

What are Housing Assistance Support Recipients Reporting as Rent ?

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This paper reports the results of research and analysis undertaken by U.S. Census Bureau staff. It has undergone more limited review than official publications and was released to inform interested parties of ongoing research and to encourage discussion of work in progress. Any views expressed are those of the author and not necessarily those of the U.S. Census Bureau.

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INTRODUCTION

Housing is one of the most basic necessities in life, and housing costs usually figure as a fundamental element of a household's expenditures. Enabling low-income households to defray their housing costs is an important component of the social safety net. The ability of such households to meet their housing needs is taken into account in measures of poverty, such as the Census Bureau's Supplemental Poverty Measure (Renwick, 2011; Short, 2014; Renwick and Fox, 2016).

A question on monthly rent is included in the nationally representative American Community Survey (ACS), whose size and design would facilitate the calculation of subnational and regional measures of rent. How to interpret responses to this item, in particular, whether they indicate the out-of-pocket expenditure of the household for rent or the total cost for rent of that unit, has been a matter of some uncertainty for ACS recipients of housing subsidies. This uncertainty is increased by the fact that respondents in different modes received alternative instructions on what to include. The question is whether, and for whom, the responses can be interpreted as indicative of the rental value of the dwelling unit on the market. In the case of residents of subsidized housing, the question becomes whether the ACS item represents the entire rental cost of the unit, or only the amount the household contributes in payment, excluding the subsidy also received by the housing provider.

Administrative datasets maintained by the Department of Housing and Urban Development (HUD), the agency of the government providing support towards housing costs to low-income households, provide a separate source of data on housing support recipients' expenditures on housing that can be helpful in establishing what the ACS rent item is capturing for these households. These are used to address the above question in the analysis described below.

RESEARCH QUESTIONS

In the analysis that follows, we will attempt to address the following research questions:

1. Are the ACS respondents who receive housing subsidies more likely to report their out of pocket rent payments or the full amount including the subsidy provided to the property owner ?
2. Does this likelihood vary by ACS response mode (mail self-response, computer-assisted personal interview, computer-assisted telephone interview) ?
3. Does this likelihood vary by type of housing assistance ?

The data to be analyzed consist of a dataset of merged records in which HUD administrative data for household heads in 2013 and 2012 have been matched to corresponding records for the same individuals in the annual ACS housing files for those years. The results from this analysis will hopefully be able to inform subsequent research on how best to incorporate the reporting of rent from the ACS as part of the Census Bureau's Supplemental Poverty Measure research.

THE HUD DATA

The administrative data used in the present analysis come as two files, one pertaining to HUD's Public and Indian Housing programs (the "PIC File") and the other to HUD's Tenant Rental Assistance programs (the "TRACS File"). Each file consists of a capture made in March, aimed at containing records for which the effective date of the certification made by HUD occurred in the preceding 12 months.¹ The majority of the certification dates fall within the first quarter of the target year and the last quarter of the preceding year. The unit of observation in these files is the person, but most variables pertain to the household and are repeated for each member. Each person is distinguished by a Person Identification Key (PIK) assigned by the Center for Administrative Records Research and Applications (CARRA), which is intended to be unique across various datasets and is associated with a household by a "Quick PIK" (QPIK) of the Household Head.² The QPIK of the Household Head is the identifier in the HUD files that allows us to group persons into households.³ The housing unit is also associated with a Master Address File ID (MAFID) assigned by CARRA, whose aspect is more problematic for reasons discussed below.

The PIC and TRACS files share many variables in common. However, in many instances these items are not measured in a fully comparable manner. For example, member age is available as exact age in years on the PIC files, whereas the TRACS files contain the member's date of birth, so that age must be calculated by subtraction from the certification date. Similarly, the PIC file contains multiple race for members in the form of five items corresponding to the 1997 OMB categories.⁴ The TRACS file, on the other hand incorporates an additional "other race" category, making for six items and a discrepancy in the measure. There are analogous differences in the relationship to household head items between the PIC and TRACS files. This has led us to develop variables on comparable metrics, such as exact age calculated for TRACS cases by subtracting dates and rounded to integer years for comparability to the PIC age measure. We have included these variables, along with the original variables, in a merged PIC and TRACS file.

Because our interest lies at the household/housing unit level, we aggregated the HUD person-files to the household level by sorting on MAFID and the QPIK of the household head, then summing all persons with the same MAFIDs and Head's QPIKs. In the process, we constructed measures of household size and composition, namely the ages of the oldest and youngest household members and the difference between them. We also assigned any persons living alone with missing values on the relationship to household head item the designation of head of their (single-person) household. The individual

¹ In practice, they sometimes miss the mark, and the certification dates can fall outside the endpoints of the 12 month period.

² When individuals' social security numbers are available, PIKs are assigned by a process involving a match to the Census Bureau's internal variant of the Social Security Administration's NUMIDENT database (Wagner and Layne, 2014). According to CARRA, QPIKs are based exclusively on social security numbers without taking account of any other factors that can play a part in the assignment of PIKs and are not unique across datasets.

³ In instances where there was only one person associated with a QPIK and that person had a missing value on relationship to household head, we designated that person as the head of the (single-person) household.

⁴ These are White, Black/African-American, American Indian/Alaska Native, Asian, and Native Hawaiian and Other Pacific Islander.

attributes of the household head, such as age and sex, were retained. Thereafter, the household files created from the PIC and TRACS files were merged into combined datasets.

Rent Concepts Relevant to Recipients of Housing Support

Two categories of housing expenditure excluding utilities are distinguished in the HUD data: Contract Rent, and Total Tenant Payment (TTP). The former corresponds to what the dwelling unit rents for, while the latter is the household's outlay exclusive of any subsidy or other costs. Both constructs are important for recipients of HUD assistance that provides subsidies intended to help low-income tenants obtain adequate housing with a payment that is affordable to them. The Contract Rent is ordinarily the Total Tenant Payment plus the HUD subsidy. For certain categories of housing assistance, such as traditional public housing and homeownership vouchers, Contract Rent is not defined.⁵ Total Tenant Payment is typically determined by regulations that take account of the household's income with adjustments for certain circumstances such as health care costs of disabled members, and can exist in situations where there is no Contract Rent.

THE ACS

The ACS is a nationwide survey designed to provide communities with reliable and timely demographic, social, economic, and housing data for the nation, states, congressional districts, counties, places, and other localities every year. It has an annual sample size of 3.5 million addresses across the US and Puerto Rico, including both housing units and group quarters (e.g. nursing homes, prisons).⁶ The ACS is conducted in every county in the US, to which the present analysis is limited. For information on the ACS sample design and other topics, visit www.census.gov/acs/www.

The Concerns about the ACS Instructions on Rent

The ACS instruction pamphlet included with the paper questionnaire and the help instructions for Internet Self-Response instruct the respondent to "Report the rent agreed to or contracted for, even if the rent for your home, apartment, or mobile home is unpaid or paid by someone else." Standing in juxtaposition, the ACS help screen instructions for telephone or personal interviews contain the same sentence, followed immediately by "Do not include any subsidy amount which may be paid by a local housing authority or other agency." Moreover, respondents may in general be more apt to indicate their monthly outlay on rent, of which they are well aware, than some amount including a subsidy that they may not recall readily, all instructions notwithstanding. Whether or not recipients of housing support include the amount of the subsidy provided should clearly influence the amount of rent they report in response to the ACS item. This, in turn, has obvious implications in terms of how responses to the ACS rent item should be interpreted for recipients of housing support. The present analysis hopes to shed some light on this question.

⁵ Public housing residents pay a rent equivalent to 30 percent of their adjusted monthly income irrespective of the rental value of their apartment, while homeownership voucher recipients make mortgage payments rather than rent.

⁶ Group quarters are excluded from this analysis.

The ACS Data Files

The ACS files come in several variants for each calendar year, notably a person-file and a housing-unit file. There are also files including the population in group quarters. Only the former two sets of files are germane to the present exercise. These files differ substantially in their contents. The person-level ACS file does not contain housing items or aggregate household characteristics such as household income, while the housing unit file contains only one record per housing unit with various individual characteristics of the reference person, typically the householder, and a variety of household-level items including combined income and the number of wage earners in the household. The housing-unit file omits the reference person's sex and does not contain the separate incomes of any individual members. The files to which we have access also include a Master Address File ID (MAFID) from the Master Address File that is the basic frame used in developing the ACS annual sample, and is unique for each housing unit/household.⁷

The basic identifier in the ACS housing unit file is a Continuous Measurement ID (CMID) that is unique to each household in the ACS. There is generally a one-to-one correspondence between ACS CMIDs and MAFIDs, and these are unique for each housing unit/household in the non-group quarters population. The ACS person files to which we currently have access include MAFIDs as an item. The ACS person-level files include, in addition, person order numbers that in combination with the CMIDs or MAFIDs uniquely identify household members in the non-group quarters population universe in the given year.

We also possess tables of correspondences of PIKs to CMIDs, person number, and person order numbers in 2012 and 2013. Unlike the PIK assignment method used for the HUD administrative records that provided social security numbers, the matching done by CARRA to attach PIKs to ACS records had to use other attributes because the ACS does not obtain social security numbers. Instead, PIKs were assigned by CARRA using individual name, address, and household composition information through the Person Identification Validation System (Wagner and Layne, 2014). The assignment of PIKs to ACS persons is apt to be less reliable than the assignment of PIKs to persons in the HUD files, whose original versions do incorporate social security numbers.

THE MATCHING PROCESS

Initial Disconcerting Results and the Problem with HUD Dwelling Unit Designation

Our initial examination of the HUD datasets for 2013 revealed a significant problem with the standard use of MAFIDs as a matching key with the ACS dataset. We found many instances of MAFIDs that were associated with several hundreds, or even thousands, of persons at a particular street address. With the first 2013 file we received from CARRA we also found instances of households defined by QPIKs of heads containing hundreds of members. At approximately the same time, we learned from one of our colleagues at HUD that there were numerous instances in which residents of large multiunit structures (for which each apartment should have received a unique MAFID) had been assigned a single MAFID based on the street address of the multiunit structure alone, without distinguishing apartments as

⁷ ACS households are defined in terms of coresidence in the housing unit and therefore coincide with the demarcation of (occupied) housing units. HUD also defines the household as all who reside in the housing unit, but in various cases the QPIKs distinguish multiple households associated with the same MAFID.

separate dwelling units. Although CARRA subsequently corrected an undescribed error in the assignment of QPIKs that greatly reduced the number of implausibly large households defined by this item, this left us with MAFIDs on the HUD files that would lead to implausible data when used as matching keys with ACS records.⁸ Fortunately, the availability of tables of correspondences of individual PIKs to ACS CMIDs and person order numbers (termed “crosswalk files”) created by CARRA presented a viable alternative, allowing PIKs to be assigned directly to ACS person records. We could then merge the records from the two datasets using the PIKs with the HUD administrative data without reference to address information.⁹

Working Dataset Construction

One complication we encountered was that the ACS housing file does not contain the sex of the householder, which can be helpful in identifying mismatches and is of some interest in analysis of the population in poverty. We were able to place the householder’s sex on our housing files by obtaining them from the ACS person file. Our procedure to link ACS and HUD individuals using the PIKs began with the crosswalk files that linked ACS CMIDs to PIKs. All instance of duplicate PIKs in the files we used were eliminated, along with any records missing a PIK. In this way we obtained a crosswalk of actual ACS CMIDs to unambiguous PIKs.¹⁰ Next, PIKs were assigned to ACS records by matching to the ACS person file using the CMID as a linking variable. Only ACS records with CMIDs that corresponded to PIKs in this crosswalk were retained. Thereafter household reference persons were selected from this “PIKed” ACS person file according to relationship code. The sexes of these householders were retained and merged onto the records in the ACS housing unit file having the same CMIDs. Only instances in which a match existed between a CMID of a selected person from the ACS person file and a CMID on the ACS housing unit file were retained. This procedure was used to construct both a 2013 and a 2012 ACS housing unit file for merging to the 2013 HUD dataset.

In matching the resulting files to the 2013 HUD file, instances of duplicate PIKs were first eliminated from the HUD file. We took care to retain such individual characteristics of the household head/reference person such as sex, race, and age from both the HUD and the ACS data in order to facilitate checking the quality of the matches and to identify mismatches. The resultant file contained 120,162 records for household heads/reference persons. In the analysis which follows we excluded instances where the sex of household head did not agree between the ACS and HUD data, and where the HUD head’s age differed by more than 2 years from that of the ACS householder. We also excluded HUD certifications no longer active due to moveouts from local jurisdictions and terminations from HUD assistance, as well as instances in which the ACS interview date preceded the HUD move-in date. In the

⁸ It is not clear at this point if the lack of apartment designations in the HUD administrative data are simply due to an oversight or to the fact that apartment designations are not needed to administer certain HUD rent subsidy programs.

⁹ While use of PIKs as matching keys is a good substitute if MAFIDs are not available, PIKs based solely on name and address (since the ACS does not obtain social security numbers) will not be as reliable as PIKs based on social security number (which the HUD data provide).

¹⁰ When a single PIK corresponds to two or more CMIDs in an ACS person file, it is not clear which is the correct match (if either). Therefore, we eliminated all instances of such duplication. ACS records which do not correspond to any PIK afford no possibility of matching to the HUD data, and we eliminated these records as well.

former case the household is no longer receiving HUD assistance, at least at the dwelling unit to which the certification refers; in the latter, the householder was not interviewed for the ACS in the dwelling unit to which the HUD certification refers. In addition, we excluded all instances in which the ACS interview data differed from the HUD certification date by more than 2 years. We excluded all instances in which the ACS rent item was allocated. Finally, we excluded all records pertaining to certifications flagged as “not the current certification”.¹¹ These exclusions reduced the number of matched records to 83,278.¹² Due to the way the dataset was constructed, it may not represent the full US population.

COMPARISON BETWEEN ACS SELF-REPORTED RENT AND HUD CONTRACT RENT AND TOTAL TENANT PAYMENT

A histogram of the weighted difference between responses to the ACS monthly rent item and the HUD Contract Rent reported for the same households in our matched sample is presented in Figure 1¹³. The distribution is bimodal but dominated by the overall mode centered at a difference of zero, indicating that a sizeable share (25 percent¹⁴) of householders are reporting a monthly rent that is within \$25 of the HUD Contract Rent.¹⁵ Apart from this, the left-hand skew of the distribution illustrates that most households (71 percent) report paying less than the HUD Contract Rent. In contrast, the distribution of the difference of Total Tenant Payment from ACS rent in Figure 2 is unimodal, with the modal category again centered at zero. In this case, the distribution is skewed to the right, revealing a sizeable contingent (48 percent) reporting a rent in the ACS that is in excess of their HUD Total Tenant Payment.

Figures 3-8 show the influence of mode of interview. Given the discrepant instructions for the different interview modes mentioned above, one might expect mode of interview to influence whether households report a rent closer to HUD Contract Rent or closer to Total Tenant Payment. This is not what we observe in these figures. In general, the distinction of mode of interview does not alter the form of the distributions, especially in the case of Contract Rent. There is clearly one contingent of households reporting something close to the Contract Rent and another reporting something around the Total Tenant Payment.

¹¹ The TRACS dataset contains a variable flagging such instances.

¹² Most of the exclusions were due to sex mismatches (roughly 9500 records), nonresponse on ACS rent (roughly 8000 records), records classed as inactive or superseded (roughly 4500) terminations and moveouts (roughly 2000) and age discrepancies of more than two years (roughly 6000). In many instances excluded records were invalid according to more than one of our criteria, so that the frequencies cited depend on the order in which the exclusions were tallied.

¹³ The histogram, tables, and results described in the text were obtained using the Survey package in R (Lumley, 2014), which accommodates the replicate weights used with the ACS design.

¹⁴ The figure, of course, does not convey this degree of precision. The numbers cited refer to point estimates rounded to the nearest percentage.

¹⁵ The width of each bar in this histogram, as well as figures 2-8 is \$50, and the mode is centered at zero, so that the protruding bar comprises households with ACS rents that differ by \$25 or less from Contract Rent.

HUD Program Category

Thus far, we have examined univariate distributions of the overall (weighted) sample. We turn now to investigating whether a household's response to the ACS rent question is closer to HUD Contract Rent or Total Tenant Payment for the same respondent. The figures we analyze are weighted to reflect the share of the U.S. household population that each household in the analysis represents. In much of what follows we shall employ a dichotomous variable reflecting whether the ACS rent response is at least as close to HUD Contract Rent as it is to HUD Total Tenant Payment.

The criteria and regulations of HUD's various housing and rental assistance programs differ in ways that can affect how households respond to the ACS rent item. For example, residents in conventional public housing may find the distinction between Contract Rent and Total Tenant Payment difficult to understand. HUD does not provide a Contract Rent for this category of subsidized housing. Section 236, on the other hand, provides mortgage assistance to property owners so that they charge affordable rent to low-income tenants, who may be more apt to be aware of the Contract Rent.

Figure 9 presents a plot of the proportions of weighted households reporting an ACS rent that is at least as close to HUD Contract Rent as it is to Total Tenant Payment for the same household, for each of 19 HUD program categories that our data permit us to distinguish.¹⁶ In most categories, the proportion is below 0.5, indicating that the majority of weighted households in the category are reporting an ACS rent that is closer to the HUD Total Tenant Payment. Proportions of zero are featured for three categories, namely Public Housing (PICP), Moving to Work Homeownership Vouchers (PICH), and Homeownership Vouchers NOS (PICHV)¹⁷. For these three categories HUD does not define a Contract Rent, but does register a Total Tenant Payment.¹⁸ At the opposite extreme, over 98 percent of households in the Section 236 program (TRACSH4) report an ACS rent at least as close to their HUD Contract Rent, as do 89 percent of households in the Below Market Interest Rate program (TRACSH5).¹⁹

Our dichotomy is open to the criticism of insensitivity to the magnitudes of the quantitative differences between ACS rent and the HUD measures. An ACS rent that differs from Total Tenant Payment by \$202 and Contract Rent by \$201 would receive the same score as an ACS rent that is exactly equal to the Contract Rent and \$200 greater than Total Tenant Payment. This concern is addressed in Tables 1 and 2

¹⁶ See Table 3 for the weighted counts and proportions, as well as a list of expanded titles of the respective program categories, whose abbreviations appear in the graph legend.

¹⁷ Here we mean Homeownership Vouchers not connected with the Moving to Work program. "NOS" is an acronym for "not otherwise specified".

¹⁸ This makes impeccable sense for the homeownership voucher programs, which involve a mortgage payment rather than rent. In the case of Public Housing, where residents are generally required to pay 30 percent of their monthly adjusted income as "rent", it seems more arbitrary; presumably, the notion is that this monthly payment is determined not by housing market forces but rather as a fraction of adjusted household income.

¹⁹ The stability of these proportions depends on the overall weight of the respective categories, and is considerably less for the latter two program categories than for large programs such as Section 8 NOS or Tenant Based Vouchers. Nevertheless, taking this into account, it still seems reasonable to conclude that a majority of households in the latter categories are reporting in the ACS a rent that is at least as close to their Contract Rent as their Total Tenant Payment.

that present two measures which take account of the sizes of the differences in dollar amounts of ACS rent from Total Tenant Payment and Contract Rent, namely: 1) the interquartile ranges (IQRs) of the distributions of the differences; and 2) the proportions of households whose ACS rents differ from the two respective HUD measures by less than \$50 in absolute value. The former measure is often interpreted as a nonparametric indicator of the dispersion of a distribution,²⁰ while the latter quantifies the concentration of the distributions within a \$100 range around the points of equality between ACS rent and the two respective HUD measures.

The interquartile ranges in Table 1 agree with the picture presented in Figure 9. In general, programs whose recipient households in our weighted sample tend to report ACS rents closer to HUD Total Tenant Payment than HUD Contract Rent exhibit higher interquartile ranges on the distribution of the difference between ACS rent and HUD Contract Rent than on the distribution of the corresponding difference between ACS rent and HUD Total Tenant Payment. The first program category, PIC Certificates, stands as an exception to this regularity.

The estimates of standard errors of the IQRs in Table 1 were obtained directly from the 80 replicates obtained with the ACS replicate weights. These figures are presented to give an impression of the underlying stability of the IQRs. Our estimates suggest that the IQRs for the relatively small Below Market Interest Rate program (TRACSH5) are not especially stable, whereas those for the modestly sized Enhanced Voucher program (PICEV) appear considerably more solid. According to the standard errors, there would be major overlap between confidence intervals around the IQRs for the PIC Certificate program (PICCE).

The proportions of households in the various program categories indicating an ACS rent within \$50 of the HUD Contract Rent and Total Tenant Payment are presented together with their standard errors in Table 2.²¹ These comprise sizeable shares of the households receiving HUD assistance, amounting to at least 30 percent overall. As the table reveals, the shares vary considerably by program category, but apart from a few (4) program categories, we are 90 percent confident that at least one of the measures for ACS-Contract Rent, or for ACS Rent-TTP is at least as great as 30 percent given the level of sampling variability indicated by the standard errors. The maximum proportion is 73 percent. Taking account of sampling variability, we can be 90 percent confident that over 50 percent of households in the program category report an ACS rent within \$50 of the Contract Rent or Total Tenant Payment in 9 of the 19 categories distinguished. Eight of these instances pertain to Total Tenant Payment. At the same time, three programs in sparsely represented program categories – Moving to Work Homeownership Voucher (PICH), Below Market Interest Rate (BMIR – TRACSH5), and Section 202/162 PRAC (TRACSH9) - include

²⁰ The interquartile range is based on order statistics, namely the first and third quartiles, and makes no assumption about the form of the distribution. In contrast, the standard deviation is associated with the notion that two thirds of a normal distribution fall within one standard deviation of the mean.

²¹ Some confidence intervals based on these standard errors would go beyond the bounds of zero or unity, which is implausible for any proportion. We could compute more exact measures of stability at the cost of a considerable increase in complexity, for instance, by taking logits of the proportions and constructing more unassailable confidence intervals by inverting the transformation of the interval borders. Here, however, we only seek a rough measure of stability. If we did the extra esoteric work, it would very likely remain the case that differences in the size of the various program categories are the primary determinants of differences in their standard errors.

no cases within \$50 of one or more of the HUD measures (Contract Rent, Total Tenant Payment). In terms of program categories, the results in Table 2 are consistent with those from the interquartile ranges in Table 1 and the results portrayed in Figure 9. In other words, the categories whose IQRs were smaller for Total Tenant Payment than Contract Rent exhibit greater proportions within \$50 of Total Tenant Payment than the corresponding proportions with regard to Contract Rent, and vice versa, while the categories whose IQRs are closer for Contract Rent than Total Tenant Payment exhibit greater proportions within \$50 of Contract Rent in comparison to the shares within \$50 of Total Tenant Payment and vice versa.

Bivariate Distribution

An important and thus far neglected consideration concerns the relative sizes of the various program categories. We address this in Figure 10, which displays the bivariate distribution of represented households by program category and whether or not ACS rent is closer to HUD Contract Rent than HUD Total Tenant Payment in the form of a stacked bar chart. This chart reveals that out of the awkward multiplicity of program categories, three account for the overwhelming majority of represented households: Tenant Based Vouchers NOS (PICTBV),²² Public Housing (PICP), and Section 8 NOS (TRACSH1). As Table 3 confirms, these three categories comprise 89 percent of represented households. Furthermore, Public Housing and Section 8 NOS are entirely or almost entirely comprised of represented households reporting ACS rent closer to Total Tenant Payment than Contract Rent. A substantial minority, roughly 39 percent, of the Tenant Based Voucher NOS category represented households are also in the category reporting rent closer to Total Tenant Payment. In general, over two thirds of represented households fall in this category. Figure 11 makes the additional point that the sizes of the 19 disaggregated program categories vary greatly, some accounting for tangible shares of represented households, and others not.

CONCLUSION AND DISCUSSION

We can draw the following tentative conclusions for the research questions posed above:

1. Are the ACS respondents who receive housing subsidies more likely to report their out of pocket rent payments or the full amount including the subsidy provided to the property owner? - The majority of HUD housing assistance recipients examined in the present analysis report ACS rents that are clearly below market rents, either by omitting the subsidy they receive from HUD or, as in the case of conventional Public Housing, because they are assessed a payment in a context where market rent does not apply.
2. Does this likelihood vary by ACS response mode (mail or internet self-response, computer-assisted personal interview, computer-assisted telephone interview)? Figures 3-8 appear to show that the patterns of differences between the ACS rent and the HUD contract rent and between the ACS rent and the HUD Total Tenant Payment did not differ by mode (mail response, computer-assisted telephone interview and computer-assisted personal interview). However, the differences by mode may be statistically significant without being obvious at this

²² This excludes Tenant Based Vouchers connected to the Moving to Work program.

level of visualization. We believe that further investigation in a multivariate context is warranted to see if these same patterns hold when we control for other variables.

3. Does this likelihood vary by type of housing assistance? There were differences among the various programs in the closeness of ACS rent to either HUD Contract Rent or HUD Total Tenant Payment. A couple small categories of HUD assistance recipients in specific programs seem to overwhelmingly report their Contract Rent. These are programs²³ in which property owners receive assistance from HUD so that they offer affordable rent to low income tenants. In other words, the rents in these cases are HUD-subsidized to be lower than they would be otherwise. They are not comparable to ordinary market rents.

Based on the findings of this analysis, including ACS self-reported rents for households receiving HUD rent subsidies would downwardly bias an estimate aiming to represent ordinary residential rent. In calculating such estimates, it would be better to exclude the majority, if not all, recipients of HUD assistance.

References

Lumley, Thomas, "survey: analysis of complex survey samples". R package version 3.30. 2014.
<http://r-survey.r-forge.r-project.org/survey/>

Renwick, Trudi J, Geographic Adjustments of Supplemental Poverty Measure Thresholds: Using the American Community Survey Five-Year Data on Housing Costs. SEHSD Working Paper Number 2011-21. US Bureau of the Census, July, 2011.

Renwick, T., & Fox, L. (2016). *The Supplemental Poverty Measure: 2015* [U.S. Census Bureau, P60-258(RV)]. Washington, DC: U.S. Government Printing Office.

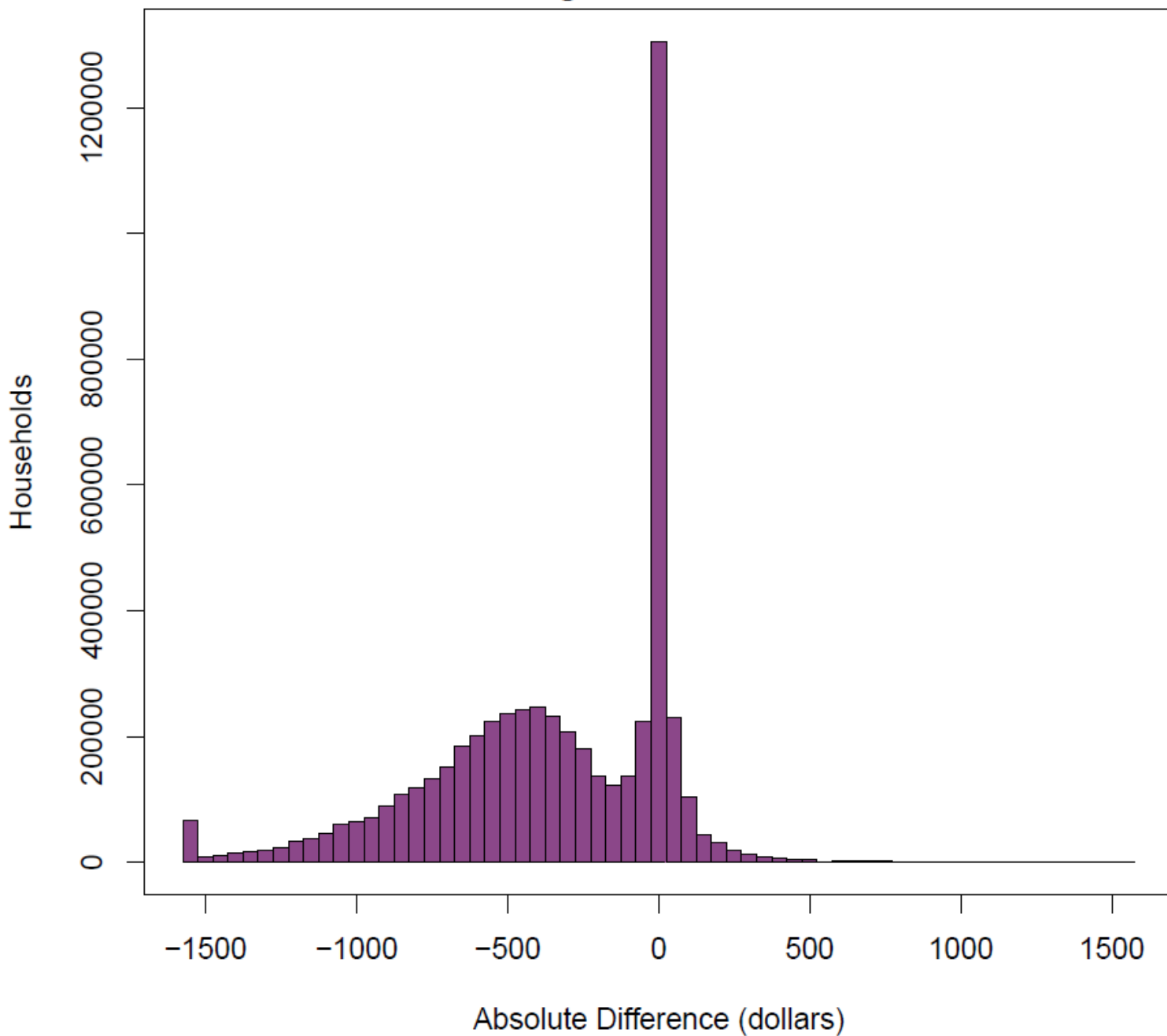
Short, Kathleen, The Supplemental Poverty Measure: 2013, Current Population Reports P60-251. US Census Bureau, October, 2014.

US Department of Housing and Urban Development, Programs of HUD: Major Mortgage, Grant, Assistance, and Regulatory Programs, 2016. portal.hud.gov/hudportal/HUD/hudprograms

Wagner, Deborah and Mary Layne "The Person Identification Validation System (PVS): Applying the Center for Administrative Records Research and Applications (CARRA) Record Linkage Software". CARRA Working Paper #2014-01. Washington, DC: US Census Bureau. 2014.

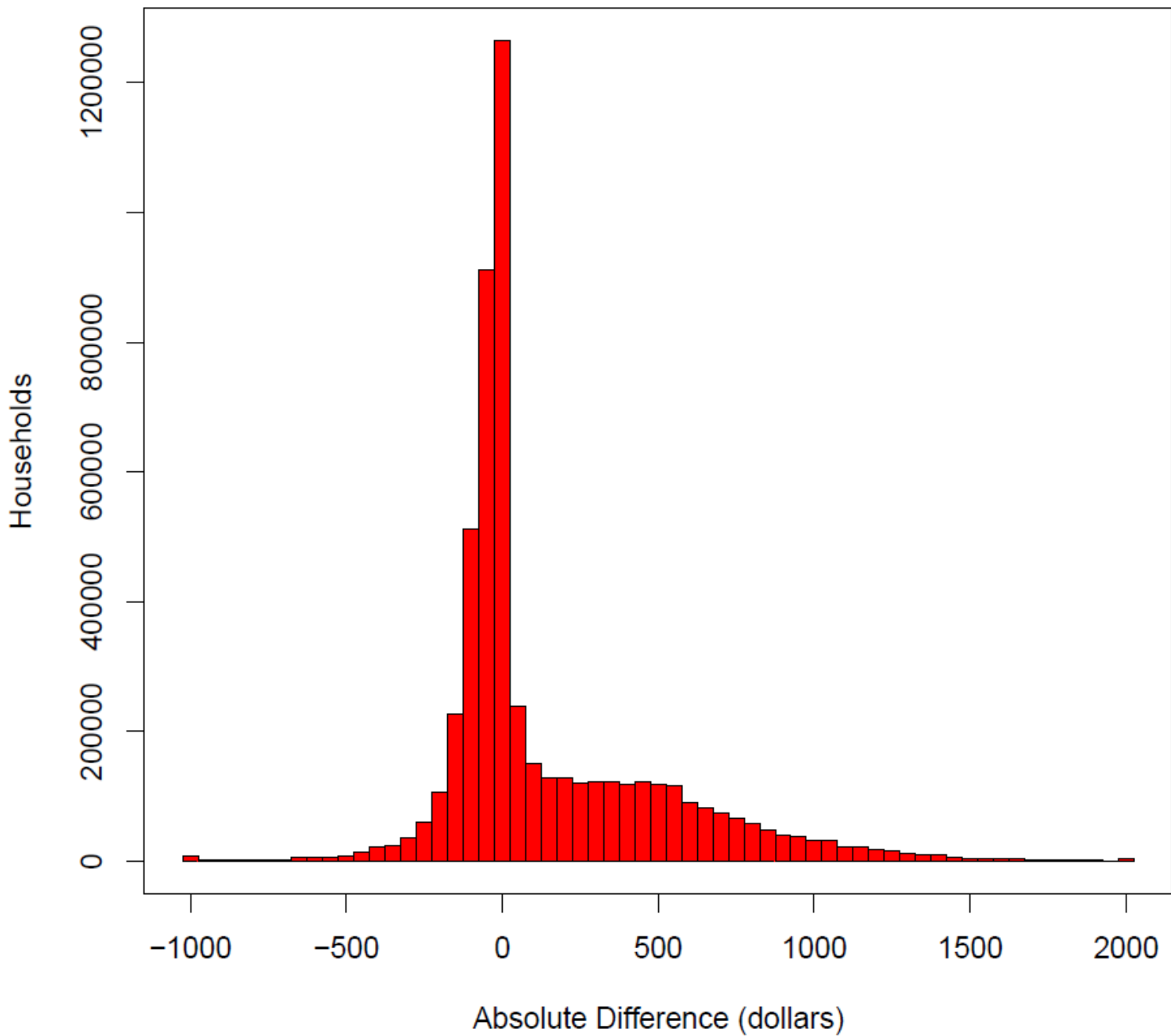
²³ We refer to Section 236 and the Below Market Interest Rate (BMIR) program.

Figure 1.
Difference ACS 2012/13 Reported Rent – HUD 2013 Contract Rent
Weighted Instances



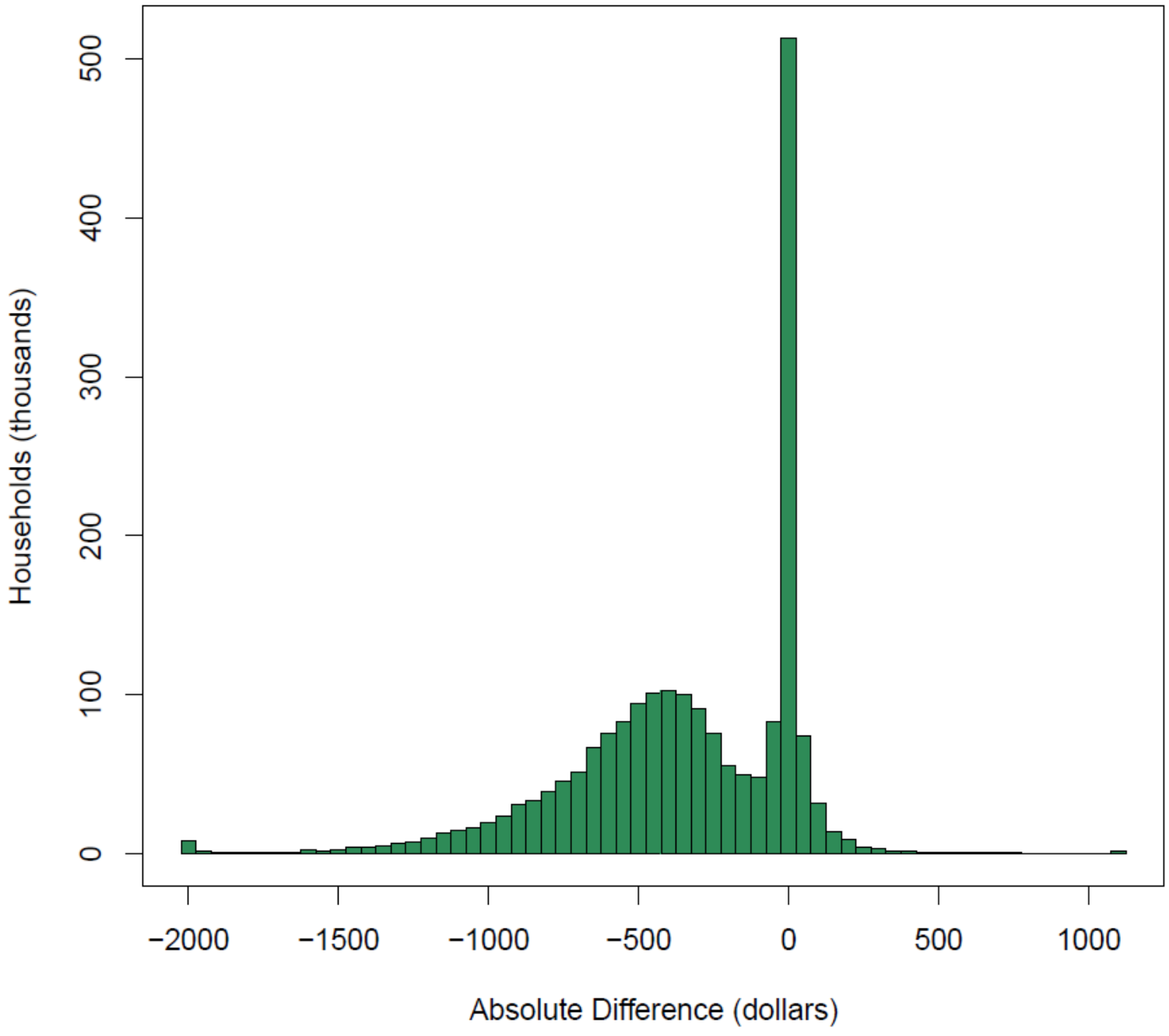
Source: Matched HUD/ACS 2012–2013 dataset described in text.

Figure 2.
Dif ACS 2012/13 Reported Rent – HUD 2013 Total Tenant Payment
Weighted Instances



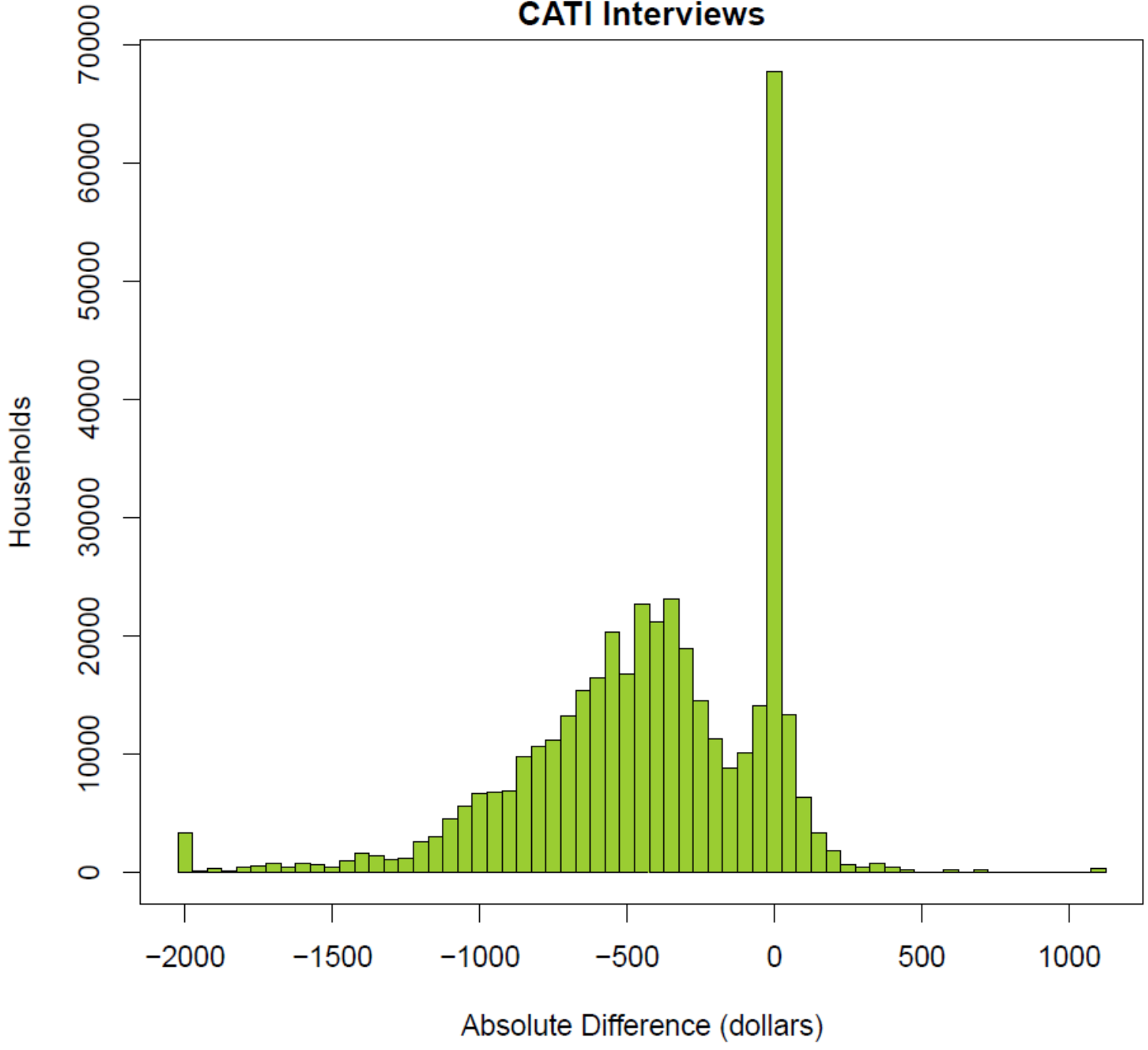
Source: Matched HUD/ACS 2012–2013 dataset described in text.

Figure 3.
Difference ACS 2012/13 Rent – HUD 2013 Contract Rent
Mail Interviews



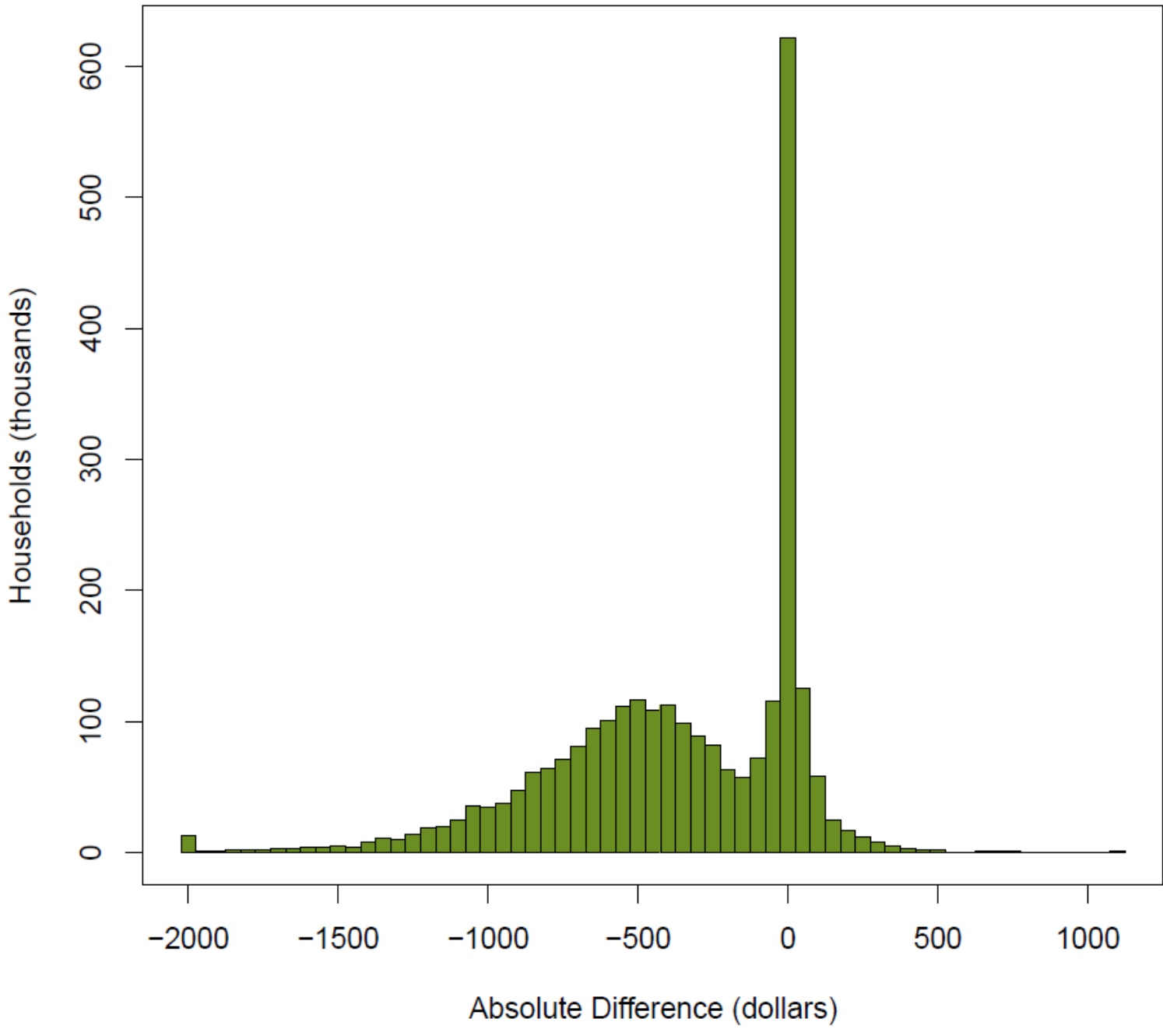
Source: Matched HUD/ACS 2012–2013 dataset described in text.

Figure 4.
Difference ACS 2012/13 Rent – HUD 2013 Contract Rent
CATI Interviews



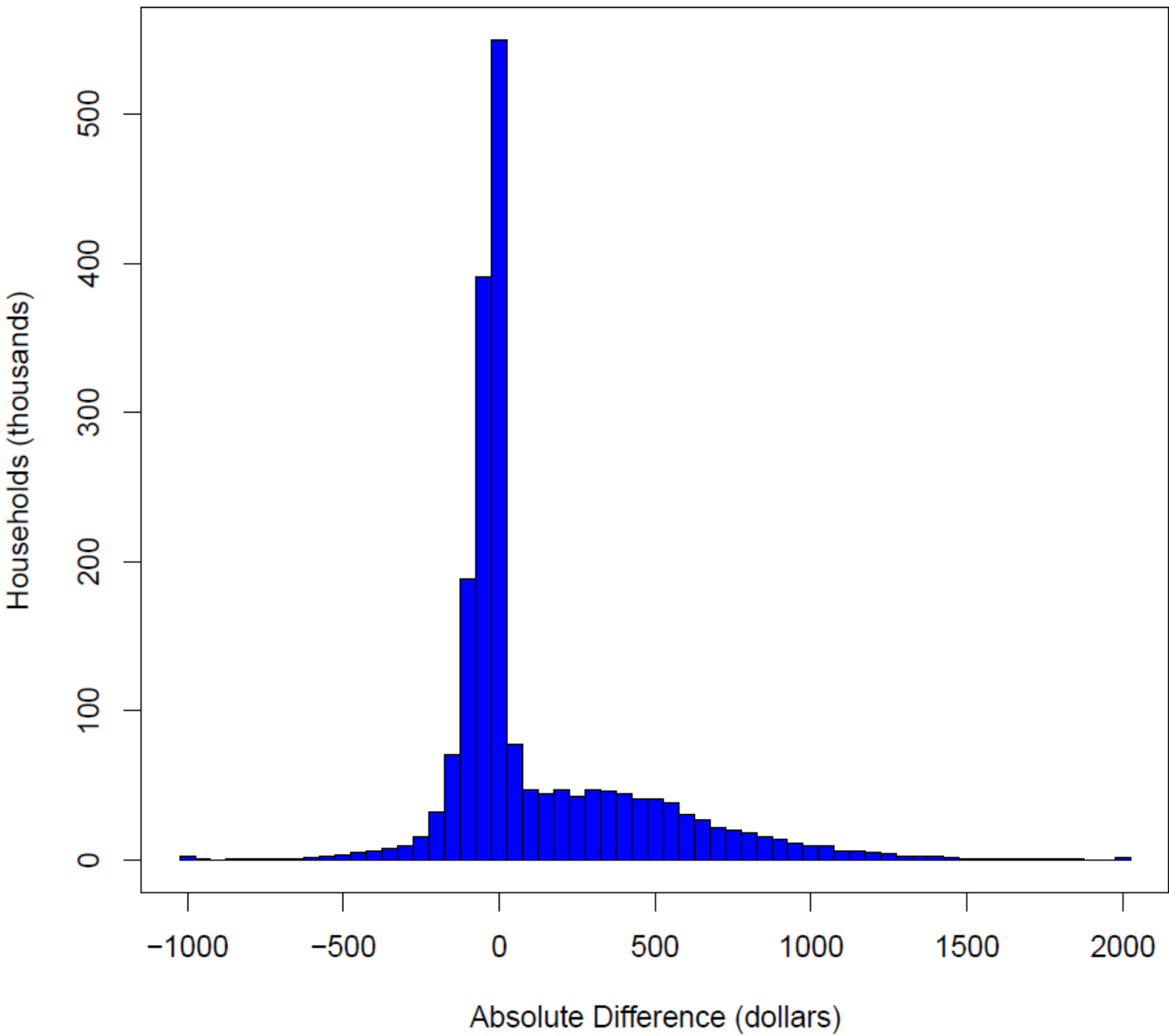
Source: Matched HUD/ACS dataset described in text.

Figure 5.
Difference ACS 2012/13 Rent – HUD 2013 Contract Rent
CAPI Interviews



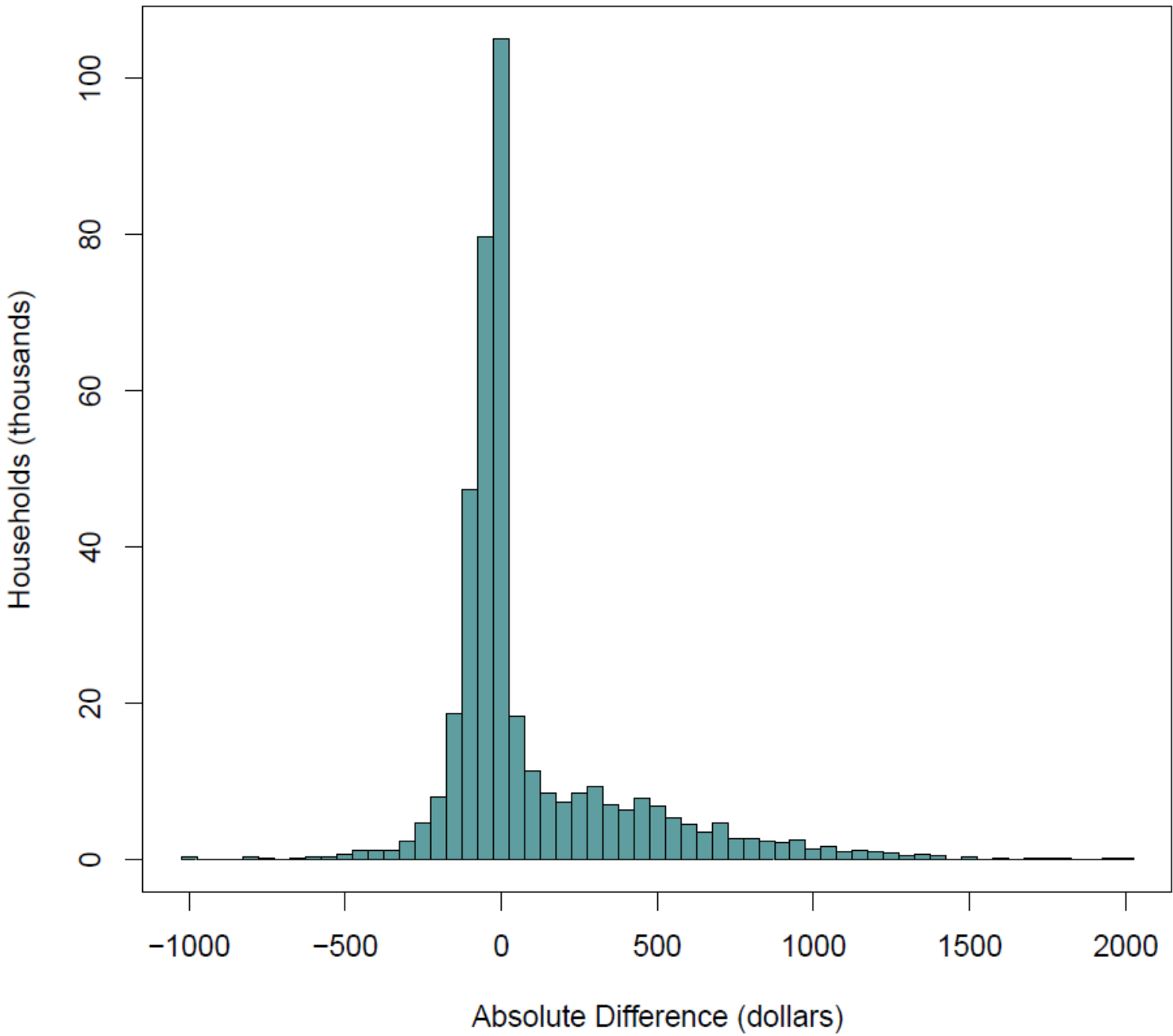
Source: Matched HUD/ACS 2012–2013 dataset described in text.

Figure 6.
Difference ACS 2012/13 Rent – HUD 2013 Total Tenant Payment
Mailback Response



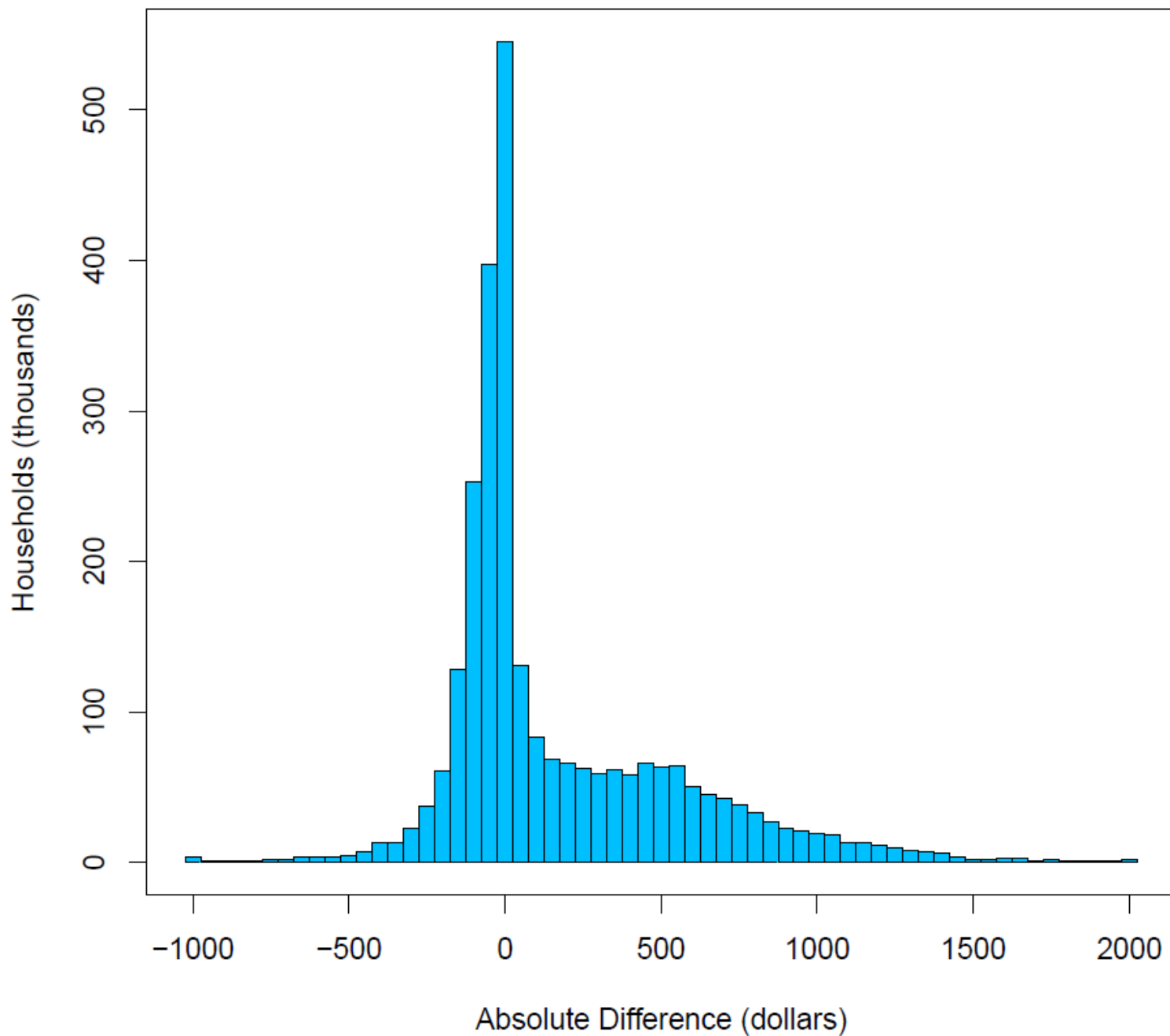
Source: Matched HUD/ACS 2012–2013 dataset described in text.

Figure 7.
Difference ACS 2012/13 Rent – HUD 2013 Total Tenant Payment
CATI Interview



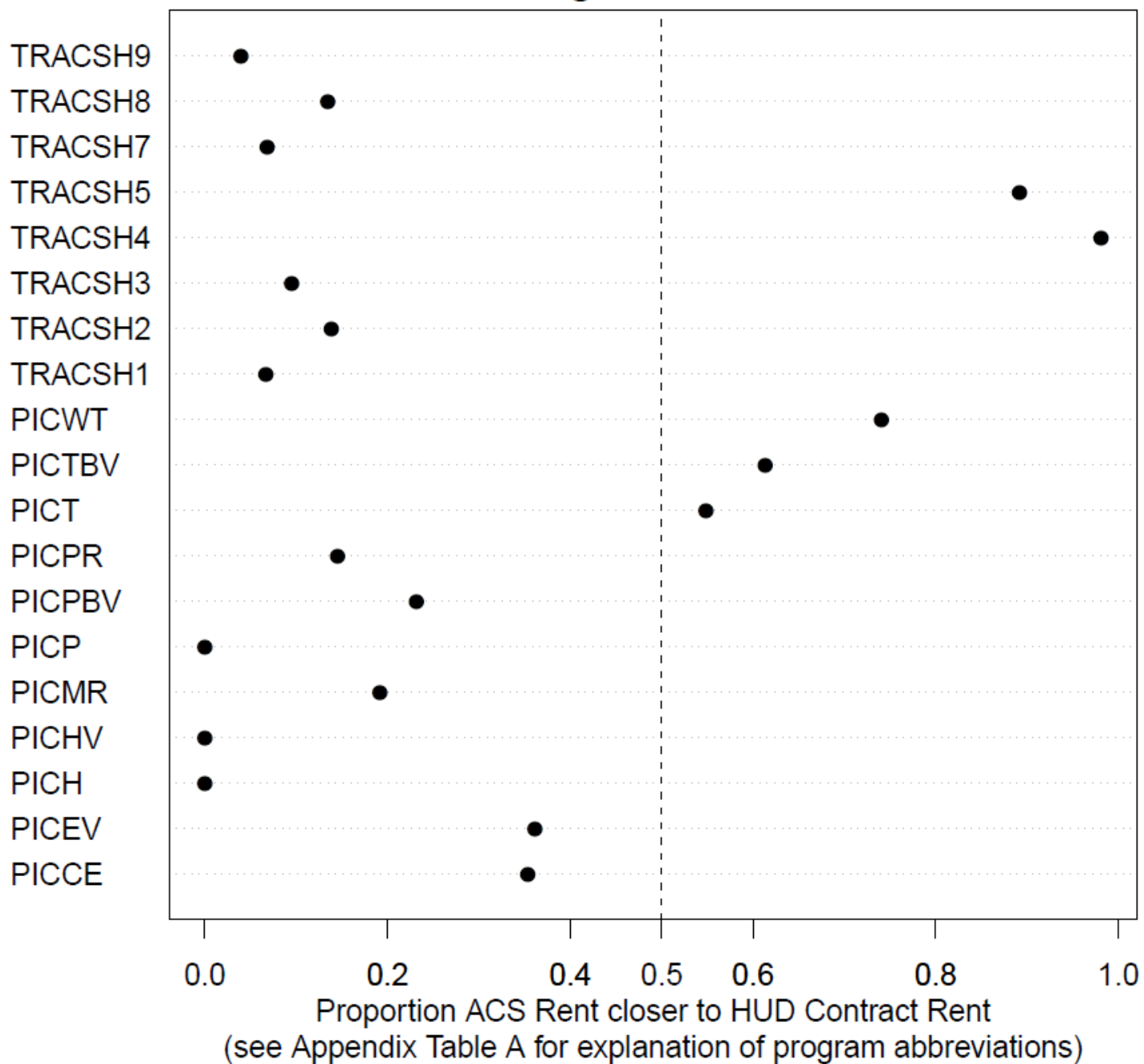
Source: Matched HUD/ACS 2012–2013 dataset described in text.

Figure 8.
Difference ACS 2012/13 Rent – HUD 2013 Total Tenant Payment
CAPI Interview



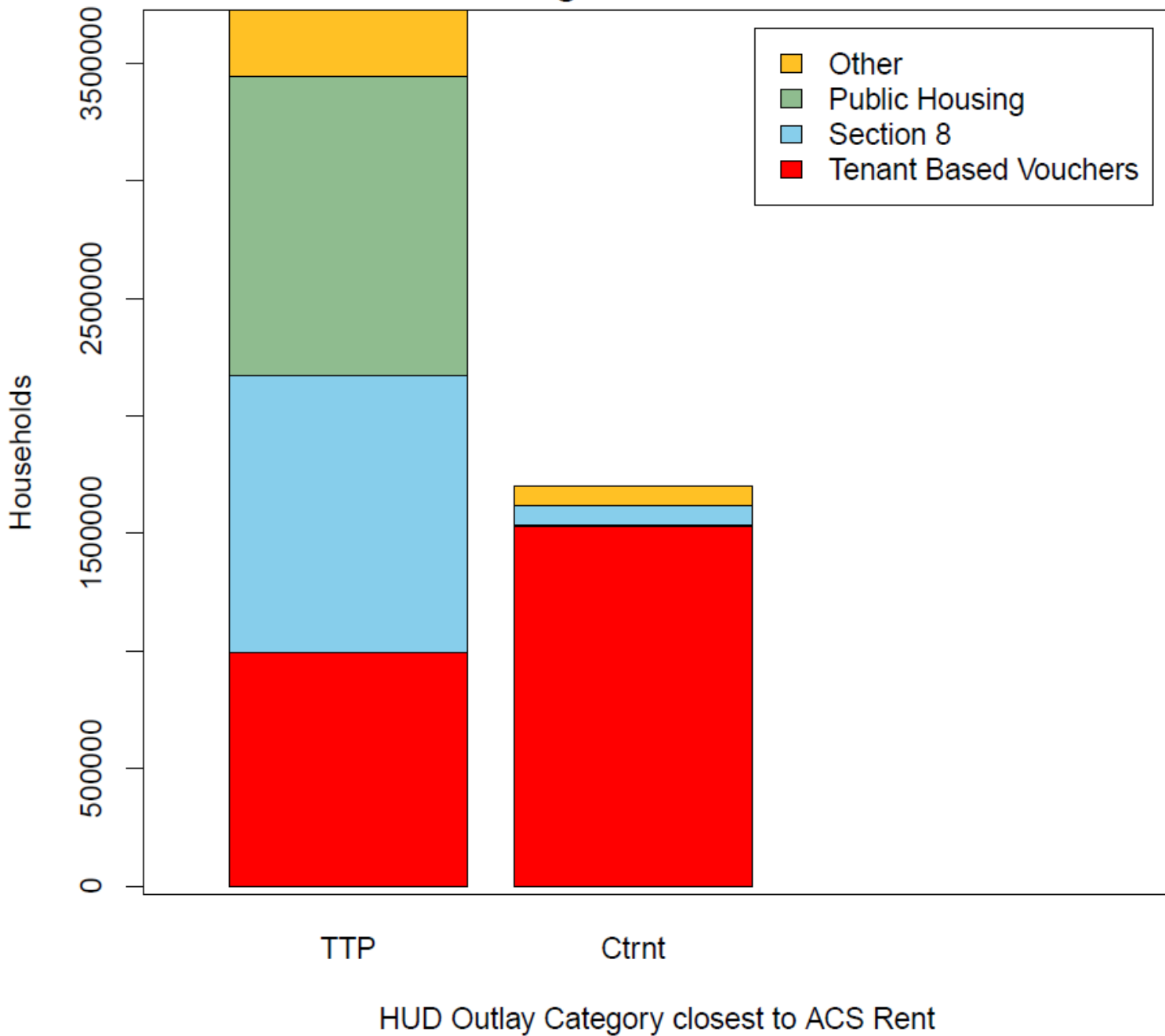
Source: Matched HUD/ACS 2012–2013 dataset described in text.

Figure 9.
Proportion ACS Rent closer to HUD Contract Rent than TTP
Weighted Counts



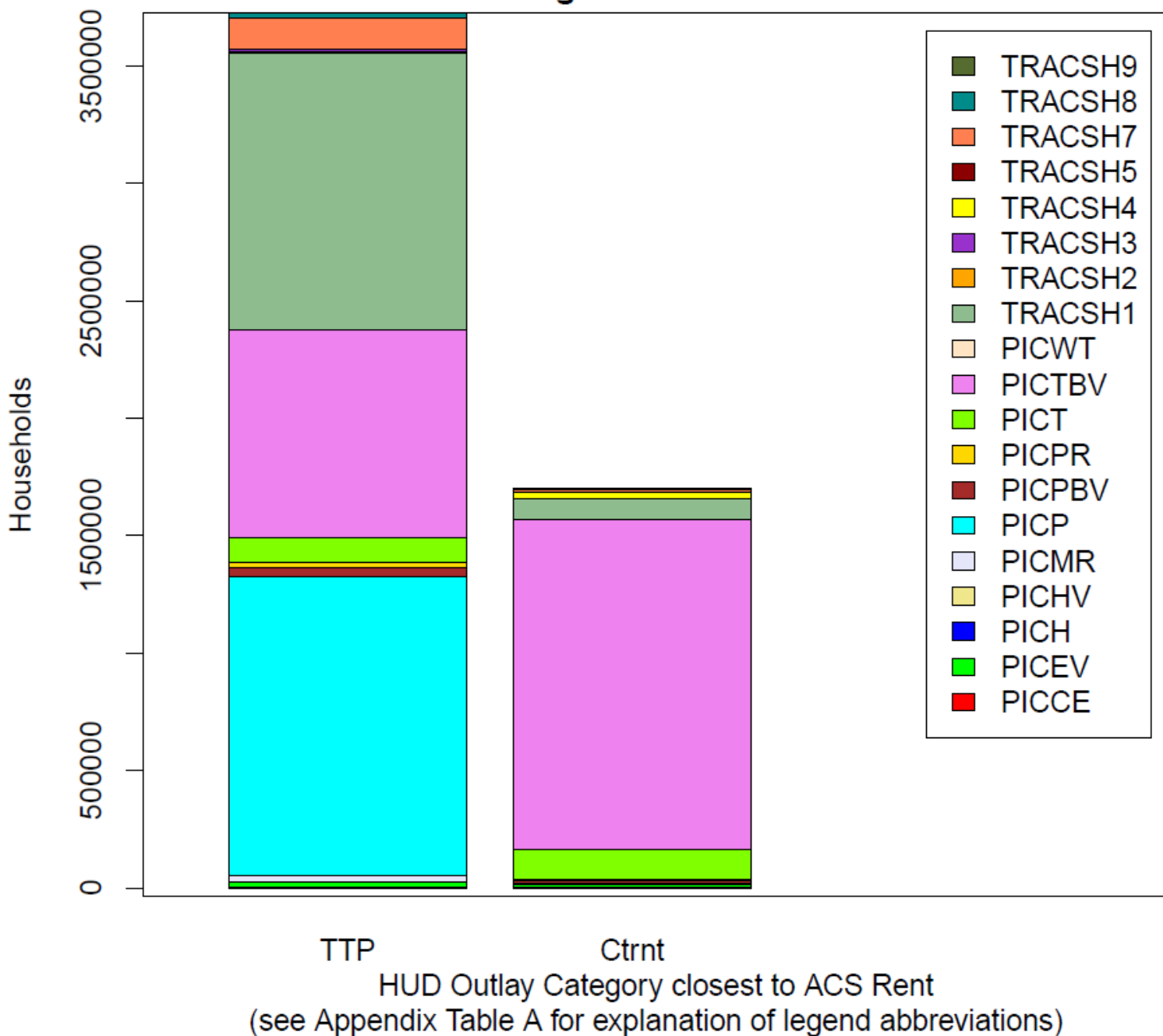
Source: Matched HUD/ACS 2012–2013 dataset described in text.

Figure 10.
Program Type by HUD Outlay Category ACS Rent is Closer to
Weighted Instances



Source: Matched HUD/ACS dataset described in text.

Figure 11.
Detailed Program Type by HUD Outlay Category ACS Rent is Closer to Weighted Instances



Source: Matched HUD/ACS 2012–2013 dataset described in text.

Table 1. Interquartile Ranges for Differences ACS Rent - HUD Measure (Dollars)

| Program | IQR ACS - Contract Rent | SE ACS - Contract Rent | IQR ACS -Total Tenant Payment | SE ACS -Total Tenant Payment | |
|---------|-------------------------------|------------------------------|-------------------------------------|------------------------------------|-----------------------------|
| Total | 598.00 | 3.21 | 363.00 | 4.07 | |
| PICCE | 405.57 | 163.14 | 581.39 | 395.40 | PIC Certificate NOS |
| PICEV | 910.79 | 40.99 | 560.15 | 67.52 | Enhanced Voucher |
| PICH | NA | NA | 199.22 | 289.04 | MTW Homeownership Voucher |
| PICHV | NA | NA | 342.86 | 84.76 | Homeownership Voucher NOS |
| PICMR | 376.33 | 28.96 | 99.50 | 13.80 | PIC Moderate Rehabilitation |
| PICP | NA | NA | 91.00 | 1.61 | Public Housing |
| PICPBV | 525.40 | 21.45 | 188.00 | 37.03 | Project Based Voucher NOS |
| PICPR | 309.79 | 34.30 | 86.00 | 17.90 | MTW Project Based Voucher |
| PICT | 607.00 | 15.87 | 754.07 | 10.76 | MTW Tenant Based Voucher |
| PICTBV | 405.00 | 4.84 | 596.00 | 3.79 | Tenant Based Voucher NOS |
| PICWT | 335.90 | 271.15 | 613.76 | 166.11 | Welfare to Work Voucher |
| TRACSH1 | 401.00 | 5.00 | 65.00 | 1.57 | Section 8 |
| TRACSH2 | 363.11 | 45.63 | 67.92 | 17.25 | TRACS Rent Supplement |
| TRACSH3 | 446.80 | 54.35 | 46.64 | 12.95 | RAP |
| TRACSH4 | 19.15 | 6.39 | 293.18 | 26.27 | Section 236 |
| TRACSH5 | 22.64 | 279.63 | 165.22 | 96.23 | BMIR |
| TRACSH7 | 244.21 | 10.26 | 53.00 | 1.38 | Section 202 PRAC |
| TRACSH8 | 302.00 | 24.46 | 60.00 | 3.31 | Section 811 PRAC |
| TRACSH9 | 158.78 | 130.61 | 86.24 | 64.31 | Section 202/162 PRAC |

Note: For Public Housing and the Homeownership Voucher Programs, a Contract Rent does not exist.

Source: Matched HUD/ACS 2012-2013 dataset described in text.

Table 2. Proportions of respondents whose ACS reported rents come within \$50 (plus or minus) of contract rent or total tenant payment

| Program | Proportion within \$50 of Cont Rent | SE prop within \$50 of Cont Rent | Proportion within \$50 of TTP | SE prop within \$50 of TTP | |
|---------|-------------------------------------|----------------------------------|-------------------------------|----------------------------|-----------------------------|
| Total | 0.298 | 0.002 | 0.349 | 0.002 | |
| PICCE | 0.295 | 0.102 | 0.222 | 0.123 | PIC Certificate NOS |
| PICEV | 0.218 | 0.023 | 0.293 | 0.025 | Enhanced Voucher |
| PICH | NA | NA | 0.000 | 0.000 | MTW Homeownership Voucher |
| PICHV | NA | NA | 0.177 | 0.155 | Homeownership Voucher NOS |
| PICMR | 0.112 | 0.016 | 0.467 | 0.030 | PIC Moderate Rehabilitation |
| PICP | NA | NA | 0.528 | 0.005 | Public Housing |
| PICPBV | 0.128 | 0.014 | 0.360 | 0.018 | Project Based Voucher NOS |
| PICPR | 0.070 | 0.016 | 0.612 | 0.028 | MTW Project Based Voucher |
| PICT | 0.378 | 0.011 | 0.297 | 0.011 | MTW Tenant Based Voucher |
| PICTBV | 0.463 | 0.003 | 0.135 | 0.002 | Tenant Based Voucher NOS |
| PICWT | 0.541 | 0.089 | 0.138 | 0.060 | Welfare to Work Voucher |
| TRACSH1 | 0.024 | 0.002 | 0.527 | 0.004 | Section 8 |
| TRACSH2 | 0.040 | 0.014 | 0.670 | 0.049 | TRACS Rent Supplement |
| TRACSH3 | 0.050 | 0.016 | 0.681 | 0.038 | RAP |
| TRACSH4 | 0.758 | 0.022 | 0.002 | 0.002 | Section 236 |
| TRACSH5 | 0.735 | 0.176 | 0.000 | 0.000 | BMIR |
| TRACSH7 | 0.061 | 0.006 | 0.663 | 0.011 | Section 202 PRAC |
| TRACSH8 | 0.058 | 0.014 | 0.545 | 0.028 | Section 811 PRAC |
| TRACSH9 | 0.000 | 0.000 | 0.686 | 0.188 | Section 202/162 PRAC |

Source: Matched HUD/ACS 2012-2013 dataset described in text.

Table 3. Crosstabulation of HUD Program Type by Proximity of ACS Rent to Total Tenant Payment vs Contract Rent Weighted Counts

| Abbreviation | NTTP | NCtrnt | Tot | Tot%TTP | Tot%Ctrnt | Tot%All | Short Name |
|--------------|---------|---------|---------|---------|-----------|---------|-----------------------------|
| Total | 3725301 | 1700249 | 5425550 | 68.66 | 31.34 | 100.00 | |
| PICCE | 684 | 374 | 1058 | 0.01 | 0.01 | 0.02 | PIC Certificate NOS |
| PICEV | 24153 | 13677 | 37830 | 0.45 | 0.25 | 0.70 | Enhanced Voucher |
| PICH | 369 | 0 | 369 | 0.01 | 0.00 | 0.01 | MTW Homeownership Voucher |
| PICHV | 660 | 0 | 660 | 0.01 | 0.00 | 0.01 | Homeownership Voucher NOS |
| PICMR | 25365 | 6021 | 31386 | 0.47 | 0.11 | 0.58 | PIC Moderate Rehabilitation |
| PICP | 1275464 | 0 | 1275464 | 23.51 | 0.00 | 23.51 | Public Housing |
| PICPBV | 39701 | 11981 | 51682 | 0.73 | 0.22 | 0.95 | Project Based Voucher NOS |
| PICPR | 18611 | 3162 | 21773 | 0.34 | 0.06 | 0.40 | MTW Project Based Voucher |
| PICT | 104868 | 127577 | 232445 | 1.93 | 2.35 | 4.28 | MTW Tenant Based Voucher |
| PICTBV | 886389 | 1405470 | 2291859 | 16.34 | 25.90 | 42.24 | Tenant Based Voucher NOS |
| PICWT | 1160 | 3312 | 4472 | 0.02 | 0.06 | 0.08 | Welfare to Work Voucher |
| TRACSH1 | 1178114 | 84524 | 1262638 | 21.71 | 1.56 | 23.27 | Section 8 |
| TRACSH2 | 6760 | 1088 | 7848 | 0.12 | 0.02 | 0.14 | TRACS Rent Supplement |
| TRACSH3 | 11531 | 1211 | 12742 | 0.21 | 0.02 | 0.23 | RAP |
| TRACSH4 | 538 | 28416 | 28954 | 0.01 | 0.52 | 0.53 | Section 236 |
| TRACSH5 | 88 | 728 | 816 | 0.00 | 0.01 | 0.02 | BMIR |
| TRACSH7 | 129646 | 9482 | 139128 | 2.39 | 0.17 | 2.56 | Section 202 PRAC |
| TRACSH8 | 20589 | 3201 | 23790 | 0.38 | 0.06 | 0.44 | Section 811 PRAC |
| TRACSH9 | 611 | 25 | 636 | 0.01 | 0.00 | 0.01 | Section 202/162 PRAC |

Note: For Homeownership Vouchers and Public Housing, the concept of Contract Rent does not apply, and was not ascertained. All households in these programs are taken to have indicated a rent closer to their total tenant payment. An additional 45 households in the Enhanced Voucher Program were excluded due to not ascertained contract rent.

Other exclusions include all instances of ACS rent imputed, ACS sex fails to match HUD sex, ACS age differs from HUD age by greater than 2 years, ACS interview date differs from HUD certification date by more than 2 years, moved out or terminated from program, certification not "active" according to HUD (obsolescent record still in dataset).

NTTP - ACS Rent closer to HUD Total Tenant payment

NCtrnt - ACS Rent closer to HUD Contract Rent

Source: Matched HUD/ACS 2012-2013 dataset described in text.

Appendix Table A. HUD Program Names and Abbreviations

| Abbreviation | Short Name | Annotation |
|--------------|-----------------------------|---|
| PICCE | PIC Certificate NOS | Old Program Type Replaced by Project Based Vouchers. Some Units still coded as Certificates. They are said to be really project based vouchers. |
| PICEV | Enhanced Voucher | For tenants who would be adversely affected by HUD decisions like terminating project based assistance. Good as long as remain in project. Can cover up to full market rent. |
| PICH | MTW Homeownership Voucher | Homeownership vouchers that are part of program to help residents find employment. |
| PICHV | Homeownership Voucher NOS | Public Housing Authority (PHA) can use Housing Choice Vouchers to assist with Mortgage Payments instead of rent, plus down payment assistance. TTP usually 30% monthly adjusted income, 10% of monthly income, or an amount of at least \$25 set by PHA. |
| PICMR | PIC Moderate Rehabilitation | Repealed 1991. Assistance limited to properties previously rehabilitated pursuant to housing assistance payments contract with owner and PHA. Expiring contracts are eligible for renewal. |
| PICP | Public Housing | Said to range from single-family units to big highrises. Financed by HUD and administered by local Housing Authorities. Tenants usually pay 30% of adjusted income, 10% of monthly income, or an amount of at least \$25 set by PHA. |
| PICPBV | Project Based Voucher NOS | PHAs can assign up to 20% of voucher assistance to specific housing units whose owners agree to rehabilitate or construct units, or set aside a portion of existing units. The PHA pays the owner the difference between 30 percent of family income and the gross rent for the unit. |
| PICPR | MTW Project Based Voucher | Project based voucher in Moving to Work Program. |
| PICT | MTW Tenant Based Voucher | Tenant based voucher in Moving to Work Program. |
| PICTBV | Tenant Based Voucher NOS | Family responsible for finding unit. For low income families. Covers standard 30% adjusted family income or PHA standard or gross rent (whichever is lower). |

Appendix Table A (continued). HUD Program Names and Abbreviations

| Abbreviation | Short Name | Annotation |
|--------------|-------------------------|---|
| PICWT | Welfare to Work Voucher | Type of Section 8 Voucher for families recently on welfare, intended to assist by providing housing nearby work. |
| TRACSH1 | Section 8 NOS | Housing Assistance Payments. Project-based assistance to PHAs or private owners to make rents affordable to tenants |
| TRACSH2 | TRACS Rent Supplement | Rent geared to income with private property owners. Get a unit with rent geared to income. Housing is subsidized. Eligible tenants pay 30 percent of the rent or 30 percent of their income toward the rent, whichever is greater. |
| TRACSH3 | RAP | Rental Assistance Payment for Section 236 properties. Extra rent subsidy for very low-income tenants. Predecessor of Section 8. |
| TRACSH4 | Section 236 | Combines federal mortgage insurance with interest reduction payments to mortgagee to offer housing at below market rents to needy families. No new subsidies. Eligible tenants typically pay 30 percent of the gross rent or 30 percent of the household's adjusted monthly income (whichever is greater) toward the rent, but tenants may pay up to HUD mkt rent. No new subsidies are being offered, but existing properties and tenants continue to be supported |
| TRACSH5 | BMIR | Below Mkt Interest Rate subsidized mortgage loans to facilitate construction or rehab of multifamily rental housing for low income families. No new subsidies but grandfather old residents. |
| TRACSH7 | Section 202 PRAC | Supportive Assistance for the Elderly. Capital advance to private nonprofit sponsors. Environment should include support services (cleaning, cooking, transportation). Project Rental Assistance Contract. Tenants pay 30% of adjusted income towards rent. |

Appendix Table A (continued). HUD Program Names and Abbreviations

| Abbreviation | Short Name | Annotation |
|--------------|----------------------|--|
| TRACSH8 | Section 811 PRAC | Supportive Housing for Disabled. Capital advances or providing project rental assistance to state housing agencies. Project Rental Assistance Contract. Tenants live independently but in an environment that provides support activities such as cleaning, cooking, transportation, etc. Occupancy is open to very low-income persons with at least one adult household member with a disability. Rent is highest of 30% of the family's monthly adjusted income, 10% of the family's monthly income, or the welfare rent |
| TRACSH9 | Section 202/162 PRAC | Supportive Housing for Elderly Persons with Disabilities. Project Rental Assistance Contract. Rent similar to Section 811 PRAC |