 percent of income on housing costs at the time of lease up. Beyond these requirements, PHAs have substantial discretion to prioritize assistance to different types of households. Some PHAs place priority on housing those recipients who are in greatest need, whereas others place emphasis on those most able to move to achieve greater self-sufficiency (Devine et al., 2000). Dawkins (2007) found that, since the enactment of QHWRA, PHAs increasingly have been admitting smaller families headed by older adults and fewer extremely low-income female-headed households with children, thus signaling a trend away from the types of households identified by McClure (2005) who are most likely to incur high housing cost burdens.

¹ Pub. L. 105–276, Title V.

Data and Methods

This research relies on administrative data from HUD’s Public and Indian Housing Information Center, or PIC, system to examine trends in HCV housing cost burden between 2003 and 2015. The data are assembled from tenant-level databases collected from the HUD-50058 Family Report form completed by local PHAs.

We assemble two primary databases for the analyses. The first database is a set of cross-sectional household-level files for each year between 2003 and 2015. These files (one for each year) include the last household record available for each household in each year for all households that have successfully leased up during or prior to the year in question. Using these databases, we examine trends in housing cost burden over time for all HCV-assisted households and households classified by various household, housing unit type, and geographic characteristics. For those participating in the HCV program in the most recent period (2015), we also examine the marginal effect of each of these characteristics, holding the others constant, on the odds of an HCV household experiencing a housing cost burden.

We also construct two longitudinal files of households that leased up in 2003 and 2008. For each of these longitudinal files, we follow households over time, appending observations on rental spells for each year after initial lease up until either 2015 or the year in which the household exits from the HCV program. Using these two longitudinal databases, we examine the duration of housing cost burden, emphasizing factors associated with different housing cost burden trajectories. The findings section is organized according to more specific research questions.

We define housing cost burden as the ratio of the family’s total contribution to housing payments (gross rent minus the household’s HAP) to the household’s total annual adjusted gross income. Gross rent is equal to the contract rent plus utility allowance. HAP is defined as the lower of gross rent or the payment standard minus the total tenant payment (TTP). We use the terms *rent burden* and *housing cost burden* interchangeably throughout the report to reflect the percentage of income spent on rental housing costs. We categorize housing cost burdens into the following cost burden categories: no cost burden (spending 30 percent or less of income on housing costs), moderate cost burden (spending 31 to 40 percent of income on housing costs), high cost burden (spending 41 to 50 percent of income on housing costs), and severe cost burden (spending 51 percent of income or higher on housing costs). The so-called “30 percent rule” is a standard threshold level of housing cost burden that can be traced to the Brooke Amendment to the 1968 Housing and Community Development Act. Because HCV recipients are required to spend no more than 40 percent of income on housing on lease up, we use the 40-percent threshold to define a second housing cost burden threshold. The 50-percent threshold corresponds to HUD’s definition of severe cost burden in its *Worst Case Housing Needs* reports. Households with zero income, those that receive project-based vouchers, and those that receive HCVs from Moving to Work PHAs are excluded from the analyses. Appendix table A1 displays the number of HCV households included and excluded from the analyses.

Findings

The discussion of research findings is organized according to seven specific research questions. The first three questions are addressed using the cross-sectional household-level files for each year between 2003 and 2015, with some analyses emphasizing only the cross-sectional file for the most recent year (2015). To address the fourth question, we rely on a subset of households from the cross-sectional files that exited the program between 2003 and 2015. The final three research questions are addressed using the two longitudinal files of households that leased up in 2003 and 2008.

How has the prevalence of housing cost burden changed over time?

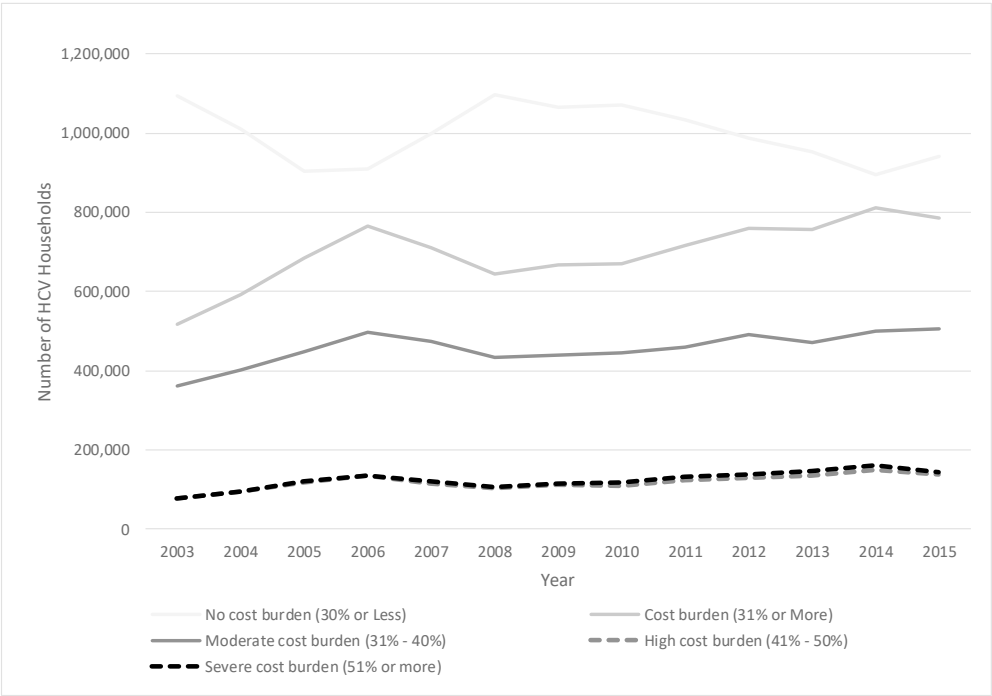
To address this question, we calculate housing cost burden for each year (2003 through 2015) for each of the housing cost burden categories defined in the previous section. Figure 1 displays, for each year, the total number of HCV households spending 30 percent or less of their income on rent, 31 percent or more of income on rent, between 31 and 40 percent of income on rent, between 41 and 50 percent of income on rent, 51 percent or more of income on rent, and the total number of households. Figure 2 displays the percentage of households falling into each of these housing cost burden categories by year. (The tables used to construct each of these and subsequent figures are provided in the appendix).

Although the total number of HCV-assisted households remained essentially flat during the 2003-to-2015 period (see appendix table A2), the number of cost-burdened HCV households has increased 52 percent from 517,665 in 2003 to 786,958 in 2015 (The number of cost-burdened households reached a high of 811,315 in 2014 but fell slightly in 2015). As a share of total HCV households in each year, those experiencing any level of cost burden increased by 13 percentage points, those experiencing moderate cost burdens increased by 7 percentage points, those experiencing high cost burdens increased by 3 percentage points, and those experiencing severe cost burdens increased by 4 percentage points.

The year-to-year change in housing cost burden roughly corresponds to the recent housing market boom-and-bust cycle and subsequent economic depression. The share of HCV households experiencing housing cost burdens rose to a peak of 46 percent of households in 2006, with a steady decline during the housing bust period. As the housing market began to recover, the share of cost-burdened HCV households rose again, to a higher peak of 48 percent in 2014.

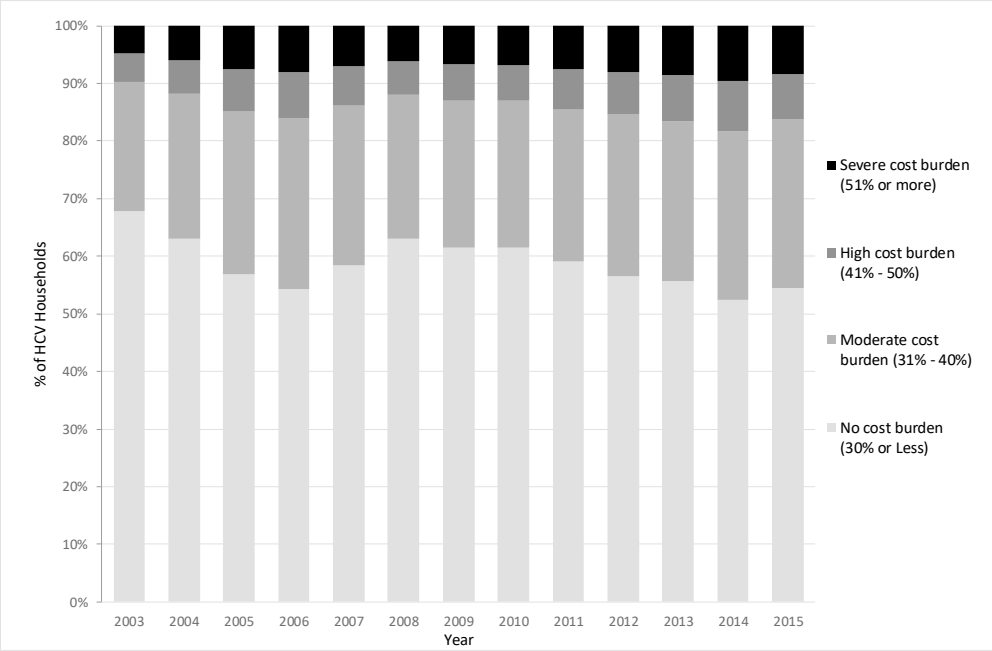
These trends likely reflect larger housing market dynamics. Rental prices peaked in 2007, steadily declined from 2007 through 2010, and have risen since (JCHS, 2016). DiPasquale and Murray (2017) found that between 1970 and 2010, incomes fell for renters in all but the highest income quintile. Between 2000 and 2010, incomes for renters in the lowest income quintile fluctuated, falling by 12 percent between 2000 and 2005, rising by 7 percent between 2005 and 2008, and falling again by 6 percent between 2008 and 2010. These larger trends roughly correspond to the housing cost burden trends displayed in figures 1 and 2, suggesting that increased rental affordability temporarily lowered housing cost burdens for HCV households during the housing bust.

Figure 1. HCV Households by Extent of Housing Cost Burden, 2003–2015



HCV = Housing Choice Voucher.

Figure 2. Proportion of HCV Households With Specified Housing Cost Burden, 2003–2015



HCV = Housing Choice Voucher.

What factors are associated with the prevalence of housing cost burden in the HCV program? Has the prevalence of more severe housing cost burdens changed over time across different locations and types of HCV households?

To address these questions, we classify households experiencing various housing cost burden levels into the following categories:

- Household characteristics (length of program participation, household size, female-headed household status, elderly status of household head, disability status of household head, presence of children, TTP relative to the HUD minimum rent threshold (\$50), household income, source of income, race, and ethnicity).
- Housing unit type (number of bedrooms, structure type, year built).
- Geography (U.S. Census region; metropolitan and rural location; central city, suburb, or rural location; census tract poverty rate; census tract minority (non-White) percentage; census tract vacancy rate; and census tract median rent).

Tables 1 through 3 display, for those households participating in the HCV program in the most recent year (2015), the total number of HCV households, total number experiencing any cost burden, and total number experiencing a severe cost burden, along with corresponding row and column percentages.

Tables A4 through A9 in the appendix display trends in the “Row percent” column (percentage of households within a given category that are cost burdened or severely cost burdened) across years. Figures 3 through 9 graphically display selected trends from tables A4 through A9 that differ significantly from the cross-sectional findings displayed in tables 1 through 3. We begin with a discussion of the prevalence of housing cost burdens and severe housing cost burdens by various household characteristics.

We might expect those with shorter HCV program durations to be more likely to rely on HCV assistance to address temporary conditions of housing instability, perhaps induced by short-term job loss or changes in family status compared with long-term program participants who may be more heavily dependent on housing assistance to cover rent payments. As displayed in table 1, the length of program participation has little relation to the prevalence of any housing cost burden, but those with longer program durations are more likely to exhibit severe cost burdens. In 2015, participants who had been in the HCV program for 10 years or longer were more than twice as likely to exhibit a severe cost burden than those who had been in the program for less than 1 year.

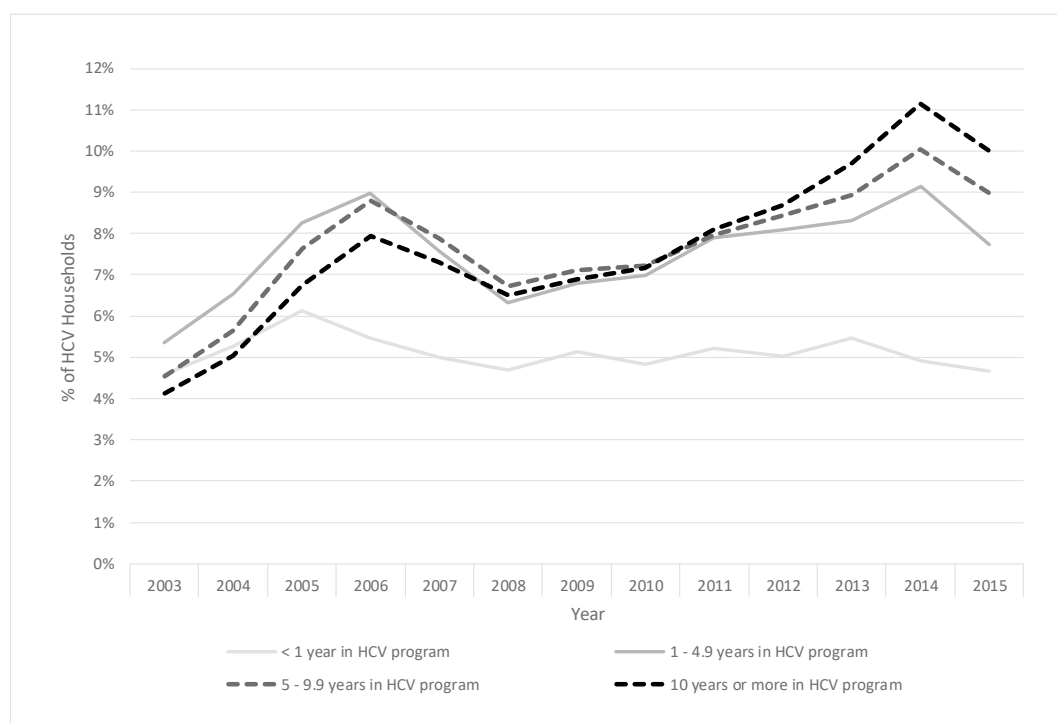
Table 1. HCV Households by Household Characteristics and Severity of Housing Cost Burden, 2015

	Total HCV Households		Any Cost Burden (31% or More)			Severe Cost Burden (51% or More)		
	Number	Column %	Number	Row %	Column %	Number	Row %	Column %
	1,728,756		786,958	46		144,402	8	
Length of HCV program participation								
< 1 year	273,747	16	124,040	45	16	12,783	5	9
1–4.9 years	404,783	23	182,949	45	23	31,310	8	22
5–9.9 years	472,076	27	217,149	46	28	42,417	9	29
10 years or more	577,939	33	262,707	45	33	57,869	10	40
Household size								
1 member	704,952	41	322,973	46	41	51,493	7	36
2 members	362,151	21	178,586	49	23	35,242	10	24
3 members	286,987	17	130,676	46	17	27,460	10	19
4 members	195,379	11	83,422	43	11	17,805	9	12
5 or more members	179,287	10	71,301	40	9	12,402	7	9
Presence of children								
No children	937,003	54	431,441	46	55	70,532	8	49
Children	791,753	46	355,517	45	45	73,870	9	51
Household head gender								
Male	330,182	19	135,650	41	17	17,868	5	12
Female	1,398,519	81	651,272	47	83	126,522	9	88
Household head age								
Nonelderly	1,332,946	77	623,043	47	79	124,544	9	86
Elderly	395,810	23	163,915	41	21	19,858	5	14
Household head disability status								
Nondisabled	1,234,653	71	558,666	45	71	116,908	9	81
Disabled	494,103	29	228,292	46	29	27,494	6	19
Income								
\$5,000 or less	161,699	9	105,101	65	13	64,256	40	44
\$5,001–\$10,000	503,440	29	223,834	44	28	44,896	9	31
\$10,001–\$15,000	453,546	26	196,352	43	25	23,462	5	16
More than \$15,000	610,071	35	261,671	43	33	11,788	2	8
Income (as percent of AMI)								
10% or less	196,882	11	120,295	61	15	70,873	36	49
11–30%	1,053,181	61	452,725	43	58	67,702	6	47
31–50%	392,432	23	178,963	46	23	5,436	1	4
51–80%	78,384	5	33,523	43	4	258	0	0
More than 80%	5,512	0	778	14	0	3	0	0
Primary source of income								
Wages	523,356	30	226,586	43	29	25,138	5	17
Government	1,205,072	70	560,069	46	71	118,990	10	83
TTP								
\$50 or less	74,152	4	68,248	92	9	44,867	61	31
More than \$50	1,654,604	96	718,710	43	91	99,535	6	69
Race/ethnicity								
White, not Hispanic	584,128	34	256,052	44	33	34,228	6	24
Black, not Hispanic	778,144	45	377,683	49	48	77,107	10	53
Asian/Pacific Islands, not Hispanic	40,776	2	16,874	41	2	3,740	9	3
Native American, not Hispanic	11,131	1	4,863	44	1	821	7	1
More than one race, not Hispanic	15,468	1	6,500	42	1	1,153	7	1
Hispanic, any race	297,856	17	124,517	42	16	27,276	9	19

AMI = Area Median Income. HCV = Housing Choice Voucher. TTP = total tenant payment.

As graphically displayed in figure 3, the relationship between length of program participation and severity of cost burden has changed over time. Until 2006, the length of program participation had little relation to the severity of cost burden, but afterwards, participants who had been in the program for longer periods of time were more likely to experience severe cost burdens, particularly after 2011. These trends likely reflect the combination of program rules and household choices to consume slightly more expensive housing on initial lease up. If households spend up to the program limit of 40 percent of income in their first HCV-subsidized home and rents rise over time or household incomes fall, the incidence of severe cost burden would rise, particularly for participants who stay in the program but do not move to less expensive housing.

Figure 3. Prevalence of Severe Housing Cost Burden by Length of Program Participation, 2003–2015

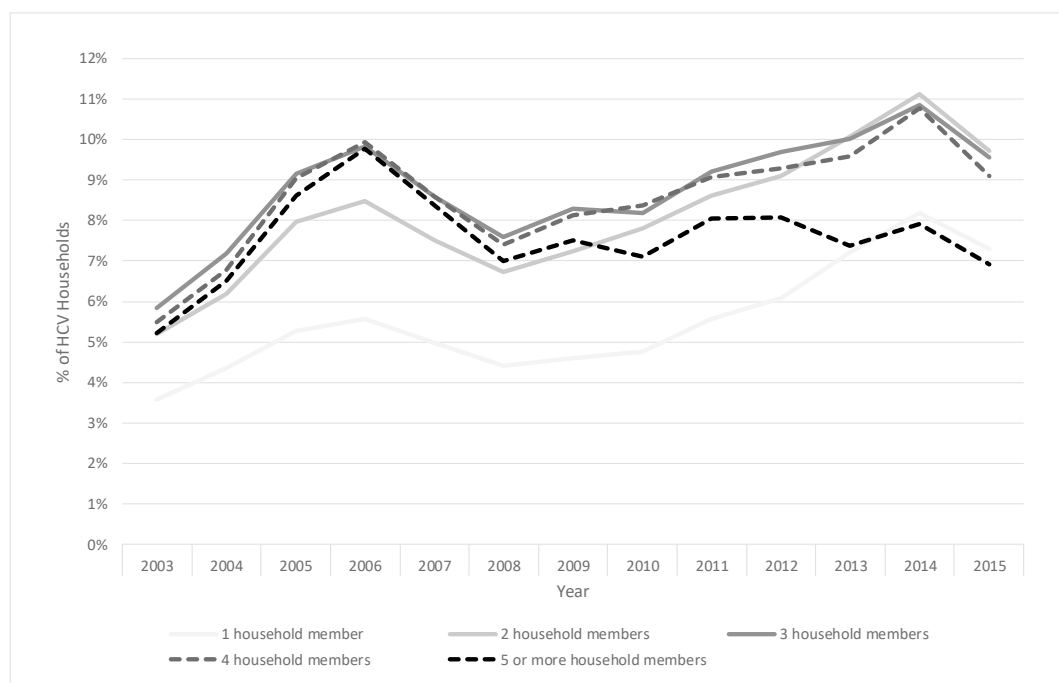


HCV = Housing Choice Voucher.

We may also expect housing cost burden to vary with household size and the presence of children, because larger families may require larger, more expensive homes. Table 1 does not fully support this conjecture, as smaller households are slightly more likely to experience a housing cost burden, and moderately sized households (two to three persons) are the most likely household size group to experience a severe housing cost burden. Figure 4 suggests that this relationship has changed over time. Until about 2011, single-person households were less likely than larger households to exhibit severe housing cost burdens. Afterwards, the relationship still holds, but four-person households became less likely to experience a severe housing cost burden as compared with other household size groups. Regarding the influence of various demographic

characteristics, households headed by females, nonelderly persons, non-Hispanic Black persons, and persons without a disability are more likely to exhibit severe housing cost burdens. These demographic differences generally held across the entire analysis period.

Figure 4. Prevalence of Severe Housing Cost Burden by Household Size, 2003–2015



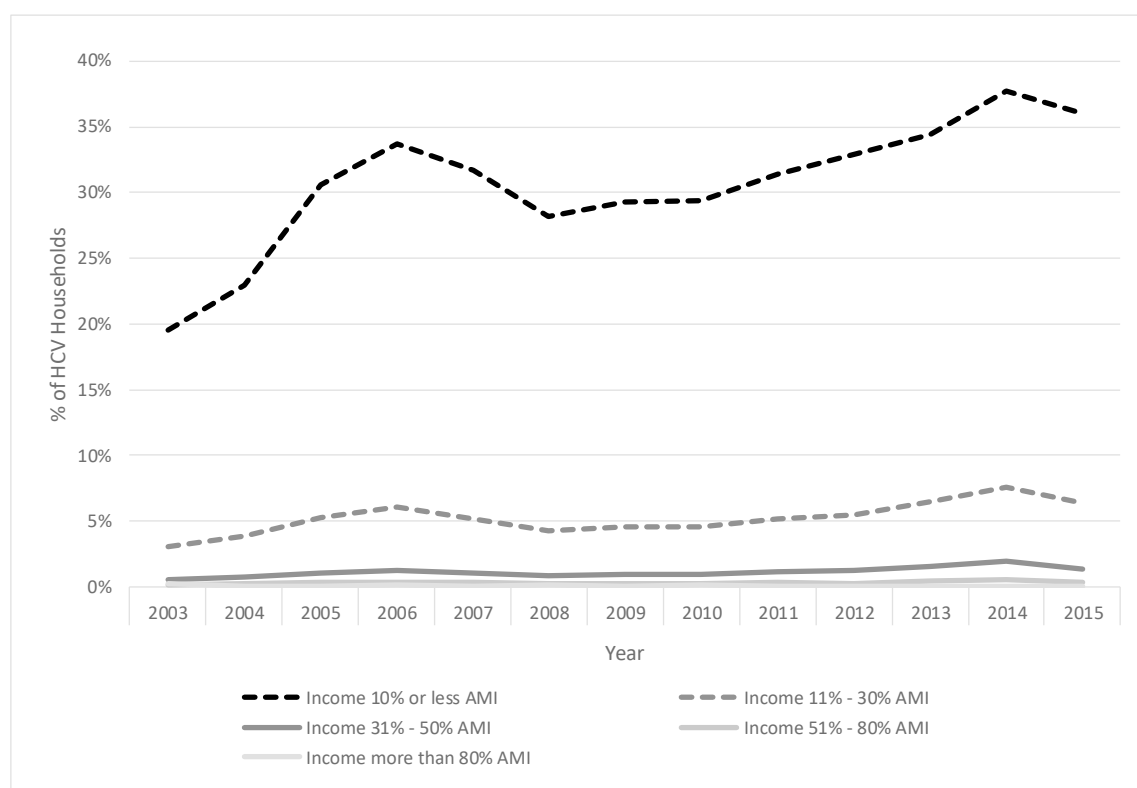
HCV = Housing Choice Voucher.

The higher incidence of severe housing cost burden among households headed by nondisabled persons is somewhat unexpected, given evidence that those with disabilities often face more severe constraints in the housing market (Souza et al., 2011). In 2015, approximately 29 percent of households in the sample are headed by those with a disability. It is possible that households with disabled heads rely on more steady income support streams, even if fixed, and live in units that are not as likely to increase in price. This finding deserves further exploration in future research.

Table 1 points to significant differences in cost burden by income, with lower income households exhibiting much higher cost burdens. As of 2015, the majority of HCV households in the sample (61 percent) had incomes between 11 and 30 percent of AMI. 11 percent had incomes less than 10 percent of AMI, and the remainder had incomes more than 30 percent of AMI. Among those with incomes less than 10 percent of AMI, 61 percent experienced a housing cost burden, and 36 percent experienced a severe housing cost burden. Also, among those earning \$5,000 or less, 65 percent experienced a housing cost burden, and 40 percent experienced a severe housing cost burden.

Figure 5 examines the prevalence of severe housing cost burden by income over time. The gap in severe housing cost burdens between those with incomes of 10 percent or less of AMI and those with incomes of more than 80 percent of AMI has grown over time, from 35 percentage points in 2003 to 47 percentage points in 2015. It is notable that in all years but 2003, more than 20 percent of those with incomes of 10 percent or less of AMI experienced cost burdens of 51 percent or higher, a level of cost burden that is inconsistent with HCV program rules.

Figure 5. Prevalence of Severe Housing Cost Burden by Income as a Percentage of AMI, 2003–2015



AMI = Area Median Income. HCV = Housing Choice Voucher.

Table 1 also suggests that households relying on government sources of income are more likely to exhibit cost burdens and severe cost burdens (households are classified into a given income source category if 50 percent or more of income is attributable to that source). Although government sources of income may be more stable than income from wages, these findings suggest that government transfer payments are inadequate to offset rising rents.

Table 2 displays the prevalence of housing cost burden and severe housing cost burden by various structural characteristics of the housing units where HCV households reside. Although HAPs are adjusted for family size and number of bedrooms, households may choose to consume larger homes than their HAP is designed to cover. Likewise, rents may be proportionately higher for multifamily apartments with more bedrooms if the supply of homes large enough to

accommodate large families is limited. We find that the prevalence of housing cost burdens and severe housing cost burdens is highest among those living in larger single-family homes. We do not find a significant relationship between cost burden and age of the structure, although those living in the oldest housing units (100 years or older) exhibit lower cost burdens than those living in newer housing units.

Table 2. HCV Households by Housing Unit Characteristics and Severity of Housing Cost Burden, 2015

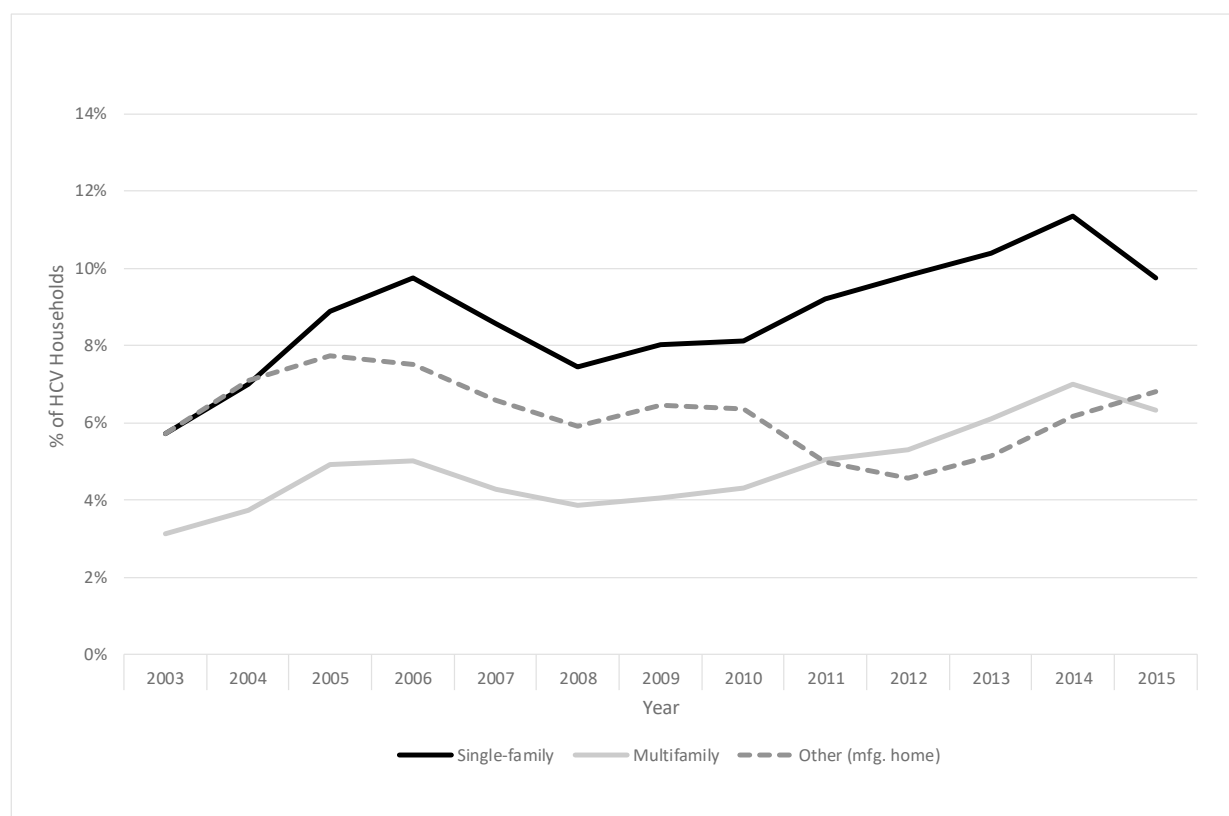
	Total HCV Households		Any Cost Burden (31% or More)			Severe Cost Burden (51% or More)		
	Number	Column %	Number	Row %	Column %	Number	Row %	Column %
	1,728,756		786,958	46		144,402	8	
Number of bedrooms								
0 bedrooms	26,853	2	7,386	28	1	1,369	5	1
1 bedroom	463,328	27	172,835	37	22	18,161	4	13
2 bedrooms	628,606	36	312,808	50	40	52,521	8	36
3 bedrooms	490,954	28	234,493	48	30	57,615	12	40
4 or more bedrooms	119,015	7	59,436	50	8	14,736	12	10
Structure type								
Single-family	1,008,653	58	501,260	50	64	98,378	10	68
Multifamily	635,699	37	254,939	40	32	40,286	6	28
Other (mfg. home)	84,403	5	30,758	36	4	5,737	7	4
Years since home built								
< 10 years	137,616	8	61,701	45	8	9,586	7	7
10–19.9 years	240,674	14	110,503	46	14	19,231	8	13
20–29.9 years	156,572	9	75,742	48	10	14,417	9	10
30–39.9 years	263,809	15	125,476	48	16	23,534	9	16
40–49.9 years	267,814	15	117,552	44	15	21,155	8	15
50–99.9 years	529,898	31	243,112	46	31	46,704	9	32
100 years or more	131,933	8	52,681	40	7	9,738	7	7

HCV = Housing Choice Voucher.

Figure 6 suggests that the prevalence of severe housing cost burden by structure type has varied over time. In all years between 2003 and 2015, those living in single-family homes have consistently been more likely to exhibit severe housing cost burdens, even though the percentage of HCV households living in single-family homes has declined from 64 percent in 2003 to 58 percent in 2015. Over the same period, the percentage of households living in multifamily homes increased from 33 to 37 percent, and the percentage living in other housing types has increased from 3 to 5 percent.

Even though very few HCV households live in other housing types (primarily manufactured housing), the prevalence of severe housing cost burden among these households has declined since 2005. It is possible that these trends reflect changing dynamics in the affordability of manufactured homes available for rent by HCV households. This trend deserves further exploration in future research.

Figure 6. Prevalence of Severe Housing Cost Burden by Structure Type, 2003–2015



HCV = Housing Choice Voucher.

Table 3 displays the prevalence of housing cost burden and severe housing cost burden by various geographic characteristics. Housing cost burdens are most prevalent in the South and least prevalent in the Northeast. Many large manufacturing centers in the Northeast have been slow to recover from the recent housing market crisis, so housing prices in these areas are likely lower than in the South, which has been quick to recover.

Table 3 also examines differences in the severity of cost burden across central city, suburban, and rural areas. Metropolitan areas are defined as Core Based Statistical Areas (CBSAs), including metropolitan and micropolitan areas. Central cities include the CBSAs' principal cities, suburbs include all portions of the metropolitan area that are outside of central cities, and rural areas include all areas that are outside of metropolitan areas. Those living in metropolitan areas were slightly more likely to experience severe housing cost burdens in 2015. Within metropolitan areas, those living in the suburbs were slightly more likely to exhibit severe housing cost burdens than those living in central cities.

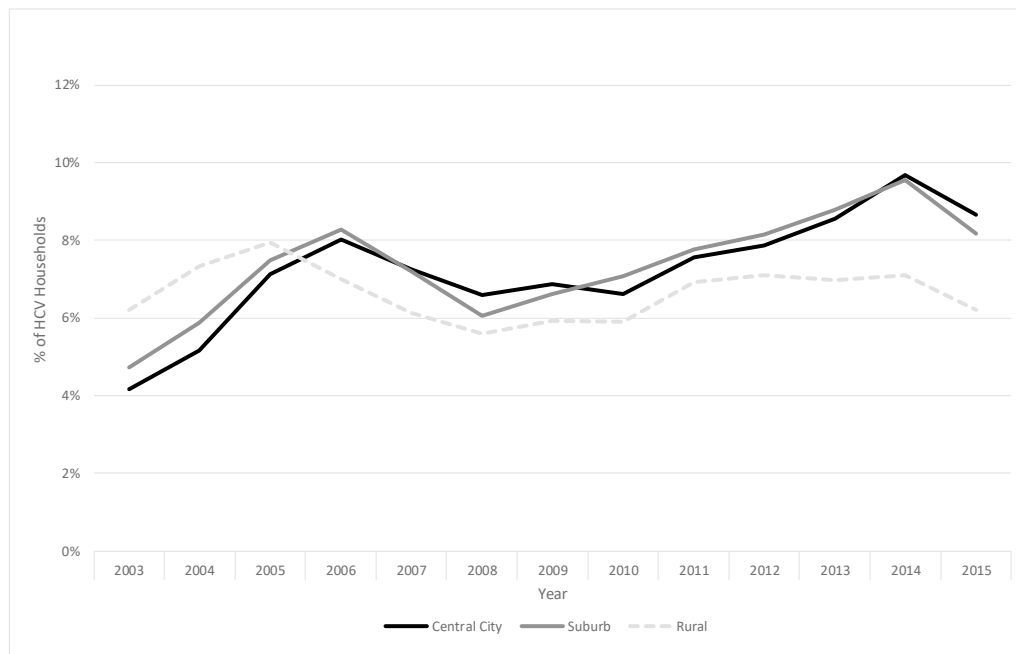
Table 3. HCV Households by Geographic Characteristics and Severity of Housing Cost Burden, 2015

	Total HCV Households		Any Cost Burden (31% or More)			Severe Cost Burden (51% or More)		
	Number	Column %	Number	Row %	Column %	Number	Row %	Column %
HCV households	1,728,756		786,958	46		144,402	8	
Geography								
Region								
Northeast	421,878	25	161,529	38	21	28,698	7	20
Midwest	324,082	19	156,247	48	20	23,884	7	17
South	583,601	34	291,899	50	38	56,207	10	40
West	374,377	22	168,083	45	22	31,324	8	22
Metropolitan								
Metropolitan	1,527,645	88	695,150	46	88	132,278	9	92
Nonmetropolitan/rural	201,111	12	91,808	46	12	12,124	6	8
Central city								
Central city	738,361	43	337,032	46	43	60,294	8	42
Suburb	920,865	53	418,899	45	53	79,795	9	55
Rural	69,530	4	31,027	45	4	4,313	6	3
Census tract characteristics								
Median rent per month								
Less than \$400	14,696	1	5,846	40	1	1,804	12	1
\$400–\$800	709,735	41	318,074	45	41	50,788	7	35
More than \$800	995,830	58	459,584	46	59	90,889	9	63
Vacancy rate								
Less than 5%	316,022	18	143,037	45	18	26,743	8	19
5–8%	334,416	19	153,315	46	20	27,775	8	19
Greater than 8%	1,071,973	62	488,268	46	62	89,259	8	62
Poverty rate								
10% or less	336,225	20	161,971	48	21	28,365	8	20
11–20%	552,868	32	257,325	47	33	44,196	8	31
More than 20%	833,742	48	365,409	44	47	71,234	9	50
Minority percentage								
20% or less	365,094	21	166,167	46	21	21,168	6	15
20–40%	300,062	17	140,054	47	18	21,593	7	15
More than 40%	1,057,701	61	478,489	45	61	101,037	10	70

HCV = Housing Choice Voucher.

Figure 7 suggests that the differences in severity of cost burden across central city, suburban, and rural areas have fluctuated over time. During the housing boom, rural areas saw the highest housing cost burdens. When the national housing market and economy fell into decline, cost burdens fell in all areas, but as the housing market began to recover, severe cost burdens rose again in metropolitan areas, due primarily to the relative increase in housing cost burdens within suburban areas. The geographic mobility of HCV households may have also played a role in shaping these trends, as HCV households increasingly suburbanized over the analysis period. Between 2003 and 2015, the proportion of HCV households living in central cities declined from 53 percent to 43 percent; the proportion living in suburban areas increased from 33 percent to 53 percent; and the proportion living in rural areas declined from 14 to 4 percent.

Figure 7. Prevalence of Severe Housing Cost Burden by Central City, Suburb, or Rural Location, 2003–2015

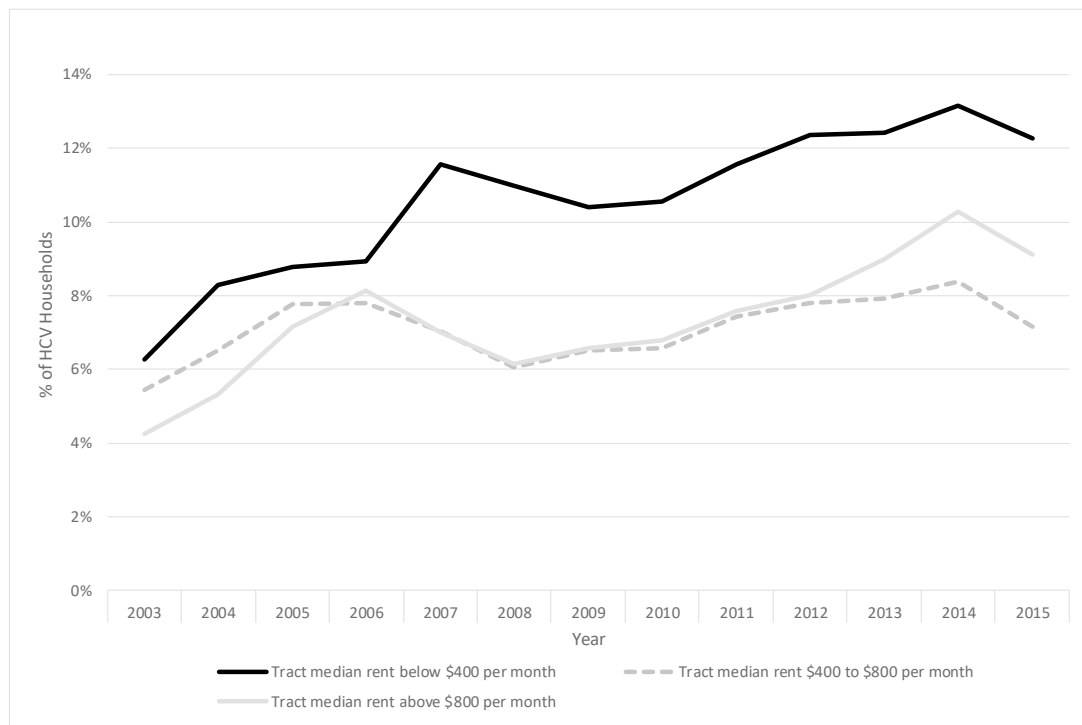


HCV = Housing Choice Voucher.

We also examined the severity of housing cost burden by various characteristics of the census tracts where HCV households reside. The thresholds used to define breakpoints for each census tract category are based on McClure (2005), who examined similar census tract characteristics for the 2000-to-2002 period, just prior to our analysis period. Table 3 suggests that housing cost burden varies according to census tract characteristics, and the relationships differ by severity of cost burden. Households living in census tracts with higher median rents, lower poverty rates, and a smaller percentage of minority residents were more likely to exhibit housing cost burdens. Households exhibiting severe cost burdens were more likely to live in census tracts with low median rents and a high percentage of minority residents.

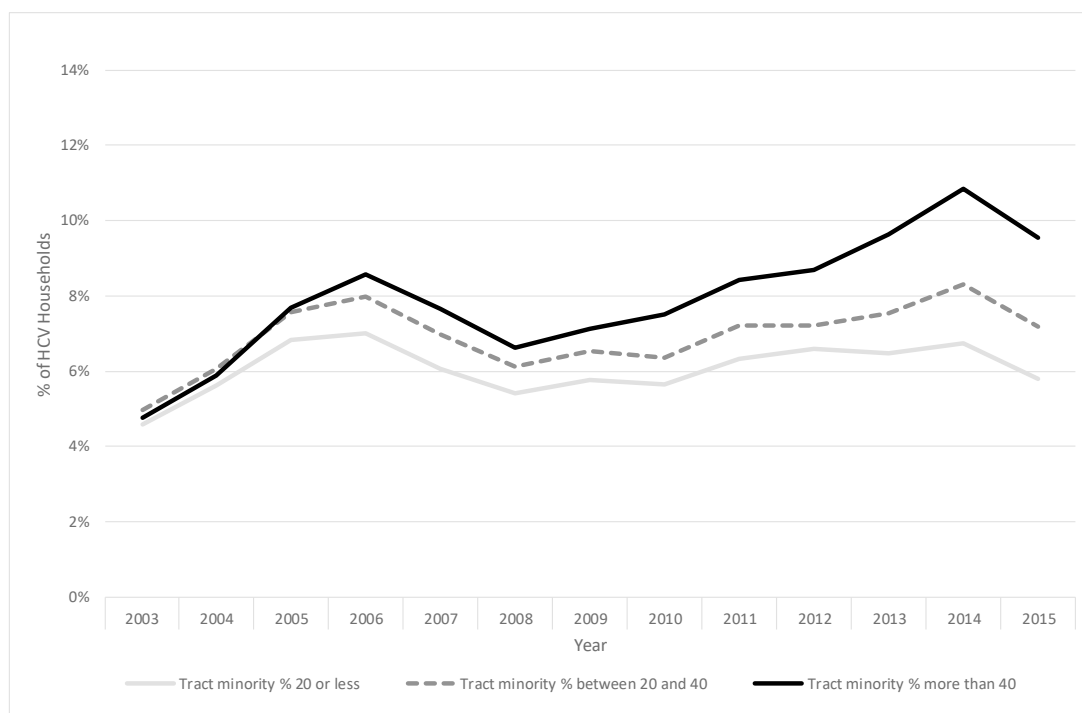
Figures 8 and 9 examine trends in severe housing cost burden by median rents and census tract minority percentage. Across all years, households living in census tracts with the lowest median rents were the most likely to exhibit severe cost burdens, although the gap between the most expensive and least expensive census tracts has narrowed since 2006. Until 2005, the differences in prevalence of severe housing cost burden by census tract minority percentage were small, but over time, those living in census tracts with a larger minority percentage have become increasingly more likely to experience severe cost burdens, and the differences in severe cost burden between neighborhoods with low and high minority percentages have increased over time. The next section explores these findings in more detail.

Figure 8. Prevalence of Severe Housing Cost Burden by Census Tract Median Rent, 2003–2015



HCV = Housing Choice Voucher.

Figure 9. Prevalence of Severe Housing Cost Burden by Census Tract Minority Percentage, 2003–2015



HCV = Housing Choice Voucher.

What factors increase the odds of a HCV household experiencing housing cost burden?

The analysis in the previous section examined the influence of each household, housing unit, and geographic factor on the prevalence of housing cost burden in isolation. It is more useful to examine the marginal contribution of each of these factors while simultaneously controlling for the influence of other factors. To address this issue, we estimate two logistic regression models. Logistic regressions are models that are used to explain the factors associated with outcomes that are binary in nature. We estimate models that account for the factors associated with being cost-burdened or not and models that account for the factors associated with being severely cost-burdened or not. Independent variables for these models include the various household, housing unit, and geographic factors used to address research question 2. We estimate these models for the most recent period for which data are available (2015). Appendix table A10 provides a description of the variables used in the regression model. We begin with a discussion of the logistic regression coefficients displayed in table 4.

We find that the length of program participation is negatively associated with the odds of having any cost burden but positively associated with the odds of having a severe housing cost burden. These effects are small and generally consistent with the descriptive evidence presented in the previous section. Households most likely to suffer housing cost burdens include those without children, those headed by females, those with nonelderly household heads, those without disabled household heads, those headed by non-White household heads, those headed by Hispanic household heads, those dependent on government sources of income, and those earning lower incomes. Households earning the lowest incomes (10 percent or less of AMI) are 1.4 times as likely to experience a housing cost burden and 3.9 times as likely to experience a severe housing cost burden as those earning 51 to 80 percent of AMI.

Consistent with the descriptive evidence examined in the previous section, households living in larger single-family units are more likely to experience a housing cost burden. The effect of the number of bedrooms on the odds of a severe housing cost burden is 1.8 times greater than the effect of number of bedrooms on the odds of any housing cost burden. Although households living in newer units are more likely to experience housing cost burdens, the magnitude of this effect is small compared with the effect of other housing unit characteristics. These findings should be confirmed with additional research that examines HCV use in different housing types.

We also find evidence of significant geographic variation in the odds of experiencing a housing cost burden. Consistent with the evidence presented in the previous section, households living in the South are more likely to experience a housing cost burden than those living in other regions. In contrast to the evidence in the previous section, households living in central cities are more likely to experience a housing cost burden, compared with those living in suburban areas. The evidence presented in table 4 also suggests that the influence of census tract characteristics on housing cost burden changes when controlling for other determinants of housing cost burden. We find that households living in census tracts with higher median rents, lower vacancy rates, and lower poverty rates are more likely to experience a housing cost burden, although these census tract-level effects are small compared to the influence of other factors.

Table 4. Factors Associated With the Odds of Any Housing Cost Burden and Severe Housing Cost Burden, 2015 (Base Model)

Category/Explanatory Variable	Any Cost Burden	Severe Cost Burden
Household characteristics		
Length of participation	– 0.000***	0.000***
Household size	– 0.281***	– 0.448***
Children	– 0.211***	– 0.221***
Female	0.117***	0.172***
Elderly	– 0.268***	– 0.622***
Disabled	– 0.086***	– 0.481***
Income at 10% or less than AMI	2.298***	7.028***
Income at 11–30% of AMI	1.644***	5.033***
Income at 31–50% of AMI	1.744***	3.440***
Income at 51–80% of AMI	1.596***	1.806***
Primarily wage	– 0.145***	– 0.376***
Non-White	0.079***	0.087***
Hispanic	0.041***	0.137***
Housing unit type		
Bedroom	0.456***	0.817***
Single-family	0.338***	0.300***
Building age	– 0.000***	– 0.000***
Geography		
Midwest	0.333***	0.170***
South	0.391***	0.394***
West	0.227***	0.219***
Central city	0.114***	0.120***
Suburb	0.029***	– 0.060***
Neighborhood characteristics		
Tract median rent	0.000***	0.001***
Tract vacancy	– 0.005***	– 0.006***
Tract poverty	– 0.004***	– 0.003***
Tract minority	– 0.001***	0.002***
Constant	– 2.648***	– 9.537***
Number of observations	1,697,242	1,697,242
Wald chi-square	88,679.65***	183,413.74***
Pseudo R^2	0.044	0.234

*** $p < 0.01$. ** $p < 0.05$. * $p < 0.1$.

AMI = Area Median Income.

Notes: Income more than 80% of AMI is omitted. Northeast is omitted. Rural is omitted.

Estimates of the impact of census tract minority percentage are comparable to those discussed in the previous section. In the descriptive analysis, census tract percentage of minority residents was not clearly related to the prevalence of any cost burden, but census tracts with a larger minority

percentage had a higher prevalence of severe cost burden, and the differences in severe cost burden between neighborhoods with low and high minority percentages have increased over time.

Taken together, the evidence suggests that some household characteristics, particularly race and income, possibly interact in more complex ways with geographic characteristics to shape housing cost burdens. For example, the housing cost burdens of non-White households living in neighborhoods with higher non-White percentages may reflect the influence of racial segregation on non-White households' housing options. To examine this conjecture, we examine the interaction between income, race, and census tract characteristics in table 5.

Table 5 suggests that residential segregation by race and income has an impact on the prevalence and severity of housing cost burden. Among non-White persons with the lowest household incomes (income 10 percent or less of AMI), higher census tract poverty rates do not significantly reduce cost burden despite the lower housing prices found in high-poverty areas. For non-White persons earning higher incomes, living in a high-poverty census tract lowers housing cost burden, and the magnitude of this effect increases with household income. This finding is expected, because higher income households face a potentially larger housing cost savings from living in neighborhoods likely to exhibit lower housing costs.

We also find that higher income non-White persons are more likely than White persons to experience a cost burden when living in census tracts with a higher percentage of non-White residents. The impact of census tract median rents on the cost burden experienced by non-White households is statistically significant in most models, but the magnitude of this effect is very small.

Taken together, these findings suggest that reductions in residential segregation by race and income segregation may improve housing affordability for HCV households, even if local rents change in response to household mobility. These results should be confirmed by a general equilibrium analysis that examines the simultaneous interaction among housing supply, household demand, and household mobility.

What are the income and cost burden levels of families at the time of their last recertification before exiting the program?

To address this question, we calculate the average housing cost burden upon entering and exiting the HCV program, for a subset of households from the cross-sectional files that exited the program between 2003 and 2015. As table 6 indicates, households' cost burdens, income, and rent differ little from program entry to exit, although rent and incomes have increased slightly, and exit is associated with a slightly higher cost burden. In a separate analysis not discussed in this report, we also examined housing cost burden by income at the time of last recertification before exiting the program. That analysis revealed that 65 percent of households experiencing housing cost burdens at the time of exit had extremely low incomes, and 97 percent of households with severe housing cost burdens upon exit had extremely low incomes.

Table 5. Factors Associated With the Odds of Any Housing Cost Burden and Severe Housing Cost Burden, 2015 (Income, Race*Census Tract Characteristics Interactions)

Category/Explanatory Variable	Any Cost Burden	Severe Cost Burden
Household characteristics		
Length of participation	– 0.000***	0.000***
Household size	– 0.283***	– 0.449***
Children	– 0.208***	– 0.222***
Female	0.119***	0.178***
Elderly	– 0.264***	– 0.619***
Disabled	– 0.082***	– 0.466***
Income at 10% or less than AMI	2.235***	7.371***
Income at 11–30% of AMI	1.647***	5.314***
Income at 31–50% of AMI	1.739***	3.704***
Income at 51–80% of AMI	1.533***	2.129***
Primarily wage	– 0.144***	– 0.379***
Non-White	0.089***	0.477***
Hispanic	0.058***	0.116***
Housing unit type		
Bedroom	0.457***	0.818***
Single-family	0.340***	0.305***
Building age	– 0.000***	– 0.000***
Geography		
Midwest	0.337***	0.162***
South	0.395***	0.388***
West	0.230***	0.209***
Central city	0.125***	0.115***
Suburb	0.038***	– 0.062***
Neighborhood characteristics		
Tract median rent	0.000***	0.001***
Tract vacancy	– 0.004***	– 0.004***
Tract poverty	– 0.002***	– 0.001***
Tract minority	– 0.002***	0.002***
Interaction terms (Race x income x neighborhood characteristics)		
Non-White x income at 10% or less than AMI x tract median rent	– 0.000***	– 0.000***
Non-White x income at 10% or less than AMI x tract vacancy	0.014***	0.014***
Non-White X income at 10% or less than AMI x tract poverty	0.000	0.000
Non-White X income at 10% or less than AMI x tract minority	0.002***	– 0.003***
Non-White X income at 11–30% of AMI x tract median rent	0.000***	– 0.000***
Non-White X income at 11–30% of AMI x tract vacancy	– 0.004***	– 0.019***
Non-White X income at 11–30% of AMI x tract poverty	– 0.002***	– 0.005***
Non-White X income at 11–30% of AMI x tract minority	0.001***	0.002***
Non-White X income at 31–50% of AMI x tract median rent	0.000***	– 0.000*
Non-White X income at 31–50% of AMI x tract vacancy	– 0.005***	– 0.037***
Non-White X income at 31–50% of AMI x tract poverty	– 0.006***	– 0.014***
Non-White X income at 31–50% of AMI x tract minority	0.001***	0.006***
Non-White X income at 51–80% of AMI x tract median rent	0.000***	– 0.000
Non-White X income at 51–80% of AMI x tract vacancy	– 0.002	– 0.047***
Non-White X income at 51–80% of AMI x tract poverty	– 0.011***	– 0.022**
Non-White X income at 51–80% of AMI x tract minority	0.004***	0.010***
Constant	– 2.674***	– 10.019***
Number of observations	1,697,242	1,697,242
Wald chi-square	90,313.88***	181,904.79***
Pseudo R ²	0.045	0.236

*** $p < 0.01$. ** $p < 0.05$. * $p < 0.1$.

AMI = Area Median Income.

Notes: Income more than 80% of AMI is omitted. Northeast is omitted. Rural is omitted.

Table 6. Descriptive Statistics for Households Upon HCV Program Entry and Exit

Number of households that received a voucher between 2003 and 2015	3,993,848
Number of households that exited the program between 2003 and 2015	1,964,144
Average length of program participation (years)	4.7
Average gross rent at beginning of the voucher contract (\$)	864.41
Average income at beginning of the voucher contract (\$)	13,359.82
Average cost burden at beginning of the voucher contract (%)	34.6%
Average gross rent at last recertification before program exit (\$)	876.06
Average income at last recertification before program exit (\$)	15,236.34
Average cost burden at last recertification before program exit (%)	35.2%

HCV = Housing Choice Voucher.

Tracking cohorts of voucher households over time, what was the duration of housing cost burden, and what were the potential causes of increased housing cost burden?

To address this research question and those that follow, we construct a longitudinal cohort-level file of HCV households that initially leased up in the year 2003 and track each household from this initial lease-up year until 2015 or exit from the program. We also construct a similar cohort-level file for HCV households that initially leased up in the year 2008 and track these households until 2015 or exit from the program. Two cohort years were chosen to determine if the dynamics of housing cost burden differ for those entering the program during the housing market upswing relative to the period immediately following the housing market bust. We construct a longitudinal file for households with multiple years of participation in the HCV program to examine how housing cost burdens have changed over time. To examine the duration and causes of increased housing cost burden (changes in income versus changes in rent), we examine tables that display, across different year-to-year periods, the percentage change in annual income versus the percentage change in gross rent, separately for households whose cost burden level increased (positive change in cost burden) and households whose cost burden level decreased (negative change in cost burden) over year-to-year periods.

Table 7 is based on the longitudinal cohort of HCV participants that initially leased up in 2003. Shown in table 7 are percentage changes in gross rent and annual income for households experiencing different cost burden trajectories (positive versus negative changes in cost burden). Households are further differentiated by their housing cost burden status at the end of each year. Table 8 displays the same information for the longitudinal cohort of HCV participants that initially leased up in 2008. Rent and income were calculated in 2015 dollar values using CPI-U city average series for all items, not seasonally adjusted, provided by the U.S. Bureau of Labor Statistics.

Table 7. Percent Change in Housing Cost Burden for HCV Households by Change in Rent and Change in Income (Leased Up in 2003)

	Year											
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
HCV households that leased up in 2003	153,500	129,272	113,266	100,383	90,786	82,077	76,456	71,630	66,734	62,750	58,986	55,423
Mean rent burden (%)	34.7	35.8	36.2	35.3	34.6	34.9	35.1	35.6	35.9	36.4	37.1	36.6
Mean gross rent (\$)	1,007	1,013	1,027	1,047	1,053	1,091	1,096	1,087	1,083	1,085	1,084	1,100
Mean income (\$)	13,324	13,732	14,120	14,444	14,286	14,620	14,416	14,017	13,982	14,110	14,178	14,627
HCV households that reduced rent burden	63,642	43,854	44,781	47,751	44,594	35,941	28,260	25,227	27,501	27,145	25,051	24,525
Change in rent burden (%)	-6.3	-8.4	-9.5	-10.1	-8.3	-7.0	-8.4	-8.5	-7.2	-7.2	-7.3	-9.9
Change in gross rent (%)	-1.0	-2.5	-1.1	-0.6	-1.3	2.1	-1.6	-2.7	-2.1	-1.4	-1.6	-0.3
Change in income (%)	110.3	138.0	134.4	150.6	114.0	139.5	174.4	68.6	45.7	99.5	90.0	202.8
No rent burden	45,660	29,319	30,600	32,216	32,561	26,352	18,879	16,635	17,889	17,890	16,019	14,511
Change in rent burden (%)	-5.2	-6.5	-7.2	-8.0	-6.1	-4.9	-6.2	-6.3	-5.0	-5.3	-5.0	-7.5
Change in gross rent (%)	-0.8	-2.5	-1.0	-0.5	-1.1	2.4	-1.2	-2.5	-1.8	-1.0	-1.2	0.0
Change in income (%)	122.8	108.7	115.9	179.4	94.3	79.5	190.1	85.3	47.9	90.7	56.7	247.0
Rent burden	17,982	14,535	14,181	15,535	12,033	9,589	9,381	8,592	9,612	9,255	9,032	10,014
Change in rent burden (%)	-9.2	-12.2	-14.4	-14.5	-14.2	-12.8	-12.9	-12.6	-11.4	-11.0	-11.3	-13.5
Change in gross rent (%)	-1.4	-2.5	-1.2	-0.8	-1.8	1.4	-2.3	-3.3	-2.7	-2.0	-2.2	-0.9
Change in income (%)	78.5	197.2	174.2	90.9	167.3	304.4	142.9	36.3	41.8	116.4	149.0	138.7
Severe rent burden	736	1,034	1,182	1,336	1,125	912	906	973	1,104	1,130	1,206	1,298
Change in rent burden (%)	-17.2	-16.5	-16.6	-15.9	-15.9	-14.5	-14.9	-14.7	-12.6	-12.4	-12.5	-14.7
Change in gross rent (%)	-0.3	-2.3	-0.9	0.4	1.0	2.0	-1.6	-2.9	-1.8	-1.5	-1.9	-1.1
Change in income (%)	163.2	97.2	372.1	41.2	156.4	1,055.0	34.1	43.3	35.0	57.0	66.6	790.3
HCV households that increased rent burden	63,105	54,247	41,944	33,341	28,978	30,597	28,635	26,856	29,225	26,084	25,579	22,894
Change in rent burden (%)	16.0	17.4	19.5	16.5	14.5	14.5	15.3	15.9	13.4	15.0	16.0	13.7
Change in gross rent (%)	2.9	3.0	5.3	8.1	4.3	7.1	2.3	0.8	1.0	1.2	1.1	3.0
Change in income (%)	7.7	6.5	6.8	5.0	3.0	7.2	1.6	0.6	3.4	2.7	3.0	4.4
No rent burden	28,839	24,148	15,446	15,841	14,860	15,275	14,234	11,587	14,872	11,899	10,521	11,239
Change in rent burden (%)	0.3	0.9	1.0	1.4	0.7	0.5	0.7	0.2	0.8	0.2	0.3	0.2
Change in gross rent (%)	0.5	1.4	3.8	4.5	1.8	4.4	0.8	-1.1	-0.3	-0.1	0.0	1.4
Change in income (%)	16.8	13.0	14.0	12.2	9.5	13.9	8.3	9.8	11.1	9.1	9.2	11.9
Rent burden	34,266	30,099	26,498	17,500	14,118	15,322	14,401	15,269	14,353	14,185	15,058	11,655
Change in rent burden (%)	29.1	30.6	30.3	30.1	29.0	28.6	29.7	27.9	26.5	27.5	27.0	26.7
Change in gross rent (%)	4.9	4.2	6.2	11.4	7.0	9.7	3.9	2.1	2.4	2.3	1.9	4.5
Change in income (%)	0.0	1.3	2.5	-1.4	-3.9	0.6	-5.1	-6.4	-4.5	-2.7	-1.3	-2.8
Severe rent burden	6,185	5,793	5,403	3,803	2,830	2,962	3,085	3,288	3,087	3,273	3,512	2,687
Change in rent burden (%)	97.3	89.7	82.0	78.9	82.3	83.4	87.0	76.7	73.0	69.8	69.8	69.1
Change in gross rent (%)	4.4	2.2	3.9	6.1	4.7	7.6	2.0	0.4	1.5	1.0	0.9	2.9
Change in income (%)	-32.1	-23.8	-22.2	-28.0	-31.5	-26.5	-25.9	-26.2	-26.5	-19.9	-20.7	-23.4

HCV = Housing Choice Voucher.

Table 8. Percent Change in Housing Cost Burden for HCV Households by Change in Rent and Change in Income (Leased Up in 2008)

	Year						
	2009	2010	2011	2012	2013	2014	2015
HCV households that leased up in 2008	145,861	128,713	115,139	103,651	94,974	87,304	80,201
Mean rent burden (%)	34.8	35.1	35.6	35.8	36.1	36.8	36.2
Mean gross rent (\$)	967	986	989	993	1,001	1,005	1,025
Mean income (\$)	13,273	13,257	13,060	13,181	13,423	13,562	14,057
HCV households that reduced rent burden	65,619	48,858	41,371	42,736	41,960	36,407	35,809
Change in rent burden (%)	- 7.0	- 9.1	- 9.0	- 8.0	- 7.8	- 7.6	- 9.8
Change in gross rent (%)	2.2	- 1.4	- 2.5	- 1.9	- 1.1	- 1.5	- 0.1
Change in income (%)	98.9	111.2	112.1	144.4	36.7	196.3	471.0
No rent burden	46,762	32,322	27,163	27,371	28,041	23,548	21,752
Change in rent burden (%)	- 5.8	- 7.3	- 7.1	- 6.0	- 5.9	- 5.4	- 7.5
Change in gross rent (%)	2.3	- 1.2	- 2.3	- 1.6	- 0.8	- 1.1	0.3
Change in income (%)	91.6	145.4	123.2	143.7	31.0	191.9	226.1
Rent burden	18,857	16,536	14,208	15,365	13,919	12,859	14,057
Change in rent burden (%)	- 9.9	- 12.6	- 12.7	- 11.5	- 11.7	- 11.5	- 13.4
Change in gross rent (%)	1.8	- 1.8	- 2.8	- 2.4	- 1.6	- 2.1	- 0.7
Change in income (%)	116.9	44.6	90.9	145.7	48.3	204.2	850.1
Severe rent burden	623	1,026	1,154	1,346	1,368	1,348	1,523
Change in rent burden (%)	- 16.9	- 16.7	- 16.7	- 14.7	- 14.2	- 13.1	- 15.2
Change in gross rent (%)	3.0	- 1.4	- 2.0	- 1.8	- 1.4	- 1.5	- 0.9
Change in income (%)	447.6	128.9	42.4	357.3	50.4	56.0	784.5
HCV households that increased rent burden	57,583	48,008	44,296	44,607	38,470	38,232	32,733
Change in rent burden (%)	16.9	16.9	17.7	14.5	15.7	16.0	13.6
Change in gross rent (%)	5.7	3.0	1.5	1.1	1.6	1.2	3.2
Change in income (%)	7.2	3.0	0.8	2.4	2.7	2.1	5.3
No rent burden	25,842	22,003	17,907	21,817	17,068	15,906	15,698
Change in rent burden (%)	0.2	0.9	0.7	1.0	0.3	0.2	0.3
Change in gross rent (%)	3.4	1.2	- 0.1	- 0.4	0.2	0.0	1.7
Change in income (%)	16.9	12.2	10.8	9.4	10.6	9.8	12.9
Rent burden	31,741	26,005	26,389	22,790	21,402	22,326	17,035
Change in rent burden (%)	30.5	30.5	29.2	27.4	27.9	27.1	25.9
Change in gross rent (%)	7.6	4.5	2.6	2.5	2.7	2.0	4.6
Change in income (%)	- 0.8	- 4.8	- 5.9	- 4.2	- 3.6	- 3.5	- 1.7
Severe rent burden	5,892	5,071	5,275	4,550	4,525	4,836	3,592
Change in rent burden (%)	100.3	97.3	89.4	82.1	78.3	75.8	73.3
Change in gross rent (%)	6.1	3.1	1.4	1.5	1.4	1.0	3.0
Change in income (%)	- 36.3	- 31.8	- 30.6	- 30.3	- 24.8	- 23.8	- 26.1

HCV = Housing Choice Voucher.

Tables 7 and 8 reveal additional insights into the dynamics of housing cost burden. Across most periods, households that reduced their housing cost burden saw small percentage declines in rent along with much larger percentage increases in income. Note that between 2014 and 2015, households that saw reductions in rent burden saw an average income increase of more than 200 percent compared with rent declines of less than 1 percent. Comparatively, households that saw increases in rent burden experienced declines or small increases in income that were not large enough to offset proportionately larger increases in rent. Of particular importance, households that experienced increased housing cost burden and became or remained severely cost burdened at the end of each period experienced large decreases in income (more than 20 percent in every period) while also experiencing an increase in rent. These trends are roughly the same for those that entered the HCV program in 2008.

Taken together, tables 7 and 8 suggest that changes in income play a proportionately larger role than changes in rent in altering a household's housing cost burden trajectory. This is an important finding, because it suggests that adjustments to HAPs on annual reexaminations may not be sufficiently keeping pace with changing housing cost burdens. This finding also suggests that housing options that also improve households' access to employment prospects and earning potential can foster large gains in housing affordability, even if rents are higher in those locations, as long as tenant rent is not increased proportionally to rising income. This finding also suggests that policy arenas that typically lie outside the domain of housing, such as workforce development, can go a long way toward lowering housing cost burden for HCV recipients.

Are there typical, longitudinal trajectories of housing cost burdens experienced by individual HCV households or clusters of households, and are such trajectories associated with length of program participation?

This analysis relies on the same 2003 and 2008 cohort files used to address research question 5. For this analysis, we construct indicators of whether, in a given year, a household has moved since the previous year. This analysis enables us to compare the longitudinal trajectories of renters who remained in their existing dwellings with those of renters who moved from their initial dwelling. We also examine the trajectories since initial lease up of renters who exit the program. These files are used to calculate several descriptive statistics.

For all households, we calculate—

- Average total duration (years).
- Average duration in rent burden (years), separately for all households and households that have ever experienced a rent burden.
- Average duration in severe rent burden (years), separately for all households and households that have ever experienced a rent burden.
- Percentage that are rent burdened at beginning of the voucher contract.
- Percentage that are severely rent burdened at beginning of the voucher contract.
- Percentage that are rent burdened at least 1 year.

- Percentage that are severely rent burdened at least 1 year.
- Percentage that are rent burdened consecutively during the voucher contract.
- Percentage that are severely rent burdened consecutively during the voucher contract.

For the subsample of households that exited the HCV program during the analysis period, we also calculate—

- Percentage that are rent burdened at the time of last recertification before exiting the program.
- Percentage that are severely rent burdened at the time of last recertification before exiting the program.

For the subsample of households that moved at least once during the analysis period, we also calculate—

- Average number of moves.
- Percentage that reduced rent burden upon mobility.
- Percentage that reduced rent burden upon mobility and became not burdened.
- Percentage that reduced severe rent burden upon mobility and became not burdened.
- Percentage that reduced severe rent burden upon mobility and became burdened.
- Percentage that increased rent burden upon mobility.
- Percentage that became rent burdened upon mobility.
- Percentage that became severely rent burdened upon mobility.
- Percentage that increased rent burden upon mobility and became severely rent burdened.

Table 9 reports each of these longitudinal statistics for the two cohorts of HCV participants: households that initially leased a unit in 2003 and households that initially leased a unit in 2008. We report separate statistics for households that exited the program before 2015 and households that moved from their initial residential location.

On average, households that initially leased a unit in 2003 participated in the HCV program for about 6 years. Households that leased up in 2008 participated for about 5 years, although this shorter duration likely reflects the shorter observational period for the 2008 cohort. Despite these differences, both cohorts exhibit an average rent-burden duration of about 2 years and spend less than 1 year on average in a severely cost-burdened state. Among the HCV households that have ever experienced any rent burden, those entering the program in 2003 spend an average of about 4 years in a rent-burdened state, and those entering the program in 2008 spend an average of about 3 years in a rent-burdened state.

Table 9. Longitudinal Statistics for HCV Households, 2003 and 2008 Cohorts

Category/Explanatory Variable	Leased a Unit in 2003	Leased a Unit in 2008
All HCV households	204,213	176,949
Average total duration (years)	6.3	5.3
Average duration in rent burden (years)	2.4	2.1
Average duration in rent burden (HCV households have ever experienced rent burden only)	3.7	3.3
Average duration in severe rent burden (years)	0.4	0.3
Average duration in severe rent burden (HCV households have ever experienced severe rent burden only)	2.1	1.9
Percent rent burdened at beginning of the voucher contract	37.3	39.6
Percent severely rent burdened at beginning of the voucher contract	3.1	3.0
Percent rent burdened at least 1 year	64.3	62.8
Percent severely rent burdened at least 1 year	18.0	16.3
Percent rent burdened consecutively during the voucher contract	16.4	17.3
Percent severely rent burdened consecutively during the voucher contract	0.9	0.7
All HCV households who exited the program	121,132	82,526
Average total duration (years)	4.5	3.4
Average duration in rent burden (years)	1.8	1.4
Average duration in rent burden (HCV households have ever experienced rent burden only)	2.8	2.4
Average duration in severe rent burden (years)	0.3	0.2
Average duration in severe rent burden (HCV households have ever experienced severe rent burden only)	1.7	1.5
Percent rent burdened at the time of last recertification before exiting the program	42.9	40.9
Percent severely rent burdened at the time of last recertification before exiting the program	6.2	5.8
All HCV households who moved since initial lease up	39,092	30,348
Average number of moves	1.4	1.3
Average total duration (years)	9.3	6.8
Average duration in rent burden (years)	3.7	2.9
Average duration in rent burden (HCV households have ever experienced rent burden only)	4.4	3.6
Average duration in severe rent burden (years)	0.6	0.5
Average duration in severe rent burden (HCV households have ever experienced severe rent burden only)	2.2	1.8
Percent who reduced rent burden upon mobility	42.5	42.2
Average change in income upon mobility (\$)	1,026	990
Percent who reduced rent burden upon mobility and became not burdened (burden $\geq$ no burden)	15.4	15.9
Percent who reduced severe rent burden upon mobility and became not burdened (severe burden $\geq$ no burden)	2.3	2.4
Percent who reduced severe rent burden upon mobility and became burdened (severe burden $\geq$ burden)	3.6	3.4
Percent who increased rent burden upon mobility	45.5	45.5
Average change in income upon mobility (\$)	506	389
Percent who became rent burdened upon mobility (no burden $\geq$ burden)	21.8	21.4
Percent who became severely rent burdened upon mobility (no burden $\geq$ severe burden)	1.0	1.0
Percent who increased rent burden upon mobility and became severely burdened (burden $\geq$ severe burden)	1.4	1.4

HCV = Housing Choice Voucher.

Although more than 60 percent of households experience no cost burden upon entering the HCV program, a substantial share (37 percent in 2003 and 40 percent in 2008) experience some level of cost burden, and about 3 percent experience severe cost burdens. Because program rules preclude households from spending more than 40 percent of their income on rent at the time of lease up, this latter percentage suggests that either some PHAs are not adequately monitoring compliance with the program rules or some HCV households spend more on utilities beyond what their utility allowance covers.

Across most statistics, the differences between the 2003 and 2008 cohort are small, which suggests that overall housing market conditions had little influence on the trajectory of those entering the program at different points in the housing market cycle. Given this, the remainder of this discussion focuses on the 2003 cohort, for which we have data over a longer observational period. For these households, 64 percent experienced a cost burden of at least 1 year, and 16 percent experienced cost burdens throughout their duration of tenure in the HCV program. Notably, 18 percent of households experienced at least 1 year of severe cost burden.

The middle portion of table 9 examines similar trajectories for households that exited the program to determine if length of program participation plays a role in the trajectories observed. Households that exit the HCV program tend to spend less time in a cost-burdened state, but, as a ratio of the total average duration spent in the program, those that exit spend about the same average proportion of time in a rent-burdened state as all HCV households (38 percent). Of those that exit the program, about 43 percent are cost burdened upon exiting the program, and 6 percent are severely cost burdened. This percentage is twice as high as the percentage of those that enter the program and incur a severe cost burden upon initially leasing a unit.

The bottom portion of table 9 describes various transitions between different levels of cost burden upon residential mobility. The most noteworthy finding is that, among the 39,092 (19 percent) of households that leased up in 2003 and moved at some point later in their HCV tenure, households were more likely to transition from not experiencing a cost burden to experiencing it upon mobility (22 percent), compared with initially experiencing a cost burden but no longer experiencing it upon mobility (15 percent). This finding suggests that households that move may be more likely to do so in order to occupy larger units or units in more expensive neighborhoods. Again, income changes seem to play an important role in reducing housing cost burden upon mobility. Among households with rent burden that declined upon mobility, the average change in income was more than \$1,000.

Do households accept high housing cost burdens to maintain stability in a unit?

Households may accept high rent burdens to live in high-amenity neighborhoods that are closer to work, particularly if few housing options in the surrounding housing market offer comparable amenities at a lower cost. To examine how households' acceptance of higher cost burdens upon initial lease up influences their cost burden trajectories over time, while also examining the impact of housing options in the surrounding market, we calculate similar longitudinal statistics to those used to address question 6, emphasizing how households' trajectories differ with respect to: (1) initially renting a unit above or below the local payment standard, (2) the Fair Market

Rent (FMR) for the surrounding area, and (3) the percentage of census tracts where HCV households reside where median rents are above the FMR. Whereas the second variable controls for the average level of housing costs within the region, the third variable reflects the range of neighborhoods where HCV households can use their voucher without likely having to pay a rent that is higher than the payment standard. Due to the small number of census tracts in many rural counties, the second variable is calculated only for households living in U.S. metropolitan areas (Core Based Statistical Areas, including metropolitan and micropolitan areas).

To determine how households' longitudinal trajectories are influenced by the decision to initially live in a more expensive housing unit, table 10 displays the same longitudinal information from the previous analysis, focusing on the comparison between households initially renting a unit above the payment standard and households initially renting a unit at or below the payment standard. Because no large differences emerged in findings between the 2003 and 2008 cohorts, table 10 focuses only on the 2003 cohort. Appendix table A11 displays comparable information for the 2008 cohort.

It is useful to further elaborate on the significance of the comparison between households renting units above and below the payment standard. If gross rent is equal to or lower than the payment standard, then rent burden is simply equal to total tenant payment divided by income. In this case, TTP is usually equal to 30 percent of a household's adjusted monthly income, so the rent burden would be 30 percent or below in this case, regardless of the level of the payment standard. However, if rent increases at the same time that income declines, and after the change, rent becomes higher than the payment standard, HCV households might experience an increase in rent burden, because the HAP is not sufficient to reduce a household's cost burden to 30 percent. If gross rent is higher than the payment standard, rent burden is equal to $([\text{gross rent} - \text{payment standard} + \text{TTP}] / \text{income})$. If rent increases and income declines, rent burden will always increase unless the payment standard is set higher than the newly increased rent. These relationships suggest that the level of the payment standard interacts with income and rent to jointly influence housing cost burden.

Approximately 36 percent (73,045) of households initially leasing a unit in 2003 leased a unit with a rent above the payment standard. Of these households, 95 percent were cost-burdened upon lease up, and 43 percent remained cost-burdened throughout the analysis period. By comparison, only 5 percent of households leasing a unit below the payment standard were cost-burdened upon lease up, and only 2 percent of these households experienced housing cost burden throughout the analysis period. Households leasing a unit above the payment standard also exhibited longer cost burden durations, were more likely to exhibit severe cost burdens, and were more likely to exhibit a cost burden upon exiting the program. Households initially living in a high-cost unit were also more likely to exhibit a lower cost burden upon residential mobility. An interesting comparison is how initially living in high-cost versus low-cost units affects changes in cost burden state for households that move. Whereas households living in low-cost units were more likely to transition from not having a cost burden to having one upon mobility, those living in high-cost units were more likely to transition from having a cost burden to not having one. These trends suggest that HCV households are sensitive to housing cost and will adjust housing to the extent possible to reduce their cost burdens.

Table 10: Longitudinal Statistics by Initial Rent Payment, 2003 HCV Cohort

Category/Explanatory Variable	Rent ≤ Payment Standard	Rent > Payment Standard
All HCV households	131,168	73,045
Average total duration (years)	6.4	6.1
Average duration in rent burden (years)	1.7	3.8
Average duration in rent burden (HCV households have ever experienced rent burden only)	3.4	3.9
Average duration in severe rent burden (years)	0.4	0.5
Average duration in severe rent burden (HCV households have ever experienced severe rent burden only)	2.1	2.1
Percent rent burdened at beginning of the voucher contract	5.3	94.7
Percent severely rent burdened at beginning of the voucher contract	2.6	4.1
Percent rent burdened at least 1 year	46.1	97.0
Percent severely rent burdened at least 1 year	15.4	22.6
Percent rent burdened consecutively during the voucher contract	1.7	42.7
Percent severely rent burdened consecutively during the voucher contract	0.6	1.4
All HCV households who exited the program	75,808	45,324
Average total duration (years)	4.6	4.4
Average duration in rent burden (years)	1.1	2.9
Average duration in rent burden (HCV households have ever experienced rent burden only)	2.6	3.0
Average duration in severe rent burden (years)	0.2	0.3
Average duration in severe rent burden (HCV households have ever experienced severe rent burden only)	1.7	1.8
Percent rent burdened at the time of last recertification before exiting the program	24.9	73.0
Percent severely rent burdened at the time of last recertification before exiting the program	5.0	8.4
All HCV households who moved since initial lease up	25,853	13,239
Average number of moves	1.4	1.4
Average total duration (years)	9.3	9.1
Average duration in rent burden (years)	3.0	5.2
Average duration in rent burden (HCV households have ever experienced rent burden only)	3.9	5.2
Average duration in severe rent burden (years)	0.6	0.7
Average duration in severe rent burden (HCV households have ever experienced severe rent burden only)	2.2	2.2
Percent who reduced rent burden upon mobility	37.7	51.8
Average change in income upon mobility (\$)	1,059	974
Percent who reduced rent burden upon mobility and became not burdened (burden ≥ no burden)	11.2	23.7
Percent who reduced severe rent burden upon mobility and became not burdened (severe burden ≥ no burden)	2.3	2.4
Percent who reduced severe rent burden upon mobility and became burdened (severe burden ≥ burden)	2.7	5.2
Percent who increased rent burden upon mobility	47.5	41.5
Average change in income upon mobility (\$)	620	254
Percent who became rent burdened upon mobility (no burden ≥ burden)	24.6	16.2
Percent who became severely rent burdened upon mobility (no burden ≥ severe burden)	1.3	0.4
Percent who increased rent burden upon mobility and became severely burdened (burden ≥ severe burden)	1.3	1.7

HCV = Housing Choice Voucher.

Table 11 examines how conditions in the surrounding housing market influence household trajectories over time. We examine two indicators of housing market conditions: FMR for the surrounding metropolitan housing market and the percentage of census tracts within the surrounding metropolitan area where HCV households reside that have median rents above the FMR. Again, due to the similarity in results between the 2003 and 2008 cohort, table 11 emphasizes only results for the 2003 cohort. Refer to Appendix table A12 for comparable results for the 2008 cohort.

The proportion of HCV households experiencing a cost burden upon lease up and the proportion of HCV households that are rent burdened throughout their participation in the HCV program are inversely associated with FMR. This counterintuitive finding is likely explained by the relatively higher cost burdens found in rural areas over the majority of the analysis period.

The second set of columns in table 11 focuses in those living in metropolitan and micropolitan areas only, placing emphasis on the degree of choice across neighborhoods in those areas. Generally, HCV recipients living in metropolitan areas with fewer census tracts with median rents below the FMR are more likely to be cost-burdened at the beginning of the voucher contract, cost-burdened at least 1 year, cost-burdened consecutively throughout the contract period, and cost-burdened when leaving the HCV program. Affordable housing choice also plays a role in households' mobility over time. Whereas 17,067 households living in areas with greater choice moved since lease up, only 10,314 households living in areas with fewer choices moved since lease up. Taken together, these results point to the importance of neighborhood options in helping HCV households to alleviate housing cost burdens.

Table 11: Longitudinal Statistics for HCV Households That Leased a Unit in 2003 (Market Characteristics)

Category/Explanatory Variable	FMR			Percent of Tracts With Rents Above FMR		
	< 600	600–850	> 850	< 40%	40–55%	> 55%
All HCV households	81,107	62,827	58,976	72,246	56,373	59,096
Average total duration (years)	5.1	6.4	7.8	7.0	6.5	5.7
Average duration in rent burden (years)	2.2	2.6	2.5	2.4	2.5	2.6
Average duration in rent burden (HCV households have ever experienced rent burden only)	3.3	3.9	4.0	3.8	3.8	3.6
Average duration in severe rent burden (years)	0.3	0.4	0.5	0.5	0.4	0.4
Average duration in severe rent burden (HCV households have ever experienced severe rent burden only)	2.0	2.1	2.3	2.3	2.1	2.0
Percent rent burdened at beginning of the voucher contract	46.2	34.2	28.6	29.1	33.6	48.9
Percent severely rent burdened at beginning of the voucher contract	3.9	2.6	2.5	3.6	1.9	3.3
Percent rent burdened at least 1 year	65.9	64.4	62.5	60.6	63.1	70.8
Percent severely rent burdened at least 1 year	16.1	19.0	19.4	19.1	17.6	18.2
Percent rent burdened consecutively during the voucher contract	23.9	13.8	8.8	11.2	13.6	22.9
Percent severely rent burdened consecutively during the voucher contract	1.4	0.6	0.5	0.9	0.5	1.1
All HCV households who exited the program	60,214	36,586	23,509	37,940	30,048	40,208
Average total duration (years)	4.1	4.7	5.6	5.0	4.7	4.3
Average duration in rent burden (years)	1.8	1.8	1.7	1.7	1.8	1.9
Average duration in rent burden (HCV households have ever experienced rent burden only)	2.7	3.0	3.0	3.0	2.9	2.8
Average duration in severe rent burden (years)	0.2	0.3	0.3	0.3	0.2	0.3
Average duration in severe rent burden (HCV households have ever experienced severe rent burden only)	1.7	1.8	1.9	1.9	1.7	1.7
Percent rent burdened at the time of last recertification before exiting the program	48.4	40.8	32.4	36.4	40.3	49.7
Percent severely rent burdened at the time of last recertification before exiting the program	6.5	6.2	5.7	6.3	5.7	6.5
All HCV households who moved since initial lease-up	13,406	13,579	11,890	17,067	9,849	10,314
Average number of moves	1.5	1.5	1.4	1.5	1.4	1.5
Average total duration (years)	8.5	9.3	10.1	9.6	9.2	8.9
Average duration in rent burden (years)	3.7	4.0	3.4	3.4	3.8	4.2
Average duration in rent burden (HCV households have ever experienced rent burden only)	4.3	4.7	4.3	4.2	4.6	4.7
Average duration in severe rent burden (years)	0.6	0.7	0.6	0.7	0.6	0.6
Average duration in severe rent burden (HCV households have ever experienced severe rent burden only)	2.1	2.2	2.2	2.3	2.1	2.1
Percent who reduced rent burden upon mobility	41.4	43.6	42.5	41.4	42.9	44.1
Average change in income upon mobility (\$)	1,007	1,109	925	1,040	945	1,072
Percent who reduced rent burden upon mobility and became not burdened (burden -> no burden)	15.5	16.5	14.2	14.6	15.6	16.7
Percent who reduced severe rent burden upon mobility and became not burdened (severe burden -> no burden)	2.3	2.4	2.3	2.4	2.2	2.4
Percent who reduced severe rent burden upon mobility and became burdened (severe burden -> burden)	3.5	4.2	2.9	3.2	3.6	4.4
Percent who increased rent burden upon mobility	44.8	46.6	45.4	45.4	44.9	46.7
Average change in income upon mobility (\$)	412	647	428	488	560	498
Percent who became rent burdened upon mobility (no burden -> burden)	21.1	24.4	19.8	20.5	22.4	23.9
Percent who became severely rent burdened upon mobility (no burden -> severe burden)	1.3	1.0	0.8	1.3	0.8	0.9
Percent who increased rent burden upon mobility and became severely burdened (burden -> severe burden)	1.9	1.3	1.1	1.7	0.8	1.5

FMR = Fair Market Rent. HCV = Housing Choice Voucher.

Note: Rural areas excluded in calculation of percentage of tracts with rents above FMR.

Conclusion

We conclude with a recap of the report's most important findings.

Findings

- ***The percentage of HCV households experiencing a housing cost burden has fluctuated over time.***

The number and share of HCV households experiencing a housing cost burden has increased since 2003, and the year-to-year trend in HCV cost burden roughly corresponds to the recent housing market boom/bust cycle. Despite this overall trend, when we compare households that lease up during the housing market upswing with those that lease up during the bottom of the housing market cycle, longitudinal trajectories are remarkably similar for these two cohorts. The difference between cross-sectional comparisons across years and the longitudinal findings suggests that households are slow to adjust to changing housing market conditions, once a unit has been secured. A lack of housing choice in neighborhoods where units can be rented below the FMR reduces the likelihood that households will move for the purpose of reducing housing costs.

- ***HCV housing cost burdens persist over time and are not always reduced by residential mobility.***

Among households entering the program in 2003, 64 percent experienced a cost burden of at least 1 year, 16 percent experienced cost burdens throughout their duration of tenure in the HCV program, and 18 percent experienced at least 1 year of severe cost burden. Households that moved from their initial neighborhoods were more likely to become cost burdened than to eliminate cost burden on mobility. On the other hand, households initially living in high-cost units were more likely to transition from having a cost burden to not having one. These findings suggest that, although some households that move may be more likely to do so in order to consume larger units or units in more expensive neighborhoods, HCV households are sensitive to housing cost and will adjust housing to the extent possible to reduce their cost burdens.

- ***The prevalence of housing cost burden declines dramatically with income.***

The gap in housing cost burden between those earning the highest and lowest incomes has grown over time. Generally speaking, changes in income play a proportionately larger role than changes in rent in explaining these trends. Across most periods studied, households that reduced their housing cost burden saw small percentage declines in rent, along with much larger percentage increases in income. Comparatively, households that saw increases in rent burden experienced declines or small increases in income that were not large enough to offset proportionately larger increases in rent. These trends are roughly the same for those that entered the HCV program in 2008, suggesting that housing market dynamics played a less significant role in shaping the long-term dynamics of households' cost burden trajectories.

- ***The prevalence and severity of housing cost burden varies by length of program participation, household composition, and demographic characteristics.***

By 2015, households that had been in the HCV program for longer periods of time were more likely to have more severe cost burdens. Across most years, single-person households were less likely than larger households to exhibit severe housing cost burdens. Households headed by females, nonelderly persons, non-Hispanic Black persons, and persons that did not have a disability were more likely to exhibit severe housing cost burdens.

- ***Households living in larger single-family homes are more likely to exhibit housing cost burdens than those living in other types of housing.***

By 2015, 12 percent of those living in homes with three or more bedrooms experienced a severe cost burden, whereas only 5 percent of those living in studio apartments experienced a severe cost burden. The prevalence of cost burden was highest for households living in single-family homes, second highest for those living in multifamily homes, and lowest for those living in other housing types. In all years, households living in single-family homes have consistently been more likely to exhibit severe housing cost burdens, even though the percentage of HCV households living in single-family homes has declined over time.

- ***The geography of housing cost burden is uneven.***

Housing cost burdens have been most prevalent in the South and least prevalent in the Northeast. Trends in rural areas relative to central cities and suburban areas fluctuated over the analysis period. During the housing boom, rural areas saw the highest housing cost burdens. When the market fell into decline, cost burdens fell in all areas, but as the market began to recover, severe cost burdens rose in metropolitan areas, due largely to the relative increase in housing cost burdens within suburban areas. Trends at the census tract level have also varied over time. Across all years, households living in census tracts with the lowest median rents were the most likely to exhibit severe cost burdens, although the gap between the most expensive and least expensive census tracts has narrowed since 2006. Until 2005, the differences in prevalence of severe housing cost burden by census tract minority percentage were small, but over time, households living in census tracts with a larger minority percentage have experienced an increasingly higher incidence of severe cost burden, and the differences in severe cost burden between neighborhoods with low and high minority percentages have increased over time. Our findings also suggest that residential segregation by race and income shape the prevalence and severity of housing cost burden.

- ***Payment standards play an important role in shaping households' housing cost burden trajectories.***

Local PHAs have discretionary authority to set payment standards at 90 to 110 percent of FMR, but payment standards above 110 percent of FMR must be approved by HUD. If FMRs rise, PHAs may elect not to change payment standards as long as the payment standard remains between 90 and 110 percent of the FMR. Since households must cover the proportion of rent that lies above the payment standard, failing to adjust payment standards to reflect rising market rents may place an undue housing cost burden on low-

income voucher recipients. We find that renting a unit above the payment standard is strongly associated with the prevalence of housing cost burden. Those leasing a unit above the payment standard exhibited longer cost burden durations, were more likely to exhibit severe cost burdens, and were more likely to exhibit a cost burden upon exiting the program.

- ***Housing markets that provide greater affordable housing choice enable HCV households to reduce housing cost burdens over time.***

HCV recipients living in metropolitan areas with fewer affordable neighborhoods are more likely to be cost-burdened at the beginning of the voucher contract, cost-burdened at least 1 year, cost-burdened consecutively throughout the contract period, and cost-burdened when leaving the HCV program. Affordable housing choice also plays a role in households' mobility over time. Whereas 17,067 households living in areas with greater choice moved since lease up, only 10,314 households living in areas with fewer choices moved since lease up. These trends appear to interact with metropolitan levels of racial segregation. Taken together, these results point to the importance of local government policies that encourage affordable rental housing development and neighborhood options in helping HCV households to alleviate housing cost burdens.

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Appendix

Table A1. HCV Households Included and Excluded From Analyses

Year	HCV Households Excluded From Analyses	Total Included (TBV recipients with income above \$0 administered by non-MTW agencies)
2003	418,627	1,613,348
2004	442,032	1,602,917
2005	503,394	1,589,316
2006	577,068	1,675,208
2007	535,958	1,709,899
2008	532,131	1,740,256
2009	533,377	1,733,080
2010	501,353	1,741,422
2011	463,472	1,750,422
2012	420,299	1,746,608
2013	452,187	1,707,830
2014	456,106	1,705,190
2015	481,036	1,728,756

HCV = Housing Choice Voucher. MTW = Moving to Work. TBV = tenant-based voucher.

Table A2. HCV Households by Extent of Housing Cost Burden, 2003–2015

Year	No Cost Burden (30% or Less)	Any Cost Burden (31% or More)	Moderate Cost Burden (31–40%)	High Cost Burden (41–50%)	Severe Cost Burden (51% or More)	Total
2003	1,095,683	517,665	360,794	78,500	78,371	1,613,348
2004	1,011,929	590,988	400,695	95,364	94,929	1,602,917
2005	904,844	684,472	447,381	117,583	119,508	1,589,316
2006	909,791	765,417	496,044	134,108	135,265	1,675,208
2007	999,470	710,429	473,754	116,054	120,621	1,709,899
2008	1,095,772	644,484	435,053	101,988	107,443	1,740,256
2009	1,066,702	666,378	440,855	110,858	114,665	1,733,080
2010	1,070,330	671,092	444,345	109,283	117,464	1,741,422
2011	1,033,761	716,661	460,935	123,229	132,497	1,750,422
2012	986,171	760,437	490,866	130,585	138,986	1,746,608
2013	952,359	755,471	472,499	136,247	146,725	1,707,830
2014	893,875	811,315	499,697	149,189	162,429	1,705,190
2015	941,798	786,958	505,710	136,846	144,402	1,728,756

HCV = Housing Choice Voucher.

Table A3. Proportion of HCV Households With Specified Housing Cost Burden, 2003–2015

Year	No Cost Burden (30% or Less)	Any Cost Burden (31% or More)	Moderate Cost Burden (31–40%)	High Cost Burden (41–50%)	Severe Cost Burden (51% or More)
2003	67.91%	32.09%	22.36%	4.87%	4.86%
2004	63.13%	36.87%	25.00%	5.95%	5.92%
2005	56.93%	43.07%	28.15%	7.40%	7.52%
2006	54.31%	45.69%	29.61%	8.01%	8.07%
2007	58.45%	41.55%	27.71%	6.79%	7.05%
2008	62.97%	37.03%	25.00%	5.86%	6.17%
2009	61.55%	38.45%	25.44%	6.40%	6.62%
2010	61.46%	38.54%	25.52%	6.28%	6.75%
2011	59.06%	40.94%	26.33%	7.04%	7.57%
2012	56.46%	43.54%	28.10%	7.48%	7.96%
2013	55.76%	44.24%	27.67%	7.98%	8.59%
2014	52.42%	47.58%	29.30%	8.75%	9.53%
2015	54.48%	45.52%	29.25%	7.92%	8.35%

HCV = Housing Choice Voucher.

Table A4. Percent of HCV Households Experiencing Any Housing Cost Burden (31 Percent or More) by Household Characteristics

	Year												
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Household characteristics													
Length of HCV program participation													
< 1 year	37.8	43.8	49.0	48.2	44.4	41.0	41.9	41.8	42.7	45.9	44.6	47.4	45.3
1–4.9 years	32.7	38.5	44.8	47.4	42.4	37.7	39.4	39.6	42.4	45.0	45.2	48.4	45.2
5–9.9 years	26.7	32.3	40.4	45.3	41.6	36.6	38.0	38.0	40.4	43.2	44.2	47.5	46.0
10 years or more	24.2	28.2	34.5	38.4	35.7	32.3	34.1	34.7	38.3	41.1	43.2	47.1	45.5
Household size													
1 member	30.8	34.6	38.1	39.1	35.5	32.1	33.4	33.8	36.5	39.8	43.5	47.5	45.8
2 members	34.3	39.0	45.6	48.2	43.8	39.4	41.0	41.6	44.0	46.8	48.1	51.7	49.3
3 members	33.2	38.7	46.0	49.6	45.5	40.2	41.9	41.7	44.3	46.5	44.9	47.8	45.5
4 members	30.9	36.5	45.1	49.5	45.0	39.4	41.2	40.8	42.9	44.8	42.5	45.3	42.7
5 or more members	30.4	36.2	45.1	49.8	45.9	40.1	41.4	40.5	42.5	44.0	39.8	41.8	39.8
Presence of children													
No children	30.8	34.6	38.8	40.5	36.7	33.3	34.5	35.0	37.7	40.8	44.0	47.8	46.0
Children	33.0	38.5	46.4	50.0	45.7	40.4	42.1	41.9	44.2	46.5	44.5	47.3	44.9
Household head gender													
Male	29.1	32.5	36.9	38.5	34.4	30.6	31.7	32.0	34.3	36.7	39.0	42.6	41.1
Female	32.7	37.8	44.3	47.2	43.0	38.4	39.9	39.9	42.4	45.1	45.4	48.7	46.6
Household head age													
Nonelderly	33.3	38.4	45.2	48.1	43.9	39.1	40.7	40.8	43.2	45.8	45.8	49.0	46.7
Elderly	26.3	29.5	33.5	35.2	31.6	28.3	29.1	29.4	32.0	34.8	38.6	42.6	41.4
Household head disability status													
Nondisabled	31.8	36.6	43.2	46.0	41.9	37.3	38.7	38.8	41.2	43.6	43.9	47.2	45.2
Disabled	32.8	37.6	42.7	45.0	40.7	36.4	37.8	38.0	40.3	43.5	45.1	48.6	46.2
Income													
\$5,000 or less	45.3	51.2	59.5	61.4	58.6	55.3	57.1	58.8	61.3	63.2	64.1	66.7	65.0
\$5,001–\$10,000	30.8	35.3	40.4	42.8	38.7	33.9	35.3	35.2	37.9	41.2	42.5	46.1	44.5
\$10,001–\$15,000	30.9	35.8	41.8	43.5	38.7	34.2	35.5	35.7	38.3	40.8	42.0	45.6	43.3
More than \$15,000	28.3	33.2	41.1	45.5	41.6	36.9	38.3	37.9	39.8	41.8	41.7	45.0	42.9
Income (as percent of AMI)													
10% or less	41.6	46.9	57.0	60.4	57.5	52.8	54.0	54.7	56.9	58.9	59.7	62.9	61.1
11–30%	30.1	34.8	40.3	42.7	38.5	34.0	35.3	35.3	37.8	40.5	41.5	45.0	43.0
31–50%	32.6	38.0	44.2	47.3	43.0	38.1	39.6	39.6	41.9	44.5	44.6	47.8	45.6
51–80%	26.2	30.5	37.7	40.9	38.2	35.4	36.7	37.0	39.2	41.1	42.4	45.0	42.8
More than 80%	7.1	8.5	12.0	10.7	9.7	10.9	11.2	10.2	10.3	11.3	11.7	14.8	14.1
Primary source of income													
Wages	30.7	35.8	42.6	46.4	42.2	36.7	38.2	37.8	39.7	42.1	41.9	45.3	43.3
Government	32.7	37.4	43.3	45.3	41.2	37.2	38.5	38.8	41.4	44.1	45.1	48.5	46.5
TTP													
\$50 or less	65.1	72.1	83.9	86.6	86.6	84.5	85.8	87.5	89.4	89.8	91.0	92.3	92.0
More than \$50	30.2	34.9	41.0	43.9	39.6	35.0	36.4	36.3	38.7	41.4	42.1	45.5	43.4
Race/Ethnicity													
White, not Hispanic	34.5	39.3	43.9	44.8	40.1	36.2	37.4	37.6	38.9	41.2	41.6	45.0	43.8
Black, not Hispanic	31.6	37.3	45.3	49.6	46.0	40.5	42.6	42.6	44.9	47.5	47.5	51.1	48.5
Asian/Pacific Islands, not Hispanic	29.2	28.0	32.7	36.8	35.2	31.0	31.2	31.1	34.3	36.3	39.4	42.9	41.4
Native American, not Hispanic	34.3	39.2	45.5	46.8	42.1	38.6	39.3	39.9	41.0	42.3	42.0	44.5	43.7
More than one race, not Hispanic	37.9	41.1	46.0	46.3	44.6	41.8	40.3	38.2	42.4	43.8	43.3	46.6	42.0
Hispanic, any race	27.4	31.1	37.2	40.1	35.3	31.2	31.7	31.2	35.6	38.7	41.7	44.2	41.8

AMI = Area Median Income. HCV = Housing Choice Voucher. TTP = total tenant payment.

Table A5. Percent of HCV Households Experiencing Severe Housing Cost Burden (51 Percent or More) by Household Characteristics

	Year												
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Household characteristics													
Length of HCV program participation													
< 1 year	4.6	5.3	6.1	5.5	5.0	4.7	5.1	4.8	5.2	5.0	5.5	4.9	4.7
1–4.9 years	5.4	6.5	8.3	9.0	7.6	6.3	6.8	7.0	7.9	8.1	8.3	9.1	7.7
5–9.9 years	4.6	5.6	7.6	8.8	7.9	6.7	7.1	7.2	8.0	8.4	8.9	10.0	9.0
10 years or more	4.1	5.0	6.7	8.0	7.3	6.5	6.9	7.2	8.1	8.7	9.7	11.1	10.0
Household size													
1 member	3.6	4.4	5.3	5.6	5.0	4.4	4.6	4.8	5.6	6.1	7.2	8.2	7.3
2 members	5.2	6.2	8.0	8.5	7.5	6.7	7.2	7.8	8.6	9.1	10.1	11.1	9.7
3 members	5.8	7.2	9.1	9.8	8.6	7.6	8.3	8.2	9.2	9.7	10.0	10.9	9.6
4 members	5.5	6.8	9.1	9.9	8.6	7.4	8.1	8.4	9.1	9.3	9.6	10.8	9.1
5 or more members	5.2	6.5	8.6	9.8	8.4	7.0	7.5	7.1	8.1	8.1	7.4	7.9	6.9
Presence of children													
No children	3.5	4.3	5.4	5.8	5.2	4.6	4.8	5.1	5.9	6.4	7.5	8.5	7.5
Children	5.8	7.1	9.2	9.9	8.6	7.5	8.3	8.4	9.2	9.6	9.8	10.7	9.3
Household head gender													
Male	2.9	3.5	4.5	4.9	4.3	3.8	3.8	4.0	4.6	4.8	5.4	6.1	5.4
Female	5.3	6.4	8.1	8.7	7.6	6.7	7.2	7.3	8.2	8.7	9.3	10.3	9.0
Household head age													
Nonelderly	5.4	6.6	8.4	9.0	7.9	6.9	7.5	7.7	8.6	9.1	9.7	10.7	9.3
Elderly	2.2	2.7	3.4	3.9	3.3	2.9	2.9	3.0	3.4	3.7	4.7	5.6	5.0
Household head disability status													
Nondisabled	5.5	6.8	8.6	9.2	8.0	7.1	7.6	7.8	8.7	9.2	9.7	10.7	9.5
Disabled	2.8	3.5	4.5	5.1	4.5	3.9	4.1	4.1	4.7	5.0	5.8	6.6	5.6
Income													
\$5,000 or less	21.4	25.3	32.3	34.6	32.8	30.2	32.1	32.9	35.5	37.3	38.7	41.6	39.7
\$5,001–\$10,000	3.9	5.1	6.8	8.1	7.1	6.0	6.5	6.4	7.3	7.9	8.9	10.1	8.9
\$10,001–\$15,000	1.5	2.1	3.3	4.1	3.6	3.1	3.4	3.5	4.0	4.3	5.1	6.1	5.2
More than \$15,000	0.4	0.7	1.2	1.7	1.4	1.2	1.3	1.4	1.6	1.7	2.0	2.4	1.9
Income (as percent of AMI)													
10% or less	19.5	23.0	30.6	33.7	31.7	28.2	29.3	29.4	31.4	32.9	34.4	37.8	36.0
11–30%	3.0	3.9	5.3	6.0	5.2	4.3	4.5	4.5	5.2	5.5	6.5	7.6	6.4
31–50%	0.5	0.8	1.1	1.3	1.1	0.9	0.9	1.0	1.1	1.2	1.6	2.0	1.4
51–80%	0.1	0.2	0.3	0.4	0.3	0.2	0.3	0.3	0.3	0.3	0.4	0.5	0.3
More than 80%	0.2	0.1	0.1	0.2	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Primary source of income													
Wages	2.4	3.0	3.9	4.4	3.7	3.1	3.4	3.5	3.8	4.0	4.8	5.7	4.8
Government	6.0	7.3	9.2	9.8	8.6	7.5	7.9	7.9	8.9	9.4	10.0	11.1	9.9
TTP													
\$50 or less	35.7	41.6	52.2	55.5	54.2	50.9	53.0	53.7	56.4	58.0	59.1	61.9	60.5
More than \$50	3.1	4.0	5.3	5.9	5.0	4.2	4.6	4.6	5.3	5.6	6.2	7.1	6.0
Race/Ethnicity													
White, not Hispanic	4.0	4.8	5.9	6.2	5.3	4.7	4.9	4.8	5.4	5.7	6.0	6.6	5.9
Black, not Hispanic	5.7	7.1	9.2	10.2	8.9	7.7	8.4	8.6	9.5	9.8	10.4	11.7	9.9
Asian/Pacific Islands, not Hispanic	3.3	3.8	5.4	7.2	6.4	5.6	5.6	5.5	6.7	7.3	8.6	9.7	9.2
Native American, not Hispanic	4.6	5.5	7.6	7.9	7.3	6.1	6.9	7.0	7.5	7.4	8.4	8.2	7.4
More than one race, not Hispanic	6.7	7.6	9.0	8.1	7.6	6.9	6.7	6.4	7.5	7.7	7.7	8.7	7.5
Hispanic, any race	5.0	5.8	7.3	7.9	6.7	5.9	6.0	6.2	7.5	8.0	9.4	10.1	9.2

AMI = Area Median Income. HCV = Housing Choice Voucher. TTP = total tenant payment.

Table A6. Percent of HCV Households Experiencing Any Housing Cost Burden (31 Percent or More) by Housing Characteristics

	Year												
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Housing unit type													
Number of bedrooms													
0	18.7	20.6	22.8	22.5	20.1	17.7	17.9	17.2	18.0	20.0	23.4	27.1	27.5
1	24.2	26.7	30.0	30.1	26.2	22.9	23.1	22.8	24.8	27.5	31.6	36.7	37.3
2	35.1	40.1	46.2	48.7	44.2	39.4	41.2	41.8	44.5	47.6	49.1	52.5	49.8
3	33.7	39.8	48.1	52.7	48.7	43.4	45.5	45.3	47.7	50.0	48.1	50.6	47.8
4 or more	39.0	44.7	54.7	61.6	58.5	52.5	53.8	53.2	55.0	56.6	52.8	54.3	49.9
Structure type													
Single-family	36.2	41.8	48.1	51.8	48.0	42.7	44.1	43.8	46.7	49.7	49.2	52.1	49.7
Multifamily	23.6	26.5	32.9	34.3	29.6	26.6	28.2	28.9	32.6	35.6	38.3	42.5	40.1
Other (mfg. home)	39.4	44.9	47.8	46.0	41.8	37.2	38.3	39.9	27.7	27.2	28.2	32.2	36.4
Years since home built													
< 10	38.0	42.6	48.0	49.9	45.1	39.9	41.5	41.7	43.7	46.5	45.8	48.5	44.8
10–19.9	36.0	40.4	46.7	47.5	42.4	37.7	39.2	39.7	42.1	45.3	45.7	48.6	45.9
20–29.9	33.7	38.8	45.2	48.0	43.3	38.5	40.3	41.7	44.7	47.8	49.1	51.8	48.4
30–39.9	29.9	34.1	40.1	42.2	38.5	34.8	36.8	37.9	40.8	44.0	45.7	49.4	47.6
40–49.9	30.6	34.4	41.6	45.1	40.5	36.0	36.9	36.6	38.9	40.9	42.7	46.3	43.9
50–99.9	29.9	35.3	41.9	45.5	41.9	37.8	39.1	38.9	41.2	43.3	43.5	47.3	45.9
100 or more	26.2	31.2	37.6	39.4	35.8	31.5	32.6	30.6	32.4	34.6	35.5	39.2	39.9

HCV = Housing Choice Voucher.

Table A7. Percent of HCV Households Experiencing Severe Housing Cost Burden (51 Percent or More) by Housing Characteristics

	Year												
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Housing unit type													
Number of bedrooms													
0	3.3	3.7	4.8	4.9	4.3	3.7	3.8	3.3	3.8	4.0	4.4	5.1	5.1
1	2.0	2.2	2.7	2.7	2.3	2.0	2.0	2.0	2.4	2.5	3.1	3.8	3.9
2	5.1	6.1	7.5	7.7	6.7	5.8	6.1	6.3	7.1	7.4	8.4	9.4	8.4
3	6.5	8.1	10.5	11.7	10.3	9.1	9.9	10.1	11.3	11.9	12.5	13.7	11.7
4 or more	7.2	9.0	12.7	15.1	13.5	11.3	12.1	11.9	13.3	14.0	13.8	15.1	12.4
Structure type													
Single-family	5.7	7.0	8.9	9.8	8.6	7.4	8.0	8.1	9.2	9.8	10.4	11.4	9.8
Multifamily	3.1	3.7	4.9	5.0	4.3	3.9	4.0	4.3	5.0	5.3	6.1	7.0	6.3
Other (mfg. home)	5.7	7.1	7.7	7.5	6.6	5.9	6.5	6.4	5.0	4.5	5.1	6.2	6.8
Years since home built													
< 10	5.7	6.6	8.1	8.3	7.0	6.1	6.6	6.8	7.6	7.9	8.2	8.7	7.0
10–19.9	5.4	6.5	8.3	8.5	7.0	6.3	6.6	6.6	7.4	7.9	8.3	9.2	8.0
20–29.9	5.4	6.5	8.2	8.5	7.6	6.6	7.1	7.2	8.1	8.6	9.6	10.6	9.2
30–39.9	4.4	5.3	6.9	7.3	6.6	6.0	6.5	6.9	7.7	8.3	9.2	10.2	8.9
40–49.9	4.5	5.6	7.3	8.1	6.9	6.0	6.4	6.5	7.4	7.6	8.3	9.1	7.9
50–99.9	4.3	5.5	7.2	8.2	7.2	6.3	6.8	7.1	8.0	8.3	8.8	10.0	8.8
100 or more	4.5	5.6	6.8	7.1	6.3	5.3	5.6	5.1	5.6	6.1	6.7	7.7	7.4

HCV = Housing Choice Voucher.

Table A8. Percent of HCV Households Experiencing Any Housing Cost Burden (31 Percent or More) by Geographic Characteristics

	Year												
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Geography													
Region													
Northeast	24.8	29.4	35.5	37.7	34.3	30.7	29.8	27.6	29.2	30.8	31.3	36.1	38.3
Midwest	34.5	40.8	46.8	49.8	47.1	42.1	43.9	44.9	47.3	50.0	50.0	51.9	48.2
South	36.0	41.5	47.4	50.4	46.6	39.9	42.4	41.9	45.0	48.4	48.9	52.7	50.0
West	32.0	35.2	42.4	44.9	38.2	36.1	38.0	40.8	43.1	45.4	47.4	49.6	44.9
Metropolitan													
Metropolitan	30.1	34.9	42.0	45.5	41.2	36.6	38.0	38.0	40.3	43.0	44.2	47.7	45.5
Nonmetropolitan/rural	41.1	46.0	48.3	46.6	43.8	39.9	41.3	42.4	45.1	47.3	44.6	47.0	45.7
Central city													
Central city	30.2	34.1	41.7	45.6	42.6	39.6	40.5	39.7	41.7	42.4	43.3	47.2	45.5
Suburb	29.4	34.7	41.7	45.2	40.2	34.5	36.2	36.6	39.1	44.7	45.5	48.2	45.6
Rural	45.7	51.4	52.3	49.3	43.8	39.8	41.3	42.5	45.6	46.1	43.0	45.8	44.6
Census tract characteristics													
Median rent per month													
Less than \$400	33.0	39.3	41.5	42.7	41.0	36.8	36.8	36.5	39.2	38.3	37.7	40.4	39.8
\$400–\$800	35.8	41.8	46.6	47.9	43.0	37.6	39.2	39.6	42.4	45.3	44.2	47.1	44.8
More than \$800	29.1	33.2	40.8	44.5	40.6	36.7	38.0	37.8	40.1	42.6	44.5	48.1	46.2
Vacancy rate													
Less than 5%	30.1	33.7	40.4	43.0	38.2	35.1	36.7	37.3	39.1	41.8	43.8	47.3	45.3
5–8%	31.8	36.1	42.6	45.3	40.4	36.6	37.8	38.4	40.7	42.4	44.1	47.7	45.8
Greater than 8%	32.5	37.9	44.2	47.1	43.1	37.8	39.2	39.0	41.7	44.6	44.6	47.7	45.5
Poverty rate													
10% or less	36.0	40.4	47.0	50.8	47.1	42.8	44.1	43.6	45.4	46.5	47.7	50.7	48.2
11–20%	33.6	38.5	44.4	46.7	42.2	37.7	39.2	39.3	42.1	45.0	46.0	49.1	46.5
More than 20%	28.0	33.0	39.6	41.9	37.1	32.5	33.8	34.3	36.8	41.5	41.8	45.4	43.8
Minority percentage													
20% or less	37.9	43.2	47.9	48.8	44.1	40.0	41.7	41.8	43.9	46.2	45.0	47.4	45.5
20–40%	35.3	40.4	46.1	48.3	43.9	39.0	40.2	39.7	42.1	45.6	45.6	48.9	46.7
More than 40%	27.7	32.2	39.7	43.5	39.4	34.7	36.1	36.2	39.0	42.2	43.7	47.4	45.2

HCV = Housing Choice Voucher.

Table A9. Percent of HCV Households Experiencing Severe Housing Cost Burden (51 Percent or More) by Geographic Characteristics

	Year												
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Geography													
Region													
Northeast	3.7	4.6	5.7	6.4	5.7	5.1	4.8	4.4	4.9	5.1	5.5	6.5	6.8
Midwest	4.6	5.9	7.6	8.2	7.5	6.4	6.9	7.2	8.0	8.3	8.5	9.0	7.4
South	6.4	7.6	9.3	9.6	8.5	7.3	8.1	7.8	8.9	9.5	10.4	11.5	9.6
West	3.6	4.4	6.4	7.1	5.6	5.0	5.6	6.9	7.6	8.0	8.9	9.8	8.4
Metropolitan													
Metropolitan	4.6	5.7	7.4	8.2	7.2	6.3	6.7	6.9	7.7	8.1	8.8	9.9	8.7
Nonmetropolitan/rural	6.2	7.2	8.2	7.7	6.2	5.7	5.9	5.9	6.9	7.0	6.8	7.0	6.0
Central city													
Central city	4.2	5.2	7.1	8.0	7.3	6.6	6.9	6.6	7.6	7.9	8.6	9.7	8.7
Suburb	4.7	5.9	7.5	8.3	7.2	6.1	6.6	7.1	7.8	8.1	8.8	9.6	8.2
Rural	6.2	7.3	7.9	7.0	6.1	5.6	5.9	5.9	6.9	7.1	7.0	7.1	6.2
Census tract characteristics													
Median rent per month													
Less than \$400	6.3	8.3	8.8	8.9	11.6	11.0	10.4	10.5	11.6	12.4	12.4	13.2	12.3
\$400–\$800	5.4	6.5	7.8	7.8	7.0	6.1	6.5	6.6	7.4	7.8	7.9	8.4	7.2
More than \$800	4.2	5.3	7.2	8.1	7.0	6.1	6.6	6.8	7.6	8.0	9.0	10.3	9.1
Vacancy rate													
Less than 5%	3.8	4.7	6.3	7.0	6.0	5.3	5.7	6.1	6.8	7.3	8.3	9.4	8.5
5–8%	4.4	5.4	7.0	7.6	6.6	5.8	6.2	6.5	7.1	7.4	8.2	9.3	8.3
Greater than 8%	5.2	6.3	7.9	8.4	7.6	6.5	7.0	7.0	7.9	8.4	8.8	9.6	8.3
Poverty rate													
10% or less	4.7	5.8	7.7	8.8	7.7	6.7	7.1	6.9	7.7	8.0	8.7	9.8	8.4
11–20%	4.7	5.7	7.2	7.6	6.6	5.8	6.3	6.4	7.3	7.7	8.4	9.3	8.0
More than 20%	4.8	5.9	7.4	7.8	7.0	6.1	6.5	6.9	7.8	8.1	8.7	9.6	8.5
Minority percentage													
20% or less	4.6	5.6	6.8	7.0	6.1	5.4	5.8	5.6	6.3	6.6	6.5	6.7	5.8
20–40%	5.0	6.1	7.6	8.0	7.0	6.1	6.5	6.3	7.2	7.2	7.5	8.3	7.2
More than 40%	4.8	5.9	7.7	8.6	7.6	6.6	7.1	7.5	8.4	8.7	9.6	10.8	9.6

HCV = Housing Choice Voucher.

Table A10. Variable Definitions for Logistic Regression Models (Tables 4–6 in Text)

Variable	Definition
Dependent variable	
Any cost burden	1 = A household experiences any cost burden (31% or more)
Severe cost burden	1 = A household experiences a severe cost burden (51% or more)
Independent variables	
Household characteristics	
Length of participation	Length of participation (days)
Household size	Number of household members
Children	1 = A household has at least one child
Female	1 = A household head is female
Elderly	1 = A household head is elderly
Disabled	1 = A household head is disabled
Income at 10% or less than AMI	1 = Total annual income 10% or less than AMI
Income at 11–30% of AMI	1 = Total annual income 11–30% of AMI
Income at 31–50% of AMI	1 = Total annual income 31–50% of AMI
Income at 51–80% of AMI	1 = Total annual income 51–80% of AMI
Primarily wage	1 = Primary source of income is wage
Non-White	1 = A household head is non-White
Hispanic	1 = A household head is Hispanic
Housing unit type	
Bedroom	Number of bedrooms
Single-family	1 = Single-family (detached/attached) home
Building age	Age of housing unit
Geography	
Midwest	1 = Midwest (Census region)
South	1 = South (Census region)
West	1 = West (Census region)
Central city	1 = Central city
Suburb	1 = Suburb
Neighborhood characteristics	
Tract median rent	Census-tract level median gross rent
Tract vacancy	Census-tract level vacancy rate
Tract poverty	Census-tract level poverty rate
Tract minority	Census-tract level percentage of minority population

AMI = Area Median Income.

Table A11. Longitudinal Statistics by Initial Rent Payment, 2008 HCV Cohort

Category/Explanatory Variable	Rent ≤ Payment Standard	Rent > Payment Standard
All HCV households	110,266	66,683
Average total duration (years)	5.3	5.3
Average duration in rent burden (years)	1.2	3.6
Average duration in rent burden (HCV households have ever experienced rent burden only)	2.7	3.7
Average duration in severe rent burden (years)	0.3	0.4
Average duration in severe rent burden (HCV households have ever experienced severe rent burden only)	1.8	1.9
Percent rent burdened at beginning of the voucher contract	6.4	94.4
Percent severely rent burdened at beginning of the voucher contract	3.2	2.7
Percent rent burdened at least 1 year	42.2	96.8
Percent severely rent burdened at least 1 year	13.4	21.2
Percent rent burdened consecutively during the voucher contract	1.9	42.7
Percent severely rent burdened consecutively during the voucher contract	0.7	0.8
All HCV households who exited the program	50,856	31,670
Average total duration (years)	3.4	3.4
Average duration in rent burden (years)	0.7	2.5
Average duration in rent burden (HCV households have ever experienced rent burden only)	2.0	2.5
Average duration in severe rent burden (years)	0.1	0.2
Average duration in severe rent burden (HCV households have ever experienced severe rent burden only)	1.5	1.6
Percent rent burdened at the time of last recertification before exiting the program	21.2	72.7
Percent severely rent burdened at the time of last recertification before exiting the program	4.7	7.5
All HCV households who moved since initial lease up	19,085	11,263
Average number of moves	1.3	1.3
Average total duration (years)	6.8	6.8
Average duration in rent burden (years)	2.1	4.2
Average duration in rent burden (HCV households have ever experienced rent burden only)	3.0	4.3
Average duration in severe rent burden (years)	0.4	0.5
Average duration in severe rent burden (HCV households have ever experienced severe rent burden only)	1.8	1.8
Percent who reduced rent burden upon mobility	36.0	52.8
Average change in income upon mobility (\$)	1,058	903
Percent who reduced rent burden upon mobility and became not burdened (burden ≥ no burden)	10.7	24.8
Percent who reduced severe rent burden upon mobility and became not burdened (severe burden ≥ no burden)	2.2	2.8
Percent who reduced severe rent burden upon mobility and became burdened (severe burden ≥ burden)	2.5	4.9
Percent who increased rent burden upon mobility	47.9	41.3
Average change in income upon mobility (\$)	515	141
Percent who became rent burdened upon mobility (no burden ≥ burden)	25.4	14.6
Percent who became severely rent burdened upon mobility (no burden ≥ severe burden)	1.3	0.4
Percent who increased rent burden upon mobility and became severely burdened (burden ≥ severe burden)	1.2	1.7

HCV = Housing Choice Voucher.

**Table A12. Longitudinal Statistics for HCV Households That Leased a Unit in 2008
(Market Characteristics)**

Category/Explanatory Variable	FMR			Percent of Tracts With Rents Above FMR		
	< 600	600–850	> 850	< 40%	40–55%	> 55%
All HCV households	74,563	55,417	46,523	45,710	58,030	60,173
Average total duration (years)	4.6	5.4	6.3	6.0	5.3	5.1
Average duration in rent burden (years)	2.0	2.3	2.2	2.0	2.2	2.3
Average duration in rent burden (HCV households have ever experienced rent burden only)	3.0	3.3	3.5	3.3	3.3	3.3
Average duration in severe rent burden (years)	0.3	0.4	0.4	0.3	0.3	0.3
Average duration in severe rent burden (HCV households have ever experienced severe rent burden only)	1.8	1.8	2.1	2.0	1.9	1.8
Percent rent burdened at beginning of the voucher contract	42.5	39.6	35.1	34.9	38.8	43.8
Percent severely rent burdened at beginning of the voucher contract	3.3	3.3	2.2	3.6	2.9	2.6
Percent rent burdened at least 1 year	62.5	65.4	60.3	58.9	63.2	66.4
Percent severely rent burdened at least 1 year	14.7	18.0	16.9	16.4	17.1	16.4
Percent rent burdened consecutively during the voucher contract	21.2	16.8	11.7	12.9	16.4	20.4
Percent severely rent burdened consecutively during the voucher contract	0.9	0.7	0.5	0.8	0.6	0.6
All HCV households who exited the program	46,038	24,372	11,935	14,832	26,576	32,184
Average total duration (years)	3.2	3.5	3.9	3.6	3.5	3.4
Average duration in rent burden (years)	1.3	1.4	1.3	1.2	1.4	1.4
Average duration in rent burden (HCV households have ever experienced rent burden only)	2.3	2.4	2.5	2.4	2.4	2.4
Average duration in severe rent burden (years)	0.2	0.2	0.2	0.2	0.2	0.2
Average duration in severe rent burden (HCV households have ever experienced severe rent burden only)	1.5	1.6	1.7	1.6	1.6	1.5
Percent rent burdened at the time of last recertification before exiting the program	42.5	41.4	34.0	35.1	40.4	43.8
Percent severely rent burdened at the time of last recertification before exiting the program	5.7	6.3	5.1	5.9	5.7	5.8
All HCV households who moved since initial lease-up	11,867	11,082	7,302	6,953	11,552	10,448
Average number of moves	1.3	1.4	1.3	1.3	1.4	1.3
Average total duration (years)	6.5	6.9	7.3	7.1	6.9	6.7
Average duration in rent burden (years)	2.8	3.1	2.8	2.7	2.9	3.1
Average duration in rent burden (HCV households have ever experienced rent burden only)	3.4	3.7	3.6	3.5	3.6	3.6
Average duration in severe rent burden (years)	0.5	0.5	0.4	0.5	0.5	0.4
Average duration in severe rent burden (HCV households have ever experienced severe rent burden only)	1.8	1.8	1.9	1.9	1.9	1.7
Percent who reduced rent burden upon mobility	40.9	42.0	44.7	44.3	41.3	42.3
Average change in income upon mobility (\$)	925	1,157	827	899	1,011	1,043
Percent who reduced rent burden upon mobility and became not burdened (burden -> no burden)	15.4	16.1	16.4	15.8	15.9	16.1
Percent who reduced severe rent burden upon mobility and became not burdened (severe burden -> no burden)	2.4	2.5	2.4	2.4	2.6	2.4
Percent who reduced severe rent burden upon mobility and became burdened (severe burden -> burden)	3.1	3.7	3.3	3.4	3.3	3.5
Percent who increased rent burden upon mobility	43.8	47.5	45.4	45.3	44.7	46.7
Average change in income upon mobility (\$)	389	448	294	311	324	483
Percent who became rent burdened upon mobility (no burden -> burden)	20.7	24.1	18.7	18.2	21.4	23.7
Percent who became severely rent burdened upon mobility (no burden -> severe burden)	1.2	1.0	0.6	0.8	1.2	0.9
Percent who increased rent burden upon mobility and became severely burdened (burden -> severe burden)	1.6	1.3	1.1	1.4	1.5	1.2

FMR = Fair Market Rent. HCV = Housing Choice Voucher.