

## **Housing Cost Burden, Material Hardship, and Family Well-Being after the Great Recession**

### **Abstract**

Millions of households face housing affordability problems as house prices and rents rise faster than incomes. Yet little is known about how high housing expenditures affect family well-being. Using data from the Survey of Income and Program Participation, we examine the relationship between housing cost burden, material hardship, and residential satisfaction after the Great Recession. We find that households with higher housing cost burdens were more likely to experience some form of material hardship, controlling for other variables. The probability of material hardship increased with cost burden for households spending up to 50% of income on housing but diminished at higher levels of spending. We find some evidence that families with school-age children trade high housing costs for improvements in housing conditions. The findings suggest higher housing cost burdens may contribute to decreased family well-being through multiple forms of material hardship but also may have threshold effects.

**Keywords:** housing cost burden; material hardship; family well-being; residential satisfaction; neighborhood conditions; Great Recession

## **Introduction**

An ongoing housing affordability crisis in the United States affects millions of people, especially low-income families (Fernald, 2019; Rohe, 2017; Watson et al., 2017). Increases in housing costs have grown at a faster rate than inflation and income for many households (Charette et al., 2015; Paulin, 2018). From 2001 to 2017, the number of housing cost burdened households, defined as those paying more than 30% of their income toward housing expenses, increased from approximately 31 million to nearly 38 million (Fernald, 2019). Further, more than 80% of low-income households are considered housing cost burdened, with most spending more than half of their income on housing (Larrimore and Schuetz, 2017; Watson et al., 2017). The high levels raise concerns about the impacts of cost burdens on family life.

The theoretical literature suggests high housing cost burdens may harm family well-being by increasing the risk of material hardship (Leventhal and Newman, 2010; Newman, 2008). Lower income households faced with high housing costs spend less money on food, transportation, and health care than similar unburdened households (Fernald, 2019; Paulin, 2018). Unemployment, mortgage foreclosures, and rising cost burdens during the Great Recession placed many households in precarious situations (Colburn and Allen, 2018; Ellen and Dastrup, 2012). However, the multidimensional relationship between housing cost burden and hardship is often overlooked (Deidda, 2015). Previous research is based on small, non-representative samples and focuses on a separate hardship domain in isolation (for example, Kirkpatrick and Tarasuk, 2011; Pollack et al., 2010). Further, past studies rarely account for potential tradeoffs where some households may choose to pay more of their income for housing in exchange for better quality living conditions or improved neighborhood characteristics

(Acevedo-Garcia et al., 2016; Jewkes and Delgadillo, 2010). Despite affecting a growing number of families, little is known about how housing cost burden affects family well-being.

This paper investigates the relationship between housing cost burdens, material hardship, and well-being. It fills several gaps in the literature by: i) addressing multiple domains of material hardship and residential satisfaction, ii) presenting evidence on potential tradeoffs between cost burden and housing conditions, and iii) providing generalizable results based on nationally representative data. In addition, the paper shows household outcomes after the economic fallout of the Great Recession. Using the 2008 panel of the Survey of Income and Program Participation (SIPP), we find that housing costs are positively associated with material hardship, controlling for income, demographic characteristics, and region. Households with higher housing cost burdens are more likely to experience some form of material hardship, including food insecurity, failing to pay a bill, and electing to forego needed medical care. The probability of having a material hardship increases with cost burden for households spending up to half of income on housing. However, households that spend more than half of their income on housing are no more likely to experience material hardship than households who spend around 50%. There is some evidence that families with school-age children may trade high housing costs for improvements in housing conditions. The findings suggest higher housing cost burdens may contribute to reduced family well-being through multiple forms of material hardship. Further, spending half of income on housing may have threshold effects on experiencing material hardship and decreased well-being. The wide impacts of housing cost burdens on households after the Great Recession are important in themselves and warn of what may happen after the COVID-19 economic shock.

The rest of the paper proceeds as follows. The next section reviews the literature on the effects of housing cost burden on households, with attention to material hardship and neighborhood conditions. Then we describe the SIPP data, variables, and logistic regression models used in the study. The following sections present the results and discuss the findings.

### **The possible effects of housing cost burden**

The central role of housing in the lives of households is reflected by its substantial cost. According to data from the Consumer Expenditure Survey, housing is the biggest component of total expenditures for most households (BLS, 2014). Housing has consistently remained the largest expense for both homeowners and renters over a 25-year period (Reichenberger, 2012), which raises questions about the cumulative effects of high housing costs. Renters generally have lower incomes and are especially vulnerable to high housing expenditures; more than one in four renter households were spending more than half of income on housing expenses after the Great Recession (Charette et al., 2015; Colburn and Allen, 2016). The conventional measure of affordability categorizes households that spend more than 30% of income on housing expenses as moderately cost burdened; those spending more than 50% of income are considered severely cost burdened.

### ***Housing cost burden and material hardship***

Housing cost burdens may affect well-being primarily through the channel of material hardship (Beverly, 2001; Newman, 2008). Households that spend large proportions of their income on rent may have less money remaining to pay for essential needs, including adequate food and medical care (Paulin, 2018; Stone, 1993). Deprivation due to housing cost burden can

be especially harmful to children by reducing spending on books and other educational materials, childcare, and enrichment activities that are crucial for development (Duncan and Brooks-Gunn, 1997; Leventhal and Newman, 2010).

Food expenditures and food insecurity at the household level are strongly related to housing costs. A study of Canadian households finds that spending on food declined as the proportion of income spent on housing increased, for lower income households (Kirkpatrick and Tarasuk, 2007). Canadian households with high housing cost burdens are also more likely to experience food insecurity than other families with lower housing expenses, where food insecurity is defined as being unable to obtain adequate food due to limited financial resources (Kirkpatrick and Tarasuk, 2011). However, the results are based on a small number of households ( $n=473$ ) living in high poverty neighborhoods in Toronto.

The high cost of housing may also influence health conditions and access to health care. Some Pennsylvania residents who report difficulty paying housing costs are more likely to also report that they skipped health care or prescriptions because of cost than similar individuals living in affordable housing (Pollack et al., 2010). Those with self-reported higher housing costs were also more likely to indicate that they experienced poor health and health problems but the survey results are based on a non-representative sample of people living in Philadelphia and adjacent counties. A study of households in New York City finds higher out-of-pocket housing rent burdens are associated with worse self-reported health conditions and a higher likelihood of postponing medical services for financial reasons (Meltzer and Schwartz, 2016). The relationship is particularly strong for those households who pay 50% or more of their income toward housing costs. However, the results are limited to New York City and may be skewed by its extreme housing situation.

High housing costs may also be related to problems paying important bills, including telephone service and utility bills for heating and electricity. Interviews with low-income women indicate that some juggled rent and utility bill payments or made partial payments to forestall eviction or utility shut-off (Heflin et al., 2011). But the results are based on a small number of interviewees ( $n=38$ ) living in Cleveland.

### ***Housing cost burden and neighborhood conditions***

Few studies directly assess the potential tradeoffs between housing cost burdens and neighborhood conditions. Families with children may be especially likely to pay more for housing in exchange for living in neighborhoods with lower crime or better public services, like schools. One study finds housing cost burden has a nonlinear relationship with children's test scores (Newman and Holupka, 2015), which may indicate household preferences for schools or other neighborhood characteristics. The results show that test scores are positively associated with housing cost burden levels up to 30% but are negatively associated with higher levels.

Other work yields mixed results on area housing costs and household outcomes that might be associated with neighborhood conditions. Living in metropolitan areas with higher housing costs is associated with worse health for children (Harkness and Newman, 2005). These outcomes are not displayed in the most expensive areas, which may reflect better local amenities including high quality schools and recreation opportunities. However, additional work finds few differences in school-related academic and behavioral outcomes for low-income children living in high housing cost areas compared to low cost ones (Harkness et al., 2009). Both analyses exclude direct measures of housing cost burden.

To summarize, prior work finds that high housing costs may be detrimental to specific aspects of family well-being, including adequate food, good health, access to healthcare, and ability to pay bills. However, existing studies rely on non-representative samples of households living in a small number of places, which limits the generalizability of the results. Housing cost burdens may have a cascading effect on a broad set of material hardships experienced by families but some may choose to tradeoff high costs for better housing and neighborhoods.

## **Data and methods**

The analysis used data from the 2008 panel of the Survey of Income and Program Participation (SIPP). The SIPP is conducted by the U.S. Census Bureau using a multistage stratified sample and contains detailed information on housing costs and household income. A noteworthy benefit of the SIPP for our analysis is that the survey is nationally representative of the civilian, non-institutionalized population in the United States.

In the 2008 SIPP panel, respondents were interviewed every 4 months from September 2008 to December 2013. At each interview, participants completed both a core interview and a topical module interview. The core interview was repeated at each wave and included items on subjects such as demographic characteristics, employment, income, and public assistance receipt. The topical module interviews covered specific topic areas and varied from wave to wave. We combined data from the Wave 7 core interview, the Wave 7 Real Estate topical module, and the Wave 9 Adult Well-being topical module. Data collection for Wave 7 was completed between September and December 2010, while data collection for Wave 9 was completed between May and August 2011, i.e. after the Great Recession officially ended in 2009.

The SIPP collected data for every member of a sample household who was at least 15 years old at the time of the survey. However, many items were collected at the household level, including the cost of the mortgage or rent. For these items, the household reference person answered the survey questions. Response values were then assigned to all members of the household. The household reference person was the person listed on the household's lease or mortgage. If more than one person was listed on the lease or mortgage, interviewers randomly selected a reference person from those listed on the lease or mortgage. We limit the sample to household reference persons. Before releasing the data, the U.S. Census Bureau imputed most missing data (see U.S. Census Bureau, 2008). As a result, there is little missing data in our analytic sample.

A small number of households (fewer than 2 percent) reported housing costs that exceeded their income. We excluded these households from the main analysis. As a test, we performed the analyses again with these households in the sample and found that our results were not sensitive to this decision. Additionally, a small number of households (fewer than 3 percent) reported not paying any housing expenses. We elected to keep these households in the sample. We tested this decision by conducting analyses in which we excluded these households, and we found similar estimates. Our final analytic sample consisted of 28,641 household reference persons.

### ***Dependent variables***

The dependent variables used in the analyses cover four areas of well-being: (1) material hardship, (2) subjective housing satisfaction, (3) housing problems, and (4) neighborhood conditions. For *material hardship*, we created three dichotomous variables that measure food



insecurity, bill-paying hardship, and medical care hardship. A respondent was defined as having experienced food insecurity if, during the last four months, the respondent reported there was a time when there was not enough food to eat in the home, the respondent reported running out of food and was not able to afford more, or the respondent reported an inability to afford balanced meals. A respondent was defined as experiencing bill-paying hardship if, during the last twelve months, the respondent reported not being able to pay the full rent or mortgage amount; not being able to pay the full amount of a gas, oil, or electricity bill; lost telephone service because of nonpayment; or an inability to meet essential expenses. A respondent was defined as experiencing medical care hardship if, during the last twelve months, the respondent reported there was a time anyone in the household needed to go to the hospital, doctor, or dentist but did not. Last, we also created a single dichotomous measure of whether the respondent experienced any of these material hardships.

We included five dependent variables that measure *subjective housing satisfaction*. Respondents were asked about: (1) their overall satisfaction with their home, (2) their satisfaction with the amount of room or space in their home, and (3) their satisfaction with the general state of repair of their home. For each of these outcomes, participants could respond very satisfied, somewhat satisfied, somewhat dissatisfied, or very unsatisfied. The variables were coded so that higher values represent greater levels of satisfaction. Additionally, respondents were asked about: (4) their satisfaction with the coolness of their home in the summer and (5) their satisfaction with the warmth of their home in the winter. For both of these measures, nearly 95 percent of respondents were either satisfied or somewhat satisfied with the temperature of the home. Therefore, we coded these measures as dichotomous. A respondent was defined as

satisfied with the temperature of their home if the respondent reported being either somewhat satisfied or very satisfied with the temperature of their home in the summer or winter.

We included five dichotomous measures of distinct *housing problems*. Respondents reported whether they had a problem with: (1) pests such as rats, mice, roaches, or other insects; (2) a leaking roof or ceiling; (3) broken window glass or windows that cannot shut; (4) toilet, hot water heater, or other plumbing that does not work; and (5) holes or large cracks in walls or the ceiling. The SIPP also asked about exposed wires or holes in the floor but less than one percent of respondents reported these problems so we did not include them in the main analysis.

Finally, we included eight items related to *neighborhood conditions*. The first item asked respondents, “Overall, how satisfied are you with conditions in your neighborhood?” Participants could respond very satisfied, somewhat satisfied, somewhat unsatisfied, or very unsatisfied. The second item asked respondents if they consider their neighborhood very safe from crime, somewhat safe, somewhat unsafe, or very unsafe. The third item asked respondents about their satisfaction with public services in the neighborhood. Participants could respond very satisfied, somewhat satisfied, somewhat unsatisfied, or very unsatisfied. For each of these three outcomes, the variables were coded so that higher values represent greater satisfaction or greater levels of safety. Respondents were also asked about a series of possible neighborhood issues and whether these problems were present in their neighborhood. Specifically, respondents were asked whether there was a problem with: trash and litter in the streets; rundown or abandoned houses or buildings; industries, businesses, or non-residential activities; or odor, smoke, or gas fumes. We treated each of these problems as separate dichotomous measures of neighborhood conditions. The SIPP also asked about problems with traffic or street repair but less than 1.5 percent of

participants reported these problems so we did not include them in the main analysis. Descriptive statistics for all dependent variables are presented in the Appendix.

### ***Independent variables***

Our focal independent variable is housing cost burden. Housing cost burden is equal to total monthly housing cost divided by average monthly household income. Housing cost included the total monthly rent or mortgage and monthly utility costs, as well as any condominium or association fees. Household income included income from all sources (e.g. earnings from labor, cash public assistance, and social security income). To account for instability or volatility in household income, we calculated household income as the average monthly income over the two years leading up to the measure of housing cost. We then divided housing cost burden by 10 to facilitate easier interpretation of small coefficients.

We also included controls for gender, race/ethnicity (Non-Hispanic White, Non-Hispanic Black, Asian American, Hispanic of any race, other race/ethnicity), region of residence (South, Northeast, Midwest, West), educational attainment (did not complete high school, high school graduate, some college, bachelor's degree or greater), household income (total household income from all sources divided by 10,000), presence of school age children in the home (at least one child between the ages of 5 and 17 in the home), marital status (married, not married), whether the respondent owned or rented their home, metro status (lived in metropolitan statistical area, lived outside of metropolitan statistical area, unidentified metro status), and whether the household received any housing assistance such as public housing or a housing subsidy. Nearly 8 percent of households moved between the time when housing cost was measured and the time when the outcome variables were measured. Therefore, we included a dummy variable for

whether the household moved. As a sensitivity test, we also conducted analyses where we excluded these cases from the sample and found similar results. Finally, we included state fixed effects in all models to control for unobserved, time-invariant differences between places. Descriptive statistics for all independent variables are presented in the Appendix.

### *Analytic strategy*

We estimated a series of logistic and ordered logistic regression models. Each model included housing cost burden, all control variables, and state fixed effects. Housing cost burden may have a nonlinear relationship with well-being so to test for possible quadratic effects, we included a squared term for housing cost burden. In all multivariate analyses, we used household survey weights.

The basic logistic regression model can be expressed as:

$$\log \frac{p(y)}{1 - p(y)} = \alpha + \beta_1 \text{Housing Cost}_i + \beta_2 \text{Housing Cost}^2_i + \beta_3 X_i + \varepsilon_i$$

where for each household  $i$ ;  $y$  is a dichotomous outcome for material hardship, subjective housing satisfaction, housing problems, or neighborhood conditions;  $\beta_1$  is the coefficient for housing cost;  $\beta_2$  is the coefficient for housing cost squared;  $X$  represents a vector of control variables and state fixed effects; and  $\varepsilon$  represents a random error term. The ordered logistic regression model is similar and can be stated as:

$$\text{logit}[P(Y \leq j)] = \alpha_j + \beta_1 \text{Housing Cost}_i + \beta_2 \text{Housing Cost}^2_i + \beta_3 X_i + \varepsilon_i$$

The ordered logistic model assumes proportional odds and only estimates one slope for housing cost; however, there is a different intercept for each level of the ordinal outcome, denoted by  $\alpha_j$ .

We also separately estimated all of our models with an interaction between housing cost burden and presence of school-age children in the home. Specifically, the logistic regression models can be expressed as:

$$\log \frac{p(y)}{1 - p(y)} = \alpha + \beta_1 \text{Housing Cost}_i \times \beta_2 \text{Housing Cost}^2_i \times \beta_3 \text{Children}_i + \beta_4 X_i + \varepsilon_i$$

where children represents a dummy variable equal to 1 if any children between the ages of 5 and 17 live in the home. These models test for the possibility that relationships with housing cost burden are conditional on the presence of school-age children. For parsimony, we only present the statistically significant results.<sup>1</sup>

In some ordered logistic regression models, the proportional odds assumption was violated. Therefore, we estimated both generalized order logit models and multinomial logit models. We found that the results were substantively similar across model specifications. Therefore, for ease of interpretation, we present the ordered logistic regression estimates; however, estimates from the multinomial logit models are available in the Appendix. To facilitate interpretation of some statistically significant findings, we present predicted probabilities that were derived from model estimates.

## Results

Figure 1 presents a histogram that shows the distribution of housing cost burden. The average housing cost burden was just above 20%, meaning that the typical household spent one-fifth of their income on housing costs. Approximately 1-in-5 households had a housing cost

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<sup>1</sup> We also estimated models with a lagged dependent variable to control for previous material hardship experienced by the household. The results are substantively similar to the main models.

burden greater than 30%, while nearly 7 percent of households spent more than half of their income on housing costs.<sup>2</sup>

[Figure 1 Here]

### ***Housing cost burden and material hardship***

Table 1 presents findings from a series of logistic regression models estimating the relationship between housing cost burden and different material hardship domains net of control variables. Across all outcomes—food insecurity, bill-paying hardship, medical care hardship, and any hardship—housing cost burden was positively associated with material hardship ( $p < 0.001$ ). Additionally, there were quadratic effects, where the association with housing cost burden diminished as housing cost burden increased ( $p < 0.001$ ).

[Table 1 Here]

The relationship between housing cost burden and material hardship is clear in Figure 2, which reports the predicted probability of experiencing each material hardship outcome at different levels of housing cost burden. The predicted probabilities are based on the estimates presented in Table 1, and show that as housing cost burden increased so too did the risk of experiencing material hardships. However, across all outcomes, the relationship leveled off once housing cost burden reached approximately 50 percent of household income. Differences in the risk of material hardship among the severely housing cost burdened were minimal.

[Figure 2 Here]

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<sup>2</sup> In the 2008 SIPP panel, respondents were asked about monthly income at each wave. We used the average of incomes across waves to account for potential month-to-month fluctuations in household income leading up to the housing cost measure. If a point-in-time measure of income is used, the proportion of housing cost burdened households in the data is higher: 25 percent are moderately cost burdened and 14 percent severely cost burdened.

### *Housing cost burden and subjective housing satisfaction*

Table 2 presents ordered logistic regression and logistic regression estimates for outcomes related to subjective housing satisfaction. In the first column, the outcome is overall satisfaction with the home, and the estimates show that there was not a statistically significant relationship between housing cost burden and home satisfaction. Those who were severely burdened were no more or less satisfied with their home than those who had more affordable housing. Similarly, housing cost burden was not associated with satisfaction with the amount of space or room in the home (Column 2). These findings do not support the idea that high housing cost burden is part of a tradeoff where households pay more to gain greater housing quality or more adequate space.

[Table 2 Here]

In fact, the results show that housing cost burden was negatively associated with satisfaction with the home's state of repair, having a home that is a comfortable temperature in the summer (Column 4), and having a home that is a comfortable temperature in the winter (Column 5). However, for each of these three outcomes, the sizes of the coefficients were modest. While the estimates in Table 2 report statistically significant relationships for satisfaction with the coolness of the home during the summer, the warmth of the home in the winter, and the general state of repair of the home, given the small coefficient sizes, it is perhaps more accurate to think of these findings as showing no meaningful differences in subjective housing satisfaction by housing cost burden. For example, the predicted probability of having a house that is too cold in the winter was .065 for respondents who spent 20 percent of their income on housing cost and .068 for respondents who spent 50 percent of their income on housing cost. Similarly, the predicted probability of being very satisfied with the home's state of

repair was .65 for respondents who spent 20 percent of their income on housing cost and .63 for respondents who spent 50 percent of their income on housing cost.

### ***Housing cost burden and housing problems***

Table 3 presents estimates of the association between housing cost burden and different housing problems. Each outcome variable is dichotomous and equal to 1 if the given problem was present. There was a statistically significant association between housing cost burden and only one of the five housing problems. Specifically, housing cost burden was associated with an increased likelihood of having broken window glass or windows that cannot shut ( $p < 0.001$ ). These results again do not strongly suggest that households are making a tradeoff between housing cost burden and housing quality.

[Table 3 Here]

### ***Housing cost burden and neighborhood conditions***

Next, we examined the association between housing cost burden and neighborhood conditions. The first three outcomes pertain to subjective assessment of the neighborhood. Estimates from these models are presented in Table 4. In the first and second columns of Table 4, the outcomes are overall neighborhood satisfaction and satisfaction with neighborhood services. There was not a statistically significant association between housing cost burden and either of these outcomes. The third column of Table 4 shows that there was a statistically significant relationship ( $p < 0.05$ ) between housing cost burden and perceived neighborhood safety. Specifically, higher housing cost burdens were associated with feeling that the neighborhood was less safe. However, the coefficient was substantively small.



[Table 4 Here]

Table 5 presents estimates from a series of logistic regression models where the outcomes are different neighborhood problems. The association between housing cost burden and neighborhood problem was not statistically significant for any of these neighborhood problems. These results do not provide support for the idea that households are trading off high housing cost burdens for better neighborhood conditions.

[Table 5 Here]

### ***Housing cost burden and school-age children***

Last, we explored the possibility of differences for households with children by conducting all of the analyses with an interaction between housing cost burden and presence of a school-age child in the home. We focus on results from the three outcomes related to subjective housing satisfaction, the only models where the interaction effects were statistically significant. Results from these models are presented in the Appendix. Estimates from models predicting overall housing satisfaction, satisfaction with the amount of space or room in the home, and satisfaction with the general state of repair of the home are presented in Figure 3. Each panel of the figure displays predicted probabilities, which were derived from the models presented in the Appendix.

[Figure 3 Here]

The left panel of Figure 3 shows that the relationship between housing cost burden and overall home satisfaction is conditional on the presence of school-age children. Specifically, among those with school-age children in the home, as housing cost burden increased, satisfaction with the home increased. Conversely, for those without school-age children in the home, as

housing cost burden increased, housing satisfaction decreased. However, once housing cost burden exceeded 40 percent of income, there was not a statistically significant difference in housing satisfaction between those with and without school-age children.

The middle panel of Figure 3 shows the interaction effect of housing cost burden and presence of school-age children on satisfaction with housing space. Again, among those with school-age children in the home, as housing cost burden increased, satisfaction with the amount of space in the home increased, while the opposite held for those without school-age children in the home. Additionally, once households spent 30 percent or more of their income on housing, those differences were no longer statistically significant.

Finally, the right panel of Figure 3 shows the association between housing cost burden and satisfaction with the general state of the repair of the home. Again, consistent with the other findings, satisfaction with the repair condition of the home increased with housing cost burden for those with school-age children in the home and decreased for those without school-age children. However, there was again no difference once households became housing cost burdened and spent 30 percent or more of their income on housing costs.

### ***Limitations***

An important concern with the analysis is that the independent and dependent variables are collected from different waves of the SIPP. Housing cost burden and control variables are based on responses between September and December 2010 while measures of well-being are collected between May and August 2011. One possibility is that households may move in the intervening period between waves, in which case the reported housing cost burden might not be related to the reported levels of material hardship and residential satisfaction. To address this

concern, we include a dummy variable for households that move between waves (see Appendix). The coefficient on the dummy variable is not statistically significant, which supports the main results.

## **Discussion**

Housing affordability is a pressing concern in the United States because of its impact on the lives of households. Much attention has focused on calculating the percentage of household income spent on housing costs and determining the number of households who are housing cost burdened (for example, Fernald, 2019; Watson et al., 2017). Descriptions of the degree and extent of housing cost burdens are valuable but they can overshadow the basic issue of why affordability is important, i.e. how do housing affordability problems affect family well-being.

The results of this study indicate that high housing costs relative to income are associated with an increased probability of experiencing material hardship after the Great Recession, controlling for a host of other variables. Further, the relationship with the housing cost-income ratio is positive and statistically significant across various domains of material hardship. These domains are related but distinct from each other, which suggests the wide-reaching impact of high housing cost burdens. Material hardship can have an immediate negative effect on family well-being and also have cumulative effects over time (Heflin, 2006). In addition, high housing cost burden may threaten family well-being in other ways if it leads to economic and residential instability in the form of multiple moves, doubling up with relatives or friends, or homelessness (Hill et al., 2017; Wood et al., 2008). The results of this study provide support for the importance and multidimensional aspects of housing in understanding the lives of households, especially low-income families.

The ratio of housing cost to income is a widely adopted indicator of housing affordability but needs better justification for its continued use and usefulness. There are many criticisms of the housing cost burden measure, including its deficiencies in accounting for household differences in income, family size, housing unit quality, location and neighborhood characteristics, and non-housing expenses (Jewkes and Delgadillo, 2010; O'Dell et al., 2004; Stone, 1993). A fundamental question remains whether labels like not cost burdened and moderately or severely cost burdened accurately reflect meaningful differences in household experiences.

This study provides some empirical evidence to support using 50% of income spent on housing as an important threshold for housing affordability. We find that the association between housing cost burden and material hardship is positive for households spending up to half of income on housing expenses but the relationship levels off at higher levels of cost burden. In other words, households in the sample that spend 80% or even 90% of income on housing are not significantly more likely to experience material hardship than those households that spend 50%. One possible explanation is that families who are severely cost burdened, i.e. devote more than half of income on housing, may already be in such a precarious financial position that additional spending on housing has little or no marginal effect on the situation. These findings relate to prior work on housing cost burden and children's achievement that provides empirical support for using the 30% ratio as an affordability standard (Newman and Holupka, 2015; 2014)

High housing cost burdens may pose a major financial challenge for households, especially low-income households, but they may also reflect choices or preferences for better neighborhood conditions. High housing costs may reflect neighborhood opportunities, including education, health, social and economic opportunities (for example, Acevedo-Garcia et al., 2016).

We find little evidence that households overall trade higher housing cost burdens for improved neighborhood conditions. However, there is some evidence that is consistent with households with school-age children trading higher housing cost burdens for improvements in housing conditions. These households report higher levels of satisfaction with their home at higher levels of housing cost relative to income. However, this relationship only holds up to a point.

Households with school-age children that spend greater than 30% of income on housing do not have significantly higher levels of housing satisfaction than their counterparts who spend less than 30% and their satisfaction levels are not significantly different from households without children paying similar percentages for housing. The results suggest that higher levels of housing cost burden may place a limit on the value of tradeoffs.

The problem of housing affordability continues to affect millions of households as house prices and rents rise at a faster rate than incomes and inflation. After the Great Recession, high housing cost burdens were strongly and positively associated with multiple domains of material hardship. The economic shock from COVID-19 may lead to higher and more widespread housing cost burdens and material hardship, which harm family well-being.

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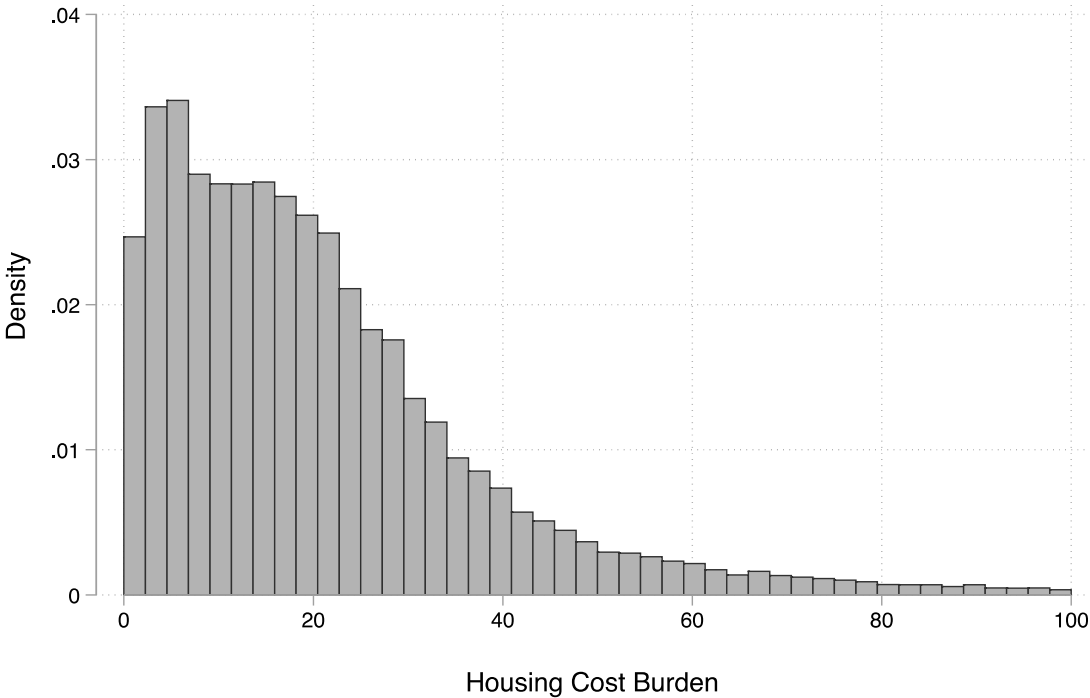
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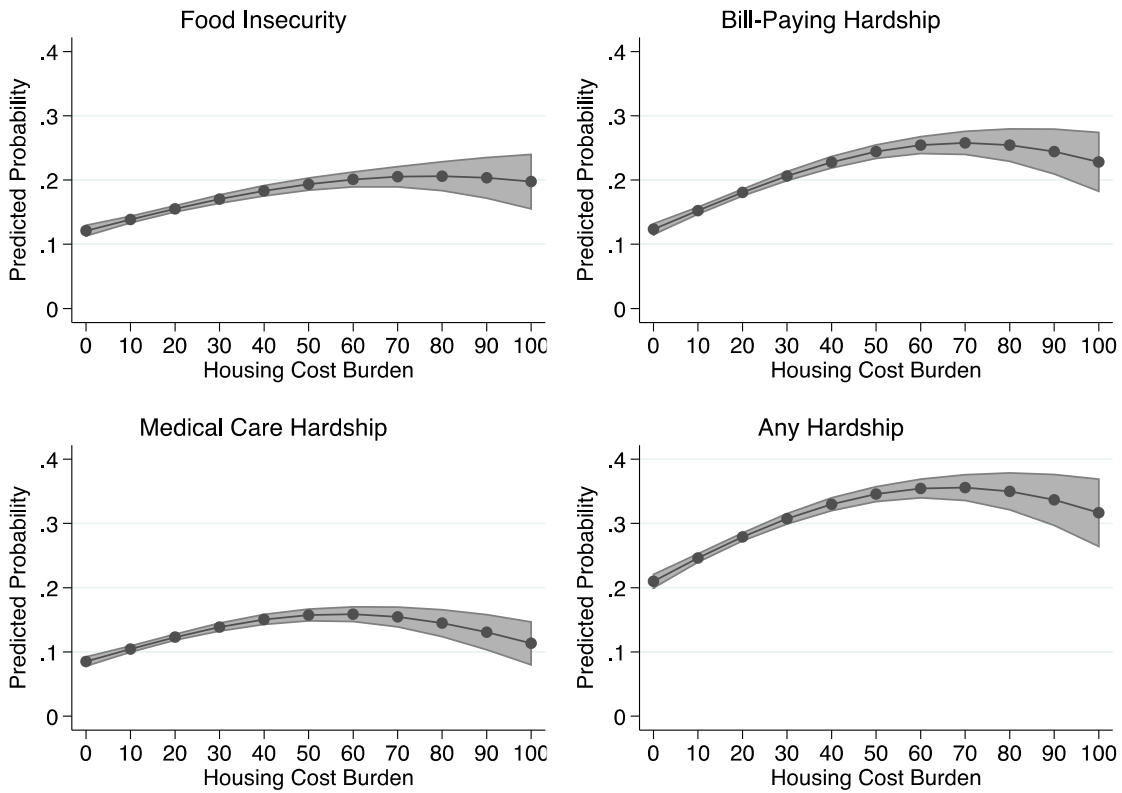


**Figure 1. Distribution of housing cost burden.**



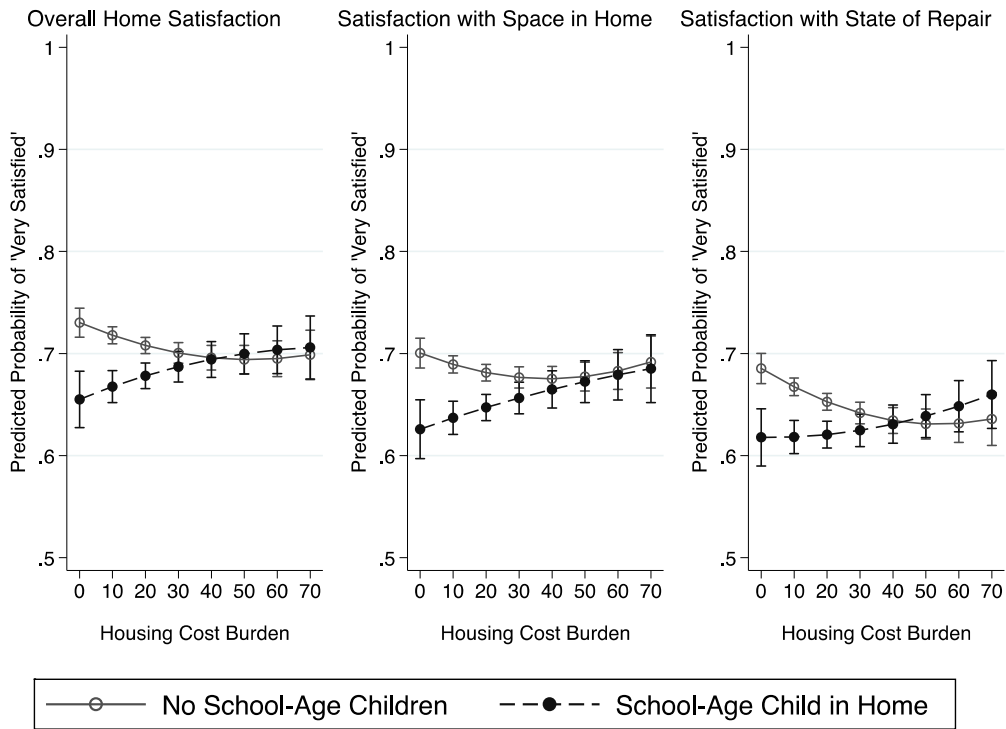
Note: Data are from the 2008 Survey of Income and Program Participation.

**Figure 2. Predicted probability of experiencing material hardship by housing cost burden.**



Note: Data are from the 2008 Survey of Income and Program Participation. Predicted probabilities are derived from estimates presented in Table 1. Shaded areas represent 95 percent confidence intervals.

**Figure 3. Predicted probabilities of home satisfaction by housing cost burden and presence of school-age children.**



Note: Data are from the 2008 Survey of Income and Program Participation. Predicted probabilities are derived from estimates presented in Appendix Table 4. Error bars represent 95 percent confidence intervals.

**Table 1. Weighted logistic regression estimates of the association between housing cost burden and material hardship.**

	Food Insecurity <i>b</i> (se)	Bill-Paying Hardship <i>b</i> (se)	Medical Care Hardship <i>b</i> (se)	Any Hardship <i>b</i> (se)
Housing Cost Burden	0.181*** (0.03)	0.301*** (0.03)	0.257*** (0.03)	0.256*** (0.03)
Housing Cost Burden <sup>2</sup>	-0.012** (0.00)	-0.022*** (0.00)	-0.022*** (0.00)	-0.020*** (0.00)
Household Income (\$10,000s)	-0.151*** (0.01)	-0.143*** (0.01)	-0.124*** (0.01)	-0.131*** (0.01)
Female	0.159*** (0.04)	0.167*** (0.04)	0.166*** (0.04)	0.146*** (0.03)
Non-Hispanic Black	0.428*** (0.06)	0.531*** (0.06)	-0.083 (0.07)	0.490*** (0.05)
Asian American	-0.104 (0.12)	-0.203+ (0.12)	-0.021 (0.13)	-0.064 (0.10)
Hispanic	0.243*** (0.07)	-0.009 (0.07)	-0.071 (0.07)	0.134* (0.06)
Other Race/Ethnicity	0.407*** (0.10)	0.514*** (0.10)	0.459*** (0.10)	0.476*** (0.09)
Age	-0.012*** (0.00)	-0.019*** (0.00)	-0.013*** (0.00)	-0.017*** (0.00)
Northeast	-0.293 (0.61)	0.465 (0.54)	1.503* (0.65)	0.922* (0.46)
Midwest	0.243 (0.20)	0.209 (0.17)	0.505* (0.22)	0.370* (0.16)
West	0.592** (0.19)	0.469** (0.17)	0.792*** (0.22)	0.767*** (0.15)
High School Graduate	-0.173** (0.06)	-0.029 (0.06)	-0.162* (0.07)	-0.162** (0.05)
Some College	-0.248*** (0.06)	-0.034 (0.06)	-0.077 (0.07)	-0.227*** (0.05)
College +	-0.804*** (0.07)	-0.715*** (0.07)	-0.729*** (0.08)	-0.827*** (0.06)
School-Age Child in Home	0.246*** (0.05)	0.450*** (0.04)	0.066 (0.05)	0.324*** (0.04)
Married	-0.030	-0.082+	-0.033	-0.070+

	(0.04)	(0.04)	(0.05)	(0.04)
Owens Home	-0.473***	-0.344***	-0.366***	-0.399***
	(0.05)	(0.04)	(0.05)	(0.04)
Housing Assistance	0.439***	0.098	-0.077	0.301***
	(0.08)	(0.08)	(0.09)	(0.07)
Not in Metro Area	-0.039	-0.052	-0.026	-0.068
	(0.05)	(0.05)	(0.06)	(0.04)
Metro Area Not Identified	-0.124	0.098	-0.367	-0.032
	(0.38)	(0.36)	(0.44)	(0.30)
Moved	-0.006	0.012	-0.037	-0.004
	(0.07)	(0.07)	(0.07)	(0.06)
Constant	-0.902***	-0.621***	-1.370***	-0.154
	(0.20)	(0.18)	(0.23)	(0.16)

Note: Data are from the 2008 Survey of Income and Program Participation. All models include state fixed effects. Non-Hispanic White is the reference category for race/ethnicity. South is the reference category for region. Did not complete high school is the reference category for educational attainment. Lives in Metropolitan Statistical Area is the reference category for metro status. Moved is a dichotomous variable equal to 1 if the respondent reported moving houses in the past 9 months.

N=28,641

+ $p < .1$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

**Table 2. Weighted regression estimates of the association between housing cost burden and housing satisfaction.**

	Overall Satisfaction <sup>1</sup>	Amount of Space <sup>1</sup>	State of Repair <sup>1</sup>	Temperature in Summer <sup>2</sup>	Temperature in Winter <sup>2</sup>
	<i>b</i>	<i>b</i>	<i>b</i>	<i>b</i>	<i>b</i>
	(se)	(se)	(se)	(se)	(se)
Housing Cost Burden	-0.038 (0.02)	-0.034 (0.02)	-0.075*** (0.02)	-0.103* (0.04)	-0.167*** (0.05)
Housing Cost Burden <sup>2</sup>	0.004 (0.00)	0.006+ (0.00)	0.008** (0.00)	0.012* (0.01)	0.017* (0.01)
Household Income (\$10,000s)	0.066*** (0.01)	0.045*** (0.01)	0.062*** (0.01)	0.068*** (0.01)	0.078*** (0.01)
Female	0.010 (0.03)	-0.000 (0.03)	-0.026 (0.03)	-0.104+ (0.06)	-0.084 (0.06)
Non-Hispanic Black	-0.384*** (0.05)	-0.340*** (0.05)	-0.416*** (0.05)	-0.116 (0.09)	-0.179+ (0.09)
Asian American	-0.343*** (0.08)	-0.328*** (0.07)	-0.283*** (0.07)	-0.003 (0.16)	-0.237 (0.16)
Hispanic	0.031 (0.06)	0.030 (0.06)	0.065 (0.05)	-0.083 (0.10)	-0.060 (0.12)
Other Race/Ethnicity	-0.343*** (0.09)	-0.295*** (0.09)	-0.301*** (0.09)	-0.450*** (0.13)	-0.467** (0.15)
Age	0.016*** (0.00)	0.018*** (0.00)	0.013*** (0.00)	0.017*** (0.00)	0.012*** (0.00)
Northeast	-0.293 (0.54)	0.873+ (0.52)	-0.052 (0.47)	0.224 (0.79)	-3.122** (1.16)
Midwest	-0.163 (0.15)	-0.218 (0.14)	-0.076 (0.14)	-0.688* (0.31)	-0.621+ (0.35)
West	-0.711*** (0.14)	-0.694*** (0.14)	-0.701*** (0.14)	-1.150*** (0.27)	-1.138*** (0.30)
High School Graduate	0.153** (0.05)	0.168** (0.05)	0.082 (0.05)	0.198* (0.09)	0.241* (0.10)
Some College	0.119* (0.05)	0.121* (0.05)	0.109* (0.05)	0.162+ (0.09)	0.258** (0.10)
College +	0.460*** (0.06)	0.429*** (0.06)	0.453*** (0.05)	0.510*** (0.11)	0.492*** (0.12)
School-Age Child in Home	-0.152*** (0.04)	-0.168*** (0.04)	-0.134*** (0.03)	0.052 (0.07)	-0.060 (0.07)
Married	0.161***	-0.008	0.198***	0.175**	0.256***

	(0.03)	(0.03)	(0.03)	(0.07)	(0.07)
Owns Home	0.420***	0.439***	0.090*	0.161*	0.092
	(0.04)	(0.04)	(0.04)	(0.07)	(0.08)
Housing Assistance	0.051	-0.006	0.114+	-0.086	0.042
	(0.07)	(0.07)	(0.07)	(0.11)	(0.13)
Not in Metro Area	0.110**	0.148***	0.073+	-0.044	-0.047
	(0.04)	(0.04)	(0.04)	(0.08)	(0.08)
Metro Area Not Identified	0.372	-0.068	-0.327	-0.310	1.550
	(0.36)	(0.28)	(0.28)	(0.41)	(1.04)
Moved	0.282***	0.249***	0.342***	0.442***	0.335**
	(0.06)	(0.05)	(0.06)	(0.11)	(0.12)
Constant				1.902***	2.421***
				(0.29)	(0.33)

<sup>1</sup> Ordered Logistic Regression

<sup>2</sup> Logistic Regression

Note: Data are from the 2008 Survey of Income and Program Participation. All models include state fixed effects. Non-Hispanic White is the reference category for race/ethnicity. South is the reference category for region. Did not complete high school is the reference category for educational attainment. Lives in Metropolitan Statistical Area is the reference category for metro status. Moved is a dichotomous variable equal to 1 if the respondent reported moving houses in the past 9 months.

N=28,641

+ $p < .1$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

**Table 3. Weighted logistic regression estimates of the association between housing cost burden and house problems.**

	Pests	Leaking Roof	Broken Windows	Plumbing Problems	Large Cracks
	<i>b</i>	<i>b</i>	<i>b</i>	<i>b</i>	<i>b</i>
	(se)	(se)	(se)	(se)	(se)
Housing Cost Burden	0.061+	0.058	0.233***	0.108+	0.108+
	(0.04)	(0.05)	(0.06)	(0.06)	(0.06)
Housing Cost Burden <sup>2</sup>	-0.007	0.002	-0.026**	-0.004	-0.012
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)
Household Income (\$10,000s)	-0.058***	-0.076***	-0.123***	-0.124***	-0.129***
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Female	0.042	0.071	0.128+	0.009	-0.020
	(0.05)	(0.06)	(0.08)	(0.10)	(0.08)
Non-Hispanic Black	0.301***	0.342***	0.159	0.450***	0.383**
	(0.07)	(0.09)	(0.12)	(0.13)	(0.12)
Asian American	-0.063	-0.206	-0.224	-0.002	-0.661*
	(0.14)	(0.20)	(0.26)	(0.27)	(0.31)
Hispanic	0.236**	0.109	-0.192	-0.060	-0.246
	(0.08)	(0.11)	(0.14)	(0.18)	(0.15)
Other Race/Ethnicity	0.602***	0.506**	0.648***	0.429*	0.505**
	(0.11)	(0.16)	(0.16)	(0.20)	(0.17)
Age	-0.006***	-0.008***	-0.015***	-0.006+	-0.018***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Northeast	0.380	-0.661	1.322	0.111	0.297
	(0.71)	(1.30)	(0.99)	(1.08)	(0.95)
Midwest	-0.143	0.366	-0.443	0.301	-0.185
	(0.25)	(0.30)	(0.39)	(0.51)	(0.38)
West	0.362	0.394	0.476	0.629	0.612+
	(0.23)	(0.30)	(0.34)	(0.49)	(0.35)
High School Graduate	-0.253**	-0.147	-0.329**	-0.164	-0.343**
	(0.08)	(0.11)	(0.12)	(0.15)	(0.13)
Some College	-0.234**	-0.153	-0.480***	-0.043	-0.388**
	(0.08)	(0.11)	(0.12)	(0.15)	(0.12)
College +	-0.316***	-0.419***	-0.896***	-0.209	-0.728***
	(0.09)	(0.12)	(0.15)	(0.18)	(0.15)
School-Age Child in Home	0.108+	0.156*	0.260**	0.204+	0.179+
	(0.06)	(0.08)	(0.09)	(0.11)	(0.09)
Married	-0.095+	-0.043	-0.063	-0.184+	-0.226*
	(0.05)	(0.07)	(0.09)	(0.11)	(0.09)



Owens Home	-0.040 (0.06)	0.275*** (0.08)	0.267** (0.10)	0.070 (0.11)	0.168+ (0.10)
Housing Assistance	0.161 (0.10)	-0.452* (0.18)	-1.248*** (0.25)	-0.089 (0.20)	-0.622** (0.20)
Not in Metro Area	0.068 (0.06)	-0.002 (0.08)	0.184* (0.09)	0.071 (0.12)	-0.111 (0.11)
Metro Area Not Identified	0.182 (0.47)	-0.093 (0.77)	0.073 (0.75)	0.211 (1.42)	-0.137 (0.66)
Moved	-0.330*** (0.10)	-0.302* (0.13)	-0.309* (0.16)	-0.263 (0.17)	-0.579*** (0.17)
Constant	-1.999*** (0.23)	-3.031*** (0.30)	-2.452*** (0.35)	-3.779*** (0.52)	-1.826*** (0.41)

Note: Data are from the 2008 Survey of Income and Program Participation. All models include state fixed effects. Non-Hispanic White is the reference category for race/ethnicity. South is the reference category for region. Did not complete high school is the reference category for educational attainment. Lives in Metropolitan Statistical Area is the reference category for metro status. Moved is a dichotomous variable equal to 1 if the respondent reported moving houses in the past 9 months.

N=28,641

+ $p < .1$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

**Table 4. Weighted ordered logistic regression estimates of the association between housing cost burden and neighborhood quality.**

	Neighborhood Satisfaction	Neighborhood Services	Neighborhood Safety
	<i>b</i>	<i>b</i>	<i>b</i>
	(se)	(se)	(se)
Housing Cost Burden	-0.016 (0.02)	0.015 (0.02)	-0.053* (0.02)
Housing Cost Burden <sup>2</sup>	0.003 (0.00)	-0.002 (0.00)	0.008** (0.00)
Household Income (\$10,000s)	0.061*** (0.01)	0.043*** (0.01)	0.054*** (0.00)
Female	-0.037 (0.03)	0.002 (0.03)	-0.185*** (0.03)
Non-Hispanic Black	-0.690*** (0.05)	-0.425*** (0.05)	-0.803*** (0.04)
Asian American	-0.323*** (0.07)	-0.277*** (0.07)	-0.253*** (0.07)
Hispanic	-0.138** (0.05)	0.020 (0.05)	-0.275*** (0.05)
Other Race/Ethnicity	-0.230** (0.09)	-0.253** (0.08)	-0.451*** (0.09)
Age	0.013*** (0.00)	0.012*** (0.00)	0.008*** (0.00)
Northeast	0.411 (0.54)	-1.341* (0.54)	-0.378 (0.49)
Midwest	0.043 (0.15)	0.502*** (0.14)	0.205 (0.14)
West	-0.758*** (0.14)	-0.183 (0.13)	-0.983*** (0.13)
High School Graduate	0.125* (0.05)	0.031 (0.05)	0.150** (0.05)
Some College	0.117* (0.05)	0.005 (0.05)	0.170*** (0.05)
College +	0.442*** (0.06)	0.194*** (0.06)	0.483*** (0.05)
School-Age Child in Home	0.046 (0.04)	-0.021 (0.03)	0.032 (0.03)
Married	0.095**	0.064*	0.134***

	(0.03)	(0.03)	(0.03)
Owens Home	0.228***	-0.048	0.277***
	(0.04)	(0.04)	(0.03)
Housing Assistance	-0.238***	-0.052	-0.331***
	(0.07)	(0.07)	(0.07)
Not in Metro Area	0.285***	-0.125**	0.563***
	(0.04)	(0.04)	(0.04)
Metro Area Not Identified	0.068	-0.023	0.734**
	(0.32)	(0.29)	(0.28)
Moved	0.176**	0.091+	0.105*
	(0.06)	(0.05)	(0.05)

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Note: Data are from the 2008 Survey of Income and Program Participation. All models include state fixed effects. Non-Hispanic White is the reference category for race/ethnicity. South is the reference category for region. Did not complete high school is the reference category for educational attainment. Lives in Metropolitan Statistical Area is the reference category for metro status. Moved is a dichotomous variable equal to 1 if the respondent reported moving houses in the past 9 months.

N=28,641

+ $p < .1$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

**Table 5. Weighted logistic regression estimates of the association between housing cost burden and neighborhood problems.**

	Trash Problem <i>b</i> (se)	Abandoned Buildings <i>b</i> (se)	Problem Industries <i>b</i> (se)	Odors and Fumes <i>b</i> (se)
Housing Cost Burden	0.038 (0.04)	-0.006 (0.04)	0.049 (0.05)	-0.042 (0.06)
Housing Cost Burden <sup>2</sup>	-0.008 (0.01)	0.000 (0.01)	-0.008 (0.01)	0.006 (0.01)
Household Income (\$10,000s)	-0.065*** (0.01)	-0.024** (0.01)	-0.034** (0.01)	-0.049*** (0.01)
Female	0.114* (0.06)	0.134** (0.05)	0.126+ (0.07)	0.177* (0.08)
Non-Hispanic Black	0.545*** (0.08)	0.544*** (0.07)	0.308** (0.10)	0.531*** (0.12)
Asian American	0.103 (0.16)	-0.470* (0.19)	-0.468* (0.22)	0.229 (0.21)
Hispanic	0.269** (0.09)	-0.195* (0.10)	-0.015 (0.12)	0.346** (0.12)
Other Race/Ethnicity	0.378** (0.14)	0.085 (0.14)	0.125 (0.19)	0.432* (0.18)
Age	-0.016*** (0.00)	-0.010*** (0.00)	-0.009*** (0.00)	-0.005* (0.00)
Northeast	0.184 (0.94)	1.443* (0.72)	1.291 (1.09)	-0.406 (1.21)
Midwest	-0.289 (0.26)	0.607* (0.27)	0.937** (0.36)	1.296** (0.48)
West	0.352 (0.24)	1.257*** (0.26)	1.575*** (0.35)	2.077*** (0.46)
High School Graduate	-0.220* (0.09)	-0.165+ (0.09)	-0.098 (0.11)	-0.103 (0.13)
Some College	-0.259** (0.09)	-0.164* (0.08)	-0.121 (0.10)	0.012 (0.12)
College +	-0.519*** (0.10)	-0.513*** (0.10)	-0.351** (0.12)	-0.344* (0.15)
School-Age Child in Home	-0.039 (0.07)	-0.039 (0.06)	-0.200* (0.08)	-0.046 (0.10)
Married	-0.178** (0.06)	-0.092+ (0.06)	-0.143+ (0.07)	0.127 (0.09)

Owns Home	-0.121+	0.128*	-0.356***	-0.245**
	(0.07)	(0.06)	(0.08)	(0.09)
Housing Assistance	0.258*	-0.168	-0.058	0.336*
	(0.10)	(0.12)	(0.13)	(0.14)
Not in Metro Area	-0.231**	-0.095	-0.445***	0.165
	(0.08)	(0.07)	(0.10)	(0.10)
Metro Area Not Identified	-0.638	-0.196	-1.163	0.642
	(0.67)	(0.51)	(0.74)	(0.51)
Moved	-0.131	-0.130	-0.123	-0.086
	(0.10)	(0.10)	(0.12)	(0.15)
Constant	-1.481***	-2.666***	-2.925***	-4.408***
	(0.26)	(0.27)	(0.36)	(0.48)

Note: Data are from the 2008 Survey of Income and Program Participation. All models include state fixed effects. Non-Hispanic White is the reference category for race/ethnicity. South is the reference category for region. Did not complete high school is the reference category for educational attainment. Lives in Metropolitan Statistical Area is the reference category for metro status. Moved is a dichotomous variable equal to 1 if the respondent reported moving houses in the past 9 months.

N=28,641

+ $p < .1$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

**Appendix Table A1. Descriptive statistics for all dependent variables.**

	Mean or Proportion	SD
Material Hardship		
Food Insecurity	15.88	
Bill-Paying Hardship	18.12	
Medical Care Hardship	21.18	
Any Hardship	27.9	
Housing Satisfaction		
Overall Home Satisfaction	3.66	.56
Satisfaction with Room	3.6	.65
House Warm in Summer	6.5	
House Cold in Winter	5.2	
General State of Repair	3.57	.65
Housing Problems		
Pests	8.75	
Leaking Roof	4.7	
Broken Windows	3.24	
Broken Plumbing	2.1	
Cracks in Walls/Ceiling	3	
Neighborhood Quality		
Overall Neighborhood Satisfaction	3.63	.6
Neighborhood Safety	3.52	.66
Neighborhood Services	3.61	.61
Problems with Trash	6.5	
Problems with Abandoned Buildings	8.1	
Problems with Industries	4.6	
Problems with Odors	3.15	

Note: Data are from the 2008 Survey of Income and Program Participation. N=28,641

**Appendix Table A2. Descriptive statistics for all independent variables.**

	Mean or Proportion	SD
Housing Cost Burden	20.67	16.94
Household Income	4.73	3.53
Race		
Non-Hispanic White	72.85	
Non-Hispanic Black	11.9	
Hispanic	9.1	
Asian American	3.3	
Other Race/Ethnicity	2.9	
Age	51.15	16.57
Region		
South	37.57	
Northeast	17.82	
Midwest	24.47	
West	20.14	
Education		
Did Not Complete High School	11.37	
High School Graduate	24.53	
Some College	34.38	
College	29.72	
Married	50.74	
School Age-Child in Home	26.44	
Owens Home	69.3	
Housing Assistance	5.7	
Metro Status		
In Metro	76.01	
Not in Metro	19.77	
Not Identified	4.22	
Moved	7.5	

Note: Data are from the 2008 Survey of Income and Program Participation. N=28,641

**Appendix Table 3. Multinomial logistic regression results of the association between housing cost burden, housing quality, and neighborhood quality.**

	Overall Satisfaction <i>b</i> (se)	Amount of Space <i>b</i> (se)	State of Repair <i>b</i> (se)	Neighborhood Satisfaction <i>b</i> (se)	Neighborhood Services <i>b</i> (se)	Neighborhood Safety <i>b</i> (se)
Category 1 vs Category 4						
Housing Cost Burden	-0.006 (0.11)	0.035 (0.08)	0.041 (0.07)	-0.159+ (0.10)	0.073 (0.08)	-0.109 (0.08)
Housing Cost Burden <sup>2</sup>	-0.000 (0.01)	-0.004 (0.01)	-0.001 (0.01)	0.013 (0.01)	-0.009 (0.01)	0.012 (0.01)
Category 2 vs Category 4						
Housing Cost Burden	0.080 (0.06)	0.012 (0.05)	0.084+ (0.05)	0.067 (0.05)	0.038 (0.04)	0.020 (0.06)
Housing Cost Burden <sup>2</sup>	-0.012 (0.01)	-0.004 (0.01)	-0.010+ (0.01)	-0.010 (0.01)	-0.005 (0.01)	-0.002 (0.01)
Category 3 vs Category 4						
Housing Cost Burden	0.020 (0.02)	0.008 (0.02)	0.071** (0.02)	0.013 (0.02)	0.060** (0.02)	-0.015 (0.02)
Housing Cost Burden <sup>2</sup>	-0.001 (0.00)	-0.002 (0.00)	-0.006* (0.00)	-0.002 (0.00)	-0.009** (0.00)	0.002 (0.00)

Note: Data are from the 2008 Survey of Income and Program Participation. All models include state fixed effects, and controls for gender, race/ethnicity, age, region of residence, educational attainment, presence of school-age children in the home, marital status, home ownership, housing assistance receipt, metro status, and recent move. For all outcomes, values range from 1-4 and higher values represent greater satisfaction or greater safety. In all models, the base category is the highest value.

N=28,641

+ $p < .1$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$



**Appendix Table 4. Weighted regression estimates of the association between housing cost burden, having a school-age child in the home, and housing satisfaction.**

	Overall Satisfaction <i>b</i> (se)	Amount of Space <i>b</i> (se)	State of Repair <i>b</i> (se)
School-Age Child in Home	-0.383*** (0.08)	-0.358*** (0.08)	-0.315*** (0.07)
Housing Cost Burden	-0.074** (0.03)	-0.065* (0.03)	-0.096*** (0.03)
School-Age Child in Home X Housing Cost Burden	0.138** (0.05)	0.117* (0.05)	0.093+ (0.05)
Housing Cost Burden <sup>2</sup>	0.007+ (0.00)	0.008* (0.00)	0.009* (0.00)
School-Age Child in Home X Housing Cost Burden X Housing Cost Burden <sup>2</sup>	-0.011+ (0.01)	-0.010 (0.01)	-0.005 (0.01)
Household Income (\$10,000s)	0.066*** (0.01)	0.045*** (0.01)	0.062*** (0.01)
Female	0.009 (0.03)	-0.000 (0.03)	-0.026 (0.03)
Non-Hispanic Black	-0.383*** (0.05)	-0.339*** (0.05)	-0.415*** (0.05)
Asian American	-0.337*** (0.08)	-0.324*** (0.07)	-0.279*** (0.07)
Hispanic	0.028 (0.06)	0.028 (0.06)	0.060 (0.05)
Other Race/Ethnicity	-0.337*** (0.09)	-0.291*** (0.09)	-0.297*** (0.09)
Age	0.016*** (0.00)	0.018*** (0.00)	0.012*** (0.00)
Northeast	-0.298 (0.54)	0.873+ (0.52)	-0.058 (0.48)
Midwest	-0.171 (0.15)	-0.225 (0.14)	-0.083 (0.14)
West	-0.720*** (0.14)	-0.702*** (0.14)	-0.707*** (0.14)
High School Graduate	0.157** (0.05)	0.172** (0.05)	0.085+ (0.05)

Some College	0.123*	0.125*	0.113*
	(0.05)	(0.05)	(0.05)
College +	0.464***	0.433***	0.456***
	(0.06)	(0.06)	(0.05)
Married	0.155***	-0.013	0.193***
	(0.03)	(0.03)	(0.03)
Owns Home	0.416***	0.435***	0.086*
	(0.04)	(0.04)	(0.04)
Housing Assistance	0.054	-0.004	0.117+
	(0.07)	(0.07)	(0.07)
Not in Metro Area	0.112**	0.150***	0.075+
	(0.04)	(0.04)	(0.04)
Metro Area Not Identified	0.366	-0.075	-0.331
	(0.36)	(0.28)	(0.28)
Moved	0.284***	0.250***	0.345***
	(0.06)	(0.05)	(0.06)

Note: Data are from the 2008 Survey of Income and Program Participation. All models include state fixed effects. Non-Hispanic White is the reference category for race/ethnicity. South is the reference category for region. Did not complete high school is the reference category for educational attainment. Lives in Metropolitan Statistical Area is the reference category for metro status. Moved is a dichotomous variable equal to 1 if the respondent reported moving houses in the past 9 months.

N=28,641

+ $p < .1$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$