Moving to Work Retrospective

A Picture of Moving to Work Agencies' Housing Assistance

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U.S. Department of Housing and Urban Development | Office of Policy Development and Research

Evaluating the Effects of Santa Clara County Housing Authority's Rent Reform

Final Report

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Disclaimer

The contents of this report are the views of the contractor and do not necessarily reflect the views or policies of the U.S. Department of Housing and Urban Development or the U.S. Government.

Foreword

The Moving to Work (MTW) demonstration, authorized by Congress in 1996, gives selected public housing agencies (PHAs) and the Secretary of Housing and Urban Development (HUD) flexibility to implement innovative approaches to providing housing assistance. PHAs chosen to participate in the demonstration may enact certain policies otherwise not allowed by law, but only if those policies are intended to achieve one or more of the MTW demonstration's three statutory objectives: to achieve greater cost effectiveness, promote self-sufficiency among assisted families, and increase housing choice for low-income families. Since the demonstration's launch, housing authorities with MTW status have served as a laboratory for HUD policy, designing and testing a range of new approaches to delivering housing assistance. In 2015, HUD launched the MTW Retrospective Evaluation to assess the MTW demonstration as a whole. This report is one of six produced by that effort and is an excellent example of how MTW can be used to test variations in rent policy and learn from the experience.

In 2013, the Santa Clara County Housing Authority (SCCHA) faced a budget shortfall due to sequestration. To avoid terminating families from assistance, SCCHA sought to reduce the costs of housing assistance payments in its Housing Choice Voucher (HCV) program by increasing the proportion of income that assisted households paid toward rent. Most HUD-assisted households nationwide pay 30 percent of their adjusted income towards rent (as required by law), but there have been numerous proposals to increase that proportion so that HUD could serve more families at a lower cost. One concern voiced by researchers and advocates is that doing so might backfire, that the increased "tax" on earnings might lead assisted households to work and earn less, paradoxically ***increasing*** the cost per household of housing assistance.

SCCHA initially raised the tenant contribution rate for all HCV households from 30 percent of adjusted income to 35 percent of gross income, then dropped the rate a year later to 32 percent of gross income. HUD recognized SCCHA's actions as an opportunity to find out what could happen in the real world when assisted households paid more than 30 percent of their adjusted income for rent and funded a study of the impact of SCCHA's new rent policy on employment, earnings, and housing subsidies. To detect impacts, the study compared work-able HCV recipients at SCCHA to HCV recipients at three nearby PHAs who were not affected by the rent reform. The study tracked employment, earnings, and housing subsidy for 4 years after SCCHA implemented the new rent policy. The comparison showed that SCCHA's rent increase did not affect average employment

and earnings of work-able HCV households, indeed, HCV households in the study PHAs worked and earned more over the observation period. SCCHA met its objective of serving the same number of families at a lower cost. The study did not assess whether families reduced spending, increased debt, and experienced material hardship.

MTW flexibility enabled SCCHA to respond immediately to a sudden budget shortfall by adjusting rent contributions, and it allowed the agency to serve the same number of families at a lower cost. HUD's proposed Making Affordable Housing Work Act (MAHWA), submitted to Congress in April 2018, would allow all PHAs similar flexibilities. Additionally, because the flexibility to tailor activities to local conditions and adjust rapidly to changing conditions has proven valuable to current MTW agencies, HUD is adding 100 new MTW agencies, including 30 in rural communities. So that we can learn as much as possible from the MTW expansion, participating housing agencies will be part of a systematic program of research to test various policies, including different rent policies and work requirements. The reports produced by the MTW retrospective evaluation form a foundation that HUD will continue to build on as we seek more cost-effective ways to house our neediest and lowest-income families.

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Abstract

This study examines the effects of a rent reform in the Santa Clara County Housing Authority (SCCHA) on Housing Choice Voucher (HCV) residents' employment rates, average earnings, and housing subsidies using a quasi-experimental design. In the face of federal budget cuts to the HCV program in 2013, SCCHA reduced subsidies for all households rather than cutting some households from the program. The primary component of its rent reform was to increase the tenant rent contribution rate from 30 percent of adjusted income (equivalent to about 27 percent of gross income) to 35 percent of gross income (eliminating all deductions and allowances) for all subsidy households. A risk was that if tenants reduced their earnings in response to the higher "tax" rate (since they keep a smaller portion of their earnings under the new policy), their subsidies would increase, counteracting the housing agency's expected savings from increasing tenant rent contributions. A second rent reform component changed the voucher size policy, which resulted in a smaller voucher size (fewer bedrooms) for some households. The findings indicate that, on average, the SCCHA rent reform did not affect residents' employment rates and average earnings throughout the 4 years following the implementation of the rent reform. Thus, the rent reform reduced households' average housing subsidies as intended, and SCCHA was able to meet its projected savings. Since households did not increase their earnings to compensate for the reduction in their subsidies, these findings suggest that households absorbed their increased housing costs; however, whether they did so by reducing spending on necessary goods or by increasing debt and whether they experienced increased material hardship is unknown.

Executive Summary

Over 2 million households receive federal housing subsidies that allow them to rent in the private rental market. The Housing Choice Voucher (HCV) program, funded by HUD, requires households to pay 30 percent of their income toward rent, and HUD subsidizes the remaining amount of the households' rent up to a certain threshold based on area housing costs. This rent policy aims to protect assisted households from excessive rent burden, but critics argue that pegging tenant contributions to income creates a disincentive to work. A rent reform that reduces housing subsidies and increases households' contributions to rent might therefore have effects on employment. This report examines the effects of one such reform on subsidy recipients' employment rates, average earnings, and housing subsidies.

The HUD Moving to Work (MTW) demonstration, launched in 1996, grants 39 selected public housing agencies (PHAs) the flexibility to implement strategies to increase cost-effectiveness, promote household self-sufficiency, and increase housing choice for assisted households.[1] These PHAs have special statutory authority to change many HCV program rules, including rent rules.[2] The present study evaluates the impact of a rent reform made by one PHA, the Santa Clara County Housing Authority (SCCHA), using its MTW flexibility. In 2013, federal budget cuts significantly reduced the budget for PHAs operating HCV programs. To avoid having to terminate households from the HCV program, SCCHA chose to increase the tenant rent contribution rate from 30 percent of adjusted income to 35 percent of unadjusted income.[3] It also changed the voucher size policy, which resulted in a smaller voucher size (fewer bedrooms) for some households.

The results of this study suggest that the SCCHA rent reform did not affect residents' employment rates and earnings, on average, throughout the 4 years following the implementation of the rent reform. The analysis also found that, as expected given the nature of the policy changes and the absence of effects on residents' earnings, the SCCHA rent reform reduced the average housing subsidy that the PHA paid on behalf of households. It did not find any evidence of an overall effect on the percentage of households still receiving any housing subsidies during the followup period. The SCCHA rent reform, however, may have reduced earnings for a subset of this population—the households affected by the change in the voucher size policy in addition to the increase in the tenant contribution rate.

The Santa Clara County Housing Authority Rent Reform

SCCHA increased its tenant contribution rate to the level at which the total savings from lower subsidies would allow the PHA to continue to serve all households in the HCV program at that time. SCCHA's projections of savings assumed that the increase in the tenant contribution rate would not cause residents of HCV households to work or earn less. They had little evidence on which to base these projections, however. Economic theory suggests multiple possibilities: On the one hand, increasing the tenant contribution rate effectively increases the "tax" on tenants' earnings (in other words, tenants keep a smaller portion of their earnings under the new policy compared with the former policy), creating a disincentive to work. If

[1] In 2016, Congress authorized HUD to expand the MTW demonstration to grant MTW status to 100 additional PHAs.
[2] Subject to public notification, approval of each PHA's board of directors, and HUD approval.
[3] This change was tempered in 2014 when the rate was reduced to 32 percent of gross income, but this is still substantially higher than the previous rate.

tenants did reduce their earnings, it would have resulted in SCCHA having to increase the subsidy levels, effectively counteracting the savings in housing assistance payments the housing agency hoped to achieve. On the other hand, tenants who can work may increase their employment to compensate for the loss of net income. A third possibility is that households may absorb their increased housing costs without changing their employment behavior, by reducing their spending or incurring debt.

The SCCHA rent reform consisted of two main policy changes:

- **It increased the tenant contribution rate from 30 percent of adjusted income (equivalent to about 27 percent of unadjusted income) to 35 percent of unadjusted income.** After 1 year, this percentage was reduced to 32 percent of unadjusted income. This policy change eliminated all allowances and deductions, including dependent and childcare allowances, deductions for medical expenses, and utility allowances. This new rent policy was applied to the rent calculations for all HCV households.
- **It changed the policy that determines the number of bedrooms on a household's voucher.** Under the former policy, household members of different generations, of the opposite sex over the age of 5 years old, and unrelated adults (other than significant others) were allocated separate bedrooms. The new policy allocated one bedroom to the head of household (with spouse or partner) plus one additional bedroom for every two persons regardless of age, generation, relationship, or gender. This policy change resulted in a smaller voucher size for 23 percent of all SCCHA households (not including senior households or households with people with disabilities).

In anticipation of the potential hardship that HCV households might face because of the rent reform, SCCHA offered two safeguards: hardship exemptions for households that experienced a sharp increase in rent share because of the new rent calculation, and financial and legal assistance for households at risk of eviction due to the rent reform. The hardship exemption policy allowed households to have childcare or medical deductions temporarily included in the calculations for their total tenant payment (TTP) for a 90-day period. The eviction prevention assistance program provided financial assistance to cover unpaid rent or to cover a security deposit if a household had to move because of the rent reform. The program also included free legal services to prevent eviction.

Data and Methods

The study sample includes the cohort of nonelderly, nondisabled adults who were receiving HCV subsidies from the SCCHA program or one of the three selected comparison PHAs at the time the SCCHA rent reform was implemented in July 2013. The comparison PHAs are the Housing Authority of the County of Alameda, the Housing Authority of the County of San Mateo, and San Francisco Housing Authority. The effects of the rent reform are examined for up to 4 years after the rent reform. The analysis uses state unemployment insurance wage data to measure employment rates and average earnings and HUD's Inventory Management System/PIH Information Center data to measure households' housing subsidies and housing characteristics.

To estimate effects of the SCCHA rent reform on the study's key outcomes—employment and earnings—a comparative interrupted time series (CITS) analysis, a quasi-experimental design, is used. The CITS analysis uses the trends in earnings and

employment before the SCCHA rent reform for the SCCHA group and a comparison group and measures how each group deviates from its pre-rent reform trend. The impact is the difference between the two groups' post-rent-reform *deviations* from their respective pre-rent reform trends.

To study the effects of the SCCHA rent reform on housing subsidy amounts and the percentage of households continuing to receive subsidies, the study uses an autoregressive difference-in-difference method.[4] A difference-in-difference estimation compares the change in each outcome between the period before the SCCHA rent reform and each year following the rent reform for SCCHA households with the change for households in the comparison PHAs, where no rent reform was implemented at the time. The models used in the present study are autoregressive in that they also control for pre-intervention values of the outcome measures. Although difference-in-difference is a widely used quasi-experimental approach, it is less rigorous than CITS because it does not account for potentially differing baseline trends in outcomes for the treatment and comparison groups.

Additional descriptive analyses were used to explore changes in housing characteristics before and after the rent reform that may be related to households' housing decisions, including unit characteristics, household composition, neighborhood poverty, and rent burden.[5]

Key Findings

The present study primarily aims to answer two questions: How does an increase in tenant rent share affect tenants' work behavior, and how does it affect households' housing outcomes? The following are key findings from the study's quasi-experimental analyses.

- **The SCCHA rent reform did not, on average, affect residents' employment rates and average earnings throughout the 4 years following the implementation of the rent reform.**

Exhibit ES1 presents the estimated effects of the SCCHA rent reform on average annual employment rates and average annual earnings for nonelderly, nondisabled adults for each year of the followup period. The results show no evidence of effects on the percentage of nonelderly, nondisabled adults who were employed or on their average earnings across the 4 years of followup. In Year 1, for example, 50.8 percent of SCCHA households had some earnings in a given quarter, which is estimated to be only 0.5 percentage point lower than what it would have been in the absence of the SCCHA rent reform, and the impact estimate is not statistically significant. If, as these findings suggest, households did not increase their earned income to compensate for the reduction in their housing subsidies, they would have experienced reductions in their net income. For households that did not increase their income over time, these reductions in net income could have been persistent. Households who did increase their income over time would have experienced smaller increases in net income compared with the increases they would have experienced in the absence of the rent reform.

- **The SCCHA rent reform reduced the average housing subsidy that the PHA paid on behalf of households.**

[4] It was not feasible to use the CITS method to estimate the effects of the rent reform on housing subsidy amounts and continued housing subsidy receipt during the followup period, because housing subsidy data were not available for the full sample for the 4 years before the rent reform.

[5] It was not feasible to use a difference-in-difference analysis for these analyses because data on these outcomes were available only for households that were still receiving subsidies, and not all households continued to receive subsidies for the full 4 years after the implementation of the rent reform.

Exhibit ES.1 Impacts on Average Quarterly Employment Rate and Annual Earnings (Nonelderly, Nondisabled Adults)

Outcome	SCCHA Rate or Average	Estimated Effect	P-Value
Employment Rate			
Year 1	50.8	-0.5	0.604
Year 2	54.5	0.0	0.972
Year 3	56.6	0.1	0.929
Year 4	57.5	0.1	0.941
Earnings (2017 $)			
Year 1	11,187	46	0.897
Year 2	13,549	143	0.763
Year 3	16,198	200	0.738
Year 4	18,538	509	0.484
Sample Size			34,075

SCCHA = Santa Clara County Housing Authority.
Notes: Samples consist of households headed by adults who were not seniors or adults with disabilities. The set of comparison group public housing agencies includes the Housing Authority of the County of San Mateo, the San Francisco Housing Authority, and the Housing Authority of the County of Alameda. Impacts were estimated using a comparative interrupted time series model. The impact estimates represent the estimated amount by which the SCCHA actual employment rates or average earnings deviate from the predicted employment rates or earnings levels in the absence of the rent reform. All earnings impacts are reported in 2017 dollars. The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect. Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.
Source: California Employment Development Department individual-level aggregate unemployment insurance data

Exhibit ES2 presents the estimated effects of the SCCHA rent reform on the average amount of housing subsidy and the percentage of households receiving any housing subsidy at the time of followup.[6] The average household housing subsidy in the month before the implementation of the rent reform was $16,764 per year. As expected, the SCCHA rent reform reduced the average amount of housing subsidy that households received. This effect is probably a direct result of the increase in the tenant contribution rate from 30 percent of adjusted income to 35 percent of gross income and the other policy changes implemented as part of the rent reform. In the first year after the rent reform was implemented, the average annual household subsidy was estimated to be $1,593 less than it would have been in the absence of the rent reform. In the second year, when the tenant contribution rate was reduced to 32 percent, the effect was slightly smaller: The average household subsidy was $1,548 less annually than it would have been in the absence of the rent reform. In the third year, the rent reform reduced the annual subsidy by $1,329.

Overall, there is no clear evidence that the SCCHA rent reform influenced the percentage of households that lost their subsidies or left the subsidy program. This finding suggests that the increased tenant contribution did not drive housing subsidy amounts down to zero for a large proportion of households and that the increased rent burdens did not lead a large proportion of households to leave the housing subsidy program.

- The SCCHA rent reform may have reduced earnings for a subset of the population—the households that were affected by the change in the voucher size policy in addition to the increase in the tenant contribution rate.

A subgroup analysis estimated effects of the SCCHA rent reform separately for the

[6] Effects on housing subsidies were estimated for nonelderly, nondisabled households. A nonelderly, nondisabled household is defined as a household where the head of household and any spouse or co-head are under 62 years old and not disabled.

Exhibit ES.2 Impacts on Housing Subsidies (Nonelderly, Nondisabled Households)

Outcome	SCCHA Average or Rate	Estimated Effect	P-Value
Total Annual Housing Subsidy ($)			
Year 1	14,335	-1,593	0.000***
Year 2	13,414	-1,548	0.000***
Year 3	13,481	-1,329	0.000***
Any Housing Subsidy Receipt (%)			
Year 1	99.2	0.5	0.013**
Year 2	92.9	-0.4	0.368
Year 3	87.5	-0.9	0.137
Sample (Total = 15,490)	7,109		

SCCHA = Santa Clara County Housing Authority.
Notes: Samples consist of households headed by adults who were not seniors or adults with disabilities. The set of comparison group public housing agencies (PHAs) consists of the Housing Authority of the County of San Mateo, the San Francisco Housing Authority, and the Housing Authority of the County of Alameda. Utility allowance data were not available for San Mateo and are therefore not included in San Mateo's housing subsidy measures. Sample sizes may vary because of missing values. Impacts were estimated using an autoregressive difference-in-difference model, controlling for the past receipt of housing subsidies and other baseline characteristics of sample households. The impact estimates represent the estimated amount by which the SCCHA annual housing subsidy or housing subsidy receipt deviate from the predicted levels in the absence of the rent reform. To assess differences between the research groups, chi-square tests were used for categorical variables and two-tailed t-tests were used for continuous variables. The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect. Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.
Source: MDRC calculations using HUD Public and Indian Housing Information Center data

residents who were affected only by the tenant contribution rate change (77 percent of the study sample) and the residents who were affected by the voucher size rule change in addition to the tenant contribution rate change (23 percent).[7] The findings for the residents affected only by the tenant contribution rate increase mirror the estimated effects on the full sample: there was no evidence of effects of the rent reform on employment rates or average earnings through the 4 years of followup. The residents also affected by the voucher size rule change, however—who faced especially deep cuts in their housing subsidies and very high levels of rent burden if they did not move to smaller units—may have reduced their earnings in response to the rent reform. The negative effect on earnings for this subgroup is statistically significant in Years 3 and 4 following the policy change, at about $2,200 and $2,340 respectively, suggesting that some residents affected by both policy changes may have reduced their employment by this time. Employment and earnings trends over the followup period were rising for both SCCHA and the comparison group, so this estimated negative effect on average earnings means that for SCCHA residents in this group, earnings did not increase as quickly or as much as they would have in the absence of the rent reform. Descriptive findings (which do not indicate causality) suggest that some households in this subgroup moved to units with fewer bedrooms after the rent reform, but that levels of rent burden for this subgroup were especially high following the rent reform. A tight housing market in Santa Clara may have made it difficult for some families to find new housing with fewer bedrooms at an affordable rent.

Conclusion

The present study of the effects of a rent reform implemented by SCCHA provides evidence, from one location, that rent policies that increase the tenant contribution rate by a moderate amount (from 30 percent of

[7] One limitation of this analysis compared with the full-group analysis is that it was only possible to include one of the three selected comparison group PHAs in the comparison group.

adjusted income to 35 percent of gross income, later to 32 percent of gross income) do not create a substantial disincentive to work or significantly increase the likelihood that households may lose their subsidies. It also provides suggestive evidence that implementing a voucher size policy that requires some households to relocate to a different unit (with fewer bedrooms) to avoid even deeper cuts in housing subsidies may have adverse effects on some households in the context of a housing market where affordable housing options are very limited, and that short-term safeguards that PHAs provide to households may not fully prevent longer-term hardship.

The findings from the present study cannot predict how tenants may change their work behavior if the size of their tenant contribution rate increases by a larger amount than what was implemented in SCCHA. Although the increase from 30 percent of adjusted income to 35 percent of gross income (and later 32 percent of gross income) did not, on average, change employment or earnings among SCCHA tenants, it is possible that a higher increase may affect tenants' work behavior. The negative effects on earnings that were found for the group of households that were affected by both the tenant contribution rate increase and the voucher downsizing—and therefore experienced particularly deep cuts in their housing subsidies—are suggestive of this possibility.

The combination of findings that the SCCHA rent reform led to deep and lasting cuts in housing subsidies for households and that, on average, household members did not increase their earnings to compensate for the reduction in subsidies means that households absorbed their higher housing costs. Therefore, households' material hardship is an important consideration. This study did not include measures of households' material hardship beyond a measure of rent burden, and therefore cannot assess how this increase in rent burden translated into their experiences with material hardship.

It is important to understand how this type of rent reform may be expected to vary based on the context, and studies in multiple locations that represent diverse housing and labor markets are needed to examine this question. Future studies of rent reforms that might result in reduced housing subsidies should also carefully measure households' experiences with material hardship, including food insecurity and their ability to cover medical expenses.

Nevertheless, the present study begins to address one aspect of housing subsidy policy—how increasing the tenant contribution rate affects households' employment, earnings, and housing subsidies—where strong evidence is lacking. Two additional studies are currently under way that also evaluate changes in how tenant rent share is determined: The HUD-funded Rent Reform demonstration tests a rent reform model in four PHAs that caps the tenant contribution toward rent for 3 years, and the second cohort of the HUD study of the current MTW expansion is intended to investigate the effects of tiered rents (where tenant rent share is determined based on which income band household income falls into) and stepped rents (where tenant rent share is increased by a set amount at regular intervals according to a rent share schedule) in 10 PHAs with newly granted MTW status. Taken together, this set of studies will build a body of evidence that will inform future HUD and PHA decisions about the most effective rent policies to implement.

Chapter 1

Introduction and Background

Introduction

The HUD Housing Choice Voucher (HCV) program is the nation's primary rental subsidy program, assisting approximately 2.2 million low-income households in paying for housing in the private rental market. HCV households generally pay 30 percent of their income toward rent, and HUD subsidizes the remaining amount of the households' rent up to a certain threshold based on area housing costs. This rent policy aims to protect assisted households from excessive rent burden, but critics of the policy argue that pegging tenant contributions to income can disincentivize work and that public housing agencies (PHAs) find it burdensome to administer.

HUD's Moving to Work (MTW) demonstration, launched in 1996, grants selected PHAs the flexibility to implement strategies to increase cost-effectiveness, promote household self-sufficiency, and increase housing choice for assisted households. These PHAs have special statutory authority to change many HCV program rules, including rent rules.[8] Of the 39 PHAs with MTW status, 20 had implemented rent reforms as of 2014 (Khadduri et al., 2014). These changes to rent policies provide an opportunity to test alternatives to the traditional 30-percent-of-income policy and better understand how alternative rent policies affect residents. For example, through HUD's Rent Reform demonstration, four PHAs are testing an alternative rent policy that lengthens the recertification period and simplifies the rent calculation, and MDRC is evaluating the effects on tenants' employment and earnings and the PHAs' administrative efficiency. In 2016, Congress authorized HUD to expand the MTW demonstration to grant MTW status to 100 additional PHAs, and as mandated by Congress, HUD will evaluate the effects of MTW innovations (including alternative rent policies).

The present study contributes to this emerging body of evidence on the effects of alternative rent policies in subsidized housing by evaluating the impact of a rent reform at one PHA, the Santa Clara County Housing Authority (SCCHA). This study is part of a broader HUD-sponsored retrospective evaluation of the MTW demonstration led by the Urban Institute.[9] In 2013, federal budget cuts significantly reduced the SCCHA budget for HCVs, and SCCHA no longer had sufficient funds to continue to provide subsidies to all households in the HCV program at the same level as before. To avoid having to terminate households from the HCV program, SCCHA chose to increase the tenant rent contribution rate from 30 percent of adjusted income (equivalent to about 27 percent of gross income) to 35 percent of gross income.[10] It also changed the voucher size policy—the set of rules used to determine the number of bedrooms that a household's subsidy is based on—which resulted in a smaller voucher size for 17 percent of all the SCCHA HCV households.

SCCHA chose to increase its tenant contribution rate to the level at which the total savings from lower subsidies would allow the PHA to continue to serve all

[8] Subject to public notification, approval of each PHA's Board of Directors, and HUD approval.
[9] See exhibit 1.1 for a summary of other reports included in this study.
[10] This change was tempered in 2014 when the rate was reduced to 32 percent of gross income, although this is still substantially higher than the previous rate.

households in the HCV program at that time. SCCHA's projections of savings assumed that the increase in the tenant contribution rate would not cause residents of HCV households to work or earn less. They had little evidence on which to base these projections, however.

Economic theory suggests multiple possibilities: On the one hand, increasing the tenant contribution rate effectively increases the "tax" on tenants' earnings (in other words, tenants keep a smaller portion of their earnings under the new policy compared with the former policy), creating a disincentive to work. On the other hand, tenants who are able to work may increase their employment to compensate for the loss of net income. A third possibility is that households may absorb their increased housing costs without changing their employment behavior, by reducing their spending or incurring debt. Without an evidence base to indicate how a PHA could expect changes in the tenant contribution rate to affect tenants' employment and earnings, SCCHA assumed no effects on earnings when designing its rent reform.

The SCCHA rent reform offered an opportunity to assess the effects of increasing the tenant contribution rate on their employment behavior and housing outcomes. The present study analyzed employment, earnings, housing subsidy, and housing characteristics of the group of nonelderly, nondisabled SCCHA tenants who were receiving HCV subsidies when the SCCHA's rent reform was implemented (July 2013) for the 4 years before the rent reform was implemented, and then follows them for up to 4 years after the rent reform.[11]

This report begins with background on traditional HUD policies and details on the SCCHA rent reform. It then reviews existing evidence on the effects of housing vouchers and changes to the traditional HUD rent rules on tenants' labor market outcomes. The second chapter defines the study's

Exhibit 1.1 The Moving to Work Retrospective Evaluation

The HUD-sponsored Retrospective MTW Evaluation includes six reports and an online data feature that examine different aspects of the MTW program and MTW agencies' activities and performance under the program's three statutory objectives.

A Picture of Moving to Work Agencies' Housing Assistance describes MTW agencies, the assistance they provided, and the characteristics of the households they served in 2008 and 2016. A related online data feature provides access to MTW agency-level data.

Moving to Work Agencies' Use of Funding Flexibility examines how agencies have used MTW funding flexibility, alone and with regulatory waivers, and categorizes funding flexibility activities by their primary objectives—cost effectiveness, self-sufficiency of assisted households, or increased housing choice for low-income families. The study includes an indepth examination of funding shifts for a subgroup of eight agencies.

Housing Choice and Self-Sufficiency Outcomes at Moving to Work Agencies examines the extent to which MTW agencies meet two of the program's three statutory objectives, increasing housing choice and promoting self-sufficiency for assisted households.

The Impact of the Moving to Work Demonstration on the Per Household Costs of Federal Housing Assistance examines how MTW status affects the costs, to HUD, of providing housing assistance to households in the public housing and Housing Choice Voucher (HCV) programs.

Evaluating the Effects of Santa Clara County Housing Authority's Rent Reform examines the impacts on work, earnings, and housing subsidies among assisted households of Santa Clara's unique rent reform, which increased the proportion of income that households must pay toward rent.

Moving to Work Agencies' Use of Project-Based Voucher Assistance examines multiple aspects of MTW agencies' use of project-based voucher (PBV) assistance, including the share of assistance and HCV budget authority devoted to PBVs, the relationships between PBVs and the Low-Income Housing Tax Credit and Rental Assistance Demonstration programs, the locations of PBV-assisted units, and case studies of three agencies' MTW goals and activities.

[11] HUD defines an elderly household as one where the head of household, spouse, or co-head is at least 62 years old. HUD defines a disabled household as a household where at least one of the members is a disabled adult (Code of Federal Regulations, 24 CFR 888.113).

research questions and the rationale behind hypothesized effects. It also describes the study's research design, including the study sample definition, comparison group selection, study period, data sources, and different methods used for each set of research questions. The third chapter discusses the study's findings, and the final chapter discusses their implications.

Background

Santa Clara County is a diverse and densely populated region in the Bay Area of California, located in the southern portion of Silicon Valley. Santa Clara has the fifth highest median income among U.S. counties, and it is part of a metropolitan area with a very high cost of living, including an expensive housing market (U.S. Census Bureau, 2013).

SCCHA implemented its rent reform in response to the particular budget situation caused by the federal sequestration in 2013, and at the time, other MTW PHAs considered a similar response.[12] Housing authorities often have to respond to budget cuts, and in doing so they must confront the question: Should they cut the number of vouchers they provide and put many households at risk of homelessness and severe hardship, or should they instead reduce the level of housing assistance they provide to their current voucher holders, having everyone share the burden—potentially increasing hardship for many more households (albeit to a lesser degree)? At the federal level, through a 2018 proposal, HUD expressed interest in a rent reform similar to the SCCHA rent reform that would have increased the tenant contribution rate from 30 percent of adjusted income to 35 percent of gross income (HUD, 2018).

Questions such as the one above must be answered even when policymakers are not facing budget reductions. The HCV program is not an entitlement program, its budget is limited, and there are long waiting lists in most large communities served by the program. Discussions around rent reform, therefore, must consider not only effects on current voucher holders, but also effects on eligible households that are not yet served by the program. The present study contributes to the knowledge of the impact on assisted households of a rent reform that decreases the subsidy received by each household in order to serve more households.

Housing Choice Voucher Program Income-Based Tenant Rent Rules

The HCV program helps low-income families obtain decent and safe housing in the private rental market. Housing vouchers are administered locally by housing agencies with funding from HUD. The voucher is a housing subsidy paid directly to the landlord by the agency on behalf of the participating household. The household pays the difference between the gross rent (the contract rent paid to the landlord plus utility costs) and the subsidy amount, or Housing Assistance Payment (HAP). The voucher holder is typically responsible for a portion of the gross rent equal to 30 percent of the household's adjusted income (after accounting for various allowable deductions), plus any amount by which the gross rent exceeds the local payment standard.[13] Allowable deductions include a deduction for each dependent, a deduction for having at least one household member who is elderly or disabled, a child care allowance for reasonable child care expense, and an allowance for medical expenses

[12] The 2013 federal budget sequestration refers to a set of cuts to federal spending that was passed as part of the Budget Control Act of 2011 and went into effect March 1, 2013.

[13] The payment standard is the maximum subsidy a PHA can pay on behalf of a household, and payment standards are set by the PHA between 90 and 110 percent of the area's fair market rents (FMRs). HUD sets FMRs annually at the 40th percentile of gross rents in the area.

Exhibit 1.2 General Housing Policy Terms

Brooke Amendment: The Brooke Amendment to the 1968 Housing and Urban Development Act was enacted in 1969. It amends the United States Housing Act of 1937 to cap subsidy households' tenant rent share at 25 percent of their adjusted income. This percentage was raised to 30 percent in 1981.

Brooke Rent: The 30 percent of adjusted income that households pay toward their gross rent.

Section 8 Housing Choice Voucher Program: The Housing Choice Voucher (HCV) program is the federal government's primary rental subsidy program, assisting approximately 2.2 million low-income households in paying for housing in the private rental market. HCV households generally pay 30 percent of their income toward rent, and HUD subsidizes the remaining amount of the households' rent up to a certain threshold based on area housing costs. The HCV program was enacted as Section 8 of the United States Housing Act of 1974.

for household members who are elderly or disabled. The portion of the gross rent that is equal to 30 percent of the household's adjusted income is called the *total tenant payment* (TTP), and the total amount that the household pays toward its gross rent is called the *family share*. As a result, when tenants' earnings increase, their share of the rent is increased by 30 percent of the additional amount they earn.

The rule that households pay 30 percent of adjusted income predates the Section 8 program's enactment in 1974 and was based on judgment about reasonable housing cost burden at the time (Schwartz and Wilson, 2008). It was initially set at 25 percent by the 1969 Brooke Amendment to the 1968 Housing and Urban Development Act and was raised to 30 percent in 1981. This 30-percent-of-income rule is also now known as the Brooke rent.[14] Variations of this tenant contribution rate—such as the one implemented by SCCHA—have so far not been rigorously tested. If increasing the tenant portion of rent does not affect households' employment decisions and does not significantly increase tenants' material hardship, but does succeed in reducing HAP expenditures, this could be one way of providing housing assistance to more families within a fixed budget amount.

The Santa Clara County Housing Authority Rent Reform

Until September 2013, SCCHA required its tenants to pay 30 percent of adjusted income for rent (plus any amount over the payment standard). Then, in response to federal budget cuts resulting from the sequestration in March of that year, SCCHA increased tenants' share to 35 percent of *gross* income. Under traditional rent rules, income is first adjusted by subtracting various allowances and deductions—including dependent and childcare allowances and deductions for medical expenses—and then multiplying the adjusted income by 30 percent to arrive at the TTP. Under the new rules, the TTP is a flat 35 percent of the household's gross income with no allowances or deductions.[15] SCCHA estimated that this changed households' rent contribution from 27 to 35 percent of gross income (HACSC, 2013). In addition to eliminating deductions and allowances that are subtracted from gross income under traditional rules, SCCHA also eliminated utility allowances, so that households do not receive any assistance in paying for utilities when utilities are not included in their contract rent.[16] In effect, this means that those households are paying even more than 35 percent of their gross income. In September 2014, the percentage

[14] See exhibit 1.2 for definitions of general housing policy terms used in this report.

[15] SCCHA has a minimum tenant rent contribution of $50 that was in place before the rent reform (and before the beginning of the study period). Under both traditional and new rent rules, the tenant rent share is the greater of the calculated percentage of income or the $50 minimum rent.

[16] Under the traditional rent rules, for units where utilities are not included as part of the contract rent, a utility allowance is added to the contract rent amount to calculate the gross rent. The HAP calculation is then based on this gross rent amount rather than the contract rent amount and equals the gross rent minus the household's TTP (assuming the unit does not exceed the payment standard). Using the new rent calculation rules, the HAP is calculated as the contract rent minus the household's TTP (again, assuming the unit does not exceed the payment standard).

of gross income to be contributed was reduced from 35 to 32 percent. As a result of the policy change, therefore, the overall tenant contribution was drastically increased in 2013, then slightly decreased a year later. (Neither the required contribution nor the minimum voucher standard has changed since that time.)

Exhibit 1.3 shows the TTP as a percentage of gross income at baseline (the last month before the policy change) and over the followup period for the study cohort, which is the measure that most directly reflects the rent policy changes over time.[17] This measure reflects the *treatment* whose effects are evaluated in this study. In the month before the rent reform was implemented, households were paying 30 percent of their adjusted income toward rent (up to the unit's payment standard) under the traditional rent rules, which translated, on average, to 27 percent of gross income. The actual percentage during this month was 30.6 percent because this average includes households for whom 30 percent of adjusted income (or 10 percent of gross income) is less than the PHA's minimum rent. At the end of the first year after rent reform, tenants' TTP was on average equal to 37.8 percent of their gross income. (Again, this percentage is higher than 35 percent because for some households, 35 percent of gross income was below the minimum rent). It decreased slightly to 35.1 percent in Year 2 because of the reduction in TTP from 35 percent to 32 percent of gross income 1 year after the rent reform was first implemented.

While SCCHA increased the tenant contribution rate, it also changed its policy for determining a household's voucher size. The new policy allocated one room for the head of household (with spouse or partner) plus one additional bedroom for every two persons regardless of age, generation, relationship, or gender. Before this policy change, the household members of different generations (such as grandparents and their grandchildren), of the opposite sex over the age of 5, and unrelated adults (other than significant others) were allocated separate bedrooms. For example, a household that included a household head, her 7-year-old daughter, and her 9-year-old son would have had a voucher size of three bedrooms using the old rule and a voucher size of two bedrooms under the new policy. This policy change decreased the voucher size for 23 percent of nonelderly, nondisabled households served by SCCHA. In other words, 23 percent of voucher households

Exhibit 1.3 Total Tenant Payment as a Percentage of Monthly Gross Income Among Nonelderly, Nondisabled Households Receiving Subsidies

TTP Among Households Receiving Subsidies (% of Monthly Gross Income)	SCCHA
Last Month of Baseline	30.6
Last Month of Year 1	37.8
Last Month of Year 2	35.1
Last Month of Year 3	34.3
Sample Size	7,109

SCCHA = Santa Clara County Housing Authority. TTP = total tenant payment.
Notes: Samples consist of households headed by adults who were not seniors or adults with disabilities. Sample sizes may vary by year because of missing values. TTP is the minimum amount a family must contribute toward rent and utilities regardless of the unit selected. Outcomes shown describe only those households receiving any housing subsidies in the specified month.
Source: MDRC calculations using HUD Public and Indian Housing Information Center data

[17] This measure is only available for households in the study cohort who are receiving subsidies at the time.

were housed in a unit where the number of bedrooms exceeded the number of bedrooms on their vouchers under the new policy. For these households, if they didn't move before the effective date of the new policy, their expected tenant contribution would sharply increase because their subsidy was now based on the fair market rent (FMR) for a smaller unit than the one they occupied.

In anticipation of the potential hardship that HCV households might face because of the rent reform, SCCHA offered two means of assistance: hardship exemptions for households that experienced a sharp increase in rent share because of the new rent calculation, and financial and legal assistance for households at risk of eviction due to the rent reform.

The hardship exemption policy allowed households to have childcare or medical deductions temporarily included in the calculations for their TTP. These expenses were deducted from the household's gross income (the exemption did not include other deductions, such as the dependent deduction). A household was eligible to apply for a hardship exemption if its rent portion increased by at least $50 because of the new rent calculation method. Since the households with larger deduction amounts were most affected by the rent reform, eligible households consisted mostly of households with children under the age of 13 that were paying for childcare, or elderly and disabled households. Hardship exemptions were granted to 414 households (out of 754 requested), most of them immediately after the rent reform went into effect.[18] Households that were granted the exemption paid the lower TTP for 90 days, after which it was reset to the regular amount under the new rent rules, based on 35 percent of the household's gross income with no deductions.

SCCHA also collaborated with the Law Foundation of Silicon Valley and other local organizations to create the Sequester Eviction Prevention Program (SEPP) to assist HCV households that were facing eviction because of the SCCHA rent reform. The program provided financial assistance to cover unpaid rent or to cover a security deposit if a household had to move because of the rent reform. The program also included free legal services to prevent eviction. While the program was primarily designed to assist households affected by the voucher size rule change, the program was open to any household facing eviction because of an inability to pay the higher rent under the new rent policy. Households that experienced a substantial increase in their rent share (at least $300) or that were otherwise at risk of eviction because of the rent reform were eligible to receive assistance from the program. The program assisted 293 households comprising 805 people. Of those households, 260 were nonelderly, nondisabled households and therefore included in the household-level analysis sample of the present study. SCCHA committed $500,000 of MTW funds for SEPP, which was supplemented with additional funds from the county of Santa Clara, the city of San Jose, and the Housing Trust Silicon Valley for a total funding commitment of $1,820,000. Of this committed funding, $808,078 was spent on the program, and all payments were made by August 2014.

SCCHA chose to increase the tenant contribution rate, which reduced the size of the housing subsidy per household, so they could continue to provide housing assistance to all households that were in the HCV program at the time. The alternative would have been to maintain the same percentage-of-income amount but reduce the number

[18] The total of 414 hardship exemptions includes exemptions for all households regardless of elderly or disabled status. SCCHA did not track elderly and disabled status of households granted hardship exemptions, so it is unknown how many of these households are in the study sample, which only includes nonelderly, nondisabled households and individuals.

of households already in the subsidy program by terminating some households' participation in the program.[19]

The decision by SCCHA was based partly on the assumption that increasing the amount that households paid toward rent would not substantially reduce tenants' employment.[20] Reductions in employment would have led to reductions in income, which would have led to necessary increases in HAP amounts, making the policy change counterproductive. Without any existing empirical evidence on the effects of changing the tenant contribution rate on employment and earnings, however, the effects of the kinds of policy changes made in SCCHA on actual HAP expenditures, households' employment decisions, and hardship were difficult to predict. A few years after the rent reform was implemented, SCCHA leadership told the research team that their general impression was that, overall, voucher households did not seem to have changed their employment behavior in response to the policy, but instead made do with less. Furthermore, SCCHA achieved the HAP savings it projected using the assumption that the rent reform would have no effects on employment.

Existing Evidence About the Effects of Housing Subsidies on Employment and Earnings

Given the increase in the percentage of income that tenants paid toward rent under the new SCCHA rent policy, there was a risk that tenants might reduce their earnings, which would have resulted in SCCHA having to increase the subsidy levels, effectively counteracting the HAP savings the housing agency hoped to achieve. The economic theory behind these expectations is not straightforward, however. Economic theory suggests that, on the one hand, increasing the percentage of income that tenants pay toward rent can reduce employment in response to the increased "tax" on their earnings (the "substitution effect" in labor economics): The tenants would gain less disposable income with each extra hour of work than they would have in the absence of that tax. On the other hand, households might increase their employment to compensate for the reduction in their subsidy and maintain the level of disposable income they had before the policy change (the "income effect" in labor economics).

While there is no prior research on changing the percentage of income that households pay toward rent or total housing costs among households already receiving subsidies, some insight can be drawn from the existing evidence about providing housing vouchers to households that had not been receiving housing subsidies. For such households, both the income and substitution effects point to housing subsidy receipt as a work disincentive.[21] The income effect suggests that providing housing subsidies can reduce employment among recipients by increasing households' disposable income, because the subsidy covers a large part of the housing costs that households were previously paying for, increasing their disposable income. The substitution effect suggests a further disincentive to work by imposing an implicit "tax" on their earnings, since the 30-percent-of-income rule for determining tenant rent share means that households would only "take home" 70 cents for every dollar they earn. (This tax is in addition to the explicit

[19] SCCHA also put a freeze on issuing new vouchers at the time of the 2013 rent reform, so households that left the program after the rent reform was first implemented were not replaced in the subsidy program for a few years. There were two exceptions: an allotment of 500 vouchers issued to waiting list applicants in 2015 and an allotment of 500 vouchers issued to the chronically homeless in 2016. The voucher freeze was lifted at the end of February 2017.

[20] It was confirmed in phone calls with executive staff at SCCHA that the estimates of HAP savings that they calculated before implementing the rent reform did not account for any potential reductions in earnings from the reform.

[21] See Shroder (2012) for a discussion of these and other factors and a literature review up to 2012.

taxes earnings bring.) This "tax" is effectively an increase from 0 percent to about 30 percent of the households' income when they begin receiving subsidies.

Three large-scale random assignment studies conducted in the past decade provide reliable evidence on new housing subsidies' effects on households' employment behavior and suggest some disincentive effect on employment and earnings consistent with the economic theory described above. The first of these recent studies is the random assignment evaluation of the Welfare to Work Voucher (WtWV) program, which studied the effects of receiving housing vouchers for households selected from the HCV waiting list that were receiving or had received Temporary Assistance to Needy Families (TANF). The study found that households randomly assigned to receive a housing voucher worked less than households who were randomly assigned to the control group, but only during the first year following random assignment (Mills et al., 2006).

A later study leveraged a lottery used by the Chicago Housing Authority Corporation to allocate newly available housing vouchers in 1997 (Jacob and Ludwig, 2012). This natural experiment found more persistent negative impacts on labor supply. The study found that receiving a voucher caused subsidy recipients to reduce their employment by 6 percent (4 percentage points) and reduce their quarterly earnings by 10 percent ($329 in 2007 dollars). The Chicago study found that the impacts were significantly larger for households who were not receiving TANF than those who were, which may be an important reason their results differed from those of WtWV (whose sample consisted of all TANF recipients and found less negative impact on employment).[22]

The most recent of the three studies, the Family Options Study, offered vouchers to homeless families as one arm of the intervention. This study also found that housing vouchers reduced employment for voucher recipients: In the short-term, 11 percentage points fewer households who were randomly assigned to receive housing vouchers were working than was the case for households that were randomly assigned to the study's control group. (Fifty percent of the intervention group had any employment during the first year after random assignment compared with 61 percent of the control group.) After 3 years, this difference fell to 6 percentage points (64 percent of treatment group members had any employment in the prior year and a half compared with 58 percent in the control group) (Gubits et al., 2015; 2016).

In all three of these studies, randomly selected households were given access to housing subsidy programs that used the traditional 30-percent-of-income rent rule. Therefore, as described earlier, these studies estimated effects of providing housing assistance to households that were not yet receiving any assistance. That research question is somewhat distinct from the question addressed by this SCCHA study, which examines the effects of changing rent policies for households that are already receiving housing assistance under the traditional rent rules. Also, while the earlier studies provide evidence for a potential work disincentive from obtaining a housing voucher at least in the short term, this evidence does not necessarily imply that reducing the housing subsidy (as in the SCCHA rent reform) would provide an incentive to work. Theoretically, as described earlier, an increase in the percentage of income a household pays toward rent could

[22] Both the WtWV and Chicago studies found that estimated effects varied according to several baseline characteristics, including household size and age of the household head. In Chicago, Jacob and Ludwig used their employment and income findings to estimate an income elasticity of -0.09 and a compensated wage elasticity of 0.15. In this case, the response of individuals determined by the elasticity of substitution was more important than the one caused by the elasticity of income.

lead to a reduction in earnings due to a higher "tax" on earnings (households would keep less of their earnings) or to an increase in earnings to compensate for lost income; the net outcome depends on which of the two effects is dominant.

To date, there is no direct prior evidence to support either hypothesis, but there are studies currently under way that may provide insight on this question. Evidence from these studies is more directly relevant to the present study because they specifically examine the effects of changing the percentage of income that housing subsidy-assisted households are required to pay toward rent. The first is the HUD-funded Rent Reform demonstration, which tests a rent reform model in four PHAs that caps the tenant contribution toward rent for 3 years. During those 3 years, households' contribution toward rent does not increase regardless of any increases in earnings during that period. The Rent Reform demonstration's evaluation will provide evidence on whether this reform leads to increases in employment and earnings.[23] An interim report with findings on short-term effects on employment and earnings and a final report with findings on long-term effects are expected to be published later this year.

The two other related studies under way are the HUD evaluation of the MTW expansion and the HUD Jobs Plus Outcomes study. The second cohort of the HUD study of the current MTW expansion is intended to investigate the effects of tiered rents (where tenant rent share is determined based on which income band household income falls into) and stepped rents (where tenant rent share is increased by a set amount at regular intervals according to a rent share schedule) in 10 PHAs with newly granted MTW status. These rent reforms are not expected to directly change the percentage of income that households will contribute toward rent but will provide alternative methods of calculating tenant rent. The HUD Jobs Plus Outcomes study will assess the effects of the Jobs Plus program, and results may provide some insight into the effects of earnings disregards combined with employment services. Jobs Plus is a place-based program implemented in public housing developments that combined on-site employment-related services and activities (including job search assistance, referrals to education and training programs, and support services), rent-based financial incentives, and community support for work. Taken together, this set of studies that evaluate changes in how tenant rent share is determined will build a body of evidence that will inform future HUD and PHA decisions about the most effective rent policies to implement.

The present study is the only study to date to assess the effects of increasing the percent of income that tenants pay toward rent in a housing subsidy program. It examines the effects of this type of rent reform on tenants' employment behavior and housing subsidies. The study's research questions are specified in the next chapter.

[23] The policy, evaluation design, and PHAs' early experiences with the new policy are described in detail in a baseline report (Riccio, Deitch, and Verma, 2017).

Chapter 2

Research Design

The present study examines the effects of Santa Clara County Housing Authority's (SCCHA) rent reform on housing subsidy recipients' employment and housing outcomes for the cohort of nonelderly, nondisabled adults and households receiving HCVs in SCCHA at the time the rent reform was implemented in 2013. It uses three methods to investigate its research questions: a comparative interrupted time series design to estimate impacts on employment and earnings; an autoregressive difference-in-difference design to estimate impacts on average housing subsidies and continued subsidy receipt; and descriptive analyses to examine subsidy households' housing characteristics and rent burden before and after the SCCHA rent reform.

Research Questions

The present study primarily aims to address the question: *How does an increase in tenant rent share affect tenants' work behavior, and how does it affect households' housing outcomes?* This question is broken down into the following research questions:

1. What was the effect of the SCCHA rent reform on household members' employment and earnings?
2. What was the effect of the SCCHA rent reform on housing assistance receipt and subsidy amounts?
3. Was there any suggestion of potential effects of the SCCHA rent reform on households' housing decisions?
4. To what extent did SCCHA households experience selected housing-related hardships after the rent reform?

These research questions are first addressed for the full study sample of nonelderly, nondisabled adults living in HCV-subsidized households. The study then explores whether these effects differ for households only affected by the increase in the tenant contribution rate (77 percent of the study sample) and for the households affected by the change in the voucher size policy *in addition to* the increase in the tenant contribution rate (23 percent of the study sample).

The remainder of this section describes the rationale for each research question and hypotheses that lie behind these questions. It also describes the rationale for assessing effects separately for households only affected by the change in the tenant contribution rate and households also affected by the voucher size rule change.

Effects on Employment and Earnings

The primary research question for this study is: "How did the SCCHA policy changes affect HCV subsidy recipients' employment and earnings?" Adults in subsidy households who were able to work could have responded to the rent reform by changing their work behavior to adjust their earnings (and therefore adjust their tenant contribution amount and net income) in three ways:

1. Households may have *increased* their employment and hours worked in response to the policy change. Doing so could increase their earnings, compensating for all or part of the reduction in disposable income so they would experience less change in their standards of living.
2. Households may have *maintained* their current levels of employment and hours worked (by choice or not), either finding a way to manage with less disposable income or perhaps experiencing increased material hardship.

3. Households may have *reduced* their employment and earnings in response to the increased disincentive to work, namely the increased "tax" on earnings, reflecting the fact that they got to keep less of each dollar they earned than they did under the former policy.

In the first two scenarios, HAP expenditures would have decreased in the amount estimated by SCCHA, and their expected savings would have been realized.[24] If, instead, households reduced their employment in response to an increase in the percentage dedicated to rent (the third scenario), HAP expenditures would not have decreased as much as expected, and SCCHA would not have met its budgetary targets. Depending on the extent of the reduction in employment, HAP expenditures might even be greater than previous levels, and the policy change would have been counterproductive.

These different forces could have immediate effects (someone could reduce the number of hours worked because of the increased implicit tax on earnings), or they could affect decisions about employment later in the followup period (someone could choose not to accept an opportunity to increase working hours because the increase in net income would not be as large as it would have been under the previous rent policy). It is also possible that households responded to the increased tenant contribution rate differently over time. For example, households may have first responded to the unanticipated income shock by working more to compensate for the lower income and to maintain longer term financial commitments, but over time they may have reduced their employment as they adjusted to the change, possibly down to their pre-2013 employment level, or even lower, in response to the increased "tax" on earnings. This study estimates the effects of the SCCHA rent reform on employment and earnings for the 4 years after the rent reform was implemented and therefore can capture both immediate and longer-term effects.

Effects on Average Housing Subsidy Amounts and Continued Housing Subsidy Receipt

The primary objective of the SCCHA rent contribution increase in September 2013 was budgetary. Initially, SCCHA sought to reduce housing assistance payments and associated administrative costs sufficiently to stay within its annual budget as constrained by the sequestration cuts. By increasing the tenant rent contribution and thereby reducing subsidy payment amounts for all families, SCCHA planned to continue to serve all the households in the HCV program at the time with the reduced budget. Therefore, the rent reform was expected to have a direct effect on housing subsidies, including the average TTP, average HAP, and average family share (TTP plus any part of the gross rent that exceeds the payment standard).[25, 26]

The increase in the tenant contribution rate and the decrease in housing subsidy payments is not necessarily a straightforward relationship, however. As described in the previous section, the SCCHA rent reform could have led to various changes in households' employment behavior. If many households had reduced their earnings in response to the rent reform, then average household HAP amounts may not have decreased substantially. In other words, the rent reform could have directly affected

[24] The elimination of utility allowances may contribute to the income effect (as households may have to increase income to cover increased utility costs) but would not contribute to the substitution effect (reducing earnings would not increase HUD coverage of utility costs; it would only increase HAP to cover rent).

[25] SCCHA also considered reducing the payment standard for the HCV program, but decided against it because an analysis it conducted comparing these two options—revising the payment standard to 90 percent of FMRs or increasing the tenant contribution rate to 35 percent of gross income—showed that the tenant contribution rate change would have a lesser impact on lower income households (households with less than $32,000 of income). See appendix 5 of the SCCHA FY2014 MTW Plan for more details (HACSC, 2013).

[26] See exhibit 2.1 for definitions of subsidy outcomes included in the present study. See exhibit 2.2 for definitions of other relevant housing subsidy terms.

Exhibit 2.1 Definitions of Housing Subsidy Measures Used in Present Study

Housing Assistance Payment (HAP): The amount that the public housing agency (PHA) provides in subsidy to pay for rent and utilities. It is calculated as the lower of (1) the payment standard for the family's unit minus the TTP, or (2) the gross rent minus the TTP. Under the SCCHA new rent calculation rules, the HAP is calculated as the lower of (1) the payment standard for the family's unit minus the TTP, or (2) the contract rent minus the TTP.

Total Tenant Payment (TTP): The minimum amount that the household must contribute towards rent and utilities. Under traditional rent rules, it is calculated as the greatest of: (1) 30 percent of monthly adjusted income, (2) 10 percent of monthly gross income, and (3) the PHA minimum rent. Under the SCCHA new rent rules, it is calculated as the greater of 35 percent (or 32 percent, after July 2014) of monthly gross income and (2) the PHA minimum rent.

Tenant Rent Share: The household's total contribution towards the contract rent. For households living in units with contract rents at or below the payment standard, the tenant rent share is equal to the household's TTP. For households with contract rents that exceed the payment standard, the tenant rent share is calculated as the TTP plus the amount by which the contract rent exceeds the payment standard.

Any Subsidy Receipt: A household is classified as receiving housing subsidies if their HAP amount is greater than zero (in any PHA). If a household's income increases to the threshold where their HAP amount is zero because their calculated TTP is greater than the gross rent, they have a grace period of 180 days during which they are not receiving any subsidies but are still considered active in the program. If their income drops before their grace period ends, they can have their TTP recalculated and will begin receiving subsidies again. A household whose HAP is $0 and is in their grace period is not classified as receiving any housing subsidies at that time.

Tenant Rent Share as a Percent of Household Gross Income: Rent burden is typically defined as the portion of a household's income used toward total housing costs, including rent and utilities. Because data on utility costs were not available for two PHAs in the sample, the present study uses an alternative measure of rent burden, which is calculated as the monthly tenant rent share (rent only, not including utilities) divided by the household's monthly gross income.

Exhibit 2.2 Definitions of Other Housing Subsidy Terms

Adjusted Income: A household's gross income minus deductions for the following: dependents, status as a senior family or family with members with disabilities, unreimbursed childcare expenses, unreimbursed medical expenses (for seniors and families with members with disabilities only), and unreimbursed disability assistance expenses.

Fair Market Rent (FMR): The gross rent for units by number of bedrooms on which the household's housing subsidy is based. HUD sets FMRs annually at the 40th percentile of gross rents in the area, based on local housing market prices for nonluxury, privately owned rental units that meet minimum standards of safety.

Gross Income: A household's total income before taxes and other deductions, received by all members of the household. It includes total income from wages, social security payments, retirement benefits, military and veteran's disability payments, unemployment benefits, welfare benefits, and asset income. It excludes certain forms of income, such as earnings from minors and income from live-in aides.

Gross Rent: The total contract rent paid to the landlord plus any utility allowances.

Payment Standard: The maximum subsidy a PHA pays on behalf of a household (before deducting the household's TTP), which is set by the PHA between 90 and 110 percent of the area's FMR.

Port-Out: A household relocating to a unit within another PHA jurisdiction.

Utility Allowance: The utility allowance is an estimate of the amount needed for a household to cover its reasonable utility costs, based on bedroom size, which utilities the tenant is responsible for outside the contract rent, the type of utilities (for example, gas versus oil heat), and other unit characteristics such as structure type.

Voucher Size: The number of bedrooms on a household's voucher. A household's rent calculation uses the lower of (1) the payment standard for the household's voucher size, or (2) the payment standard for the household's unit size.

Minimum Rent: The minimum amount set by the PHA that households must contribute towards rent and utilities.

households' subsidy levels through its change in the tenant contribution rate and indirectly affected households' subsidy levels through households' employment responses to the changes in their housing costs.

The study also seeks to address whether the SCCHA rent reform caused households to leave the HCV program. The increase in the tenant contribution rate might have driven some households' HAP down to zero, meaning that such households would be fully responsible for their own housing costs. If the rent reform did in fact increase employment and earnings, some households might have "earned their way off" housing subsidies (if their increased income effectively reduced their subsidy payments to $0). Even for

households whose HAP was significantly reduced, but not reduced fully to $0, some might have chosen to leave the HCV program because they found the smaller subsidy no longer justified the burden of staying in the program and complying with housing authority reporting requirements and other program rules. While there were strong reasons to expect direct effects on average household housing subsidy amounts (as discussed before), effects on receiving *any* housing subsidy ("attrition" from the program) would have been less direct.

Households' Housing Decisions While in the Voucher Program

Although the immediate goal of both 2013 changes in SCCHA policies was to reduce HAP expenditures in response to federal budget cuts, the changes could also have had effects on decisions households made about whether and where to relocate and whether to change who was on the lease. In contrast with the housing subsidy outcomes, which are near-term outcomes of the SCCHA rent reform, households' housing decisions are more removed and the effects on these outcomes are less direct.

The tenant contribution rate change could have encouraged households to seek other housing if their gross rent was above the payment standard, in order to offset the increase in housing costs. The study explored whether households moved to smaller units, moved to different types of neighborhoods, or relocated to units outside the jurisdiction of SCCHA (defined as "porting out"), and whether they changed their housing composition by adding or removing family members.

Household Rent Burden While in the Voucher Program

Because the policy change effectively reduced the subsidy amounts provided to households for rent, an important research question is whether the rent reform led to housing-related hardship. For example, households may have been unable to pay their rent on time, leading to arrears and, in some cases, to eviction and termination from the HCV program. Whether the SCCHA rent reform caused increased material hardship is an important question, but one that this study was not able to answer directly or comprehensively. Due to data limitations, the study was able to examine a measure of households' rent burden over time on a descriptive level, but it could not measure other aspects of material hardship, such as rent arrears, evictions, food insecurity, inability to pay utility bills or medical expenses, and other important expenses. The study relied on conversations with SCCHA leadership and internal agency documents to explore the types of assistance SCCHA provided to alleviate housing-related hardship and prevent eviction due to the rent reform.

Effects for Households Affected by the Tenant Contribution Rate Change Only Versus Households Also Affected by the Voucher Size Rule Change

The hypotheses described earlier relate to the potential effects of the tenant contribution rate change. As noted earlier, 23 percent of HCV households (not including senior households or households headed by people with disabilities) in SCCHA were immediately affected not only by the change in subsidy levels but also by the new voucher size policy that SCCHA adopted as part of its rent reform. The new voucher size policy enforced a minimum of two family members per bedroom, excluding the head of household's bedroom, regardless of age, generation, gender, or relationship of the household members.

Both groups of households—that subject to only to the tenant contribution rate change

and that also subject to the voucher size rule change—faced the same increased contribution rate of 35 percent of gross income.[27] Thus, its effect on earnings and employment should be approximately the same for the two groups. Members of the group subject to both policy changes, however, faced a much larger total reduction in housing subsidies, especially if they could not readily move to a unit with fewer bedrooms. This larger reduction in net income may have produced a stronger incentive for adult household members to increase their earnings in order to compensate for their lost net income. On the other hand, if these larger rent burdens led to evictions or other forced moves, the resulting instability of their housing situations may have led to difficulties in maintaining the same job or maintaining the same level of work effort (especially if it was necessary to relocate further away from the current job).

All households whose rent exceeded the payment standard faced some incentive to move to a less expensive unit. The households that were affected by both policy changes, however, faced an especially large reduction in their housing subsidies because of both the increase in the tenant contribution rate and a reduction in the number of bedrooms on which their subsidies would be based. The latter increase could be avoided by moving to a smaller unit, so these households had an especially strong incentive to relocate. Their options to relocate may have been limited, however, because of rapidly increasing housing prices in the area. According to SCCHA staff members working with households at the time, these rapid changes to the local housing market made it very difficult for many households to find a smaller unit that was affordable; in some cases, moving to a smaller unit would have been even more expensive than remaining where they were. To the extent that was the case, these households would have been vulnerable to especially high rent burdens.

Study Sample

The analysis sample includes all nonelderly, nondisabled households and individuals who were receiving HCV subsidies from SCCHA or one of the three selected comparison PHAs at the time of the SCCHA policy change in July 2013.[28, 29] These comparison PHAs include: the Housing Authority of the County of Alameda, the Housing Authority of the County of San Mateo, and San Francisco Housing Authority. The process used for selecting these PHAs for the comparison group is described later in this chapter.

Quarterly and annual effects on employment were estimated for the cohort of all nonelderly, nondisabled *individuals* who were living in households receiving HCV subsidies at the time of the rent reform (July 2013). Annual effects on household subsidy amounts and continued housing subsidy receipt were estimated for the cohort of all nonelderly, nondisabled *households* receiving HCV subsidies from study PHAs at the time of the rent reform.

The SCCHA policy changes affected all HCV households regardless of elderly or disability status. The present study focuses on nonelderly, nondisabled tenants because its primary research question is how the rent reform affected subsidy recipients' employment and earnings, and elderly

[27] As mentioned earlier, when SCCHA eliminated all income deductions and allowances from households' rent calculation policy change, it also eliminated utility allowances. Throughout this paper, references to the tenant rate contribution change include this elimination of utility allowances.

[28] The study uses HUD's definitions of elderly and disabled households and adults. See Box 2.3 for definitions of these terms.

[29] The SCCHA policy changes affected all HCV households, regardless of elderly or disability status. The study focuses on nonelderly, nondisabled households because elderly and disabled households would not have had the same flexibility to change their work behavior in response to the policy changes. Although the study's analysis plan included conducting a parallel, secondary analysis for elderly and disabled households, studying the effects of the rent reform on these households was not feasible due to data limitations (see Castells, Riccio, Verma, and Long, 2017).

Exhibit 2.3 HUD Definitions of Sample Terms

Adult: An individual who is 18 years of age or older or a minor under the age of 18 who has been emancipated to act on his/her own behalf, including the ability to execute a contract or lease.

Individual with Disabilities: An individual who has a physical or mental impairment that substantially limits one or more of the major life activities.

Household with Disabilities: A household whose head, co-head, spouse, or sole member is a person with a disability.

Senior Individual: A person at least 62 years of age.

Senior Household: A household whose head, co-head, spouse, or sole member is at least 62 years of age.

and disabled tenants would not have had the same flexibility to change their work behavior in response to the policy changes. Although the present study had intended to conduct a parallel, secondary analysis for elderly and disabled households, it was not feasible to examine effects of SCCHA's rent reform on these households due to data limitations. Specifically, employment trends for elderly adults declined over time as adults in these households aged. In contrast, this trend for disabled, nonelderly households increased over time, possibly because some members overcame temporary disabilities. Unfortunately, SCCHA and the comparison PHAs had different proportions of elderly households and disabled households, which meant that the employment and earnings trends for the group of elderly and disabled households in the comparison PHAs were not an appropriate counterfactual for this analysis.

The present study conducted a subgroup analysis that compares intervention effects on households that experienced only a change in the tenant contribution rate with households that were also affected by the voucher-size rule change. The subgroup of SCCHA households that were affected by the voucher size rule change was identified by comparing households' voucher sizes at baseline (in early July 2013, before the rent reform was implemented) with their voucher sizes under the new policy. Using actual subsidy data, a simulation applied the new voucher size rules to each household according to its baseline unit size and household composition. A household was included in the subgroup of households affected by the voucher size rule change, if its new rent calculation would use the payment standard of a smaller voucher size under the new policy. All other households were included in the subgroup of households that were only affected by the tenant contribution rate increase.

At the time of the SCCHA rent reform, only one PHA in the study sample other than SCCHA—the San Francisco Housing Authority (SFHA)—had not yet moved to a more conservative voucher size policy. Therefore, only SFHA could be included in the comparison group for this subgroup analysis. The method described earlier was used to identify the subgroup of households (based on baseline voucher size, unit size, and household composition) in SFHA that would have been affected by the new voucher size rules if those rules had been applied to them. Twenty-three percent of nonelderly, nondisabled households in SCCHA and 21 percent in SFHA were identified for this subgroup analysis.

The comparative interrupted time series (CITS) models for the main analysis were used to estimate effects for nonelderly, nondisabled *individuals*. For the subgroup analysis, they were used to estimate effects on adults living in nonelderly, nondisabled *households* who were affected by the voucher size policy change in addition to the increase in the tenant contribution rate. This difference

in sample definition is due to the subgroups being defined using household-level variables (voucher size, unit size, and household composition at the time of the policy change) and receiving unemployment insurance (UI) data aggregated within those groupings.

Although the unit of analysis is the same for both the full sample and subgroup analyses (individuals, aggregated to PHA-level averages), the sample of individuals differs somewhat. For the main analysis, the sample consists of nonelderly, nondisabled individuals living in either nonelderly, nondisabled households or in elderly or disabled households (which were also subject to SCCHA's rent reform). For the subgroup analysis, the individual-level analysis sample consists of all adults living in those households, regardless of their personal elderly or disabled status. The sample still consists of mostly nonelderly, nondisabled adults: 94.8 percent of the adults in the sample are neither elderly nor disabled. This distinction means, however, that 19 percent of the SCCHA adults in the main analysis sample are not included in the subgroup sample because they were living in elderly or disabled households, which are excluded from the subgroup analysis.

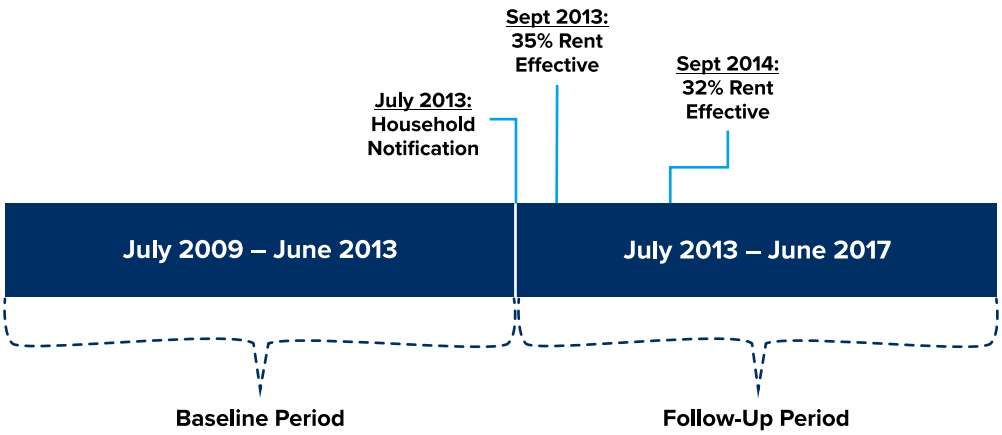
Study Period

The CITS design used in this study (described in detail later) requires a sufficient number of time points (ideally, at least 4 years) before the policy change to reliably estimate baseline trends. As exhibit 2.4 shows, the SCCHA rent reform was implemented in early July 2013 (when the PHA sent letters to subsidy households notifying them of the rent reform and their new tenant rent share under the new rent policy), and the baseline period is defined as the 4 years before the start of the SCCHA rent reform implementation: July 1, 2009, to June 30, 2013. The followup period includes the 4 years after the start of the SCCHA rent reform and is defined as July 1, 2013, to June 30, 2017. In other words, the analysis used 4 years of historical (pre-rent-reform) and 4 years of followup (post-rent reform) data on the study cohort to estimate effects of the rent reform.

Data Sources

The study primarily relies on two data sources for understanding the rent reform's effects on employment, earnings, housing subsidy receipt and amounts, plus housing characteristics: state UI wage data and the

Exhibit 2.4 Timeline of Policy Changes



HUD Inventory Management System/Public and Indian Housing Information Center (IMS/PIC) data. It also uses other data sources—including U.S. Census Bureau data and internal SCCHA documents and discussions with SCCHA staff members—to provide context for these findings.

Employment and Earnings

Employment and earnings data were obtained from the California Employment Development Department (EDD). These administrative data consist of employer-reported UI wage data for all employment covered by UI in the state of California. These data do not, however, include wage data for jobs outside of California, federal employment, or informal or self-employment not covered by UI.

The data are quarterly and were received in aggregate form (for example, average earnings in the third quarter of 2013 for all households in a group). Since this is a retrospective study relying on secondary analysis of administrative data, it was not feasible to obtain informed consent for all the members of the sample, and therefore the analysis relies on deidentified, aggregate-level earnings and employment data. The employment and earnings data for the main analysis (which estimates effects for all nonelderly, nondisabled adults receiving HCV subsidies) were grouped by PHA and whether individuals were elderly or disabled. These data were used to construct the two key measures in this analysis: the average quarterly employment rate and average quarterly earnings measures. Since CITS analysis requires the calculation of a trend in the outcome over time, average quarterly earnings were adjusted for inflation to 2017 dollars using the Bureau of Labor Statistics Consumer Price Index (CPI).[30]

For the subgroup analysis, which looks at effects on employment and earnings for adults living in households that were only affected by the increased tenant contribution rate separately from households also affected by the new voucher size policy, the sample was defined at the household level (as described in more detail in the Sample section above). The data were grouped by PHA, household elderly or disabled status, and whether the payment standard on which the household's rent calculation was based was reduced because of the new voucher size determination rules. Therefore, this analysis estimated effects on earnings and employment for all adults (regardless of elderly or disabled status) living in nonelderly, nondisabled households that were subject to the voucher size policy change. Employment and earnings measures were constructed in the same way as for the main analysis.

Housing Subsidies and Housing Characteristics

The study relies on IMS/PIC data obtained from HUD for housing-related measures. At each household certification, the PHA must complete (or update) a HUD Form 50058, which includes information on a household's housing subsidy amount, tenant rent amount, household characteristics, and unit characteristics. A certification occurs when a household is issued a new voucher, completes a regular recertification, completes an interim recertification due to a change in income or household composition, relocates to another unit outside of its regular recertification schedule, relocates to a different housing agency, or ends its program participation.[31]

[30] All Urban Consumers (Current Series) database (https://www.bls.gov/cpi/data.htm).
[31] A full list of 50058 certification types can be found in the HUD 50058 instruction booklet, available at https://www.hud.gov/sites/documents/50058I.pdf.

Quarterly IMS/PIC snapshot data were used to identify the study sample, to describe household and individual characteristics at the time of the policy change, and to create covariates for the impact models. To identify the study sample, snapshot files from the second and third quarters of 2013 were used to identify which households in the selected PHAs were receiving subsidies on July 1, 2013, just before the SCCHA rent reform was implemented. These files provide a snapshot of households' information at the end of each quarter.

IMS/PIC transactional data were used to investigate effects on housing subsidy amounts and housing subsidy receipt and to provide descriptive information on other housing-related outcomes, including rent burden and unit characteristics. The transactional files include a record for each certification that occurred during the study period. Monthly measures from July 2009 through June 2017 were created using these data. Data were acquired for all transactions recorded from January 1, 2009 (six months before the study period) to establish baseline levels of all the housing-related measures.

The IMS/PIC data for the last year of the followup period (July 1, 2016, to June 30, 2017) have important limitations. The data for this last year of the study period did not benefit from updates recorded in the following year, or from certifications that were recorded in the following year but effective during Year 4. An analysis of years in the study period that had at least one full year of subsequent data available (2009 to 2015) found that 12 to 25 percent (depending on the year) of certifications effective in a given year had an effective date that occurred after that year. In other words, it can be expected that only 75 to 88 percent of records in Year 4 are accurate. This issue is especially evident in the housing subsidy amounts in Year 4, which contain many more extreme values than the prior 3 years that would likely be corrected in an updated file. Therefore, results using the fourth year of IMS/PIC data are not presented in this report, but the overall results using Year 4 data are reported in footnotes.

MTW agencies have fewer 50058 reporting requirements and use a shortened 50058 form to collect data at each certification. It was necessary, therefore, to construct some measures that are available for traditional PHAs but are not included in HUD Form 50058 MTW: HAP, TTP, and family share. These measures rely on the payment standard at the time of the rent calculation (based on the smaller of the number of bedrooms of the voucher or unit), which is not included in the IMS/PIC data.[32] MDRC collected payment standard amounts for the full study period from SCCHA and from the Housing Authority of the County of San Mateo (HACSM), one of the MTW agencies selected for the comparison group.[33] MDRC calculated these measures as follows:

- *TTP* is the minimum amount that the household must contribute toward rent and utilities. Under traditional rent rules, it is calculated as the greatest of (1) 30 percent of monthly adjusted income, (2) 10 percent of monthly gross income, or (3) the PHA minimum rent. Under the SCCHA new rent rules, it is calculated as the greater of 35 percent (or 32 percent, after July 2014) of monthly gross income or (2) the PHA minimum rent.
- *HAP* is the amount that the PHA provides in subsidy for rent and utilities. It is calculated as the lower of (1) the payment standard for the family's unit minus the TTP or (2)

[32] The payment standard amounts and the household HAP, TTP, and family share amounts are included in the IMS/PIC data for traditional PHAs.
[33] The selection process for the comparison group is described in detail later in this chapter.

the gross rent minus the TTP. For SCCHA households after the new rent policy went into effect, it is calculated as the lower of (1) the payment standard for the family's unit minus the TTP or (2) the contract rent minus the TTP.

- The *family share* is the household's total contribution toward the gross rent. For households with a gross rent at or below the payment standard, the family share is equal to the household's TTP. For households with a gross rent that exceeds the payment standard, the family share is calculated as the TTP plus the amount by which the gross rent exceeds the payment standard. (This measure was constructed for baseline only.)

Utility allowance data were not available for SCCHA households for all recertifications after the rent reform was implemented in 2013 because the rent reform eliminated utility allowances, and for HACSM after its tiered subsidy policy was implemented in 2010 because utility allowances were incorporated into their tiered subsidy schedules. Utility allowances are the PHAs' estimates of the amount needed for a household to cover its reasonable utility costs, based on bedroom size, which utilities the tenant is responsible for outside the contract rent (for example, heat, cooking, electricity), the type of utilities (for example, gas, oil, electric), and other unit characteristics such as structure type (for example, apartment, single-family home). Utility allowances are added to contract rent to calculate gross rent, which is used to calculate family share as described earlier.

Utility allowances are not included in the calculation of HAP for HACSM in any of the analyses. (As described earlier, HAP relies on gross rent with the traditional rent policy.) Data on utility allowances are also not available for SCCHA after the rent reform, but because utility allowances were eliminated as part of the rent reform (and thus the calculation relies on contract rent instead of gross rent), these data are not needed to calculate HAP for SCCHA households after the rent reform went into effect. To test whether excluding utility allowances from HAP calculations for HACSM households influenced the impact estimates for average housing subsidies and continued housing subsidy receipt, utility allowance amounts were imputed, and the impact analyses were rerun using these imputed measures. The sensitivity tests suggest that the influence of excluding utility allowances for HACSM is negligible. This finding is unsurprising because San Mateo households comprise only about one-quarter of the comparison group sample and utility costs are not high for HACSM households (households that are responsible for paying for utilities outside of their contract rent have an average utility allowance of $97 per month during the time period that utility allowance data is available for HACSM). Imputed utility allowances for HACSM were also used for sensitivity tests of the HAP descriptive analyses, with similar findings. Specific findings of the sensitivity tests are included in footnotes in chapter 3 along with the main findings.

To impute the utility allowance amounts in SCCHA for the sensitivity test described above, a household's utility allowance amount for all followup months was set to equal the amount of the household's utility allowance in the month before the implementation of the SCCHA rent reform (the last month where utility allowance data was available for SCCHA households). For HACSM, where utility allowance data was only available during the first year of the study period, households' utility allowance amounts in all the following months of the study period were set equal to the

household's utility allowance amount from that first year.[34]

A household's family share is typically interpreted as a measure of the family's total out-of-pocket housing costs, including tenant rent share and tenant-paid utilities. Although the SCCHA rent reform eliminated utility allowances from its rent calculation, households are still responsible for the tenant-paid utilities for their units. To ensure that a consistent measure of housing costs was used across PHAs and across time (before and after the SCCHA rent reform), the descriptive analysis uses a tenant rent share measure to analyze the amount that households pay toward rent, not accounting for utilities.

An alternative measure of rent burden was constructed for both MTW and traditional PHAs. Rent burden is typically defined as a household's total housing cost—including rent share and tenant-paid utilities—as a proportion of household income. Because data on utility allowances for the entire study period are not available for SCCHA and HACSM, it was not possible to reconstruct family share for SCCHA during the followup period (or for San Mateo at all). To ensure that this descriptive analysis described later in this chapter examines a consistent measure of rent burden over time—both before and after the SCCHA rent reform—and that this measure is comparable between SCCHA and the comparison group PHAs—an alternative measure of rent burden is used. This measure is the tenant rent share (equal to the TTP plus any amount that the *contract* rent, not including tenant-paid utilities, exceeds the payment standard) divided by the household's gross income.[35]

A 40-percent rent burden is commonly used as the threshold for a high burden in the literature discussing HCV households (Ellen and Torrats-Espinosa, 2017; Dawkins and Jeon, 2017). The measure used in this study—the tenant rent share as proportion of household gross income—departs from this standard definition in two ways. First, the threshold used is typically 40 percent of *adjusted* income—which was impossible to measure in SCCHA after it eliminated deductions—which would be a lower threshold than 40 percent of gross income. Second, the measure typically uses total housing costs—including tenant rent share and tenant-paid utilities—as a proportion of household income. As described earlier, the measure used in the present study only uses tenant rent share (and does not include tenant-paid utilities).

Local Context, Neighborhood Poverty and Hardship Policies

The present study uses the census tract poverty rate as a proxy for neighborhood quality. Poverty rate is the most widely used measure of neighborhood quality and distress (Galvez, 2010). To measure neighborhood poverty, the geocoded HUD IMS/PIC data were merged with U.S. Census data. The census tract poverty rates (for individuals age 18 to 64 years) from either the 2007–2011 American Community Survey 5-year estimates or the 2012–2016 5-year estimates, depending on the date that the record was entered, were merged with the census tracts in the IMS/PIC data.

[34] This imputation method was used based on an examination of the percent of households with utility allowances and the average utility allowance amounts over the 4 years of baseline. Both measures remained very stable over these 4 years (in SCCHA, 98.1 to 98.6 percent of households had any utility allowances with an average amount of $104 to $107 each year.) For HACSM, utility allowance data were only available in the first year of the study period. To the extent to which households' unit size, household income, and other factors affect their decisions about choosing units based on their gross rents in relation to the payment standard, or based on the number and types of utilities the tenant is responsible for, these factors would be captured in their prior utility allowance levels, and this variation in utility allowance amounts is preserved using this imputation method. This imputation method cannot, however, account for changing utility costs when households relocate to different units with different utility costs.

[35] For households whose tenant rent share (TTP plus the amount that the contract rent exceeds the unit's payment standard) exceeds their gross income, this measure is set to 100 percent.

The study used two additional public data sources during the process of selecting the comparison group PHAs (described later). Public data from the California EDD website was one source for measures of labor and housing market information for 2012–2016 for the Bay Area counties where the PHAs in the present analysis were located.[36] The other source was 2013 data from the HUD Picture of Subsidized Households dataset, available publicly on the HUD website, to describe the characteristics of households living in candidate PHAs.

Last, the study relied on discussions with SCCHA leaders and internal SCCHA documentation to better understand PHA hardship policies, eviction assistance program, and the overall policy and economic context at the time the rent reform was implemented.

Analytic Approach

The present study uses a combination of analytic methods to assess the effects of the SCCHA 2013 rent reform. The most rigorous method used is a CITS analysis, which is a quasi-experimental design that was used to estimate effects on the study's key outcomes, employment and earnings. SCCHA's rent reform is particularly well suited for this method because the rent reform was rolled out all at once, the policy change affected all HCV households in SCCHA, and an appropriate comparison group of PHAs exists. These PHAs were subject to the same labor and housing market forces as SCCHA but did not implement a rent reform during the analysis period.

It was not feasible to use the CITS method to estimate the effects of the rent reform on housing subsidy amounts and continued housing subsidy receipt ("attrition") during the followup period. Multiple time points (ideally a minimum of 4 years) of baseline data are needed to estimate a baseline trend in CITS analysis, but these housing subsidy measures rely on HUD IMS/PIC data that are available for households only while they are receiving subsidies. The study sample was defined at the point in time when the rent reform was first implemented, and since not all the study households had been receiving subsidies for all 4 years before that point, it was not possible to estimate a baseline trend for the full sample. Therefore, to study the effects of the SCCHA rent reform on housing subsidy amounts and continued receipt, the study instead uses an autoregressive difference-in-difference method for housing subsidy outcomes. Although difference-in-difference is a widely used quasi-experimental approach, it is less rigorous than CITS because it does not account for potentially differing baseline trends in outcomes for the treatment and comparison groups.

In addition, descriptive analyses, which cannot indicate causality, were used to explore changes in household decisions about unit size, neighborhood quality, changes in household composition, and housing-related hardships. It was not feasible to use CITS or difference-in-difference for these analyses because data on these outcomes were available only for households who were still receiving subsidies, and not all households continued to receive subsidies for the full 4 years after the implementation of the rent reform. The results of the descriptive analyses should be interpreted with caution and are presented only to provide context for the rent-reform impact estimates. Each method is described more fully in the following.

[36] Data were compiled from the "REPORT 400 C, Monthly Labor Force Data for Counties, Annual Average (Data Not Seasonally Adjusted)" reports, produced by the Labor Market Information Division of California EDD, available on the California EDD website: https://www.labormarketinfo.edd.ca.gov/data/unemployment-and-labor-force.html.

Comparative Interrupted Time Series

The CITS analysis measures the impact of the SCCHA rent reform on earnings or on employment as the difference between the post rent reform SCCHA *deviation* from its pre-rent reform trend and the corresponding comparison group deviation from its pre-rent reform trend.[37] This method was previously used to assess the effects of the Jobs Plus program (Bloom, Riccio, and Verma, 2005). The focus of the present analysis is whether the SCCHA rent reform caused a deviation in predicted employment rates or average quarterly earnings for the cohort of all nonelderly, nondisabled adults in SCCHA's HCV program that differed from any deviation from predicted employment rates and average annual earnings that residents in comparison group PHAs experienced at the time. Model specifications for these CITS models are presented in appendix A.

The SCCHA rent reform meets important criteria for a successful CITS analysis. First, the policy change or changes must be consequential, capable of producing a substantial impact in a relatively short time. The reform was consequential in that it was expected to increase the average tenant rent share from 27 to 35 percent of gross income and decrease HAP payments by 12 percent. Second, the policy change must be implemented all at once for the entire study cohort. The rent reform affected all HCV households, and, according to the SCCHA, all households were notified and therefore potentially affected at the same time. Letters were sent out to households in the first week of July and the changes went into effect on September 1, 2013. Third, for the comparison with other housing authorities to be valid, those housing authorities' voucher holders must be subject to similar labor and housing market forces as SCCHA (the baseline levels of employment and earnings do not have to be the same). The study used a systematic comparison group selection process, described in the following, that identified comparison PHAs that faced similar local economic forces during the study period.

The first step in the CITS analysis was to measure the average earnings or employment trajectory of all the nonelderly, nondisabled adults in households receiving subsidies in the SCCHA HCV program over the 4 years before its policy changes in 2013. This baseline trend was then used to extrapolate what earnings levels or employment rates would have looked like in the absence of the policy changes in 2013. The second step was to measure the earnings levels or employment rates after these changes occurred to estimate the magnitude and direction of any subsequent deviations from this baseline trend. A parallel analysis was conducted for comparison PHAs. The final step of the design was to measure the magnitude and direction of the treatment and control group *difference* in these estimated deviations from trend. These observed differences represent the estimates of the impact of the SCCHA rent reform on individual earnings and rates of employment.

Autoregressive Difference-in-Difference

As noted earlier, the present study uses an autoregressive difference-in-difference model to estimate effects on the average amount of subsidy households received and the percentage of households in the sample still receiving subsidies each year after the SCCHA rent reform was first implemented. Difference-in-difference estimation is also a rigorous, quasi-experimental design, but unlike a CITS analysis, it does not account for differences in baseline trends.

While the lack of four full years of historical data for the full study cohort (as discussed

[37] See Somers et al. (2013) for a review of this method.

previously) ruled out using a CITS analysis for these outcomes, the comparison group selection process provides a reasonable level of confidence that the comparison PHAs had similar baseline trends in housing subsidy receipt and amounts and were subject to the same labor and housing market forces. It is important to remember the caveat that if there were any differences in the trends of these housing outcomes before the rent reform, those differences, rather than the policy changes, could be the cause of estimated impacts, or they could mask a true effect when none is detected.

Conceptually, autoregressive difference-in-difference measures the difference between the outcome of interest at the time of the policy change and the outcome at specific points during the followup period (for example, 1 year after the policy change) for both the treatment and comparison groups, and then compares those differences. Unlike a simple difference-in-difference model, however, the models used for this analysis are autoregressive in that they also control for preintervention values of the outcome measure. The model estimating effects on average HAP includes four covariates representing HAP amounts in the 4 years before the rent reform (for those households not yet receiving HCV subsidies in each of the 4 years, these values of HAP are $0), along with four binary covariates indicating whether the household was receiving any HCV subsidy in each year before the rent reform. The model specifications for these autoregressive difference-in-difference models are provided in appendix A.

Descriptive Analysis

The study looks descriptively at outcomes that may reflect housing decisions that SCCHA households made in response to the rent reform and that reflect any subsequent housing-related hardship they may have faced, including rent burden, number of bedrooms, neighborhood quality, and household size. Average levels of these outcomes for the sample households in Santa Clara are compared with averages in the comparison group PHAs at the last month of baseline and annually thereafter. Discussions with SCCHA leadership provided information on safeguards that SCCHA offered to households severely affected by the rent reform.

The trends in the descriptive exhibits should be interpreted with caution. Data on these housing measures were available for only those households still receiving subsidies. The households that leave the subsidy program each year are likely to differ systematically from households that remain. Therefore, the patterns in housing outcomes over the followup period represent only a partial picture of outcomes for the households in the study sample, and this picture gets even less representative later in the study period, as the percentage of households still receiving subsidies gets smaller.

The outcome levels for the comparison group PHAs are also presented in the descriptive exhibits to provide context for the patterns in outcomes for SCCHA in relation to patterns for the comparison group PHAs, which also have a small percentage of households losing their housing subsidies each year. The comparison group's outcomes, however, should not be interpreted as a counterfactual representing the expected outcomes for SCCHA households in the absence of the rent reform.

Drawing conclusions from the patterns of these outcomes can be especially problematic if the rent reform had an effect on the proportion of households that lost their subsidies. While the analysis did not suggest an overall effect on households

leaving housing assistance, the SCCHA rent reform may have influenced which types of households left the subsidy program during the followup even if this change is not captured by the data on changes in the percentage of households receiving subsidies over time.

The descriptive analysis serves two main purposes. First, it examines the averages in the housing subsidy outcomes as an additional check on the validity of the study. The SCCHA rent reform is expected to have direct effects on households' housing subsidies. If there is no clear pattern of an increase in TTP and reduction in HAP (especially 1 year after the rent reform was implemented), the findings might call into question the face validity of the study—whether the SCCHA rent reform was implemented as expected and whether key outcomes are being measured correctly. Second, the analysis examines patterns in averages of housing outcomes during the followup period that may reflect households' potential responses to the SCCHA rent reform to see whether any stark deviations from pre-rent reform levels are evident, especially if this deviation does not exist in the comparison group. Even if such a stark difference is evident, however, it alone would not provide compelling evidence that the change was caused by the SCCHA rent reform. Instead, it would *suggest* that the rent reform may have led to changes in SCCHA households' housing decisions and may warrant further exploration in future studies with more rigorous methods directed to this question.

Subgroup Analysis

The subgroup analysis examines whether the effects of the SCCHA rent reform for the 77 percent of nonelderly, nondisabled households who were only affected by the tenant contribution rate increase (hereafter referred to as the "single policy change" subgroup) differed from that for the 23 percent of nonelderly, nondisabled households who were affected by both the increased tenant contribution rate *and* the reduction in voucher size (hereafter referred as the "double policy change" subgroup).

As described in the "Study Sample" section above, only one PHA—SFHA—could be used for the subgroup analysis comparison group. To verify that SFHA by itself would provide a valid comparison group for the subgroup analysis, impact analyses on the four key study outcomes—average earnings, employment rates, the average household HAP, and whether households were still receiving subsidies—were rerun for the full nonelderly, nondisabled sample with only SFHA as the comparison group. Results of this analysis indicated no policy-change effects on employment rates or average earnings for the full sample, which is comparable to results produced using all three comparison PHAs. This provides some confidence that the reduced comparison group sample is valid for the subgroup analysis for earnings and employment impacts, which relies on a comparative interrupted time-series research design.

For the two housing subsidy outcomes, however, using only SFHA as the comparison group (and an autoregressive difference-in-difference research design) produced impact estimates that differed appreciably from those based on the full comparison group of three PHAs. Specifically: (1) when using the SFHA comparison group, estimated impacts on the percent of households still receiving housing subsidies receipt rates were negative and statistically significant compared to essentially zero effects when using the full comparison group), and (2) estimated SCCHA reductions in in HAP amounts were larger when SFHA replaced the full comparison group.

These differences in the estimated impacts for the housing subsidy outcomes (and the lack of meaningful differences in impact estimates on employment and earnings) suggest that there is a difference in the underlying baseline trends between SCCHA and SFHA that is accounted for by the CITS analysis (used for the employment and earnings outcomes) but not accounted for by the autoregressive difference-in-difference analysis used to estimate effects on housing subsidies. Because, with SFHA as the only comparison group PHA, the autoregressive difference-in-difference design would not produce reliable estimates of the effects on average housing subsidy amounts and the percentage of households still receiving subsidies during the followup period for the single policy change and the double policy change subgroups separately, this study focuses on the CITS estimates of effects on employment rates and average earnings.

Although the results of the validation analysis raise doubt about the validity of the impact estimates for housing subsidies and continued subsidy receipt for the single policy change subgroup alone and the double policy change subgroup alone, it is still possible to gain some insight into whether the rent reform affected households' housing subsidies differently for these two subgroups. In other words, while the study can't produce reliable estimates of the effects of the SCCHA rent reform on households in the double policy change group, it is possible to estimate *how* its effects differ (in direction and magnitude) from those for the single policy change group. These differential effects can be estimated by examining the *difference* in the separate estimated effects for the two subgroups. This method is known as a difference-in-difference-in-difference design and is conducted as an exploratory analysis for the present study.[38]

Recognizing that the simple difference-in-difference estimates for each of the subgroups likely contain a bias (due to a potentially differing underlying baseline trend for SFHA compared with SCCHA), the present difference-in-difference-in-difference method is based on the assumption that this bias is reasonably similar across both the single policy change subgroup and the double policy change subgroup and therefore can be "subtracted out" from the estimates of their differential impacts. This assumption seems reasonable here because it is unlikely that any underlying reason for the differing baseline trends would affect the double policy change group differently than the single policy change group. For example, if the difference in the underlying baseline trends in average housing subsidy amounts between SCCHA and SFHA is due to the differing baseline trends in employment rates (which are observed in exhibit 2.9, described later in the report), it is unlikely that the underlying cause of that difference—perhaps a somewhat slower-growing local economy—would affect the double policy change group substantially differently than the single policy change group. Thus, one can have some confidence in the method used to estimate the difference between rent reform impacts on the two subgroups.

Comparison Group Selection

One of the main conditions for a CITS design to be an effective method for measuring the impact of the SCCHA rent reform is that the CITS comparison group be subject to labor and housing market forces that are similar to those for SCCHA. Because the present study identified comparison PHAs in the Bay Area in counties with similar labor and housing markets, one can be reasonably confident that this condition is met. This condition is important for a CITS analysis because the

[38] See Wing, Simon and Bello-Gomez (2018) for a description of this method.

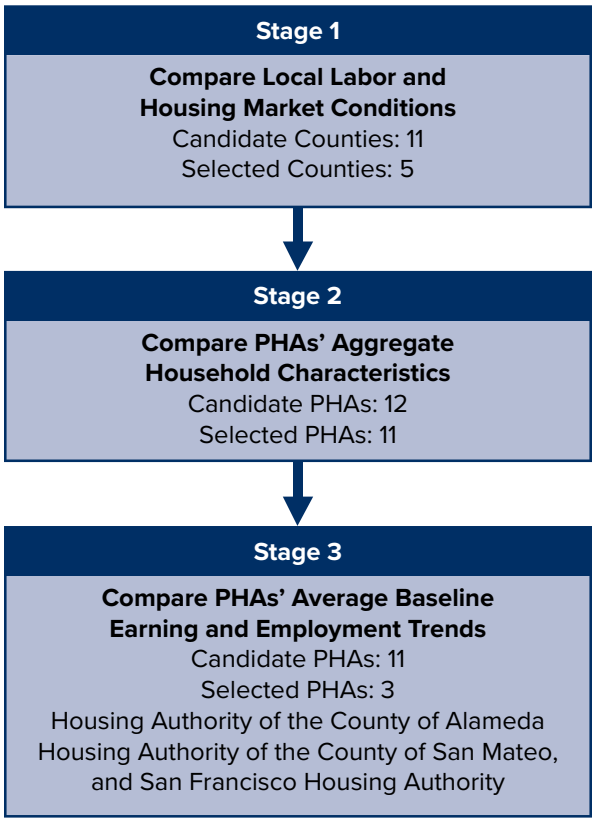
mean outcome of the comparison group does not serve as the counterfactual outcome for the treatment group, as it does in most quasi-experimental methods. Instead, the *deviation* in the mean outcome of the comparison group from its estimated baseline trend serves as the counterfactual for the *deviation* of the mean treatment group outcome from its estimated baseline trend. Consequently, the difference between these two deviations from trend identifies the impact of the SCCHA rent reform on the employment and earnings of SCCHA subsidy recipients.

In addition, it is desirable for the CITS comparison group to have baseline trends for the primary outcome measures (employment and earnings) that are similar to those for SCCHA and for the characteristics of their households to be similar to those of SCCHA residents. While these similarities are not necessary for a CITS analysis to produce valid impact estimates (because the CITS design implicitly controls for these baseline differences), the closer the alignment between the treatment and comparison groups on baseline levels and trends of earnings and employment, and the more similar the households in the two groups, the more one can be confident that the groups would respond similarly to changing local economic conditions. In the original Jobs Plus evaluation (which also used a CITS design), the close alignment in baseline trends of the primary outcome measure (earnings) of the program and comparison groups lent a great deal of credibility to the results.

In contrast, similarity of baseline trends is quite important for the difference-in-difference method that was used to estimate effects on housing subsidy levels and whether households continued to receive subsidies, since this method does not account for any treatment and comparison group differences in baseline trends.

With the preceding considerations in mind, a three-stage process was used to identify PHAs to serve as the comparison group. As exhibit 2.5 illustrates, the first stage narrowed down the counties considered by examining local labor market and housing market conditions. The second stage examined characteristics of households in the remaining candidate PHAs to determine which differed appreciably from those in SCCHA. Last, baseline earnings and employment trends for the remaining pool of PHAs were examined to select those whose baseline trends were most closely aligned with the SCCHA baseline trends.

Exhibit 2.5 Comparison Group Selection

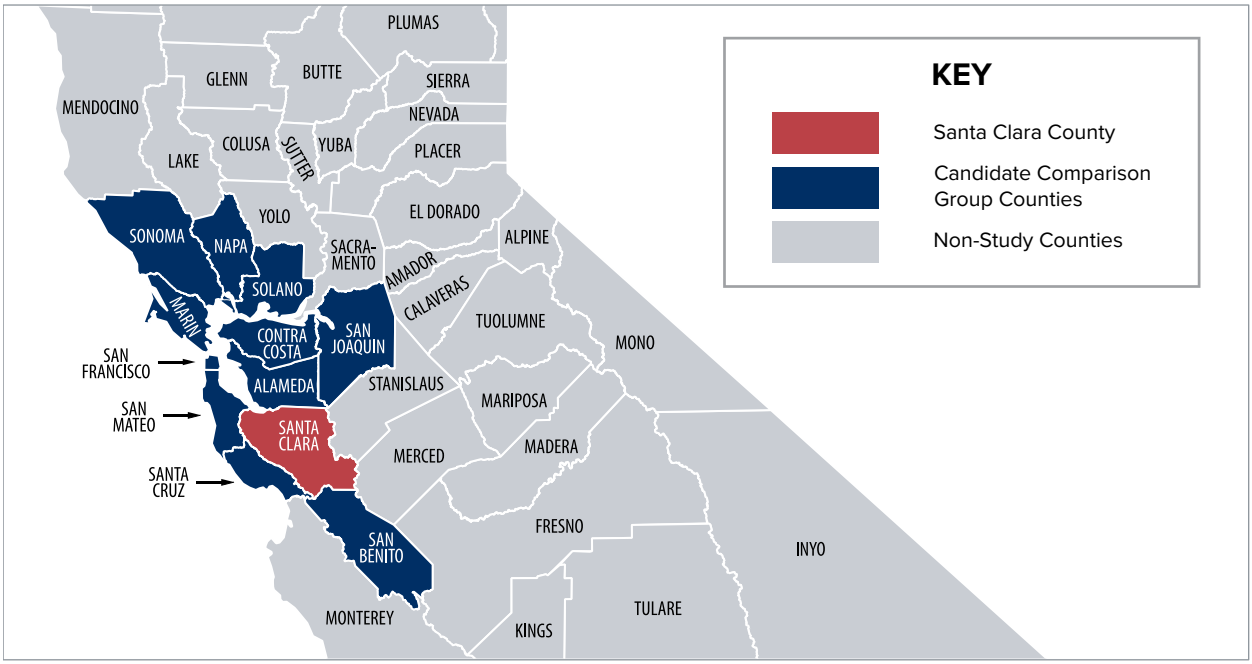


PHA = public housing agency.
Notes: Stage 1 conditions were calculated using county-level U.S. Census Bureau (2010), 2009–2013 American Community Survey 5-Year Estimates, and California Employment Development Department Monthly Labor Force Data for Counties (2012–2016) data. Stage 2 characteristics were calculated using HUD housing agency-level Picture of Subsidized Households (2013) data and HUD household-level Public and Indian Housing Information Center data. Stage 3 trends were calculated using California Employment Development Department individual level aggregate unemployment insurance (UI) data. Trends were calculated across the 4-year period from July 1, 2009, through June 30, 2013.

In the first stage, local labor and housing market conditions were examined for the 12 counties in the San Jose-San Francisco-Oakland combined statistical area,[39] including Santa Clara, in 2013 (when the SCCHA rent reform was implemented). San Benito County was excluded early on at this stage because there is no PHA located in this county, which is served by the Housing Authority of the County of Santa Cruz. The map in exhibit 2.6 shows the counties' locations in the Bay Area. In addition, the selection process considered geographical factors, such as ease of access to San Francisco and San Jose and the counties' general proximity to Santa Clara. For example, if the large cities of San Francisco and San Jose are not easily accessible by public transportation, there is a higher likelihood that households in those PHAs would be subject to different labor market forces from households in SCCHA. Also, the closer a county is to Santa Clara, the more likely it is that households in that county would face similar economic forces as SCCHA households, all other factors being equal.

Based on these factors, five counties were dropped from consideration: Napa, Sonoma, San Joaquin, Solano, and Marin. Napa, Sonoma, and San Joaquin were dropped because they are more rural than Santa Clara (as is evident by their population and housing density measures), and their local labor markets are heavily based on agriculture. Hence, they are probably subject to forces that differ substantially from those for Santa Clara. Labor market indicators also suggest dissimilarities: They all had lower household incomes, and San Joaquin and Solano had higher unemployment rates than Santa Clara during this period. Furthermore, there are indicators that housing markets differ significantly from Santa Clara's: rental vacancy rates are higher in these counties and average

Exhibit 2.6 Map of Santa Clara and Comparison Counties



Source: California State Association of Counties

[39] See appendix exhibit B.1.

rents are lower. MDRC sought input from the HUD regional office in San Francisco to validate its initial assessment. The remaining counties were Alameda, Contra Costa, San Francisco, San Mateo, and Santa Cruz.

In the second stage of the comparison selection process, all PHAs in the five remaining counties and Santa Clara were identified and the aggregate household characteristics for the HCV populations of these PHAs were examined. At this stage, a conservative approach was used because it was not clear which household characteristics would lead households to respond differently to changes in the labor and housing markets, and only one of the 12 PHAs in the five candidate counties was dropped from consideration. (A stronger indicator of whether the households in the PHAs would respond similarly to labor and housing market forces is their actual baseline trend in the outcome of interest, which was the basis for the third stage of the selection process.) Further, the mix of demographics in Santa Clara is unique (about one-third of households are Asian, one-third are Hispanic, and the remaining one-third consists of Black and White households), and while a mix of comparison PHAs can provide some level of representation of this racial and ethnic composition, there is no single PHA in the Bay Area that has a similar mix. Nonetheless, one PHA, the Livermore Housing Authority, was dropped at this stage because of a nonelderly, nondisabled HCV population that looked very different from Santa Clara's on key outcomes. The Livermore Housing Authority had a much higher proportion of households with at least one household member working and a much higher average household income than the nonelderly, nondisabled HCV population in SCCHA.

Because the remaining pool of PHAs included two MTW PHAs (Oakland Housing Authority and HACSM), MTW reports were reviewed to assess whether those PHAs had implemented any rent reforms or other policy changes with their MTW flexibility during the study period that may have affected the study's outcomes of interest. One policy change that was explored was a tiered subsidy rent structure in San Mateo, which was implemented early in the study period. It is unlikely that this policy created a work incentive or disincentive. There is currently no evidence that tiered rent or subsidy structures affect subsidy recipients' work behavior; further, the income tiers used in San Mateo's tiered subsidy policy were small ($2,500 increments). It is important to note that this change was implemented very early on in the study baseline period (early 2010), so even if there was any effect on employment or earnings, it would have been captured in the baseline trends for that PHA.

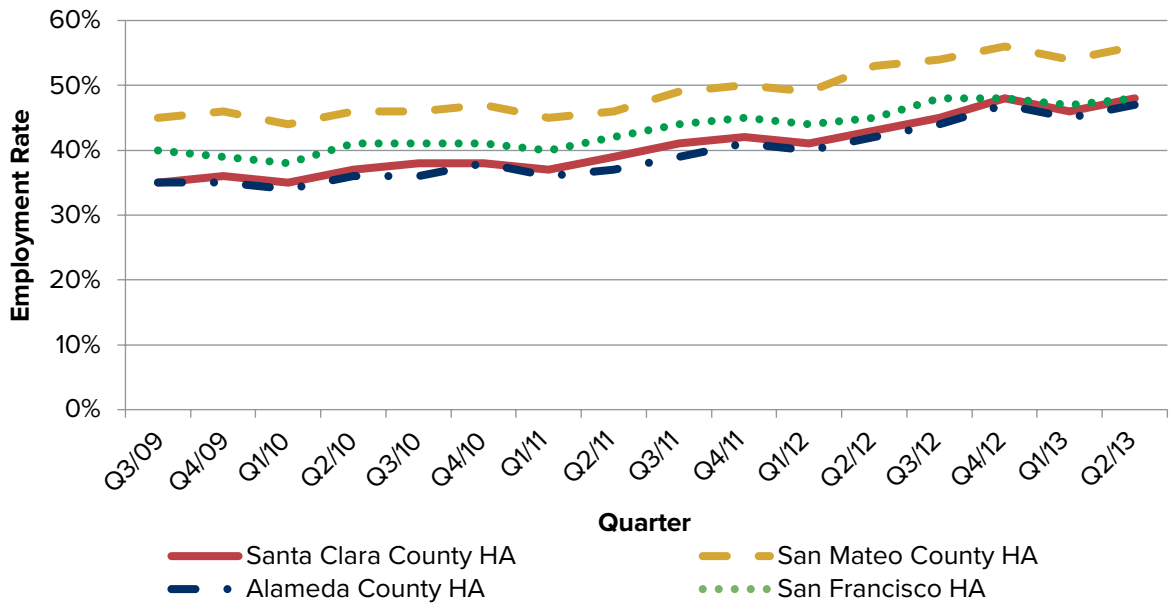
SCCHA also implemented a rent policy change in early 2010 that was intended to encourage households to increase their earnings. SCCHA extended its recertification period from the traditional 12 to 24 months for households that were not on a fixed income. This policy change was approved in 2009, and SCCHA began rolling it out in January 2010. Households could still request an interim recertification to decrease their rent share if they experienced a reduction in income between certifications but increases in income during this period did not result in increased TTP until the next scheduled recertification. If this extended recertification period led to an increase in households' earnings, it would have been captured in the baseline trend and would not be confounded with the SCCHA rent reform in 2013.

In the third and final stage of selecting comparison PHAs, earnings and employment trends for the 4 years before the SCCHA

rent reform were examined for the remaining 11 candidate comparison PHAs using UI wage data. Again, similar baseline trends are not necessary for CITS analysis to produce reliable estimates, but they increase confidence that the two groups of households would respond similarly to changing economic conditions. This is especially true for baseline trends of the primary outcome measures. If baseline earnings and employment trends among comparison group and treatment group PHAs were closely aligned, despite differences in household characteristics such as demographics, it would suggest that households in both groups respond similarly to local labor and housing market forces, regardless of differences in their characteristics.

Based on these patterns of baseline employment and earnings before the SCCHA rent reform, the sample was narrowed down to the three PHAs with trends most similar to Santa Clara's: The Housing Authority of the County of Alameda, HACSM, and SFHA. Exhibits 2.7 and 2.8 compare these trends for Santa Clara and the selected counties. Exhibit 2.9 shows the slopes for the pre-rent reform employment and earnings trends in each candidate PHA and the number of individuals in the HCV program. The slopes represent the average change in the outcome by quarter. For example, the SCCHA slope of 0.895 for the employment rate means that over the baseline period, the employment rate for adults in SCCHA increased by an average of 0.895 percentage points each quarter. The slope of 47.79 for the SCCHA average earnings means that over the baseline period, average quarterly earnings increased by $47.79 each quarter. The closer the slope to the SCCHA slope, the more similar the PHA baseline trend is to the SCCHA baseline trend. Appendix exhibits B.2 through B.7 show the baseline trends for

Exhibit 2.7 Baseline Trends in Quarterly Employment Rates of Nonelderly, Nondisabled Adults in the Santa Clara County Housing Authority and Selected Comparison Housing Agencies

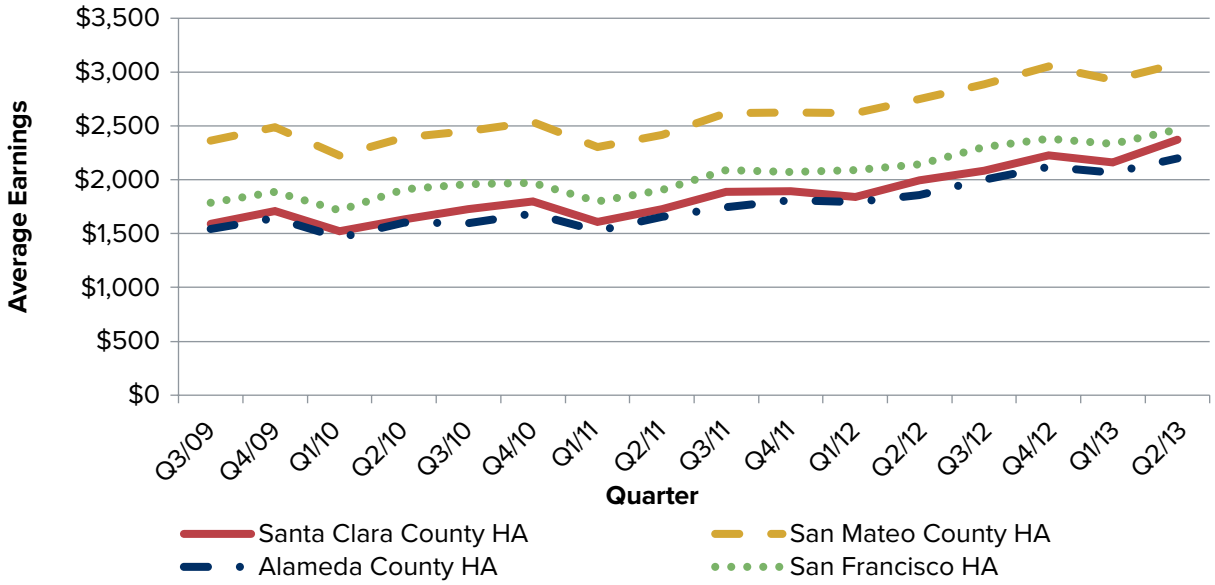


HA = housing authority.
Note: Sample consists of adults in the Housing Choice Voucher program who were not seniors or adults with disabilities.
Source: California Employment Development Department individual-level aggregate unemployment insurance data

the full set of PHA candidates along with the SCCHA baseline trend by county (with some counties combined into one graph for readability).

It is worth noting that two of the three selected comparison PHAs—those in Alameda and San Mateo—were already using voucher size determination rules

Exhibit 2.8 Baseline Trends in Average Quarterly Earnings of Nonelderly, Nondisabled Adults in the Santa Clara County Housing Authority and Selected Comparison Housing Agencies



HA = housing authority.
Notes: Sample consists of adults in the Housing Choice Voucher program who were not seniors or adults with disabilities. Earnings not adjusted for inflation.
Source: California Employment Development Department aggregate unemployment insurance data

Exhibit 2.9 Sample Sizes and Slopes of Candidate Comparison Public Housing Agencies

Housing Authority	Number of Adults	Employment Rate Slope (p.p.)	Average Earnings Slope ($)
Alameda County			
City of Alameda	1,732	0.625	24.24
Alameda County	7,969	0.880	43.39
City of Oakland	10,617	0.534	29.22
City of Berkeley	921	0.607	32.51
San Mateo County			
San Mateo County	3,694	0.800	49.30
San Francisco County			
San Francisco	6,279	0.699	43.88
Contra Costa County			
Contra Costa County	5,989	0.617	30.73
City of Richmond	1,357	0.579	33.34
City of Pittsburg	957	0.556	26.72
Santa Cruz County			
Santa Cruz County	3,813	0.686	33.26
	59,461		

Notes: Sample consists of adults (who were not seniors or adults with disabilities) in the Housing Choice Voucher program. Earnings not adjusted for inflation.
Source: California Employment Development Department aggregate unemployment insurance data

that were closer to the more conservative rules (allowing fewer bedrooms based on a given household composition) that SCCHA implemented as part of its 2013 rent reform. Like the other policy changes described earlier that sample PHAs made between 2009 and 2013, since these voucher size policies were already in place during the baseline period, any effects on employment and earnings are captured in the baseline trends. Since the comparison PHAs were selected largely based on the similarity of those trends, this fact should not undermine the validity of including these PHAs in the comparison group.

Exhibit 2.10 presents baseline characteristics for households and individuals in SCCHA and the three selected comparison PHAs in early July 2013, just before the rent reform was implemented.[40] It shows that households in both groups have on average two adults, with more than one-half having more than one adult in the household, and 65 percent in both groups have children in the household. About 62 percent of study households in SCCHA and 60 percent in comparison PHAs have at least one household member who is working. In both groups, 23 percent of households are receiving TANF.

The two groups are also quite similar at the individual level. The second panel in exhibit 2.10 presents the baseline characteristics of nonelderly, nondisabled adults in the HCV program in SCCHA and the comparison PHAs. The sample is majority female (64 percent in SCCHA and 66 percent in

Exhibit 2.10 Characteristics of the Sample at Baseline (Nonelderly, Nondisabled Households and Adults)

Characteristic	SCCHA	Comparison PHAs
Household characteristics		
Average Number of Family Members		
Adults[a]	1.9	1.8
Children	1.4	1.3
Families with More than One Adult (%)	58.3	50.7
Families with Any Children (%)	64.7	64.6
Current/Anticipated Annual Family Income ($)	17,368	18,525
Income Sources[b] (%)		
Wages	61.7	60.4
TANF	23.2	22.9
Social Security/SSI/Pension	12.8	16.5
Other Income Sources	29.1	35.5
Average Monthly Family Share[c] ($)	523	561
Average Monthly Housing Subsidy[d] ($)	1,397	1,244
Monthly Gross Rent Exceeds Payment Standard (%)	53.2	56.7
Neighborhood Poverty Rate[e] (%)		
0%–10%	41.5	41.8
11%–20%	40.1	47.2
21%–30%	14.3	8.1
More than 30%	4.1	3.0
Household Sample Size (Total = 15,499)	7,111	8,388

(continued)

[40] A more detailed set of baseline characteristics are presented in appendix exhibits C.1-C.3.

Exhibit 2.10 Characteristics of the Sample at Baseline (Nonelderly, Nondisabled Households and Adults) *(continued)*

Characteristic	SCCHA	Comparison PHAs
Adult Characteristics		
Female (%)	63.9	66.3
Average Age (Years)	35.6	35.4
Race (%)		
White, non-Hispanic	9.4	16.7
Black, non-Hispanic	14.7	40.6
Asian or Hawaiian or Pacific Islander, non-Hispanic	34.7	21.2
Hispanic	40.4	20.1
Other Race or More than One Race, non-Hispanic	0.8	1.4
Income Sources (%)		
Wages	41.1	41.4
TANF	11.5	11.9
Social Security/SSI/Pension	1.8	4.2
Other Income Sources	14.3	21.0
Average Annual Income from Wages for Individuals with Any Wage Income ($)	16,840	19,247
Individual Sample Size (Total = 34,075)	16,133	17,942

SCCHA = Santa Clara County Housing Authority; TANF = Temporary Assistance for Needy Families; SSI = Supplementary Security Income.
[a]Adults are defined as individuals age 18 and older who were not classified on the HUD-50058 form as a live-in aide.
[b]Income source categories are as defined on the HUD-50058 form. Wages include one's own business, federal wages, PHA wages, military pay, and other wages. Other income sources include child support, medical reimbursement, Indian trust/per capita, unemployment benefits, and other nonwage sources.
[c]Family share is the family's contribution toward the gross rent.
[d]Housing subsidy is the full subsidy amount paid by the housing agency on the household's behalf. It includes any utility allowance payments made to the tenant in addition to rent paid to the owner by the housing agency.
[e]Poverty rate is defined as the percentage of individuals ages 18 to 64 years whose income in the previous 12 months was below the poverty threshold.
Notes: Samples consist of households and adults that were not headed by seniors or adults with disabilities. Sample sizes may vary because of missing values. Rounding may cause slight discrepancies in sums and differences. The set of comparison group public housing agencies (PHAs) includes the Housing Authority of the County of San Mateo, the San Francisco Housing Authority, and the Housing Authority of the County of Alameda. Housing subsidy characteristics represent monthly averages. Utility allowance data were not available for San Mateo and are therefore not included in San Mateo's housing subsidy measures.
Source: MDRC calculations using HUD Public and Indian Housing Information Center and 2009–2013 American Community Survey 5-Year Estimates data

comparison PHAs) and the average age is about 36 years old in SCCHA and 35 in comparison PHAs. Forty-one percent of adults in both groups were working during the last month of the baseline period, and 12 percent in both groups were receiving TANF. Average annual earnings were higher in the comparison PHAs: $19,247 compared with $16,840 in SCCHA.

Although both groups are racially and ethnically diverse, there are differences in their racial and ethnic compositions. SCCHA has a larger Asian population (35 percent compared with 21 percent in the comparison group) and a larger Hispanic population (40 percent compared with 20 percent in the comparison group). The comparison group PHAs have a higher White (17 percent compared with 9 percent in SCCHA) and Black (41 percent compared with 15 percent in SCCHA) population. As mentioned, while there are some differences in racial and ethnic composition between SCCHA and the comparison group, the fact that the trends in employment and earnings throughout the 4-year baseline period are similar provides assurance that households in both groups respond similarly to local economic forces despite these differences.

The fact that households in both groups live in tight housing markets is evident by their high level of average household subsidies: $1,397 monthly for SCCHA households and $1,244 for the comparison PHAs. Also,

53 percent of households in SCCHA and 57 percent in comparison PHAs have a gross rent that is greater than the payment standard. On average, households pay a total of $523 monthly in SCCHA and $561 in comparison PHAs toward their housing costs (rent plus utilities). Only a very small proportion of households (4 percent in SCCHA and 3 percent in comparison PHAs) live in neighborhoods with poverty rates greater than 30 percent. Most households (82 percent in SCCHA and 89 percent in comparison PHAs) live in neighborhoods with relatively low poverty, with poverty rates of no more than 20 percent.

As explained previously, the validity of the CITS analysis that investigates the impact of the rent reform on employment and earnings is not based on how similar the comparison group is to the intervention group, but on the level of confidence that the comparison group PHAs are subject to the same labor and market forces, and generally respond similarly to such changes. The baseline trends in employment and earnings presented in exhibits 2.7 and 2.8 provide a reasonable level of confidence that subsidy recipients in each of the two groups respond similarly to changing economic conditions. Even so, it is useful to note that the study households in the comparison PHAs are quite similar to the study households in SCCHA.

Chapter 3

Findings

This chapter presents the study's findings on the effects of the SCCHA rent reform on subsidy recipients' employment rates, average earnings, average housing subsidy amounts, and continued housing subsidy receipt. This chapter also presents findings from the descriptive analysis of rent burden and households' housing decisions following the rent reform. Findings are presented first for the full cohort of nonelderly, nondisabled households and individuals in the HCV program at the time of the SCCHA rent reform in 2013, and then presented separately for households that were affected by both the tenant contribution rate increase and the voucher size policy change and households that were affected by the tenant contribution rate alone. In sum, there was no evidence of effects of the SCCHA rent reform on overall employment rates or average earnings for the full cohort, but there was some indication that the SCCHA rent reform reduced earnings for the smaller group of households who were affected by both policy changes. The analysis found evidence that the SCCHA rent reform did decrease average housing subsidies (as intended). There was no indication that the rent reform, on average, caused households to leave housing assistance.

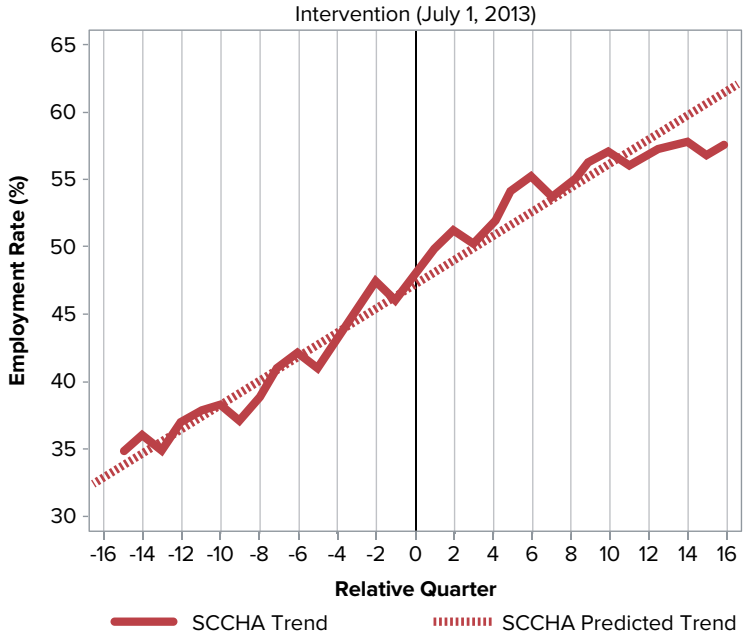
Impacts on Employment and Earnings

This section presents findings from the CITS analysis on the effects of the SCCHA rent reform on employment and earnings for the cohort of nondisabled, nonelderly adults in the HCV program in July 2013, when the SCCHA rent reform was implemented. As described in the "Data Sources" section in chapter 2, UI data were used to construct the employment and earnings measures for this analysis. Given that the SCCHA rent reform meets the conditions needed for a CITS analysis (described in the "Analytic Approach" section in chapter 2), this method provides rigorous evidence of the effects of the SCCHA rent reform on residents' employment rates and average earnings over the followup period.

As described in chapter 2, the CITS design tests whether the SCCHA rent reform caused a deviation from the predicted baseline trend in employment rates and average earnings for the nonelderly, nondisabled adults in the SCCHA HCV program. Exhibits 3.1 to 3.6 graphically illustrate this analysis. To estimate effects of the SCCHA rent reform on employment, the first step in the CITS analysis was to use the observed quarterly employment rate of the adults in the SCCHA sample (the solid line in exhibit 3.1) over the 4-year baseline period before the SCCHA rent reform—shown by the solid vertical line—to measure the employment rate trend over those 4 years, which is shown by the dotted line over the same baseline period. This baseline trend was used to extrapolate what employment rates would have looked like for this SCCHA sample in the absence of the 2013 rent reform (by extrapolating this trend into the future), as shown with the dotted line continuing throughout the 4-year followup period. The second step of the analysis was to measure the quarterly employment rates after the SCCHA rent reform (the solid line) to estimate whether there was a deviation from this baseline trend, indicated by the distance between the solid line during the followup period and the dotted line during the followup period. Visually, this gap indicates that employment rates were slightly higher than the trend would predict in the first 2 years of implementing the new SCCHA rent policies, and then somewhat lower.

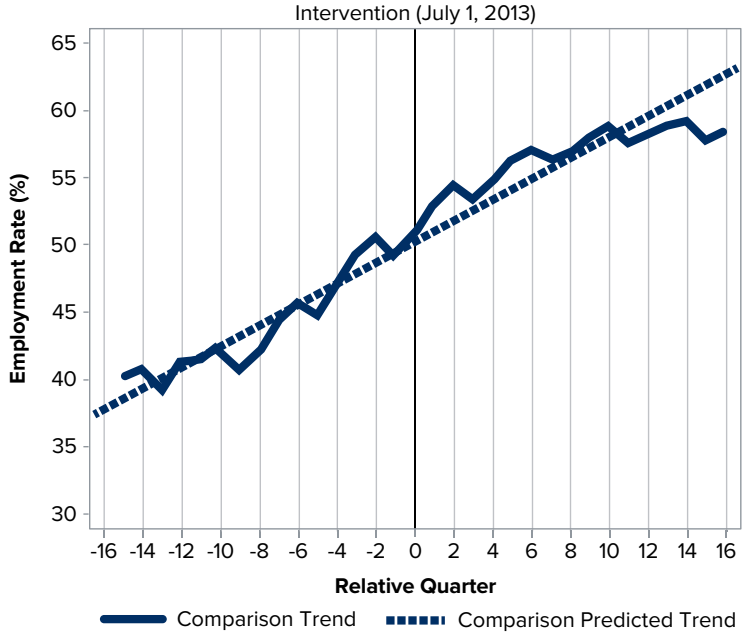
A parallel analysis was then conducted for the comparison group sample, illustrated in exhibit 3.2. The deviation of the actual employment rates from the predicted employment rates over the followup period looks similar to the deviation for SCCHA in exhibit 3.1. The final step of the analysis was to test whether the deviation

Exhibit 3.1 Quarterly Employment Rates for Nonelderly, Nondisabled Adults in the Santa Clara County Housing Authority



SCCHA = Santa Clara County Housing Authority.
Notes: Samples consist of adults who were not seniors or adults with disabilities. Impacts were estimated using a comparative interrupted time series model.
Source: California Employment Development Department individual-level aggregate unemployment insurance data

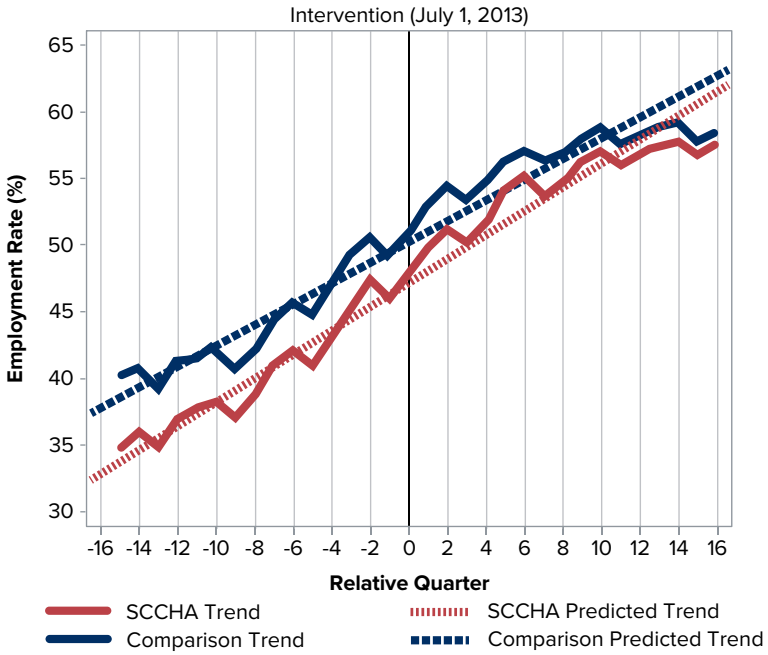
Exhibit 3.2 Quarterly Employment Rates for Nonelderly, Nondisabled Adults in the Comparison Group Housing Authoritites



Notes: Samples consist of adults who were not seniors or adults with disabilities. The set of comparison group public housing agencies includes the Housing Authority of the County of San Mateo, the San Francisco Housing Authority, and the Housing Authority of the County of Alameda. Impacts were estimated using a comparative interrupted time series model.
Source: California Employment Development Department individual-level aggregate unemployment insurance data

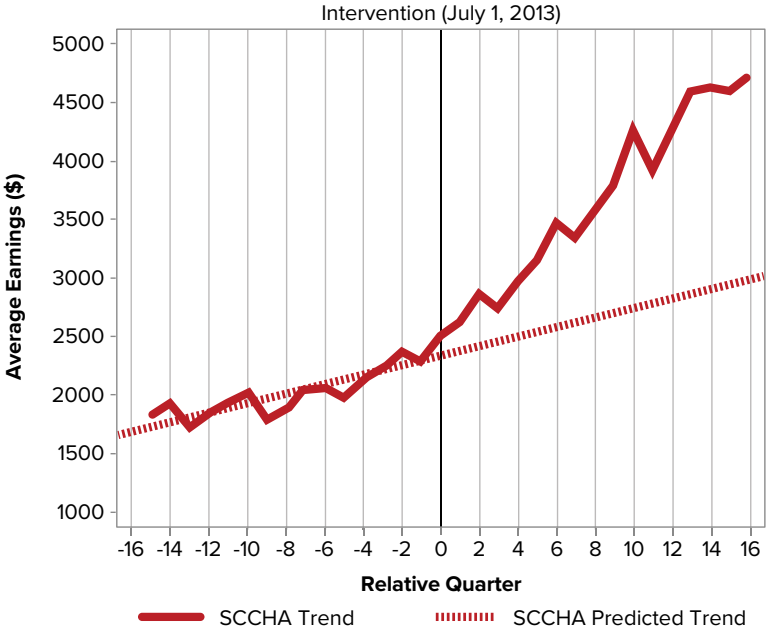
in the employment rates for SCCHA was statistically discernible from the deviation for the comparison group PHAs. In other words, the *differences* in the deviations were examined. Exhibit 3.3 overlays the graphs for the SCCHA and comparison groups. Exhibit 3.4 to 3.6 illustrate the same CITS analysis for average earnings. The difference

Exhibit 3.3 Quarterly Employment Rates for Nonelderly, Nondisabled Adults in the Santa Clara County and Comparison Group Housing Authorities



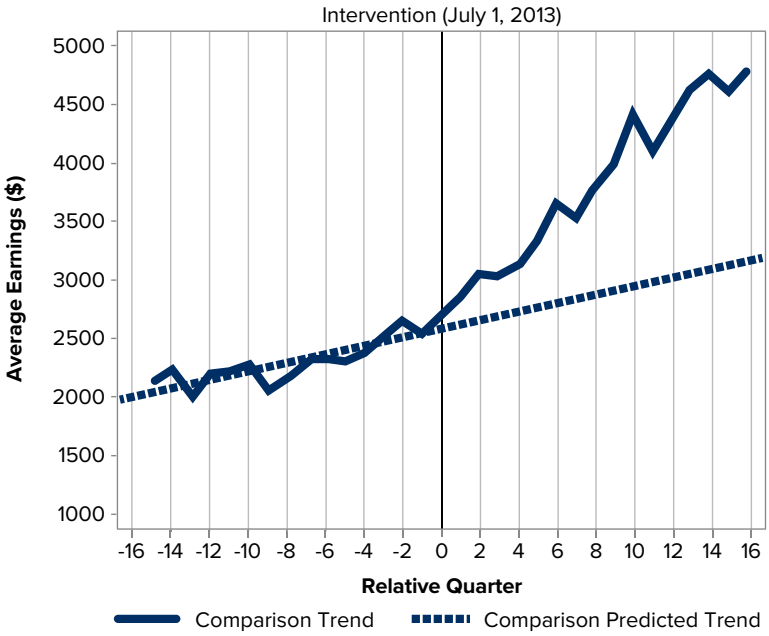
SCCHA = Santa Clara County Housing Authority.
Notes: Samples consist of adults who were not seniors or adults with disabilities. The set of comparison group public housing agencies includes the Housing Authority of the County of San Mateo, the San Francisco Housing Authority, and the Housing Authority of the County of Alameda. Impacts were estimated using a comparative interrupted time series model.
Source: California Employment Development Department individual-level aggregate unemployment insurance data

Exhibit 3.4 Average Quarterly Earnings of Nonelderly, Nondisabled Adults in the Santa Clara County Housing Authority



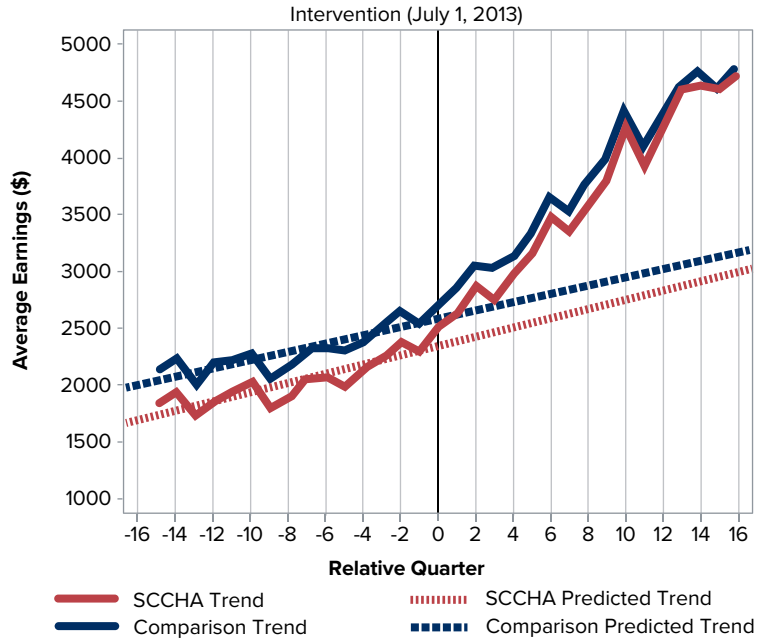
SCCHA = Santa Clara County Housing Authority.
Notes: Samples consist of adults who were not seniors or adults with disabilities. Impacts were estimated using a comparative interrupted time series model.
Source: California Employment Development Department individual-level aggregate unemployment insurance data

Exhibit 3.5 Average Quarterly Earnings of Nonelderly, Nondisabled Adults in the Comparison Group Housing Authorities



Notes: Samples consist of adults who were not seniors or adults with disabilities. The set of comparison group public housing agencies includes the Housing Authority of the County of San Mateo, the San Francisco Housing Authority, and the Housing Authority of the County of Alameda. Impacts were estimated using a comparative interrupted time series model.
Source: California Employment Development Department individual-level aggregate unemployment insurance data

Exhibit 3.6 Average Quarterly Earnings of Nonelderly, Nondisabled Adults in the Santa Clara County Housing Authority and the Comparison Group Housing Authorities



SCCHA = Santa Clara County Housing Authority.
Notes: Samples consist of adults who were not seniors or adults with disabilities. The set of comparison group public housing agencies includes the Housing Authority of the County of San Mateo, the San Francisco Housing Authority, and the Housing Authority of the County of Alameda. Impacts were estimated using a comparative interrupted time series model.
Source: California Employment Development Department individual-level aggregate unemployment insurance data

between the gaps for the two groups was not statistically significant for either the employment rate or average earnings outcome throughout the followup period.

Exhibit 3.7 presents the estimated effects of the SCCHA rent reform on average employment rates and average annual earnings for adults for each year of the followup period.[41] Yearly effects on employment rates for each year in the followup period were calculated by averaging the quarterly employment rate impact estimates across the four quarters in each followup year. Yearly effects on average earnings were calculated by summing quarterly earnings impact estimates across the four quarters in each followup year. Standard errors were computed accordingly.

The first column of results in exhibit 3.7 labeled "SCCHA Mean" represents the average outcome for the study cohort in SCCHA. For example, the average quarterly employment rate in Year 1 (which is an average of the quarterly employment rate for each of the four quarters in Year 1) is 50.8 percent. In other words, in Year 1, 50.8 percent of the SCCHA households had some earnings in a given quarter, on average, in Year 1. The second column labeled "Impact" represents the estimated impact of the SCCHA rent reform. For example, the 50.8-percent employment rate observed for SCCHA is estimated to be 0.5 percentage point lower than what it would have been in the absence of the SCCHA rent reform. This impact estimate is an estimate of the true effect, which is unknown. The third column labeled "Std. Error" presents the standard error of the impact estimate, which measures the uncertainty which exists about its corresponding impact estimate. The final column reports the p-value of the impact estimate, which represents the likelihood that an estimated effect at least as large as the one observed would have occurred by chance if there was no true effect. In this example, the p-value of 0.604 means that if there were no true effects of the SCCHA rent reform on the average quarterly employment rate in Year 1, then there would be a 60.4-percent

Exhibit 3.7 Impacts on Average Quarterly Employment Rate and Annual Earnings of Nonelderly, Nondisabled Adults

Outcome	SCCHA Mean	Estimated Effect	Std. Error	P-Value
Employment Rate				
Year 1	50.8	-0.5	0.9	0.604
Year 2	54.5	0.0	1.2	0.972
Year 3	56.6	0.1	1.5	0.929
Year 4	57.5	0.1	1.8	0.941
Earnings				
Year 1	11,187	46	349	0.897
Year 2	13,549	143	474	0.763
Year 3	16,198	200	597	0.738
Year 4	18,538	509	725	0.484
Sample Size				34,075

SCCHA = Santa Clara County Housing Authority.
Notes: Samples consist of adults who were not seniors or adults with disabilities. The set of comparison group public housing agencies includes the San Mateo County Housing Authority, the San Francisco Housing Authority, and the Alameda County Housing Authority. Effects were estimated using a comparative interrupted time series model. All estimated earnings effects are reported in 2017 dollars. The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect. Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.
Source: California Employment Development Department individual-level aggregate unemployment insurance data

[41] See appendix exhibits D.1 and D.2 for estimated quarterly impacts on employment rates and average earnings.

chance that an estimated effect of at least 0.5 percentage point would be observed. P-values are marked with one or more asterisks if the impact estimate is statistically significant, and the number of asterisks corresponds with the level of statistical significance. (Exhibit 3.7 doesn't contain any asterisks because none of the impact estimates are statistically significant.) One asterisk signifies that the probability is 10 percent or less; two asterisks signify that the probability is 5 percent or less; and three asterisks signifies that the probability is 1 percent or less.

The results show no evidence of effects on the percentage of nonelderly, nondisabled adults who are employed or on their average earnings across the 4 years of followup. The estimated effects on both outcomes are small and not statistically significant. For example, in the first year after the rent reform, the estimated impact on average earnings was $46, but this difference was not statistically significant. This estimate could be interpreted to mean that the SCCHA average quarterly earnings of $11,187 for this first followup year was $46 higher than it would have been in the absence of the rent reform. The magnitude of the effect is very small, however, and the standard error and p-values are very large, suggesting that this small difference is very likely due to chance. In other words, there is no evidence that the SCCHA rent reform caused a deviation from its predicted average earnings trend in the first year after the rent reform was implemented that was appreciably different from deviation from the predicted average earnings trend for the comparison group during the same time period, where no rent reform was implemented. As exhibits 3.1 to 3.6 illustrate, employment rates and average earnings increased steadily throughout the 4 years following the SCCHA rent reform for both SCCHA and comparison group subsidy recipients.

Impacts on Housing Subsidies

The SCCHA rent reform intended to directly decrease the average household HAP by increasing the tenant contribution rate from 30 percent of adjusted income to 35 percent of gross income and eliminating utility allowances for all households, and by reducing the voucher sizes for a smaller percentage of households (23 percent) by applying a new voucher size policy. This part of the analysis examines whether the rent reform did in fact decrease average household HAP, and whether HAP remained lower over time. If households had reduced their earnings in response to the rent reform (there was no evidence they did so, as discussed in the previous section), the SCCHA HAP savings would have been smaller than what it had projected. The analysis also tested whether the SCCHA rent reform increased the rate of households leaving the HCV program. As discussed earlier, the rent reform could have caused attrition from the HCV program if it drove some households' HAPs down to zero, reduced subsidies to the extent that some households decided the subsidy no longer justified the burden of complying with program rules, or increased household rent burden to a level that was not sustainable for households.

This section describes the results of the autoregressive difference-in-difference analysis (described in chapter 2) used to estimate effects of the SCCHA rent reform on average housing subsidy amounts and on the percent of households leaving the subsidy program. As described earlier, the results using this method are less rigorous than those produced using a CITS design, because while this method accounts for pre-rent reform differences in the *levels* of the outcome, if the underlying baseline *trends* in housing outcomes are different for the treatment and comparison groups,

it is possible that a difference detected at followup is attributable to those differing trends rather than being a true effect of the SCCHA rent reform. It is also possible that differing baseline trends could mask a true effect when none has been detected.

Exhibit 3.8 presents the estimated effects of the SCCHA rent reform on the average amount of housing subsidy and the percentage of households receiving any housing subsidy at followup using difference-in-difference estimation, which compares the change in each outcome between the time period prior to the SCCHA rent reform and the outcome at each year following the rent reform for SCCHA households compared with households in the comparison PHAs, where no rent reform was implemented at the time. The findings in this exhibit can be interpreted in the same way as described in the previous section for exhibit 3.7. Because the research design used to estimate impacts for exhibit 3.8 is weaker than that used to estimate impacts for exhibit 3.7, however, one can place less confidence in the estimates for exhibit 3.8.

The average household housing subsidy in the month before the implementation of the rent reform was $16,764 per year, or $1,397 per month (as shown in exhibit 2.10). As expected, the SCCHA rent reform reduced the average amount of housing subsidy that households received. This effect is probably a direct result of the increase in the tenant contribution rate from 30 percent of adjusted income to 35 percent of gross income and the other policy changes implemented as part of the rent reform, which resulted in the PHA paying less of a subsidy on behalf of each household. In the first year, the average annual household subsidy was estimated to be $1,593 less than it would have been in the absence of the rent reform. This annual effect is equivalent to $133 monthly.[42] In the second year after the rent reform was

Exhibit 3.8 Impacts on Housing Subsidies (Nonelderly, Nondisabled Households)

Outcome	SCCHA Mean	Estimated Effect	Std. Error	P-Value
Total Annual Housing Subsidy ($)				
Year 1	14,335	-1,593	65	0.000***
Year 2	13,414	-1,548	99	0.000***
Year 3	13,481	-1,329	123	0.000***
Receipt of Housing Subsidy (%)				
Year 1	99.2	0.5	0.2	0.013**
Year 2	92.9	-0.4	0.5	0.368
Year 3	87.5	-0.9	0.6	0.137
Sample (Total = 15,490)	7,109			

SCCHA = Santa Clara County Housing Authority.
Notes: Samples consist of households that were not headed by seniors or adults with disabilities. The set of comparison group public housing agencies (PHAs) includes the Housing Authority of the County of San Mateo, the San Francisco Housing Authority, and the Housing Authority of the County of Alameda. Sample sizes may vary because of missing values. Effects were estimated using an autoregressive difference-in-differences model, controlling for the past receipt of housing subsidies and other baseline characteristics of sample households. To assess differences between the research groups, chi-square tests were used for categorical variables and two-tailed t-tests were used for continuous variables. The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect. Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent. Utility allowance data were not available for San Mateo and are therefore not included in San Mateo's housing subsidy measures.
Source: MDRC calculations using HUD Public and Indian Housing Information Center data

[42] This first-year impact estimate does not account for the households that were granted a 90-day hardship exemption that allowed them to deduct medical and childcare expenses from their gross income for their temporary HAP calculation. A total of 414 households were granted a hardship exemption, but this total includes elderly and disabled households. SCCHA did not retain data on the elderly and disabled status of these households, so the precise number of households in the study's nonelderly, nondisabled sample is unknown.

implemented, when the tenant contribution rate was reduced to 32 percent, the effect was slightly smaller: the average monthly household subsidy was $1,548 less annually, or $129 less monthly, than it would have been in the absence of the rent reform. In the third year, the rent reform reduced annual HAP by $1,329 and monthly HAP by $111.[43,44,45]

The bottom panel of exhibit 3.8 presents the estimated effects of the rent reform on whether households are still receiving subsidies at followup.[46] Overall, there is no clear evidence that the SCCHA rent reform had an effect on the percentage of nonelderly, nondisabled households that lost their subsidies. There was a small (0.5 percentage points) but statistically significant increase (0.5 percentage point) in the percentage of households continuing to receive subsidies in the first year of followup, but this effect is probably inconsequential because of its small magnitude and the fact that it disappears after the first year.[47] (This 0.5 percentage point impact estimate can be interpreted to mean that 99.2 percent of the cohort of households who were receiving HCV subsidies from SCCHA when the rent reform was implemented in July 2013 still received subsidies during the first year after the rent reform was implemented, which is 0.5 of a percentage point more than what the percentage would have been in the absence of the rent reform.) Two years after the implementation of the rent reform there was no difference between the percentage of households in the sample receiving subsidies in SCCHA and the percentage that would have been receiving subsidies in the absence of the rent reform. This remained true 3 years after rent reform was implemented.[48,49,50]

The patterns in household housing subsidy outcomes over time—presented in appendix exhibit E.1—align with expectations based on the nature and timing of the rent reform. The average household TTP and family share (TTP plus the amount by which a household's gross rent exceeds the payment standard) increased more steeply than they did for comparison group PHAs when the tenant contribution rate changed from 30 percent of adjusted income to 35 percent of gross income in the first year of the rent reform. The increase was tempered in the second year when the tenant contribution rate was reduced to 32 percent of gross income. As expected, the household HAP—which is directly related to the TTP in that a household's HAP decreases by the same amount that the TTP increases—mirrors these patterns in TTP and family share. Housing market trends are also reflected in these patterns of housing subsidy outcomes: housing prices were steeply

[43] The effect continues to decrease in the fourth year, though this finding is likely due to the data limitation for Year 4 housing data described in the "Data Sources" section of chapter 2.

[44] The sensitivity test described in chapter 2 that estimated these effects including imputed utility allowances for the HACSM produced very similar results. Impact estimates on average housing subsidies were somewhat smaller than these main findings but were still large and had the same level of statistical significance.

[45] Results from a sensitivity test that estimated effects on HAP using utility allowance imputations for HACSM in the HAP calculations had very similar results.

[46] Any household that is receiving a HAP amount greater than zero (in any PHA) is counted as still receiving a subsidy at that time. If a household's income increases to the threshold where its HAP amount is zero because its calculated TTP is greater than the gross rent, the household has a grace period of 180 days during which it is still considered active in the program. If the household income drops during this period, TTP can be recalculated and the subsidy can resume; otherwise, the household's participation is terminated from the HCV program and the household would have to go back on the waiting list to rejoin if its situation changes. Households that leave the HCV program are included in the average with a subsidy amount of $0. If 10 percent of the sample left the HCV program and the PHA replaced them all with new households, the subsidy receipt rate for the group would be 90 percent (not 100 percent).

[47] The statistical significance for an impact estimate of such a small magnitude reflects the high precision that exists when the mean of a binary outcome variable is near zero or one.

[48] It also remained true 4 years after the rent reform was implemented. While the data limitations with the Year 4 IMS/PIC data would have affected measures of average subsidy ***amounts*** more than the measures of ***any*** subsidy receipt, the overall data limitations also reduce the reliability of this Year 4 impact estimate.

[49] As a sensitivity test, logistic regressions were run to estimate effects on this dichotomous outcome. The results were very similar.

[50] Results from a sensitivity test that included utility allowance imputations for HACSM in the HAP calculations were very similar in magnitude to these main findings except for the Year 1 impact estimate, which was smaller (but still positive) and was not statistically significant.

increasing during the followup period, so there is a general upward trend in subsidies independent of any policy change (across both SCCHA and comparison PHAs) as payment standards increased in response.

Households' Housing Decisions and Rent Burden

The findings discussed so far show that SCCHA rent reform did not have an overall effect on tenants' employment and earnings, and that it did lead to deep and lasting cuts in housing subsidies as intended. This section explores measures of households' housing characteristics over time to gain further insight into how households may have responded to the SCCHA rent reform, and to describe households' levels of rent burden in the years following the rent reform. The rent reform could have encouraged households to seek other, less expensive housing, possibly with fewer bedrooms or in higher poverty neighborhoods in some cases, or to transfer to an area in the jurisdiction of a different PHA that still used traditional rent rules. These types of housing decisions would have tempered the increase in households' rent burden resulting from the reduction in housing subsidies.

As described in the "Analytic Approach" section in chapter 2, the findings in this section should be interpreted with a great deal of caution. The exhibits in this section present average housing outcomes over time, and causal inferences should not be drawn from this descriptive analysis. For example, as described in chapter 2, a stark difference in the average level of a housing outcome (like a neighborhood poverty rate) following the SCCHA rent reform compared with the average level before the rent reform—if this difference does not exist for the comparison group—may suggest that the rent reform led to that difference. Nonetheless, such an observed difference does not by itself warrant a definitive conclusion that the SCCHA rent reform caused that difference. Comparison group levels are presented to provide context for the SCCHA findings.

Households' Housing Decisions While in the Voucher Program

The patterns in measures related to households' housing decisions throughout the followup period give no obvious indication that households are, on average, relocating to poorer quality neighborhoods, moving to smaller units, moving to units outside the jurisdiction of SCCHA, or changing their household composition.[51] There was a general upward trend in households' neighborhood poverty rate over the followup period, suggesting that households that moved tended to move to poorer neighborhoods, but this trend also existed for households in the comparison group PHAs. The SCCHA households' average number of bedrooms dropped only slightly, from 2.7 to 2.6 bedrooms. (The comparison group's average number of bedrooms remained constant throughout the followup period.) There is also no strong indication that a significant portion of households changed their household composition by adding or removing household members in response to the rent reform. Household size decreased slightly over the followup period, but a similar trend is evident for the comparison group households. Last, there is no indication that a large portion of households chose to relocate to a unit outside the jurisdiction of SCCHA to avoid the higher out-of-pocket housing costs (defined as "porting out"); SCCHA had a lower rate of port-outs than the comparison group PHAs throughout the study period.

[51] See appendix exhibit F.1 for details.

Household Rent Burden While in the Voucher Program

The lack of effects on employment and earnings discussed earlier in this chapter means that households were not increasing their incomes to cover their greater tenant rent share due to the rent reform. These findings suggest that households were absorbing their increased housing costs into their current budgets, either by reducing spending or incurring debt. Considering material hardship is therefore an important part of understanding the effects of a rent reform that increases the tenant contribution rate toward rent, but material hardship is only partially measured in this study. This section looks at patterns of a measure of rent burden over the study period to better understand the extent to which households' rent burdens increased after the rent reform was implemented.

As described in the "Data Sources" section of chapter 2, the present study uses a measure of rent burden that is the tenant rent share (equal to the TTP plus any amount that the contract rent, not including tenant-paid utilities) as a proportion of the household's gross income. Exhibit 3.9 shows patterns in this measure of households' rent burden from the last month of the baseline period (before the rent reform was implemented) through the 4 years of followup.[52] In the month before SCCHA's rent reform was implemented, the percentage of nonelderly, nondisabled households whose tenant rent share exceeded 40 percent of their gross income looked fairly similar to the percentage for the comparison group households; 12 percent in SCCHA and 14 percent in comparison PHAs were paying more than 40 percent of their gross income toward rent. In the first year following the implementation of the SCCHA rent reform, the percentage of households in SCCHA paying more than 40 percent of their income toward rent increased steeply from 12 percent to 30 percent, compared with a three percentage points increase for households

Exhibit 3.9 Tenant Rent Share as a Percent of Monthly Gross Income Among Nonelderly, Nondisabled Households Receiving Subsidies

Outcome	SCCHA	Comparison PHAs
Tenant Rent Share Exceeds 40% of Monthly Gross Income (%)		
Last Month of Baseline	12.3	14.0
Last Month of Year 1	30.1	17.4
Last Month of Year 2	30.5	14.2
Last Month of Year 3	19.4	11.2
Tenant Rent Share Exceeds 50% of Monthly Gross Income (%)		
Last Month of Baseline	8.9	9.6
Last Month of Year 1	21.4	11.9
Last Month of Year 2	21.9	9.3
Last Month of Year 3	13.9	7.7
Sample Size (Total = 15,490)	7,109	8,381

PHA = public housing agency. SCCHA = Santa Clara County Housing Authority.
Notes: Samples consist of households headed by adults who were not seniors or adults with disabilities. The set of comparison group PHAs includes the Housing Authority of the County of San Mateo, the San Francisco Housing Authority, and the Housing Authority of the County of Alameda. Sample sizes may vary because of missing values. Outcomes shown describe only those households receiving any housing subsidies in the specified month. Utility allowance data were not available for San Mateo and are therefore not included in San Mateo's housing subsidy measures.
Source: MDRC calculations using HUD Public and Indian Housing Information Center data

[52] Appendix exhibit F.2 presents alternative measures of rent burden, including average, median, and distributions of rent burden in the last month of baseline and of each followup year.

in comparison group PHAs. These patterns largely held up during the second year; the differences declined in the third. That decline may not necessarily reflect a true decline in this measure of rent burden, if it was at least in part due to households with an extreme rent burden leaving the subsidy program (voluntarily or through eviction) and therefore not being counted in the averages.[53]

Subgroup Findings

As described earlier, SCCHA implemented a new voucher size policy that enforced a minimum of two family members per bedroom, excluding the head of household's bedroom. Before this policy change, the age, generation, gender, and relationship of other household members were considered when determining voucher size. The group of households in SCCHA that were immediately affected by this change constituted approximately 23 percent of the nonelderly, nondisabled voucher population. This section presents the findings of a subgroup analysis of the effects on earnings and employment and describes housing characteristics and rent burden separately for the households only affected by the tenant rent contribution increase (referred to as the "single policy change" subgroup) and households affected by the voucher policy change in addition to the tenant contribution rate increase (referred to as the "double policy change" subgroup).

As described in the "Research Questions" section of chapter 2, all households in both subgroups were affected by the tenant contribution rate increase; therefore, all households faced the potential earnings and employment incentives and disincentives described in that section for the full sample, and all households whose rent exceeded the payment standard faced some incentive to move to a less expensive unit. It is possible, however that the rent reform's effects on employment and earnings for the subgroup of households affected only by the tenant contribution rate increase may have differed from the effects for the subgroup of households affected by both policy changes. Households also affected by the voucher size rule change might have stayed in their current units and faced much steeper out-of-pocket housing costs because they had to fully cover the difference between the new lower payment standard and the previous one, or they might have moved to a smaller unit whose gross rent exceeded the area payment standard by a larger amount than their previous larger unit. For these reasons, households in the double policy change subgroup could have had stronger incentives to change their employment behavior in addition to stronger incentives to move to a new unit. Furthermore, if double policy change households who did not move to smaller units were unable to afford their much higher rent shares, and this hardship led them to leave the subsidy program (either by voluntarily moving to a more affordable housing situation, like moving in with other family members, or through eviction), the turmoil of their housing situation may also have affected households' employment and earnings.

The single policy change subgroup differed from the double policy change subgroup in some important ways. It is important to keep this in mind when interpreting the subgroup findings, as differences in effects between the two subgroups may not be entirely due to being differentially affected by just the tenant contribution rate versus both policy changes but may also reflect how different types of households respond

[53] As described in chapter 2, this study focused on nonelderly, nondisabled households and individuals in the HCV program. Although it was not feasible to conduct an impact analysis for the cohort of elderly and disabled households and individuals in the HCV program due to the data limitations described in chapter 2, the measure of tenant rent share as a percent of gross income was available for this cohort. Appendix Table F.3 presents the rent burden measures for the cohort of elderly and disabled households and shows similar patterns as the nonelderly, nondisabled sample, though the increases in the percent of gross income these households pay toward rent are not as steep.

to the policy changes. Exhibit 3.10 presents characteristics of households just before SCCHA implemented its rent reform for the single policy change and double policy change subgroups separately. As expected, households that were directly affected by the voucher size rule change tended to be larger and have more children than households that were only affected by the tenant contribution rate change. In SCCHA, the average number of household members is 3.7 for this subgroup (compared with 3.2 for the single policy change subgroup), and 77 percent of households in the double policy change group in SCCHA included children, compared with 61 percent in the single policy change subgroup. A slightly larger proportion of households in the double policy change subgroup in SCCHA had at least one adult working at baseline than among the single policy change subgroup: 65 percent compared with 61 percent. The double policy change subgroup also had a higher level of out-of-pocket housing costs ($574 monthly) than the single policy change subgroup ($508 monthly) and a larger average subsidy ($1,711 per month compared with $1,304).[54]

Subgroup Impacts on Employment and Earnings

The estimated effects of the SCCHA rent reform on employment rates and average earnings for the subgroup of individuals living in households that were affected only by the tenant contribution rate increase (the "single policy change" subgroup) were very

Exhibit 3.10 Characteristics of the Sample at Baseline by Policy Group (Nonelderly, Nondisabled SCCHA Households and Adults)

Characteristic	Single Policy Change	Double Policy Change
Household Characteristics		
Average Number of Family Members		
Adults[a]	1.8	2.2
Children	1.4	1.5
Families with More than One Adult (%)	53.6	74.1
Families with Any Children (%)	61.2	76.7
Current/Anticipated Annual Family Income ($)	16,511	20,247
Income Sources[b] (%)		
Wages	60.7	65.2
Temporary Assistance for Needy Families (TANF)	22.6	25.4
Social Security/SSI/Pension	11.2	18.0
Other Income Sources	28.1	32.4
Average Monthly Family Share[c] ($)	508	574
Average Monthly Housing Subsidy[d] ($)	1,304	1,711
Monthly Gross Rent Exceeds Payment Standard (%)	53.5	52.0
Neighborhood Poverty Rate[e] (%)		
0%–10%	39.0	50.1
11%–20%	41.1	36.8
21%–30%	15.5	10.4
More than 30%	4.4	2.7
Household Sample Size (Total = 6,725)	5,183	1,542

(continued)

[54] See appendix G for more detailed exhibits of baseline characteristics of households in each of these subgroups.

Exhibit 3.10 Characteristics of the Sample at Baseline by Policy Group (Nonelderly, Nondisabled SCCHA Households and Adults) *(continued)*

Characteristic	Single Policy Change	Double Policy Change
Adult Characteristics		
Female (%)	63.8	64.6
Average Age (Years)	36.0	34.5
Race (%)		
White, non-Hispanic	9.7	8.5
Black, non-Hispanic	15.3	14.0
Asian or Hawaiian or Pacific Islander, non-Hispanic	33.1	37.6
Hispanic	41.0	39.1
Other Race or More than One Race, non-Hispanic	0.8	0.8
Income Sources (%)		
Wages	41.1	41.2
TANF	11.6	11.1
Social Security/SSI/Pension	1.9	1.3
Other Income Sources	14.5	13.7
Average Annual Income from Wages for Individuals with Any Wage Income ($)	16,676	17,273
Individual Sample Size (Total = 15,131)	10,974	4,157

SCCHA = Santa Clara County Housing Authority. SSI = Supplementary Security Income.
[a]Adults are defined as individuals age 18 and older who were not classified on the HUD-50058 form as a live-in aide.
[b]Income source categories are as defined on the HUD-50058 form. Wages include one's own business, federal wages, public housing agency (PHA) wages, military pay, and other wages. Other income sources include child support, medical reimbursement, Indian trust/per capita, unemployment benefits, and other nonwage sources.
[c]Family share is the family's contribution toward the gross rent.
[d]Housing subsidy is the full subsidy amount paid by the housing agency on the household's behalf. It includes any utility allowance payments made to the tenant in addition to rent paid to the owner by the housing agency.
[e]Poverty rate is defined as the percentage of individuals ages 18 to 64 years whose income in the previous 12 months was below the poverty threshold.
Notes: Samples consist of households headed by adults who were not seniors or adults with disabilities. Sample sizes may vary because of missing values. Rounding may cause slight discrepancies in sums and differences. The set of comparison group PHAs includes the Housing Authority of the County of San Mateo, the San Francisco Housing Authority, and the Housing Authority of the County of Alameda. Housing subsidy characteristics represent monthly averages. Utility allowance data were not available for San Mateo and are therefore not included in San Mateo's housing subsidy measures.
Source: MDRC calculations using HUD Public and Indian Housing Information Center and 2009–2013 American Community Survey 5-year estimates data

similar to the impact estimates for the full sample: there is no suggestion of positive or negative effects on employment rates or average earnings for this subgroup. This is unsurprising given that these households constitute 77 percent of the full study sample. As exhibit 3.11 shows, households affected by the change in the voucher size policy *in addition to* the tenant contribution rate increase (the "double policy change" subgroup)—the remaining 23 percent of the full study sample—showed a pattern of negative estimated effects on employment rates, but these estimates were not statistically significant. They were also not statistically significantly different from those for the single policy change subgroup.

The impact estimates in the "single policy change" panel and the "double policy change" panel of exhibit 3.11 represent impact estimates using a CITS analysis for each subgroup separately and can be interpreted in the same way as the impact estimates in exhibit 3.7. Exhibit 3.11 contains an additional column labeled "Difference Between Groups." This column presents the results of the statistical comparison between the *difference* in the impact estimates

Exhibit 3.11 Impacts on Average Quarterly Employment Rate and Annual Earnings by Policy Change Subgroup for Nonelderly, Nondisabled Households

	Single Policy Change Group				Double Policy Change Group				
Outcome	SCCHA Mean	Estimated Effect	Std. Error	P-Value	SCCHA Mean	Estimated Effect	Std. Error	P-Value	Difference Between Groups
Employment Rate									
Year 1	49.9	-0.2	1.4	0.881	51.0	-1.3	1.3	0.323	0.573
Year 2	53.1	-0.2	1.9	0.907	54.6	-1.7	1.7	0.322	0.560
Year 3	54.9	-0.6	2.4	0.801	56.4	-3.5	2.2	0.112	0.374
Year 4	55.6	-0.4	2.9	0.886	57.7	-4.2	2.6	0.112	0.334
Earnings									
Year 1	11,223	111	496	0.824	11,572	-663	521	0.208	0.284
Year 2	13,206	212	674	0.755	13,761	-960	695	0.172	0.228
Year 3	15,618	223	859	0.796	16,206	-2,220	875	0.014**	0.048††
Year 4	17,606	736	1,046	0.484	18,487	-2,341	1,058	0.031**	0.041††
Sample Size				12,439				4,438	

SCCHA = Santa Clara County Housing Authority.
Notes: The comparison group public housing agency in this exhibit is the San Francisco Housing Authority. Effects were estimated using a comparative interrupted time series model. All estimated earnings effects are reported in 2017 dollars. The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect. Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent. A two-tailed t-test was applied to differences between the outcomes of the policy subgroups. Statistical significance levels for differences across subgroup impacts are indicated as: ††† = 1 percent; †† = 5 percent; † = 10 percent.
Source: California Employment Development Department household-level aggregate unemployment insurance data

between the two subgroups. The numbers in the column represent the p-values, and the daggers represent the levels of statistical significance of the estimate of the difference in impacts.

The estimated impacts on average earnings by subgroup in exhibit 3.11 suggest that the SCCHA rent reform also did not affect average earnings for the households affected only by the tenant contribution rate increase. The impact estimates are small and not statistically significant. There is some evidence, however, that the household members also affected by the voucher size rule change may have reduced their earnings in response to the rent reform. For this double policy change subgroup, average annual earnings were estimated to be lower in the first 2 years after the rent reform was implemented than they would have been in the absence of the rent reform, though these estimated effects were not statistically significant from zero. By the third year, SCCHA residents in this subgroup were earning $2,220 less annually on average than they would have been in the absence of the rent reform, and this effect was sustained in the fourth year (when the estimated decrease was $2,341). These third- and fourth-year effects are statistically significant at the 0.05 level. They are also statistically significantly different from the impact estimates for the single policy change subgroup at the 0.05 level.

As exhibits 3.1 to 3.6 from the full sample analysis illustrated, employment rates and average earnings increased over the followup period for both SCCHA and the comparison group. In the context of these earnings trends, an estimated negative effect on average earnings means that although average earnings did increase over time for SCCHA subsidy residents, they did not increase as quickly or as much as they would

have in the absence of the rent reform. An estimated negative effect on average earnings could be caused either by some SCCHA residents reducing their employment in response to the rent reform, or by some SCCHA residents not obtaining employment or not increasing their hours or wages because of the rent reform.

This negative effect of the rent reform on average earnings for the households affected by both the tenant contribution rate change and the voucher size rule change seems at least partly due to the decrease in employment rates that the impact estimates (though not statistically significant) on employment rates suggest. The negative effect on employment and earnings for this subset of the sample did not occur immediately after the rent reform was implemented, suggesting that residents did not reduce their employment right away.

An exploratory analysis examined whether these employment and earnings effects may also be related to the double policy change households' housing experiences following the rent reform. As described in the "Analytic Approach" section of chapter 2, using the difference-in-difference approach with a reduced comparison group (described in the "Sample" section of the same chapter) for the subgroup analysis does not allow for reliably estimating effects on housing subsidy outcomes for the single and double policy change subgroups separately, but the exploratory analysis overcomes much of these limitations. The difference-in-difference-in-difference method used for this analysis is described in the "Analytic Approach" section of chapter 2. Because these analyses are considered exploratory, the results for this analysis are presented in the appendix exhibit G.7. The column labeled "Difference Between Subgroup Impacts" can be interpreted as the *difference* in impact estimates (the double policy change subgroup impact estimate minus the single policy change subgroup impact estimate). The column to the right of that column contains their p-values, which are marked with daggers to indicate the level of statistical significance.

The findings of this analysis do suggest that the households in the double policy change subgroup experienced much larger reductions in HAP than the single policy change group. Households in the double policy change subgroup experienced reductions in subsidies that were more than $4,000 larger than the single policy change group in the first 2 years following the rent reform, and this difference declined somewhat in the third year. These differences in effects on average HAP are statistically significant at the 0.01 significance level. The differential effects on continued subsidy receipt are not statistically significant between the two groups (though approach statistical significance by the third year), but the pattern of these differential effects may suggest that the SCCHA rent reform led a small percentage of households in the double policy change group to leave the subsidy program or lose their housing subsidies. The timing of these estimated impacts on continued subsidy receipt align with the timing of the estimated negative impacts on employment and earnings for this double policy change subgroup, suggesting that they may be related. The patterns in housing subsidies for each of the subgroups (in relation to their corresponding comparison groups) aligns with these suggestive findings. HAP decreased significantly more, and tenant rent share increased significantly more for the double policy change subgroup than for the single policy change subgroup. By the third year after the SCCHA rent reform was implemented, 86 percent of SCCHA households in the double policy

change subgroup were still receiving subsidies compared with 91 percent in the comparison group.[55]

Households' Housing Decisions and Rent Burden While in the Voucher Program by Subgroup

Households affected by only the tenant contribution rate increase may have had an incentive to move to a more affordable unit (whose contract rent exceeds the payment standard by a lesser amount than their current unit) to offset increases in housing costs. In addition to this incentive, households affected by the voucher size rule change in addition to the tenant contribution rate increase also have a very strong incentive to relocate to smaller units to avoid the steeper out-of-pocket housing cost they would have faced if they remained in their units.

Especially in a tight housing market, finding a unit that is affordable may require moving to a more affordable neighborhood. The trend among both single policy change households and double policy change households looks similar to each other: a slight increase in neighborhood poverty over the 3 years following the SCCHA rent reform that mirrors the full sample results. Similar to the full sample findings, the differences between each subgroup of SCCHA households and their corresponding comparison group households (whose trends fluctuates only slightly) are not stark, and it is impossible to draw any conclusion about effects from these purely descriptive data. The trends in number of bedrooms over time suggest more strongly that households in the double policy change group moved to smaller units, with households' average unit size dropping from 3.4 to 3.2 bedrooms in the first year after the SCCHA rent reform was implemented, and then continuing to drop to 3.1 bedrooms by the end of the third year, compared with the comparison group, whose average remains steady at 3.1 starting before the SCCHA rent reform was implemented and remaining at 3.1 throughout the 3 years following the rent reform. For the single policy change group, the number of bedrooms remains steady both for SCCHA and comparison group households. There is no apparent pattern of households changing their household composition following the policy changes for either subgroup.[56]

One particularly striking pattern is that the double policy change households' tenant rent share (as measured by TTP plus the amount that the contract rent exceeds the payment standard) increased very steeply in the year following implementation of the rent reform for households continuing to receive subsidies compared with the single policy change subgroup. Tenants' rent shares increased slightly in the comparison groups for both the single policy change households and the double policy change households. The SCCHA households' tenant rent share in the single policy change subgroup increased from $447 to $529 between the month before the SCCHA rent reform and 1 year later (which was a larger increase than the single policy change comparison group, as expected.) In contrast, the SCCHA households' tenant rent share in the double policy change subgroup rose from $511 per month just before the implementation of the rent reform to $810 per month 1 year later. (Only a tiny fraction of households in the double policy change subgroup—0.3 percent—stopped receiving housing subsidies between these two time points, so these averages are a relatively reliable measure of the sample's housing costs.) Tenant rent shares did decrease in subsequent years

[55] See appendix exhibits G.8 and G.9 for more details.
[56] See appendix exhibits G.10 and G.11 for details.

(in part because of the reduction in tenant share from 35 percent to 32 percent of gross income), but they remained high. This might suggest that while many double policy change subgroup households moved to smaller units, many other households stayed in place and paid the much higher housing costs as a result.

The increase in tenant rent share for double policy change households from $511 to $810 per month is quite large for this subset of SCCHA households, which have an average household income of $1,687 per month. This apparent hardship is explored more formally in exhibit 3.12, which presents a measure of households' rent burden (defined in the present study as the tenant rent share as a percentage of gross income) just before the SCCHA implementation of the rent reform and throughout the followup period.[57] The levels of average tenant rent share as a percentage of gross income demonstrate that this subset of households experienced very high levels of housing-related hardship after the rent reform was implemented. Just before the rent reform was implemented, just 6 percent of these households had tenant rent shares that exceeded 40 percent of their gross income. The percentage jumped to 61 percent 1 year after the rent reform was first implemented. (In contrast, this percentage only increased from 15 percent to 21 percent for single policy change households.) This percentage then decreased over the rest of the followup period, to 50 percent by the end of the second year and 33 percent by the end of the third. This decrease reflects the tenant contribution rate being reduced from 35 percent to 32 percent of gross income in the second year of its implementation, but may also reflect the fact that some households may have moved to smaller or more affordable units after the end of the first year, or that households with the highest levels of rent burden may have left the subsidy program following the rent reform. It is notable that the downward trend in the percentage of households exceeding this 40-percent threshold also decreased for the comparison group (SFHA) in this subsample, possibly also because of

Exhibit 3.12 Tenant Rent Share as a Percent of Monthly Gross Income Among Nonelderly, Nondisabled Households Receiving Subsidies, by Policy Subgroup in Santa Clara County Housing Authority

Outcome	Single Policy Change	Double Policy Change
Tenant Rent Share Exceeds 40% of Monthly Gross Income (%)		
Last Month of Baseline	14.9	5.8
Last Month of Year 1	21.4	60.5
Last Month of Year 2	24.5	50.2
Last Month of Year 3	15.6	32.9
Tenant Rent Share Exceeds 50% of Monthly Gross Income (%)		
Last Month of Baseline	10.9	4.1
Last Month of Year 1	14.0	47.3
Last Month of Year 2	16.8	38.7
Last Month of Year 3	10.9	25.0
Sample Size (Total = 6,723)	5,181	1,542

SCCHA = Santa Clara County Housing Authority.
Notes: Sample sizes may vary because of missing values. Outcomes shown describe only those households receiving any housing subsidies in the specified month.
Source: MDRC calculations using HUD Public and Indian Housing Information Center data

[57] Additional measures of rent burden are presented in appendix exhibits G.12 and G.13.

the changing composition of households continuing to receive subsidies over time. The same pattern is evident using a higher threshold. The percentage of households in the single policy change subgroup paying over one-half of their gross incomes toward rent rose only slightly from 11 to 14 percent, but for households in the double policy subgroup, this percentage rose steeply from 4 percent just before the start of implementation to 47 percent 1 year later.

Chapter 4

Discussion

This chapter summarizes the study's findings and discusses their implications. It also discusses the study's limitations and next steps for future research in the area of rent reform.

Discussion of Findings

In response to federal budget reductions in 2013, SCCHA implemented a rent reform that increased the tenant contribution rate for all households from 30 percent of adjusted income to 35 percent of unadjusted income and changed voucher size rules for these households. A central question of the present study is how the rent reform implemented by SCCHA affected households' employment and earnings. As discussed earlier in the "Research Questions" section of chapter 2, there were three such possible effects of the rent reform: (1) The increased tenant contribution rate would act as a disincentive that would cause households to decrease their earnings, (2) households would increase earnings to cover their increased housing costs, or (3) there would be no effect on earnings or employment because households would adjust spending in other areas to cover their higher housing costs, increase their debt, or experience increased material hardship.

The present study found no evidence that these policy changes had any effects, on average, with respect to the employment and earnings of nonelderly, nondisabled SCCHA residents. The absence of an overall reduction in household earnings meant that SCCHA was able to realize its projected HAP savings. (If there were to have been a reduction in household earnings, it would have led to an increase in HAP amounts, counteracting the intended savings from the increase in the tenant contribution rate.) Nonelderly, nondisabled households received approximately $1,600 less in housing subsidies, on average, during the first year, $1,550 less in the second, and $1,330 less in the third year after the rent reform than they would have received without the rent reform. There was also no evidence that the rent reform caused households to lose their housing subsidies.

There are two factors specific to the SCCHA context that might have strengthened any incentive inherent in the rent reform's policy change to increase their employment and earnings. First, Santa Clara County and its surrounding counties had a robust job market during the study period. It is worth noting that even in this job market with many employment opportunities, households did not increase their employment or earnings in response to an increased tenant contribution rate. Second, SCCHA has a 24-month recertification period, which is longer than the typical 12-month recertification period used in traditional PHAs. SCCHA households that were considering increasing their income in response to the rent reform (to compensate for lost net income) may have had a stronger incentive to do so than they would have in a PHA with a 12-month recertification period. If positive effects had been estimated on employment and earnings, these two factors would have needed to be taken into consideration when interpreting results. With no evidence of effects on employment and earnings, it is unknown whether this potential incentive may have been a factor in balancing out a disincentive to earn more.

The combination of findings that overall the SCCHA rent reform did not increase residents' average earnings levels and that it did, as intended, reduce households' housing subsidies means that households

experienced reductions in their net income. For households that did not increase their income over time, these reductions in net income could have been persistent. Households who did increase their income over time would have experienced smaller increases in net income compared with the increases they would have experienced in the absence of the rent reform. This interpretation is consistent with SCCHA leadership's impression that voucher households generally did not change their employment behavior but instead absorbed their increased housing costs. This study did not include measures of households' material hardship beyond a measure of rent burden, and therefore cannot assess how this increase in rent burden translated into their experiences with material hardship. It is an important consideration, however, because increased housing costs for households without increased income to cover those costs could mean that households are reducing spending on other necessary goods and services, which may lead to increased material hardship, or are increasing their debt.

One study—the Rent Reform demonstration—that is currently underway in four PHAs can provide some context for potential effects on households' material hardship. A baseline survey of the households participating in the demonstration—a population comparable to the sample for the present study, consisting of nonelderly, nondisabled households in the Housing Choice Voucher (HCV) program—revealed that even households receiving housing subsidies under traditional rent rules commonly experience material hardship: almost 70 percent of survey respondents said they had experienced at least one form of material hardship during the last year. Forty-six percent said they were not able to pay a utility bill, 34 percent said they were not able to pay a telephone bill, and 20 percent said they were not able to pay the (subsidized) rent in at least one month of the past year. Furthermore, 28 percent said they were not able to buy food and 23 percent said they were not able to see a doctor or buy prescription drugs they needed during at least one month in the past year (Riccio, Deitch, and Verma, 2017). Given that HCV households in SCCHA were likely to be experiencing similar material hardship before the rent reform, there is a risk that the increase in housing costs and consequent decrease in net income caused by the rent reform may have worsened such hardship.

A subgroup analysis explored how the SCCHA rent reform may have affected households subject to only the change in the tenant contribution rate differently from households who were *also* affected by the voucher size rule change. Like the findings for the full sample, there was no evidence that the rent reform had any effects on employment or earnings for the subgroup only affected by the tenant contribution rate change. There was, however, some evidence that the SCCHA rent reform reduced earnings for the subgroup of households that was affected by both policy changes. These households experienced particularly high levels of rent burden following the rent reform (measured as the tenant rent share as a proportion of household gross income). The negative effect on earnings for this subgroup did not occur immediately after the rent reform was implemented, suggesting that residents did not reduce their employment right away, but perhaps struggled with their increased housing costs before reducing their earnings. An exploratory analysis shows that, as expected, the SCCHA rent reform led to especially deep cuts in housing subsidies for this double policy change subgroup. To the extent that the steep increases in households' housing costs led some households to leave the subsidy program (of which there is only suggestive evidence),

this housing instability might partially explain the employment and earnings effects for this subgroup of households, if having to relocate to a new unit or leave the subsidy program destabilized a person's employment situation. The true drivers of these delayed negative effects on household earnings for this subgroup cannot be definitively explained within the scope of the present study.

These findings hint at some potential consequences of implementing a voucher size policy that causes steep increases in households' housing costs if they don't move to a smaller unit. The scarcity of affordable housing in Santa Clara meant that households had fewer options for less expensive units. Although the trends in the average number of bedrooms over time suggest that some households in this group did move to smaller units, it is likely that many were unable to, or that if they did, those units may not have been as affordable as their previous units.[58] In a location with more affordable housing options, it is possible that households that have to move to a smaller unit may have an easier time doing so.

SCCHA provided crucial safeguards for these households by partnering with local organizations to provide legal and financial assistance to prevent eviction. It is important for any PHA that implements a rent reform to identify the households that might be most adversely affected by the policy changes and provide them with adequate protections from severe hardship. This study provides evidence that can help inform that assessment for other PHAs considering these changes to the rent policy. For example, the SCCHA eviction prevention assistance program (SEPP) provided an important support that likely helped many households avoid eviction during the time that it was being operated. An attorney working in the program (and now a staff member of SCCHA) recalled that of the 293 households that SEPP assisted, only two cases at most resulted in an actual eviction. Other PHAs considering a similar policy change in a similar context (where finding an affordable smaller unit may be difficult) might consider that households who are vulnerable to adverse effects because of the policy change may greatly benefit from an effective safeguard such as the SEPP program that is offered over an extended period of time.

Study Limitations

Findings from this study contribute to the emerging body of evidence on how changing the rent policy for households receiving housing assistance can affect employment and earnings. Still, the study has some limitations that should be kept in mind when interpreting the results. An important limitation, as discussed earlier, is that aspects of material hardship beyond rent burden, such as food insecurity and difficulty covering medical expenses or rent and utilities, are not measured in this study. A full assessment of the implications of increasing the tenant contribution rate—or any other rent reform that effectively reduces housing subsidy levels—should consider the effects on the level of material hardship that households experience in response to the policy change.

Another limitation is that the study does not examine how the effects of the rent reform may vary for different types of individuals and households. It includes a subgroup analysis that compares effects for households only affected by the tenant contribution rate and households affected by both policies, but there may be other sources of variation that the study was not able to explore. It is possible, for example,

[58] A new unit with fewer bedrooms under the new policy could be less affordable than the former unit with more bedrooms if the new unit's gross rent exceeded the payment standard for the smaller voucher size more than the former unit's gross rent exceeded the payment standard for the larger voucher size.

that nonelderly, nondisabled adults who were already working at the time the SCCHA rent reform was implemented would have more flexibility than those who were not employed to increase or reduce their employment and earnings in response to the increased tenant contribution rate. Nonelderly, nondisabled individuals who are not yet working may have less of an incentive to begin a new job with the higher tenant contribution rate. The study was not able to estimate effects separately for these subgroups due to data limitations.

The primary analytic method in this study is a rigorous one: a CITS to examine the effects of the SCCHA rent reform on employment and earnings. As described in chapter 2, the rent reform meets important conditions for CITS in that it was a consequential change that occurred for the full study cohort all at once, and there were data available for a comparison group that was subject to the same economic forces as SCCHA. As noted in the Analytic Approach section of chapter 2, it was not feasible to use CITS to examine effects on households' average housing subsidies or continued subsidy receipt because 4 years of historical housing subsidy data were not available for the full study sample and therefore baseline trends could not be estimated for these measures. The autoregressive difference-in-difference design used to study effects of the rent reform on these outcomes is not as rigorous as CITS because it does not account for potentially differing baseline trends in housing subsidy measures. Furthermore, it was not feasible to use either CITS or autoregressive difference-in-difference to examine effects on housing characteristics (including number of bedrooms in the unit or neighborhood poverty) or household composition, because these data were not available for households that were no longer receiving subsidies. The descriptive analysis used to explore these outcomes can only provide suggestive evidence of potential effects on these outcomes.

This analysis relies on UI wage data to assess effects on employment and earnings, and these data do not capture earnings from employment that is not covered by UI. While there is no strong reason to believe that the SCCHA rent reform would have affected informal employment differently from formal employment, this study cannot formally test that assumption. It is possible, however, that the increased rent contribution rate could strengthen the incentive to underreport earnings to the PHA, and underreporting would be easier with informal employment, especially if the worker is not paying taxes on the earnings.

Finally, the present study focused on only one PHA in one location, Santa Clara County, that has a tighter housing market and a more robust job market than most of the country, though there are many PHAs in comparable situations—such as PHAs in New York City, Boston, Los Angeles, Seattle, Denver, Washington, and San Diego—serving large numbers of households. These findings provide an important contribution to the literature on the effects of rent reform on labor market outcomes; still, the estimated effects should not be interpreted as effects that one should necessarily expect if this rent reform were implemented elsewhere. Additional studies in multiple locations with diverse contexts are needed to draw more broadly applicable conclusions.

Conclusion

The present study of the effects of a rent reform implemented by SCCHA provides evidence, from one location, that a public housing agency can increase the tenant contribution rate by a moderate amount (30 percent of adjusted income to 35 percent of gross income, later to 32 percent of gross income) without creating a substantial disincentive to work and without significantly increasing the likelihood that households

may lose their subsidies. It also provides suggestive evidence that implementing a voucher size policy that requires some households to relocate to a different unit (with fewer bedrooms) to avoid even deeper cuts in housing subsidies may have adverse effects on some households in the context of a housing market where affordable housing options are very limited, and that short-term safeguards that PHAs provide to households may not fully prevent longer term hardship.

The results of this study should not be interpreted as conclusive evidence of expected effects in any context, given that the study focuses on only one location. Further research is needed in multiple locations that represent diverse housing markets and labor markets to examine how the effects of this type of rent reform may be expected to vary based on the context. Studies with a random assignment design would help overcome many of the methodological limitations of this study described above, for example, by providing a reliable counterfactual for outcomes where multiple years of pre-intervention data are not available for the full sample. Finally, future studies of rent reforms that might result in reduced housing subsidies for households should carefully measure households' experiences with material hardship, including food insecurity and their ability to cover medical expenses, in response to the rent reform. Nevertheless, the present study begins to address one aspect of housing subsidy policy—how increasing the tenant contribution rate affects households' employment, earnings, and housing subsidies—where strong evidence is lacking.

Appendix A

Model Specifications

Comparative Interrupted Time Series Model

The following comparative interrupted time series (CITS) model was used to estimate effects on quarterly employment rates and average quarterly earnings:

$$Y_i = \sum_{p=1}^{4} \alpha_p \, PHA_{pi} + \sum_{p=1}^{4} \beta_{0p} \, PHA_{pi} Q_i + \sum_{f=1}^{16} \beta_{1f} \, F_{fi} + \sum_{f=1}^{16} \beta_{2f} \, F_{fi} * S_i + e_i$$

Where:

Y_i = the value of the outcome variable for observation *i*, where observation *i* is defined as the value of the outcome variable for PHA *p* in quarter *q*,

PHA = a series of four indicator variables, one for each PHA *p*,

α = a series of four intercepts for baseline trends, one for each PHA *p*,

Q = the quarter (a continuous variable),

β_0 = a series of coefficients representing the slope of the baseline trend for each of the four PHAs,

F = an indicator value for followup quarter *f*,

β_1 = a series of coefficients representing the comparison group deviation from its baseline trend for each followup quarter *f*,

S = 1 if the PHA is SCCHA (the treatment group) and 0 otherwise,

β_2 = a series of coefficients representing the treatment-comparison group difference between their deviations from their baseline trends for each followup quarter *f*, and

e = a random error term.

Autoregressive Difference-in-Difference Model

The following autoregressive difference-in-difference (DinD) model was used to estimate effects on housing subsidy outcomes:

$$Y_h = \alpha + \beta_1 S_h + \sum_{b=-1}^{-4} \beta_{2b} \, Y_{bh} + \sum_{b=-1}^{-4} \beta_{3b} \, R_{bh} + \sum_{m=1}^{M} \beta_4 \, X_{mh} + e_h$$

Where:

Y_h = the value of the outcome variable for sample household *h*,

α = the intercept, representing the conditional mean outcome for the three comparison PHAs combined,

S = 1 if household *h* was in SCCHA (the treatment group) at the time of the rent reform and 0 otherwise,

β_1 = estimate of the effect of the SCCHA rent reform on outcome Y,

Y_{bh} = a set of four variables representing the lagged value of the outcome variable Y for the four baseline years prior to the rent reform for household *h*

β_2 = a series of four regression coefficients, one for each of the four variables representing the lagged values of the outcome for the four baseline years prior to the rent reform,

R = a set of four variables representing whether the household received any subsidies in each of the four baseline years prior to the rent reform,

β_3 = a series of four regression coefficients for the four baseline years' indicators of any housing subsidy receipt,

X = a set of background characteristics for household *h*,[59]

β_4 = the set of regression coefficients for the background characteristics,

e = a random error term.

[59] The background household characteristics included in the model as covariates include: the head of household's gender, age, race and ethnicity, and receipt of wage, Temporary Assistance for Needy Families (TANF), or Social Security/Supplementary Security Income/Pension (SSIP) income; number of adults in a household; age of the youngest child; annual household wage earnings; monthly family share; and whether the household's monthly gross rent exceeds the payment standard.

Appendix B

Supplemental Exhibits for Comparison Group Selection

Exhibit B.1 Local Labor and Housing Market Conditions, Bay Area Counties

Characteristic	Alameda County	Contra Costa County	Marin County	Napa County	San Francisco County
Total population (%)	1,510,271	1,049,025	252,409	136,484	805,235
White	33.7	47.2	72.7	55.8	41.7
Black	11.8	8.8	2.6	2.0	5.6
Asian	26.6	14.5	5.6	6.9	33.1
Hispanic	22.5	24.5	15.5	32.6	15.2
Median household rent ($)	1,289	1,365	1,628	1,350	1,488
Median household income ($)	72,112	78,756	90,839	70,443	75,604
Persons with income below the poverty level (%)	12.5	10.5	7.7	10.1	13.5
Bachelor's degree attained (%)	41.8	39.0	54.6	31.3	52.4
Unemployment in 2012 (%)	8.7	8.9	6.3	8.4	6.8
Unemployment in 2013 (%)	7.2	7.5	5.2	6.9	5.5
Unemployment in 2014 (%)	5.8	6.2	4.3	5.7	4.4
Unemployment in 2015 (%)	4.7	5.0	3.5	4.6	3.6
Unemployment in 2016 (%)	4.2	4.4	3.2	4.3	3.3
Population density (per sq. mi)	2,043.6	1,465.2	485.1	182.4	17,179.2
Housing unit density (per sq. mi)	788.3	559.1	213.7	73.2	8,041.8
Rental vacancy rate (%)	4.3	5.2	3.4	6.4	3.7

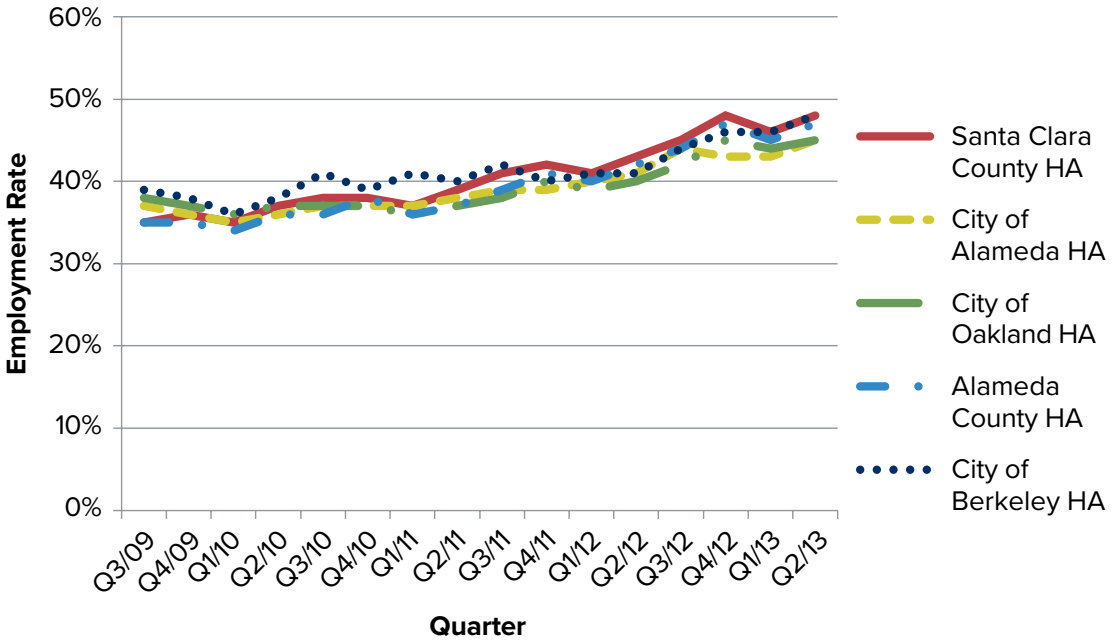
(continued)

Exhibit B.1 Local Labor and Housing Market Conditions, Bay Area Counties *(continued)*

Characteristic	San Joaquin County	San Mateo County	Santa Clara County	Santa Cruz County	Solano County	Sonoma County
Total population (%)	685,306	718,451	1,781,642	262,382	413,344	483,878
White	35.4	41.9	34.7	59.2	40.5	65.8
Black	6.8	2.5	2.4	0.9	13.7	1.4
Asian	14.0	25.1	32.3	4.1	14.3	3.9
Hispanic	39.3	25.3	26.8	32.4	24.5	25.2
Median household rent ($)	1,026	1,602	1,566	1,385	1,264	1,265
Median household income ($)	53,380	88,202	91,702	66,519	67,177	63,356
Persons with income below the poverty level (%)	18.2	7.6	10.2	14.6	13.0	11.9
Bachelor's degree attained (%)	18.1	44.4	46.5	37.0	24.3	32.2
Unemployment in 2012 (%)	14.4	6.4	7.9	11.8	10.7	8.9
Unemployment in 2013 (%)	12.3	5.3	6.5	10.3	9.1	7.1
Unemployment in 2014 (%)	10.5	4.2	5.2	8.8	7.5	5.6
Unemployment in 2015 (%)	8.9	3.4	4.2	7.5	6.1	4.5
Unemployment in 2016 (%)	8.1	3.0	3.8	5.3	5.3	3.8
Population density (per sq. mi)	492.6	1,602.2	1,381.0	589.4	503.0	307.1
Housing unit density (per sq. mi)	168.0	604.4	489.8	234.7	185.8	129.8
Rental vacancy rate (%)	6.3	3.1	3.1	4.0	6.8	4.8

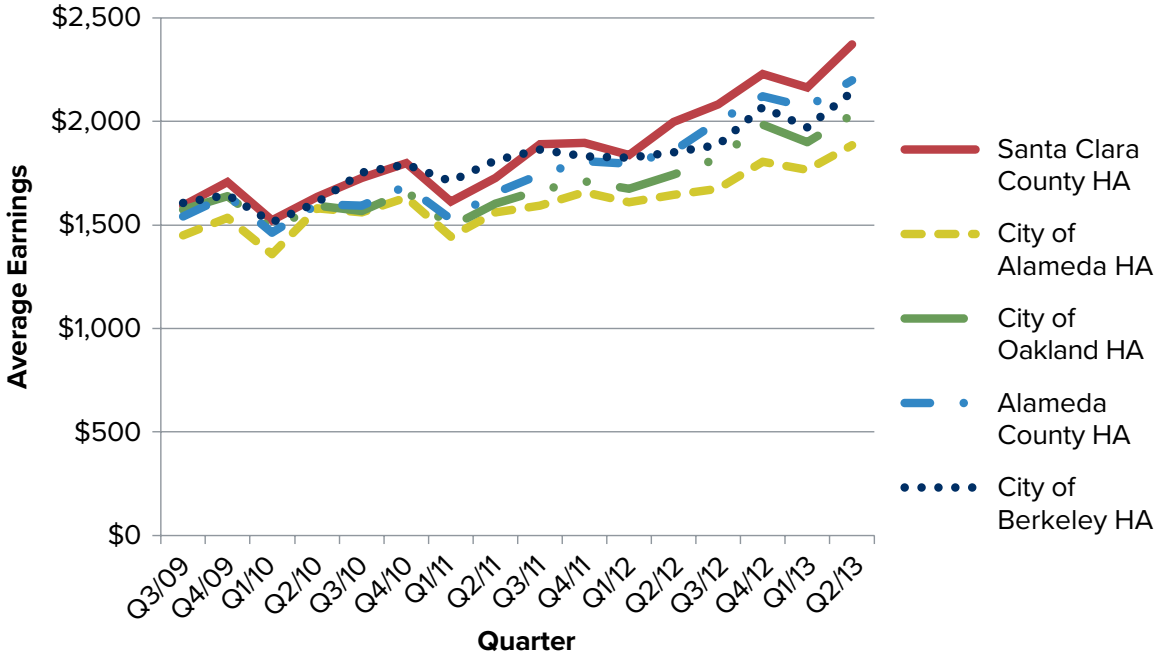
Note: No PHAs are located in San Benito County, so the county is not shown.
Sources: 2010 U.S. Census Bureau; 2009–2013 American Community Survey 5-year estimates; California Employment Development Department monthly labor force data for counties (2012–2016)

Exhibit B.2 Baseline Trends in Quarterly Employment Rates of Nonelderly, Nondisabled Adults in the Santa Clara and Alameda County Comparison Candidate Housing Agencies



Note: Samples consists of adults who were not seniors or adults with disabilities in the Housing Choice Voucher program.
Source: California Employment Development Department individual-level aggregate unemployment insurance data

Exhibit B.3 Baseline Trends in Average Quarterly Earnings for Nonelderly, Nondisabled Adults in the Santa Clara and Alameda County Comparison Candidate Housing Agencies

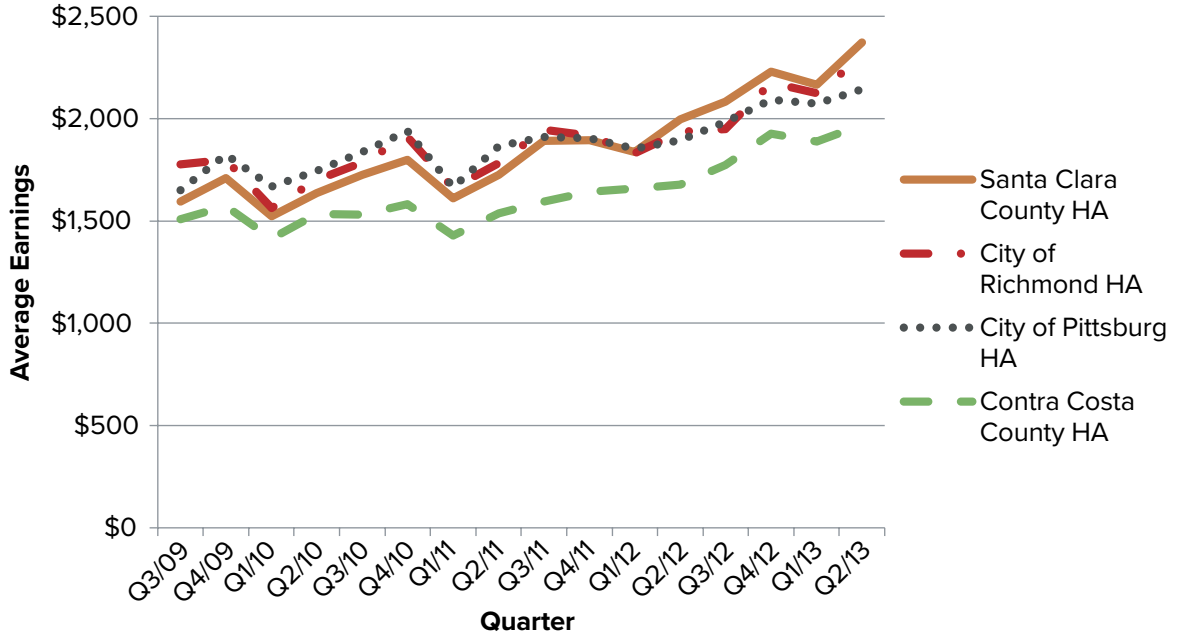


Notes: Samples consists of adults (who were not seniors or adults with disabilities) in the Housing Choice Voucher program. Earnings not adjusted for inflation.
Source: California Employment Development Department individual-level aggregate unemployment insurance data

Exhibit B.4 Baseline Trends in Quarterly Employment Rates of Nonelderly, Nondisabled Adults for Santa Clara and Contra Costa County Comparison Candidate Housing Agencies

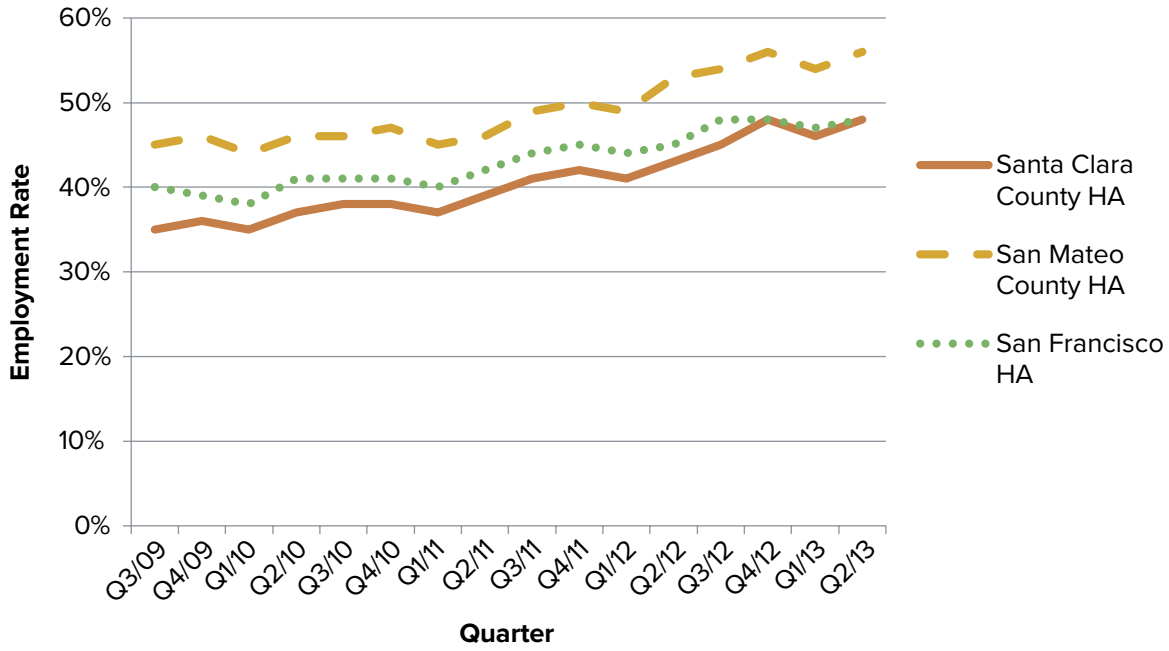
Note: Samples consists of adults (who were not seniors or adults with disabilities) in the Housing Choice Voucher program.
Source: California Employment Development Department individual-level aggregate unemployment insurance data

Exhibit B.5 Baseline Trends in Average Quarterly Earnings of Nonelderly, Nondisabled Adults for Santa Clara and Contra Costa County Comparison Candidate Housing Agencies



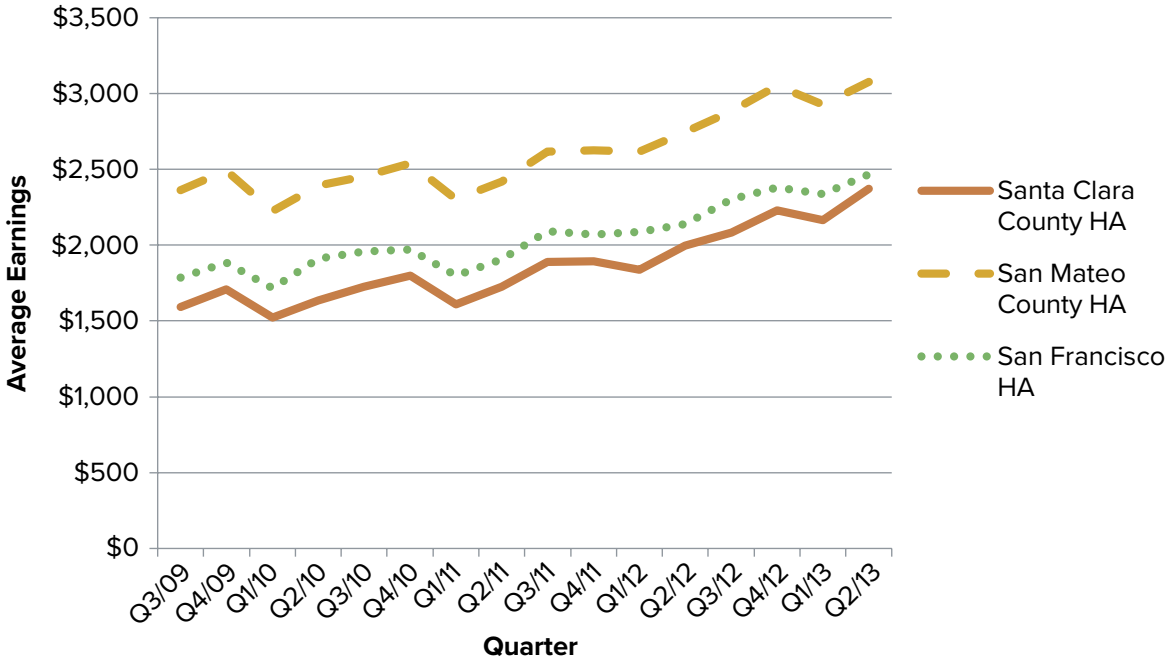
Notes: Samples consists of adults (who were not seniors or adults with disabilities) in the Housing Choice Voucher program. Earnings not adjusted for inflation.
Source: California Employment Development Department individual-level aggregate unemployment insurance data

Exhibit B.6 Baseline Trends in Quarterly Employment Rates, Nonelderly, Nondisabled Adults Santa Clara, and San Mateo County and San Francisco County Comparison Candidate Housing Agencies



Note: Samples consists of adults (who were not seniors or adults with disabilities) in the Housing Choice Voucher program.
Source: California Employment Development Department individual-level aggregate unemployment insurance data

Exhibit B.7 Baseline Trends in Average Quarterly Earnings, Nonelderly, Nondisabled Adults, Santa Clara, and San Mateo County and San Francisco County Comparison Candidate Housing Agencies



Notes: Samples consists of adults (who were not seniors or adults with disabilities) in the Housing Choice Voucher program. Earnings not adjusted for inflation.
Source: California Employment Development Department individual-level aggregate unemployment insurance data

Appendix C

Supplemental Baseline Characteristics Exhibits

Exhibit C.1 Household Composition and Income at Baseline

Characteristic	SCCHA	Comparison PHAs
Average Number of Family Members		
Adults[a]	1.9	1.8
Children	1.4	1.3
Families with More than One Adult (%)	58.3	50.7
Number of Children in Family (%)		
None	35.3	35.4
1 Child	23.3	27.7
2 Children	20.3	19.7
3 or More	21.1	17.2
For Families with Children, Age of Youngest Child (%)		
0–5 Years	36.6	34.9
6–12 Years	39.6	40.4
13–17 Years	23.8	24.6
Current/Anticipated Annual Family Income ($)	17,368	18,525
Current/Anticipated Annual Family Income (%)		
$0	3.5	4.1
$1–4,999	16.9	12.3
$5,000–9,999	22.1	20.2
$10,000–19,999	23.4	26.6
$20,000 or More	34.0	36.9
Income sources[b] (%)		
Wages	61.7	60.4
TANF	23.2	22.9
Social Security/SSI/Pension	12.8	16.5
Other Income Sources	29.1	35.5

(continued)

Exhibit C.1 Household Composition and Income at Baseline *(continued)*

Characteristic	SCCHA	Comparison PHAs
Average Annual Income from Wages, for Families with Any Wage Income ($)	22,278	24,281
Annual Income from Wages, for Families with Any Wage Income (%)		
$1–4,999	11.1	6.1
$5,000–9,999	15.0	12.8
$10,000–19,999	26.9	29.1
$20,000–29,999	19.8	20.2
$30,000 or More	27.3	31.8
Sample Size (Total = 15,499)	7,111	8,388

SCCHA = Santa Clara County Housing Authority. SSI = Supplementary Security Income. TANF = Temporary Assistance for Needy Families.
[a]Adults are defined as individuals age 18 and older who were not classified on the HUD-50058 form as a live-in aide.
[b]Income source categories are as defined on the HUD-50058 form. Wages include one's own business, federal wages, PHA wages, military pay, and other wages. Other income sources include child support, medical reimbursement, Indian trust/per capita, unemployment benefits, and other nonwage sources.
Notes: Samples consists of households that were not headed by seniors or adults with disabilities. Sample sizes may vary because of missing values. Rounding may cause slight discrepancies in sums and differences. The set of comparison group public housing agencies (PHAs) includes the Housing Authority of the County of San Mateo, the San Francisco Housing Authority, and the Housing Authority of the County of Alameda.
Source: MDRC calculations using HUD Public and Indian Housing Information Center data

Exhibit C.2 Characteristics of Adults at Baseline

Characteristic	SCCHA	Comparison PHAs
Female (%)	63.9	66.3
Age (%)		
18–24	32.2	31.3
25–34	18.7	19.8
35–44	18.0	18.7
45 or Older	31.1	30.1
Average Age (Years)	35.6	35.4
Race (%)		
White, non-Hispanic	9.4	16.7
Black, non-Hispanic	14.7	40.6
Asian or Hawaiian or Pacific Islander, non-Hispanic	34.7	21.2
Hispanic	40.4	20.1
Other Race or More than One Race, non-Hispanic	0.8	1.4
Income Sources[a] (%)		
Wages	41.1	41.4
TANF	11.5	11.9
Social Security/SSI/Pension	1.8	4.2
Other Income Sources	14.3	21.0
Average Annual Income from Wages for Individuals with Any Wage Income ($)	16,840	19,247
Annual Income from Wages for Individuals with Any Wage Income ($)		
$1–$4,999	19.8	9.9
$5,000–$9,999	18.7	18.9
$10,000–$19,999	27.9	32.4
$20,000–$29,999	16.7	18.3
$30,000 or More	16.9	20.4
Individual Sample Size (Total = 34,075)	16,133	17,942

SCCHA = Santa Clara County Housing Authority. SSI = Supplementary Security Income. TANF = Temporary Assistance for Needy Families.
[a]Income source categories are as defined on the HUD-50058 form. Wages include one's own business, federal wages, PHA wages, military pay, and other wages. Other income sources include child support, medical reimbursement, Indian trust/per capita, unemployment benefits, and other nonwage sources.
Notes: Samples consists of adults who were not seniors or adults with disabilities. Sample sizes may vary because of missing values. Rounding may cause slight discrepancies in sums and differences. The set of comparison group public housing agencies (PHAs) includes the Housing Authority of the County of San Mateo, the San Francisco Housing Authority, and the Housing Authority of the County of Alameda.
Source: MDRC calculations using HUD Public and Indian Housing Information Center data

Exhibit C.3 Characteristics of Households at Baseline

Characteristic	SCCHA	Comparison PHAs
Average Monthly Family Share[a] ($)	523	561
Average Monthly Family Share (%)		
$0	0.0	0.2
$1–$299	38.8	33.3
$300–$599	26.9	28.7
$600–$899	16.3	17.6
$900 or More	18.0	20.2
Family Share as a Proportion of Monthly Gross Income (%)		
0%–20%	1.1	1.1
21%–30%	47.8	42.4
31%–40%	29.2	32.8
41%–50%	7.5	9.1
51% or Above	14.4	14.5
Average Monthly Housing Subsidy[b] ($)	1,397	1,244
Average Monthly Housing Subsidy (%)		
$0–$599	5.8	9.7
$600–$899	10.0	13.6
$900–$1,199	19.1	23.7
$1,200 or More	65.0	53.0
Payment Standard Reduced with New Rules[c] (%)	22.9	20.6
Monthly Gross Rent Exceeds Payment Standard (%)	53.2	56.7
Neighborhood Poverty Rate[d] (%)		
0%–10%	41.5	41.8
11%–20%	40.1	47.2
21%–30%	14.3	8.1
More than 30%	4.1	3.0
Sample Size (Total = 15,499)	7,111	8,388

SCCHA = Santa Clara County Housing Authority

[a]Family share is the family's contribution toward the gross rent.

[b]Housing subsidy is the full subsidy amount paid by the housing agency. It includes any utility allowance payments made to the tenant in addition to rent paid to the owner by the housing agency.

[c]The Comparison Group value for "Payment Standard Reduced with New Rules (%)" measure is calculated for the San Francisco Housing Authority only.

[d]Poverty rate is defined as the percentage of individuals ages 18 to 64 years whose income in the previous 12 months was below the poverty threshold.

Notes: Samples consists of households that were not headed by seniors or adults with disabilities. Sample sizes may vary because of missing values. The set of comparison group public housing agencies (PHAs) includes the Housing Authority of the County of San Mateo, the San Francisco Housing Authority, and the Housing Authority of the County of Alameda. Housing subsidy characteristics represent monthly averages. Utility allowance data were not available for San Mateo and are therefore not included in San Mateo's housing subsidy measures. A sensitivity test that used imputed utility allowance values to calculate housing subsidy measures for San Mateo caused only slight change in levels.

Sources: MDRC calculations using HUD Public and Indian Housing Information Center; 2009–2013 American Community Survey 5-year estimates data

Appendix D

Quarterly Impacts on Employment and Earnings

Exhibit D.1 Impacts on Quarterly Employment Rates (Nonelderly, Nondisabled Adults)

Outcome	SCCHA Mean	Estimated Effect	Std. Error	P-Value
Average Year 1	50.8	-0.5	0.9	0.604
Q3 of 2013	49.9	-0.4	0.8	0.631
Q4 of 2013	51.2	-0.5	0.9	0.613
Q1 of 2014	50.2	-0.6	1.0	0.556
Q2 of 2014	51.7	-0.5	1.1	0.662
Average Year 2	54.5	0.0	1.2	0.972
Q3 of 2014	54.3	0.3	1.1	0.814
Q4 of 2014	55.3	0.5	1.2	0.704
Q1 of 2015	53.8	-0.4	1.3	0.740
Q2 of 2015	54.8	-0.1	1.3	0.933
Average Year 3	56.6	0.1	1.5	0.929
Q3 of 2015	56.3	0.2	1.4	0.885
Q4 of 2015	57.2	0.1	1.5	0.954
Q1 of 2016	56.1	0.1	1.6	0.938
Q2 of 2016	56.9	0.1	1.7	0.937
Average Year 4	57.5	0.1	1.8	0.941
Q3 of 2016	57.5	0.0	1.8	0.996
Q4 of 2016	57.8	0.0	1.8	0.992
Q1 of 2017	56.8	0.3	1.9	0.891
Q2 of 2017	57.6	0.3	2.0	0.873
Sample Size				34,075

SCCHA = Santa Clara County Housing Authority.
Notes: Samples consists of adults who were not seniors or adults with disabilities. The set of comparison group public housing agencies includes the Housing Authority of the County of San Mateo, the San Francisco Housing Authority, and the Housing Authority of the County of Alameda. Effects were estimated using a comparative interrupted time series model. The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect. Statistical significance levels are indicated as:
*** = 1 percent; ** = 5 percent; * = 10 percent.
Source: California Employment Development Department individual-level aggregate unemployment insurance data

Exhibit D.2 Impacts on Average Quarterly Earnings (Nonelderly, Nondisabled Adults)

Outcome	SCCHA Mean	Estimated Effects	Std. Error	P-Value
Year 1	11,187	46	349	0.897
Q3 of 2013	2,618	-6	77	0.936
Q4 of 2013	2,861	37	88	0.678
Q1 of 2014	2,744	-56	91	0.543
Q2 of 2014	2,963	71	98	0.472
Year 2	13,549	143	474	0.763
Q3 of 2014	3,150	51	108	0.638
Q4 of 2014	3,477	44	122	0.721
Q1 of 2015	3,338	27	124	0.830
Q2 of 2015	3,584	22	131	0.869
Year 3	16,198	200	597	0.738
Q3 of 2015	3,799	34	139	0.805
Q4 of 2015	4,259	50	145	0.733
Q1 of 2016	3,906	20	153	0.895
Q2 of 2016	4,234	95	162	0.557
Year 4	18,538	509	725	0.484
Q3 of 2016	4,591	163	169	0.338
Q4 of 2016	4,625	52	178	0.773
Q1 of 2017	4,596	173	187	0.358
Q2 of 2017	4,725	123	195	0.531
Sample Size				34,075

SCCHA = Santa Clara County Housing Authority.
Notes: Samples consist of adults who were not seniors or adults with disabilities. The set of comparison group public housing agencies includes the Housing Authority of the County of San Mateo, the San Francisco Housing Authority, and the Housing Authority of the County of Alameda. Impacts were estimated using a comparative interrupted time series model. All estimated earnings effects are reported in 2017 dollars. The p-value indicates the likelihood that the estimated impact (or larger) would have been generated by an intervention with zero true effect. Statistical significance levels are indicated as: *** = 1 percent; ** = 5 percent; * = 10 percent.
Source: California Employment Development Department individual-level aggregate unemployment insurance data

Appendix E

Supplemental Exhibits for Housing Subsidies

Exhibit E.1 Outcomes Related to Housing Assistance (Nonelderly, Nondisabled Households)

Outcome	SCCHA	Comparison PHAs
Received Any Housing Subsidies (%)		
Baseline[a]	100.0	100.0
Year 1	99.2	98.3
Year 2	92.9	92.4
Year 3	87.5	86.9
Total Tenant Payment (TTP), Among Households Receiving Subsidies[b] ($)		
Last Month of Baseline	420	448
Last Month of Year 1	494	468
Last Month of Year 2	489	529
Last Month of Year 3	541	579
Housing Assistance Payment (HAP), Among Households Receiving Subsidies[c] ($)		
Last Month of Baseline	1,419	1,262
Last Month of Year 1	1,206	1,257
Last Month of Year 2	1,258	1,282
Last Month of Year 3	1,401	1,361
Total Tenant Rent Share, Among Households Receiving Subsidies[d] ($)		
Last Month of Baseline	455	471
Last Month of Year 1	590	504
Last Month of Year 2	602	553
Last Month of Year 3	611	594
Sample Size (Total = 15,490)	7,109	8,381

PHAs = public housing agencies. SCCHA = Santa Clara County Housing Authority.
[a]The subsidy receipt status reported in HUD's quarterly snapshot data files differed slightly from the status reported in HUD's transactional data files. The baseline subsidy receipt status in this exhibit is based on Q2 to Q3 2013 quarterly snapshot data, while the status in the followup years are based on transactional data.
[b]TTP is the minimum amount a family must contribute toward rent and utilities regardless of the unit selected. For MTW households, TTP has been calculated to reflect the minimum rents in Santa Clara and San Mateo.
[c]Housing subsidy is the full subsidy amount paid by the housing agency on the household's behalf and includes any utility allowance payments made to the tenant in addition to rent paid to the owner by the housing agency.
[d]Total tenant rent share is the family's contribution toward the contract rent.
Notes: Samples consist of households that were not headed by seniors or adults with disabilities. The set of comparison group PHAs includes the Housing Authority of the County of San Mateo, the San Francisco Housing Authority, and the Housing Authority of the County of Alameda. Sample sizes may vary because of missing values. Outcomes shown describe only those households receiving any housing subsidies in the specified month. Utility allowance data were not available for San Mateo and are therefore not included in San Mateo's housing subsidy measures.
Source: MDRC calculations using HUD Public and Indian Housing Information Center data

Appendix F

Supplemental Exhibits for Households' Housing Decisions

Exhibit F.1 Outcomes Related to Households' Housing Decisions Among Nonelderly, Nondisabled Households Receiving Subsidies

Outcome	SCCHA	Comparison PHAs
Neighborhood Poverty Rate[a]		
Last Quarter of Baseline	11.5	12.0
Last Quarter of Year 1	11.7	12.1
Last Quarter of Year 2	12.0	12.4
Last Quarter of Year 3	12.2	12.6
Number of Bedrooms		
Last Month of Baseline	2.7	2.4
Last Month of Year 1	2.7	2.4
Last Month of Year 2	2.6	2.4
Last Month of Year 3	2.6	2.4
Took a Port-Out Action (%)		
Baseline	1.4	2.9
Year 1	1.7	4.3
Year 2	2.0	3.2
Year 3	1.8	2.7
Household Size		
Last Month of Baseline	3.3	3.1
Last Month of Year 1	3.3	3.0
Last Month of Year 2	3.3	3.0
Last Month of Year 3	3.3	3.0
Sample Size (Total = 15,490)	7,109	8,381

SCCHA = Santa Clara County Housing Authority.
[a]Poverty rate is defined as the percentage of individuals ages 18 to 64 years whose income in the previous 12 months was below the poverty threshold.
Notes: Samples consist of households headed by adults who were not seniors or adults with disabilities. The set of comparison group public housing agencies (PHAs) includes the Housing Authority of the County of San Mateo, the San Francisco Housing Authority, and the Housing Authority of the County of Alameda. Sample sizes may vary because of missing values. Outcomes shown describe only those households receiving any housing subsidies in the specified month.
Sources: MDRC calculations using HUD Public and Indian Housing Information Center data; American Community Survey 5-year estimates, 2007–2011 and 2012–2016

Exhibit F.2 Tenant Rent Share as a Percent of Monthly Gross Income Among Nonelderly, Nondisabled Households Receiving Subsidies

Outcome	SCCHA	Comparison PHAs
Median Tenant Rent Share as a Percent of Monthly Gross Income (%)		
Last Month of Baseline	29.1	29.3
Last Month of Year 1	35.0	29.5
Last Month of Year 2	32.0	29.3
Last Month of Year 3	32.0	29.3
Average Tenant Rent Share as a Percent of Monthly Gross Income (%)		
Last Month of Baseline	33.8	33.4
Last Month of Year 1	45.7	34.7
Last Month of Year 2	44.2	33.2
Last Month of Year 3	39.6	32.3
Average Tenant Rent Share as a Percent of Monthly Gross Income in the Last Month of Baseline (%)		
0–25%	16.5	16.5
26–30%	62.6	57.2
31–35%	6.1	8.7
36–40%	3.1	4.2
41–50%	3.0	4.1
51% and Above	8.7	9.4
Average Tenant Rent Share as a Percent of Monthly Gross Income in the Last Month of Year 1 (%)		
0–25%	0.5	15.3
26–30%	1.2	55.0
31–35%	60.0	8.9
36–40%	10.0	4.3
41–50%	7.6	5.0
51% and Above	20.7	11.5
Average Tenant Rent Share as a Percent of Monthly Gross Income in the Last Month of Year 2 (%)		
0–25%	0.7	14.4
26–30%	2.1	62.4
31–35%	58.7	6.1
36–40%	9.7	3.6
41–50%	7.6	4.3
51% and Above	21.3	9.2
Average Tenant Rent Share as a Percent of Monthly Gross Income in the Last Month of Year 3 (%)		
0–25%	1.0	13.5
26–30%	3.1	68.3
31–35%	71.7	4.8
36–40%	5.9	2.8
41–50%	4.8	3.1
51% and Above	13.5	7.5
Sample Size (Total = 15,490)	7,109	8,381

PHAs = public housing agencies. SCCHA = Santa Clara County Housing Authority.
Notes: Samples consist of households headed by adults who were not seniors or adults with disabilities. The set of comparison group PHAs includes the Housing Authority of the County of San Mateo, the San Francisco Housing Authority, and the Housing Authority of the County of Alameda. Sample sizes may vary because of missing values. Rounding may cause slight discrepancies in sums and differences. Outcomes shown describe only those households receiving any housing subsidies in the specified month. Utility allowance data were not available for San Mateo and are therefore not included in San Mateo's housing subsidy measures.
Source: MDRC calculations using HUD Public and Indian Housing Information Center data

Exhibit F.3 Tenant Rent Share as a Percent of Monthly Gross Income Among Elderly and Disabled Households Receiving Subsidies

Outcome	SCCHA	Comparison PHAs
Tenant Rent Share Exceeds 40 Percent of Monthly Gross Income (%)		
Last Month of Baseline	8.5	10.0
Last Month of Year 1	20.7	11.5
Last Month of Year 2	20.3	9.2
Last Month of Year 3	10.9	6.4
Tenant Rent Share Exceeds 50 Percent of Monthly Gross Income (%)		
Last Month of Baseline	4.1	5.0
Last Month of Year 1	10.4	6.2
Last Month of Year 2	11.4	5.1
Last Month of Year 3	6.4	3.8
Median Tenant Rent Share as a Percent of Monthly Gross Income (%)		
Last Month of Baseline	29.1	29.4
Last Month of Year 1	35.0	29.5
Last Month of Year 2	32.0	29.4
Last Month of Year 3	32.0	29.3
Average Tenant Rent Share as a Percent of Monthly Gross Income (%)		
Last Month of Baseline	31.6	29.1
Last Month of Year 1	39.5	29.6
Last Month of Year 2	37.9	28.7
Last Month of Year 3	35.1	28.0
Average Tenant Rent Share as a Percent of Monthly Gross Income in the Last Month of Baseline (%)		
0–25%	3.2	14.0
26–30%	75.6	62.9
31–35%	9.0	9.2
36–40%	4.1	4.5
41–50%	4.1	4.6
51% and Above	3.9	4.7
Average Tenant Rent Share as a Percent of Monthly Gross Income in the Last Month of Year 1 (%)		
0–25%	0.1	13.6
26–30%	1.0	62.5
31–35%	68.7	8.3
36–40%	11.6	5.0
41–50%	8.9	4.7
51% and Above	9.6	5.9
Average Tenant Rent Share as a Percent of Monthly Gross Income in the Last Month of Year 2 (%)		
0–25%	0.1	13.5
26–30%	1.8	68.8
31–35%	68.6	5.6
36–40%	10.5	3.4
41–50%	8.3	3.8
51% and Above	10.7	4.8

(continued)

Exhibit F.3 Tenant Rent Share as a Percent of Monthly Gross Income Among Elderly and Disabled Households Receiving Subsidies *(continued)*

Outcome	SCCHA	Comparison PHAs
Average Tenant Rent Share as a Percent of Monthly Gross Income in the Last Month of Year 3 (%)		
0–25%	0.1	13.6
26–30%	2.5	74.1
31–35%	82.8	3.8
36–40%	4.2	2.4
41–50%	4.2	2.4
51% and Above	6.1	3.7
Sample Size (Total = 20,004)	9,410	10,594

PHAs = public housing agencies. SCCHA = Santa Clara County Housing Authority.
Notes: The set of comparison group PHAs includes the Housing Authority of the County of San Mateo, the San Francisco Housing Authority, and the Housing Authority of the County of Alameda. Sample sizes may vary because of missing values. Rounding may cause slight discrepancies in sums and differences. Outcomes shown describe only those households receiving any housing subsidies in the specified month. Utility allowance data were not available for San Mateo and are therefore not included in San Mateo's housing subsidy measures.
Source: MDRC calculations using HUD Public and Indian Housing Information Center data

Appendix G

Supplemental Exhibits for Subgroup Analysis

Exhibit G.1 Household Composition and Income at Baseline, Single Policy Change Nonelderly, Nondisabled Households

Characteristic	SCCHA	SFHA
Average Number of Family Members		
Adults[a]	1.8	1.8
Children	1.4	0.9
Families with More Than One Adult (%)	53.6	53.9
Number of Children in Family (%)		
None	38.8	48.4
1 Child	21.6	25.5
2 Children	16.5	13.7
3 or More	23.1	12.3
For Families with Children, Age of Youngest Child (%)		
0–5 Years	40.5	28.3
6–12 Years	37.6	40.4
13–17 Years	21.8	31.2
Current/Anticipated Annual Family Income ($)	16,511	18,583
Current/Anticipated Annual Family Income (%)		
$0	3.9	5.1
$1–4,999	18.4	9.5
$5,000–9,999	22.0	21.2
$10,000–19,999	23.5	26.2
$20,000 or More	32.1	38.0
Income Sources[b] (%)		
Wages	60.7	63.0
TANF	22.6	17.2
Social Security/SSI/Pension	11.2	15.3
Other income sources	28.1	46.4

(continued)

Exhibit G.1 Household Composition and Income at Baseline, Single Policy Change Nonelderly, Nondisabled Households *(continued)*

Characteristic	SCCHA	SFHA
Average Annual Income from Wages, for Families with Any Wage Income ($)	21,557	23,898
Annual Income from Wages, for Families with Any Wage Income (%)		
$1–4,999	11.4	5.6
$5,000–9,999	15.4	14.7
$10,000–19,999	27.5	27.6
$20,000–29,999	20.1	21.7
$30,000 or More	25.5	30.5
Sample Size (Total = 6,915)	5,183	1,732

SCCHA = Santa Clara County Housing Authority. SFHA = San Francisco Housing Authority. SSI = Supplementary Security Income. TANF = Temporary Assistance for Needy Families.

[a]Adults are defined as individuals age 18 and older who were not classified on the HUD-50058 form as a live-in aide.

[b]Income source categories are as defined on the HUD-50058 form. Wages include one's own business, federal wages, PHA wages, military pay, and other wages. Other income sources include child support, medical reimbursement, Indian trust/per capita, unemployment benefits, and other nonwage sources.

Notes: Samples consist of households headed by adults who were not seniors or adults with disabilities. Sample sizes may vary because of missing values. Rounding may cause slight discrepancies in sums and differences.

Source: MDRC calculations using HUD Public and Indian Housing Information Center data

Exhibit G.2 Characteristics of Nonelderly, Nondisabled Adults at Baseline in Single Policy Change Households

Characteristic	SCCHA	SFHA
Female (%)	63.8	62.0
Age (%)		
18–24	30.6	28.4
25–34	19.1	18.6
35–44	18.4	14.9
45 or Older	31.9	38.1
Average Age (Years)	36.0	37.5
Race (%)		
White, non-Hispanic	9.7	16.0
Black, non-Hispanic	15.3	32.7
Asian or Hawaiian or Pacific Islander, non-Hispanic	33.1	25.8
Hispanic	41.0	23.8
Other Race or More Than One Race, non-Hispanic	0.8	1.7
Income Sources[a] (%)		
Wages	41.1	42.4
TANF	11.6	8.2
Social Security/SSI/Pension	1.9	6.4
Other Income Sources	14.5	27.4
Average Annual Income from Wages for Individuals with Any Wage Income ($)	16,676	18,596
Annual Income from Wages for Individuals with Any Wage Income ($)		
$1–$4,999	19.5	10.0
$5,000–$9,999	18.9	21.0
$10,000–$19,999	28.4	32.4
$20,000–$29,999	17.0	18.5
$30,000 or More	16.2	18.2
Individual Sample Size (Total = 15,050)	10,974	4,076

SCCHA = Santa Clara County Housing Authority. SFHA = San Francisco Housing Authority. SSI = Supplementary Security Income. TANF = Temporary Assistance for Needy Families.
[a]Income source categories are as defined on the HUD-50058 form. Wages include one's own business, federal wages, PHA wages, military pay, and other wages. Other income sources include child support, medical reimbursement, Indian trust/per capita, unemployment benefits, and other nonwage sources.
Notes: Samples consist of households headed by adults who were not seniors or adults with disabilities. Sample sizes may vary because of missing values. Rounding may cause slight discrepancies in sums and differences.
Source: MDRC calculations using HUD Public and Indian Housing Information Center data

Exhibit G.3 Characteristics of Nonelderly, Nondisabled Households at Baseline, Single Policy Change Households

Characteristic	SCCHA	SFHA
Average Monthly Family Share[a] ($)	508	589
Average Monthly Family Share (%)		
$0	2.1	2.3
$1–$299	40.5	31.2
$300–$599	26.5	28.5
$600–$899	15.9	17.7
$900 or More	17.1	22.2
Family Share as a Proportion of Monthly Gross Income (%)		
0%–20%	1.3	1.2
21%–30%	46.8	29.0
31%–40%	28.3	39.1
41%–50%	7.5	11.7
51% or Above	16.1	19.1
Average Monthly Housing Subsidy[b] ($)	1,304	1,367
Average Monthly Housing Subsidy (%)		
$0–$599	6.9	6.3
$600–$899	11.8	10.1
$900–$1,199	22.4	18.7
$1,200 or More	58.9	64.9
Payment Standard Reduced with New Rules (%)	0.0	0.0
Monthly Gross Rent Exceeds Payment Standard (%)	53.5	63.5
Neighborhood Poverty Rate[c] (%)		
0%–10%	39.0	22.9
11%–20%	41.1	59.1
21%–30%	15.5	11.3
More than 30%	4.4	6.8
Sample Size (Total = 6,915)	5,183	1,732

SCCHA = Santa Clara County Housing Authority. SFHA = San Francisco Housing Authority. SSI = Supplementary Security Income. TANF = Temporary Assistance for Needy Families.

[a]Family share is the family's contribution toward the gross rent.

[b]Housing subsidy is the full subsidy amount paid by the housing agency. It includes any utility allowance payments made to the tenant in addition to rent paid to the owner by the housing agency.

[c]Poverty rate is defined as the percentage of individuals ages 18 to 64 years whose income in the previous 12 months was below the poverty threshold.

Notes: Samples consist of households headed by adults who were not seniors or adults with disabilities. Sample sizes may vary because of missing values. Rounding may cause slight discrepancies in sums and differences. Housing subsidy characteristics represent monthly averages.

Sources: MDRC calculations using HUD Public and Indian Housing Information Center; 2009–2013 American Community Survey 5-Year Estimates data

Exhibit G.4 Household Composition and Income at Baseline, Nonelderly, Nondisabled Double Policy Change Households

Characteristic	SCCHA	SFHA
Average Number of Family Members		
Adults[a]	2.2	2.3
Children	1.5	1.0
Families with More than One Adult (%)	74.1	73.5
Number of Children in Family (%)		
None	23.3	33.0
1 Child	29.4	35.0
2 Children	32.9	29.2
3 or More	14.3	2.9
For Families with Children, Age of Youngest Child (%)		
0–5 Years	26.0	11.6
6–12 Years	44.8	46.5
13–17 Years	29.2	41.9
Current/Anticipated Annual Family Income ($)	20,247	22,326
Current/Anticipated Annual Family Income (%)		
$0	2.2	4.2
$1–4,999	11.9	8.9
$5,000–9,999	22.5	16.3
$10,000–19,999	23.2	24.3
$20,000 or More	40.2	46.3
Income Sources[b] (%)		
Wages	65.2	68.4
TANF	25.4	20.3
Social Security/SSI/Pension	18.0	22.9
Other Income Sources	32.4	46.3
Average Annual Income from Wages, for Families with Any Wage Income ($)	24,536	26,612
Annual Income from Wages, for Families with Any Wage Income (%)		
$1–4,999	10.0	5.2
$5,000–9,999	13.4	13.0
$10,000–19,999	25.1	27.0
$20,000–29,999	18.7	17.9
$30,000 or More	32.7	36.8
Sample Size (Total = 1,991)	1,542	449

SCCHA = Santa Clara County Housing Authority. SFHA = San Francisco Housing Authority. SSI = Supplementary Security Income. TANF = Temporary Assistance for Needy Families.

[a]Adults are defined as individuals age 18 and older who were not classified on the HUD-50058 form as a live-in aide.

[b]Income source categories are as defined on the HUD-50058 form. Wages include one's own business, federal wages, PHA wages, military pay, and other wages. Other income sources include child support, medical reimbursement, Indian trust/per capita, unemployment benefits, and other nonwage sources.

Notes: Samples consist of households headed by adults who were not seniors or adults with disabilities. Sample sizes may vary because of missing values. Rounding may cause slight discrepancies in sums and differences.

Source: MDRC calculations using HUD Public and Indian Housing Information Center data

Exhibit G.5 Characteristics of Nonelderly, Nondisabled Adults at Baseline in Double Policy Change Households

Characteristic	SCCHA	SFHA
Female (%)	64.6	62.9
Age (%)		
18–24	35.9	34.5
25–34	17.7	17.3
35–44	17.6	13.8
45 or Older	28.8	34.4
Average Age (Years)	34.5	35.6
Race (%)		
White, non-Hispanic	8.5	11.2
Black, non-Hispanic	14.0	34.0
Asian or Hawaiian or Pacific Islander, non-Hispanic	37.6	28.3
Hispanic	39.1	25.2
Other Race or More than One Race, non-Hispanic	0.8	1.4
Income Sources[a] (%)		
Wages	41.2	40.9
TANF	11.1	8.2
Social Security/SSI/Pension	1.3	6.2
Other Income Sources	13.7	24.5
Average Annual Income from Wages for Individuals with Any Wage Income ($)	17,273	19,126
Annual Income from Wages for Individuals with Any Wage Income ($)		
$1–$4,999	20.8	9.2
$5,000–$9,999	18.2	23.9
$10,000–$19,999	26.5	30.3
$20,000–$29,999	15.7	15.6
$30,000 or More	18.9	21.1
Individual Sample Size (Total = 5,491)	4,157	1,334

SCCHA = Santa Clara County Housing Authority. SFHA = San Francisco Housing Authority. SSI = Supplementary Security Income. TANF = Temporary Assistance for Needy Families.
[a]Income source categories are as defined on the HUD-50058 form. Wages include one's own business, federal wages, PHA wages, military pay, and other wages. Other income sources include child support, medical reimbursement, Indian trust/per capita, unemployment benefits, and other nonwage sources.
Notes: Samples consist of households headed by adults who were not seniors or adults with disabilities. Sample sizes may vary because of missing values. Rounding may cause slight discrepancies in sums and differences.
Source: MDRC calculations using HUD Public and Indian Housing Information Center data

Exhibit G.6 Characteristics of Households at Baseline, Nonelderly, Nondisabled Double Policy Change Households

Characteristic	SCCHA	SFHA
Average Monthly Family Share[a] ($)	574	702
Average Monthly Family Share (%)		
$0	2.3	2.6
$1–$299	33.3	22.3
$300–$599	28.1	28.5
$600–$899	17.5	19.4
$900 or More	21.1	29.6
Family Share as a Proportion of Monthly Gross Income (%)		
0%–20%	0.5	0.2
21%–30%	51.0	32.7
31%–40%	31.9	35.2
41%–50%	7.7	13.8
51% or Above	8.9	18.0
Average Monthly Housing Subsidy[b] ($)	1,711	1,811
Average Monthly Housing Subsidy (%)		
$0–$599	2.2	3.1
$600–$899	4.3	2.2
$900–$1,199	8.2	5.4
$1,200 or More	85.3	89.3
Payment Standard Reduced with new Rules (%)	100.0	100.0
Monthly Gross Rent Exceeds Payment Standard (%)	52.0	63.7
Neighborhood Poverty Rate[c] (%)		
0%–10%	50.1	29.4
11%–20%	36.8	60.4
21%–30%	10.4	7.6
More than 30%	2.7	2.7
Sample Size (Total = 1,991)	1,542	449

SCCHA = Santa Clara County Housing Authority. SFHA = San Francisco Housing Authority. SSI = Supplementary Security Income. TANF = Temporary Assistance for Needy Families.

[a]Family share is the family's contribution toward the gross rent.

[b]Housing subsidy is the full subsidy amount paid by the housing agency. It includes any utility allowance payments made to the tenant in addition to rent paid to the owner by the housing agency.

[c]Poverty rate is defined as the percentage of individuals ages 18 to 64 years whose income in the previous 12 months was below the poverty threshold.

Notes: Samples consist of households headed by adults who were not seniors or adults with disabilities. Sample sizes may vary because of missing values. Rounding may cause slight discrepancies in sums and differences. Housing subsidy characteristics represent monthly averages.

Sources: MDRC calculations using HUD Public and Indian Housing Information Center; 2009–2013 American Community Survey 5-year estimates data

Exhibit G.7 Estimated Effects on Housing Subsidies by Subgroup, Nonelderly, Nondisabled Households in SCCHA and SFHA

Outcome	Difference Between Subgroup Estimated Effects (Double Policy Change minus Single Policy Change)	P-Value
Total Annual Housing Subsidy ($)		
Year 1	-4,032	0.00†††
Year 2	-4,461	0.00†††
Year 3	-3,340	0.00†††
Receipt of Housing Subsidy (%)		
Year 1	0.7	0.17
Year 2	-1.8	0.28
Year 3	-3.3	0.12
Sample (Total = 8,901)		

SCCHA = Santa Clara County Housing Authority. SFHA = San Francisco Housing Authority.
Notes: Samples consist of households headed by adults who were not seniors or adults with disabilities. Sample sizes may vary because of missing values. Outcomes shown describe only those households receiving any housing subsidies in the specified month. Effects were estimated using an autoregressive difference-in-differences model, controlling for the past receipt of housing subsidies and other baseline characteristics of sample households. The estimates in the "Difference Between Subgroup Estimated Effects (Double Policy Change minus Single Policy Change)" column are calculated by subtracting the estimated effects for the single policy change subgroup from the estimated effects of the double policy change subgroup. The H-statistic is used to assess whether the difference in estimated effects between the subgroups is statistically significant. The "P-Value" column represents the p-value for the H-statistic. Significance levels are indicated as follows: ††† = 1 percent; †† = 5 percent; † = 10 percent.
Source: MDRC calculations using HUD Public and Indian Housing Information Center data

Exhibit G.8 Outcomes Related to Housing Assistance, Nonelderly, Nondisabled Single Policy Change Households

Outcome	SCCHA	SFHA
Received Any Housing Subsidies (%)		
Baseline[a]	100.0	100.0
Year 1	99.1	98.1
Year 2	93.2	94.9
Year 3	87.9	89.7
Total Tenant Payment (TTP), Among Households Receiving Subsidies ($)		
Last Month of Baseline[b]	403	450
Last Month of Year 1	484	452
Last Month of Year 2	481	522
Last Month of Year 3	529	548
Housing Assistance Payment (HAP), Among Households Receiving Subsidies ($)		
Last Month of Baseline[c]	1,320	1,389
Last Month of Year 1	1,194	1,381
Last Month of Year 2	1,244	1,406
Last Month of Year 3	1,377	1,461
Total Tenant Rent Share, Among Households Receiving Subsidies ($)		
Last Month of Baseline[d]	447	500
Last Month of Year 1	529	504
Last Month of Year 2	554	550
Last Month of Year 3	575	578
Sample Size (Total = 1,989)	5,181	1,731

[a]The subsidy receipt status reported in HUD's quarterly snapshot data files differed slightly from the status reported in HUD's transactional data files. The baseline subsidy receipt status in this exhibit is based on Q2 to Q3 2013 quarterly snapshot data, while the status in the followup years are based on transactional data.
[b]TTP is the minimum amount a family must contribute toward rent and utilities regardless of the unit selected. For MTW households, TTP has been calculated to reflect the minimum rents in Santa Clara and San Mateo.
[c]Housing subsidy is the full subsidy amount paid by the housing agency on the household's behalf and includes any utility allowance payments made to the tenant in addition to rent paid to the owner by the housing agency.
[d]Total tenant rent share is the family's contribution toward the contract rent.
Notes: Samples consist of households headed by adults who were not seniors or adults with disabilities. Sample sizes may vary because of missing values. Outcomes shown describe only those households receiving any housing subsidies in the specified month.
Source: MDRC calculations using HUD Public and Indian Housing Information Center data

Exhibit G.9 Outcomes Related to Housing Assistance, Nonelderly, Nondisabled Double Policy Change Households

Outcome	SCCHA	SFHA
Received Any Housing Subsidies (%)		
Baseline[a]	100.0	100.0
Year 1	99.7	98.2
Year 2	92.2	95.3
Year 3	85.7	91.1
Total Tenant Payment (TTP), Among Households Receiving Subsidies ($)		
Last Month of Baseline[b]	497	539
Last Month of Year 1	539	543
Last Month of Year 2	534	671
Last Month of Year 3	596	721
Housing Assistance Payment (HAP), Among Households Receiving Subsidies ($)		
Last Month of Baseline[c]	1,715	1,825
Last Month of Year 1	1,240	1,775
Last Month of Year 2	1,293	1,748
Last Month of Year 3	1,473	1,746
Total Tenant Rent Share, Among Households Receiving Subsidies ($)		
Last Month of Baseline[d]	511	579
Last Month of Year 1	810	621
Last Month of Year 2	784	727
Last Month of Year 3	753	797
Sample Size (Total = 1,989)	1,542	447

[a]The subsidy receipt status reported in HUD's quarterly snapshot data files differed slightly from the status reported in HUD's transactional data files. The baseline subsidy receipt status in this exhibit is based on Q2 to Q3 2013 quarterly snapshot data, while the status in the followup years are based on transactional data.
[b]TTP is the minimum amount a family must contribute toward rent and utilities regardless of the unit selected. For MTW households, TTP has been calculated to reflect the minimum rents in Santa Clara and San Mateo.
[c]Housing subsidy is the full subsidy amount paid by the housing agency on the household's behalf and includes any utility allowance payments made to the tenant in addition to rent paid to the owner by the housing agency.
[d]Total tenant rent share is the family's contribution toward the contract rent.
Notes: Samples consist of households headed by adults who were not seniors or adults with disabilities. Sample sizes may vary because of missing values. Outcomes shown describe only those households receiving any housing subsidies in the specified month.
Source: MDRC calculations using HUD Public and Indian Housing Information Center data

Exhibit G.10 Outcomes Related to Households' Housing Decisions Among Households Receiving Subsidies, Nonelderly, Nondisabled Single Policy Change Households

Outcome	SCCHA	SFHA
Neighborhood Poverty Rate[a]		
Last Quarter of Baseline	11.9	15.3
Last Quarter of Year 1	12.0	15.3
Last Quarter of Year 2	12.3	15.0
Last Quarter of Year 3	12.5	15.1
Number of Bedrooms		
Last Month of Baseline	2.5	2.2
Last Month of Year 1	2.5	2.2
Last Month of Year 2	2.5	2.2
Last Month of Year 3	2.5	2.2
Took a Port-Out Action (%)		
Baseline	1.6	0.8
Year 1	1.6	3.1
Year 2	1.9	2.1
Year 3	1.9	1.6
Household Size		
Last Month of Baseline	3.2	2.8
Last Month of Year 1	3.2	2.8
Last Month of Year 2	3.2	2.7
Last Month of Year 3	3.2	2.7
Sample Size (Total = 6,912)	5,181	1,731

SCCHA = Santa Clara County Housing Authority. SFHA = San Francisco Housing Authority.
[a]Poverty rate is defined as the percentage of individuals ages 18 to 64 years whose income in the previous 12 months was below the poverty threshold.
Notes: Samples consist of households headed by adults who were not seniors or adults with disabilities. Sample sizes may vary because of missing values. Outcomes shown describe only those households receiving any housing subsidies in the specified month.
Sources: MDRC calculations using HUD Public and Indian Housing Information Center data; 2007–2011 and 2012–2016 American Community Survey 5-year estimates

Exhibit G.11 Outcomes Related to Households' Housing Decisions Among Households Receiving Subsidies, Nonelderly, Nondisabled Double Policy Change Households

Outcome	SCCHA	SFHA
Neighborhood Poverty Rate[a]		
Last Quarter of Baseline	10.1	13.2
Last Quarter of Year 1	10.8	12.8
Last Quarter of Year 2	11.1	13.2
Last Quarter of Year 3	11.3	13.4
Number of Bedrooms		
Last Month of Baseline	3.4	3.1
Last Month of Year 1	3.2	3.1
Last Month of Year 2	3.2	3.1
Last Month of Year 3	3.1	3.1
Took a Port-Out Action (%)		
Baseline	1.4	1.6
Year 1	1.9	2.0
Year 2	2.3	1.6
Year 3	1.4	1.1
Household Size		
Last Month of Baseline	3.7	3.3
Last Month of Year 1	3.6	3.3
Last Month of Year 2	3.6	3.2
Last Month of Year 3	3.6	3.2
Sample Size (Total = 1,989)	1,542	447

SCCHA = Santa Clara County Housing Authority. SFHA = San Francisco Housing Authority.
[a]Poverty rate is defined as the percentage of individuals ages 18 to 64 years whose income in the previous 12 months was below the poverty threshold.
Notes: Samples consist of households headed by adults who were not seniors or adults with disabilities. Sample sizes may vary because of missing values.
Outcomes shown describe only those households receiving any housing subsidies in the specified month.
Sources: MDRC calculations using HUD Public and Indian Housing Information Center data; American Community Survey, 5-year estimates (2007–2011 and 2012–2016)

Exhibit G.12 Tenant Rent Share as a Percent of Monthly Gross Income Among Households Receiving Subsidies, Nonelderly, Nondisabled Single Policy Change Households

Outcome	SCCHA	SFHA
Median Tenant Rent Share as a Percent of Monthly Gross Income (%)		
Last Month of Baseline	29.1	29.5
Last Month of Year 1	35.0	29.5
Last Month of Year 2	32.0	29.3
Last Month of Year 3	32.0	29.4
Average Tenant Rent Share as a Percent of Monthly Gross Income (%)		
Last Month of Baseline	35.2	37.0
Last Month of Year 1	42.3	37.5
Last Month of Year 2	41.8	34.4
Last Month of Year 3	38.2	34.0
Average Tenant Rent Share as a Percent of Monthly Gross Income in the Last Month of Baseline (%)		
0–25%	15.5	8.0
26–30%	59.7	62.5
31–35%	6.9	9.0
36–40%	3.6	4.7
41–50%	3.6	3.9
51% and Above	10.6	11.9
Average Tenant Rent Share as a Percent of Monthly Gross Income in the Last Month of Year 1 (%)		
0–25%	0.4	8.3
26–30%	1.1	61.8
31–35%	68.9	8.5
36–40%	9.9	4.0
41–50%	6.1	4.1
51% and Above	13.6	13.3
Average Tenant Rent Share as a Percent of Monthly Gross Income in the Last Month of Year 2 (%)		
0–25%	0.7	6.9
26–30%	2.0	76.4
31–35%	64.8	3.6
36–40%	9.5	2.2
41–50%	6.5	2.7
51% and Above	16.4	8.2

(continued)

Exhibit G.12 Tenant Rent Share as a Percent of Monthly Gross Income Among Households Receiving Subsidies, Nonelderly, Nondisabled Single Policy Change Households *(continued)*

Outcome	SCCHA	SFHA
Average Tenant Rent Share as a Percent of Monthly Gross Income in the Last Month of Year 3 (%)		
0–25%	1.0	7.2
26–30%	3.0	78.1
31–35%	76.3	2.8
36–40%	5.2	1.7
41–50%	4.0	2.2
51% and Above	10.5	8.0
Sample Size (Total = 6,912)	5,181	1,731

SCCHA = Santa Clara County Housing Authority. SFHA = San Francisco Housing Authority.
Notes: Samples consist of households headed by adults who were not seniors or adults with disabilities. Sample sizes may vary because of missing values. Rounding may cause slight discrepancies in sums and differences. Outcomes shown describe only those households receiving any housing subsidies in the specified month.
Source: MDRC calculations using HUD Public and Indian Housing Information Center data

Exhibit G.13 Tenant Rent Share as a Percent of Monthly Gross Income Among Households Receiving Subsidies, Nonelderly, Nondisabled Double Policy Change Households

Outcome	SCCHA	SFHA
Median Tenant Rent Share as a Percent of Monthly Gross Income (%)		
Last Month of Baseline	29.1	29.5
Last Month of Year 1	35.0	29.5
Last Month of Year 2	32.0	29.3
Last Month of Year 3	32.0	29.4
Average Tenant Rent Share as a Percent of Monthly Gross Income (%)		
Last Month of Baseline	30.5	34.5
Last Month of Year 1	57.6	37.2
Last Month of Year 2	52.3	34.9
Last Month of Year 3	44.7	36.0
Average Tenant Rent Share as a Percent of Monthly Gross Income in the Last Month of Baseline (%)		
0–25%	17.6	6.4
26–30%	70.9	66.8
31–35%	4.3	9.4
36–40%	1.6	5.9
41–50%	1.5	2.3
51% and Above	4.0	9.2
Average Tenant Rent Share as a Percent of Monthly Gross Income in the Last Month of Year 1 (%)		
0–25%	0.6	7.1
26–30%	1.6	59.7
31–35%	28.4	12.0
36–40%	11.1	3.3
41–50%	12.6	3.3
51% and Above	45.8	14.6
Average Tenant Rent Share as a Percent of Monthly Gross Income in the Last Month of Year 2 (%)		
0–25%	0.8	5.1
26–30%	2.4	71.8
31–35%	38.2	6.9
36–40%	10.1	3.7
41–50%	10.8	3.7
51% and Above	37.7	8.8

(continued)

Exhibit G.13 Tenant Rent Share as a Percent of Monthly Gross Income Among Households Receiving Subsidies, Nonelderly, Nondisabled Double Policy Change Households *(continued)*

Outcome	SCCHA	SFHA
Average Tenant Rent Share as a Percent of Monthly Gross Income in the Last Month of Year 3 (%)		
0–25%	0.9	3.8
26–30%	3.6	71.1
31–35%	55.5	4.9
36–40%	8.4	5.4
41–50%	7.5	4.9
51% and Above	24.2	10.0
Sample Size (Total = 1,989)	1,542	447

SCCHA = Santa Clara County Housing Authority. SFHA = San Francisco Housing Authority.
Notes: Samples consist of households headed by adults who were not seniors or adults with disabilities. Sample sizes may vary because of missing values. Rounding may cause slight discrepancies in sums and differences. Outcomes shown describe only those households receiving any housing subsidies in the specified month.
Source: MDRC calculations using HUD Public and Indian Housing Information Center data

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