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Cityscape

**A Journal of Policy
Development and Research**

Studies in Assisted Housing

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Guest Editor's Introduction

Barbara A. Haley
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Office of Policy Development and Research
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This special issue of *Cityscape* reports the findings of research on households who receive housing assistance from the U.S. Department of Housing and Urban Development (HUD).

Assisted housing is found in every metropolitan area and in every state: 18 percent are in rural and nonmetropolitan areas, 17 percent are in suburban areas, and 56 percent are in central cities.¹

Approximately 1.1 million households live in public housing units managed by some 3,200 public housing authorities. Another 1.4 million households live in HUD-subsidized, privately owned projects, including Section 8 and other multifamily-assisted programs. Approximately 1.9 million households receive assistance under the Housing Choice Voucher (HCV) Program, formerly known as tenant-based Section 8, in which households are expected to find individual housing units owned by private landlords.²

As of 2004, 31 percent of households receiving housing assistance were headed by elderly people,³ 20 percent were headed by people who were disabled but not elderly, and 39 percent were headed by people who had children. A small percentage (about 10 percent) of housing-assisted households did not have elderly or disabled household heads and did not have children.

Housing assistance programs serve large numbers of vulnerable people. Policymakers and the public want to know more about how these programs perform, and much can be learned from HUD's administrative records, the New York City Housing Vacancy Survey, the Survey of Income and Program Participation (SIPP), and qualitative interviews with participants in the Gautreaux Two Housing Mobility Study. HUD's Office of Policy Development and Research sponsored all but two of the research projects reported here.

The authors bring a variety of theoretical and methodological tools to the research questions posed. One set of questions in this issue relates to program dynamics: To what extent are recipients' rents an acceptable burden on their incomes? To what extent do HCV Program recipients find rental housing that is privately owned in better neighborhoods than where they formerly lived? How does housing assistance relate to household composition?

Another set of questions addresses housing assistance tenure: How long do households use this assistance? What kind of household tends to have the longest tenure? What circumstances are predictive of leaving these programs?

A third set of papers presents evidence regarding access to jobs with decent wages and the question of whether different programs are associated with different employment outcomes.

Articles in This Issue

Program Dynamics

Kirk McClure reports that, from 2000 to 2002, the program witnessed significant reductions in the incidence of high housing-cost burden. Households paying more than 40 percent of income for housing dropped about 6 percentage points, from 22.5 percent to 16.6 percent. About 38 percent of all households in the program paid more than 31 percent of income on housing in 2002, down from 47 percent just 2 years earlier. Suffering from a high housing-cost burden appears to result from the household having very low income rather than from market conditions or decisions by program administrators. It appears that this problem results from some households having very little or no income at the time their housing consumption was recorded.

Judith D. Feins and Rhiannon Patterson examine the geographic mobility of families with children that entered the HCV Program between 1995 and 2002. Using a specially constructed longitudinal dataset developed from HUD administrative records, they analyze the residential moves made by these families to see whether moves within the voucher program—particularly moves after the initial lease-up—are associated with improvements in the neighborhoods where the families live and/or with increases in their economic self-sufficiency. They find that subsequent to program entry (that is, after the moves to lease up), there is a small but consistent tendency for families making later moves to choose slightly better neighborhoods. The data show reductions across a number of indicators of concentrated poverty and improvements across a number of neighborhood opportunity indicators for households that moved.

Lance Freeman explores the relationship between housing assistance and household composition using data from the New York City Housing Vacancy Survey. The results show that, for New York City, household composition is related to the receipt of housing assistance. In particular, married and cohabiting partners are less likely to be recipients of housing assistance.

Duration of Housing Assistance Receipt

Brent W. Ambrose finds that individual characteristics and economic conditions play an important role in determining assisted housing tenure. The mean census tract poverty rate for households receiving housing assistance is 22 percent, and, as the proportion of the population that does not speak the majority language increases, the less likely the household is to leave assisted housing. Households headed by an elderly or disabled individual are significantly less likely to leave assisted housing programs. Households headed by teenagers in public housing, receiving tenant-based vouchers, or in multifamily housing are more likely to exit than other households. A one-point increase in household income relative to area median income greatly increases the odds that a household will leave a tenant-based assisted housing unit or a public housing unit. Households in public housing with income from wage or salary have a significantly higher probability of leaving public housing, but this was the case only for public housing, not among households residing in multifamily or tenant-based programs. In addition, households are more likely to leave assisted housing during periods of economic expansion and are less likely to leave during periods of economic uncertainty.

Edgar O. Olsen, Scott E. Davis, and Paul E. Carrillo use administrative data of families who participated in the HCV Program between 1995 and 2002, combined with data from

other sources, to estimate the differences in attrition rates from the program. They find that large decreases in the program's payment standard and increases in the tenant contribution to rent would have small effects on program attrition. They also find that age and disability are by far the most important influences on the likelihood that the family will exit the tenant-based voucher program. Disabled families are about 37 percent less likely to exit, and elderly families are around 23 percent less likely to exit each year than are otherwise similar families. Differences in attrition rates based on other family characteristics are much smaller.

Lance Freeman uses event history methods to describe and explain the dynamics of housing assistance exits between 1995 and 2002. His results show that, except for the first year, the likelihood of exiting housing assistance is greatest in the earliest years. The probability of a household receiving housing assistance beyond 5 years is 58 percent and beyond 10 years is 36 percent. Being White, younger, not disabled, and/or not having children are personal characteristics associated with shorter spells of housing assistance receipt. These results suggest that life-cycle factors that predict residential mobility in general play an important role in determining exits from housing assistance. In addition, a higher vacancy rate in the local housing market and the availability of housing alternatives for low-income minorities also appear to be important determinants of housing assistance exits. Compared to families who receive housing assistance in the Northeast, those residing elsewhere are more likely to exit assisted housing in a given year.

Housing Assistance and Employment

Peter A. Tatian and Christopher Snow track income and earnings for households who received assistance for at least 8 consecutive years, from 1995 to 2002. Income and earnings during that period rose by 34.1 and 93.1 percent, respectively. They find that income trajectories are highest for households that are non-Hispanic Black or Hispanic; have a household head aged 18 to 25 years; have a single working-age adult; have children; are neither disabled nor elderly; have a youngest child less than 3 years old; have no spouse or cohead present; have an income level in the lowest deciles; receive welfare; do not receive Supplemental Security Income, Social Security, or pension income; were homeless at time of admission to housing assistance; live in high-poverty census tracts; and/or live in the central city or outside a metropolitan area. Steepest increases in income are for households in project-based Section 8 units and the flattest for vouchers and other site-based programs, indicating that the income trends are explainable by differences in household characteristics between the programs. After controlling for household characteristics, the odds of being employed for this group of long-term program recipients are essentially the same for residents of Section 8 site-based, voucher-assisted, and public housing.

Edgar O. Olsen, Catherine A. Tyler, Jonathan W. King, and Paul E. Carrillo examine the relationship between different types of housing assistance and earnings and employment. They use HUD's administrative data for nonelderly, nondisabled households who received rental assistance between 1995 and 2002, combined with data from other sources. The results indicate that each broad type of housing assistance is associated with receipt of lower wages than received by households that are not assisted, but the extent of the difference depends on which program is under consideration. Participation in the Family Self-Sufficiency Program, an initiative within the public housing and housing voucher programs to promote self-sufficiency, is associated with significantly higher wages than those received by assisted households who are not part of this initiative.

Scott Susin merged the 1996 panel of the longitudinal SIPP with HUD's administrative data. The merged data enabled him to accurately identify recipients of housing assistance and construct a valid comparison group. The 4 years of the SIPP panel coincided with the 1990s economic boom. Poverty and receipt of welfare decrease for households in both

subsidized housing and the comparison group. Households receiving housing assistance and the comparison group all show strong gains in employment, earnings, and income. Families in public housing, however, have substantially lower incomes than their comparison group, and poverty rates are 8 percentage points higher. For recipients of vouchers and project-based subsidies, the differences are smaller, with none statistically significant. The patterns for earnings from employment are similar to that for income. Families in public housing and households with project-based subsidies have lower earnings than the comparison group. No statistically significant differences occur for voucher recipients. Public housing residents live in census tracts with poverty rates averaging 8.8 percentage points higher than tracts with the comparison group, so differences between these groups may be partly due to neighborhood effects.

Joanna M. Reed, Jennifer Pashup, and Emily K. Snell conducted indepth interviews of voucher holders who participated in the Gautreaux Two Housing Mobility Study. Their respondents are women who used vouchers to move out of segregated, highly concentrated poverty neighborhoods into more affluent areas. The researchers connect life priorities dictated by motherhood and membership in a contingent labor market to labor force participation. They compare movers' and nonmovers' labor market experiences before they moved, finding similar employment experiences and histories of holding low-wage service jobs, interrupted by periods of welfare receipt. The primary obstacles to working are childcare; illness and health problems, including pregnancy; transportation; and layoffs from temporary jobs. Respondents have positive attitudes toward employment. Moving to more affluent neighborhoods has little or no impact on the employment situations of most study participants.

Conclusion

Changes in the legislation regulating the federal housing assistance programs occur regularly and not always in an atmosphere of clarity and understanding. The Office of Policy Development and Research is pleased to present these papers to the public in the belief that they can contribute to informed debate about programs that serve 4.4 million households.

Notes

1. The author thanks Mark Perdue for his assistance in producing these estimates. The author also thanks Robert W. Gray, Hal Holzman, and Mark Shroder for helpful comments in response to an earlier draft.
2. For more information about these programs, see the following websites:
<http://www.hud.gov/offices/pih/programs/ph/index.cfm>.
<http://www.hud.gov/offices/pih/programs/hcv/project.cfm>.
<http://www.hud.gov/offices/pih/programs/hcv/tenant.cfm>.
3. Elderly is defined here as 62 years and older.

Rent Burden in the Housing Choice Voucher Program

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University of Kansas

Abstract

The Housing Choice Voucher Program is designed to help low-income households consume housing at an acceptable burden on their income. The incidence of high housing cost in the program has been reduced over the past few years. About 38 percent of all households in the program spend more than 31 percent of their income on housing, down from 47 percent only 2 years earlier. A high housing cost burden appears to stem from very low income rather than from market conditions or decisions by program administrators. Despite program rules, a small percentage of households in the program pay a very high level of income toward housing. It appears that this problem results from some households having very little or no income at the time their housing consumption was recorded.

Introduction

The Housing Choice Voucher (HCV) Program is the nation's largest single program for low-income renter households. The HCV Program currently serves about 1.9 million households. The program pays a portion of the participating household's rent on a dwelling offered in the marketplace. This Housing Assistance Payment (HAP) is the difference between 30 percent of the household's adjusted gross income and the payment standard. The payment standard is designed to reflect the cost of renting standard quality housing in the marketplace plus paying for utilities not provided in the rent. If all goes well, the tenant is able to find a unit with a rent reflecting the payment standard. The assisted household should pay a housing cost burden of 30 percent, which means that the cost of renting the unit and paying for utilities will be 30 percent of the household's income. This formula can break down in actual practice. The payment standard may not reflect rents in the marketplace. The household's income may change after entry into the program. The agency administering the program may fail to implement the program properly or may exercise its discretion poorly.

What is the rent burden in the HCV Program given these possible areas for breakdown? More specifically, does the program succeed in making housing affordable to all households who participate or do some households continue to confront a high housing cost burden despite participation in the program?

Tenant payment should be about 30 percent of adjusted gross income (HUD, 2000). A principal goal of the program is to make housing affordable to the households that participate

in the program. If participating households pay significantly more than 30 percent of income toward housing, then the program may not be functioning as it should.

All payments above 31 percent of adjusted income do not represent a breakdown in program implementation, however. The household may choose to move into a more expensive dwelling. In such cases, the household must pay a premium because the payment standard is fixed. If the household opts for more expensive housing, its contribution toward rent will be raised. The household will continue to pay 30 percent of its income toward housing plus the amount by which the unit's rent exceeds the payment standard. The household also may choose to live in a dwelling renting for less than the payment standard. This choice does not reduce the tenant's contribution, however. In such cases, the subsidy is based on the difference between the gross rent and 30 percent of the household's income.

Program Performance

In 2002, the typical participating household in the HCV Program paid a gross rent of about \$715 a month. This gross rent was made up of a \$90 utility allowance, a tenant payment of \$175, and a HAP of \$450. The typical household had an income of about \$10,900 and paid about 30 percent of its income toward housing. In general, the program is succeeding in serving households who have a very low income and is helping them to consume housing that costs no more than 30 percent of their limited income.

This nominal success is reassuring because it was not always obvious that the program would succeed. The voucher demonstration experiment began in 1985 (Kennedy and Leger, 1990). This demonstration was an effort to determine whether the Section 8 Existing Housing Certificate Program should be modified. The certificate program was the predecessor to the HCV Program. With the certificate program, the household could not rent a unit if the rent was higher than the fair market rent (FMR), a level set by the government. This arrangement did not permit households to search across the entire housing market, because no built-in provision permitted the consumption of units with rents higher than the FMR. If the FMR did not properly reflect the rents in the market or if the household was interested in consuming housing at a price above the FMR, then the certificate program did not function well.

The HCV Program adopted the payment standard approach, initially setting the payment standard at the FMR and giving households the freedom to consume units even if the rents are above the FMR. Some feared that the HCV Program would result in higher housing cost burdens. If the payment standards and the FMRs lagged behind actual market rents, households would have to absorb a higher housing cost burden. Early experience with the HCV Program confirmed these fears. The demonstration program found that a typical voucher holder paid 35 percent of income toward housing, 4 points higher than a typical certificate program participant (Kennedy and Leger, 1990).

In 1998, the HCV Program merged from the Section 8 Existing Housing Certificate and Voucher programs into a single program very similar to the voucher demonstration program. With this merger, a new limitation was placed on the program administrators: after joining the program, the participating household cannot pay more than 40 percent of its income on rent (HUD, 2000).

Public Housing Authorities (PHAs) are the dominant form of agency to administer the program.¹ The PHA cannot allow new program participants to assume rent burdens greater than 40 percent of household income, but the PHA is obligated by the program to serve households with very low incomes. The Quality Housing and Work Responsibility Act of 1998 requires that 75 percent of households served by each administering agency must

have income at or below 30 percent of the metropolitan area median family income (AMFI). Even within these constraints, the PHAs vary in terms of the approach that they take to implementing the program. Some PHAs see their mission as providing a social safety net for those with greatest need. Others see their mission as helping people achieve greater self-sufficiency (Devine et al., 2001). Provision of a safety net encourages the admission of households with the lowest incomes among low-income households and seeks to reduce the burden of housing costs on these households. Pursuit of self-sufficiency may place greater emphasis on spreading the scarce housing resources across as many households as possible, even at the expense of these households suffering a higher housing cost burden.

Research Questions

This article examines recent data from the HCV Program. Data on rent payments and income have been used to calculate the percentage of income allocated to housing costs among these households. The standard definition of rent burden is used in this research. It divides total tenant payment (the sum of tenant-paid rent and estimated utility payments) by the adjusted annual income of the household (gross income net adjustments for household members being elderly, having dependent children, or having disabilities).²

At issue is whether some participating households pay more than 30 percent of income on housing.³ Multiple explanations suggest why program participants may suffer from high housing cost burdens.

The first possible explanation for a high housing cost burden may be found in the characteristics of the households themselves. Discrimination against racial minorities continues to be a problem in housing markets across the nation (Yinger, 1998). Ample reason exists to suspect that discrimination is also experienced by Hispanic or female-headed households. Hispanics live in housing of inferior quality when compared to non-Hispanic Whites, but the role of discrimination in this outcome is open to debate (Krivo, 1995; Betancur, 1996). Single-parent, female-headed households also tend to reside in lower quality housing than do married couples (South and Crowder, 1998). This research asks whether evidence of discrimination can be seen through a high incidence of racial or ethnic minorities, female-headed households, or other affected groups among those with high rent burden.

The second possible explanation for a high housing cost burden may be found in the characteristics of the neighborhoods where the participating households choose to reside. Rental housing markets vary across the nation. Some have very tight conditions with high rents while others are very soft with low rents. It is possible that tight market conditions may contribute to a disproportionately high incidence of households suffering from a high housing cost burden. Evidence already exists on the impact of housing market conditions on program operation. Only about 70 percent of those awarded vouchers are successful in finding housing that meets program requirements, and tight market conditions lower this number further (Finkel and Buron, 2001). In tight markets, about 61 percent of HCV households were able to find units while 80 percent of households were successful in soft markets. It is possible that in tight markets those that do find housing are compelled to accept a high housing cost burden to secure the HCV subsidy.

Turner (1998) points out that the issues of racial discrimination and housing market conditions are not readily separated. The provision of an HCV Program does not ensure access by minority households to neighborhoods with good-quality housing. Rather, minorities may be relegated to neighborhoods providing poor-quality housing while, elsewhere in the same market, ample housing may be available to nonminority households. Low-income people and minorities are concentrated into unhealthy neighborhoods despite the mobility that is supposed to be part of the voucher approach to housing assistance.

Pendall (2000) confirms this spatial concentration of low-income people as well as the limited mobility provided by the program. He discovers that users of Section 8 certificates and vouchers were 75 percent as likely as other low-income tenants to live in distressed neighborhoods. Thus, the subsidy did facilitate some movement to better neighborhoods. When compared to all renter households, however, independent of income, the tenant-based rental assistance did not close the gap. Assisted households were 150 percent more likely than all renters to live in distressed areas, although a great deal of variation existed among metropolitan areas. Assisted households tend to concentrate in distressed neighborhoods because the low-cost rental housing concentrates there. In addition, this concentration is related to race. African-American households are more likely than White households to live in distressed neighborhoods.

These concerns lead to research questions over location. Do these problems of location translate into higher housing cost burden as well? Are tight markets associated with high housing cost burden? Are urban areas or certain regions with tight housing conditions associated with high housing cost burden? Do households have to accept a high housing cost burden to leave high-poverty neighborhoods?

The third possible explanation for a high housing cost burden may be found in the decisions made by the program administrators, both the local PHA and the U.S. Department of Housing and Urban Development (HUD). A household in the HCV Program can live in any neighborhood and any dwelling unit it wants if it can find a unit that is affordable under program rules. This unit must meet HUD's Housing Quality Standards and the owner must be willing to participate in the program. The PHA, however, sets the payment standard, and HUD has established the 40th percentile standard for setting FMRs. These implementation decisions can affect the incidence of high housing cost burden.

Payment Standard as a Percentage of the FMR

With the HCV Program, the subsidy amount is dictated by the payment standard, not the FMR. Local payment standards vary, but the payment standard is initially set at the FMR (Kennedy and Leger, 1990). PHAs, however, complained that the FMRs lag below actual rents (HUD, 2000), meaning that households were unable to obtain housing without paying more than 30 percent of income because the FMR (if used as the payment standard) was below the market rent. This problem could be especially severe in housing markets experiencing very high rents (HUD, 2000).

To help with this problem, the Public Housing Reform Act of 1998 grants discretion to PHAs in setting the payment standard. PHAs may lower the payment standard to as low as 90 percent or to raise it to 110 percent of the FMRs. This adjustment may be done on a neighborhood-by-neighborhood basis or across a jurisdiction. Setting the payment standard higher offers the opportunity for a household to lease a unit with a higher rent or enter into a higher priced neighborhood than would be the case with a lower payment standard (HUD, 2000). If the PHA opts for a payment standard that is a higher percentage, the participating household receives a higher HAP, lowering the household's rent burden. Fewer households can be helped, however, with the available program dollars. If the PHA opts for a payment standard that is lower, the assisted household receives a lower HAP but more households can be helped with the available dollars (Lubell, 2001).

High rents in some housing markets present the possibility of setting a payment standard equally high and causing the program to participate in leasing units priced higher than they are worth, even in a high-priced market. As a preventive measure, a rent reasonableness test must be undertaken for each dwelling admitted to the program. This test checks the rent of the unit against what is determined to be a fair rent by comparing the rent to other units available in the marketplace and other unassisted units available in the same development or building.

If market conditions merit the adjustment, HUD can grant still further adjustments to the payment standard. With HUD permission, some parts or even all of a jurisdiction may have payment standards that are more than 120 percent of the FMR. HUD has granted hundreds of these exceptions (HUD, 2000).

Setting local payment standards and granting exceptions may influence the housing cost burden of the affected households. Do PHAs employ this discretion to set payment standard so as to avoid high rent burden?

40th Percentile Rents

A second administrative issue deals with the way the FMRs are determined. The FMRs are set so they reflect the rent of a unit at the 40th percentile from the bottom for rental units in the market. HUD has recognized that difficulties have arisen with the use of the 40th percentile rents (Lubell, 2001). The adoption of the 40th percentile standard excludes many units from the upper end of the rent distribution. To facilitate higher payment standards in some markets, HUD has raised FMRs to the 50th percentile in selected areas, increasing the number of units affordable to families with vouchers. This increase should help reduce the housing cost burden in these markets. This action raises another research question. Does HUD select 50th percentile areas well, avoiding high rent burdens in those markets?

These administrative rules for the program may contribute to a high incidence of households in the program suffering from a high housing cost burden. The program permits administering agencies to set their jurisdiction's payment standard below the FMR. The program establishes the FMR as the 40th percentile of all rents in the market. In addition, the program permits administering agencies to impose a minimum rent, independent of income. Each of these factors will be examined to determine their impact on the incidence of high housing cost burden among voucher participants.

Data

Data have been assembled from the Multifamily Tenant Characteristics System (MTCS) covering fiscal years 2000, 2001, and 2002. The data include reports from about 2,400 agencies administering HCVs for a total of about 1.3 million households (HUD, 1998).⁴

MTCS data contain demographic information about each assisted household as well as the size, rent, and utility information for the dwelling unit. HUD has added information describing the housing market conditions where the units are located along with information on each PHA's payment standard and FMR.

Question: What is the typical rent burden in the HCV Program?

In the HCV Program, more than 60 percent of all households in the program pay about 30 percent of income toward rent. Only a few, about 1 percent, pay less than 30 percent. About 38 percent pay more than 31 percent. About 11 percent allocate between 31 and 35 percent of income toward housing costs. Another 11 percent of the households allocate between 35 and 40 percent of income toward housing. About 10 percent allocate between 40 and 60 percent of income. Finally, just less than 7 percent of the voucher households allocate more than 60 percent of income toward housing costs. See exhibit 1.

Exhibit 1

Distribution of Rent-burdened Families in the HCV Program by Fiscal Year

| Fiscal Year | Percentage of All Households With Rent Burden | | |
|---|---|---------------|---------------|
| | 31% or less | More Than 31% | More Than 40% |
| All households, FY 2002 | 62.0 | 38.0 | 16.6 |
| All households, FY 2001 | 62.5 | 37.5 | 16.2 |
| All households, FY 2000 | 53.6 | 46.5 | 22.5 |
| Percentage point change from FY 2000 to FY 2002 | 8.4 | - 8.4 | - 5.8 |

Notes: Rent burden is calculated as total tenant payment (rent plus utility allowance) as a percentage of adjusted gross income. A household is included only if it reported income greater than zero.

Source: Multifamily Tenant Characteristics System data for fiscal years 2000, 2001, and 2002

It is important to note that households reporting zero income are excluded from the analysis. Approximately 73,000 households report zero income. Of these households, about 60,000 pay no rent. As such, their housing cost burden due to rent is also zero, but these households may suffer some housing cost burden due to the obligation to pay utilities not included in the rent. The remaining 13,000 households with zero income report paying some level of rent.

For families with income, particular attention is paid to those households suffering from a housing hardship. For purposes of this research, hardship is defined as paying more than 31 percent of adjusted annual income toward housing.

The tables examining the HCV Program over time tell a story of improvement. From 2000 to 2002, the program witnessed significant reductions in the incidence of high housing cost burden. Households paying more than 40 percent of income dropped about 6 percentage points, from 22.5 percent to 16.6 percent. Households paying more than 30 percent dropped about 8 percentage points.

About one in six HCV Program households is paying a very high housing cost burden, spending more than 40 percent of income on housing. The administrative rules of the program are designed to prevent this problem. At any given time, however, a participating household may lose its source of income or the household may break up, leaving it with fewer wage earners or members providing other forms of support. These incidents can cause a household to suffer a high housing cost burden given the loss of income. About 1 in 15 is paying an extremely high housing cost burden, with more than 60 percent of income spent on housing. These are extreme cases that merit additional exploration.

Question: Who pays a high housing cost burden?

A set of household characteristics was examined to see if any of these characteristics are associated with a high incidence of HCV households paying a high housing cost burden. For this analysis, a high incidence is identified by the incidence of households paying more than 31 percent of income toward housing that is at least 3 percentage points above the norm. The analysis looks for categories of households in which 41 percent or more pay in excess of 31 percent of income toward housing costs. To further refine this analysis, the incidence of households paying more than 40 percent has been detailed. As above, the analysis looks for characteristics in which the incidence of households with this very high housing cost burden is more than 3 percentage points above the norm. In round numbers, 38 percent of all HCV households pay 31 percent or more of income toward housing. A group will be identified having a high incidence of housing burden if 41 percent or more of the households pay above 31 percent of income toward housing. Similarly, 17

percent of all HCV households pay 40 percent or more on housing, making 20 percent the trigger level for identification of an especially high incidence of housing cost burden. See exhibit 2.

Exhibit 2

Distribution of Rent-burdened Families in the HCV Program by Household Characteristics, Fiscal Year 2002

| Household Characteristic | Percentage of All Households With Rent Burden | | |
|---|---|---------------|---------------|
| | 31% or less | More Than 31% | More Than 40% |
| All households, fiscal year 2002 | 62.0 | 38.0 | 16.6 |
| Single-parent, female-headed household | 57.1 | 42.9 | 21.6 |
| Household size | | | |
| One or two persons | 64.3 | 35.7 | 13.6 |
| Three or more persons | 59.2 | 40.8 | 20.3 |
| Disabled head of household | 66.8 | 33.2 | 10.2 |
| Presence of children | | | |
| Families with children | 58.2 | 41.8 | 20.4 |
| Families without children | 67.5 | 32.5 | 11.2 |
| Income | | | |
| 0 to 9 percent of area median | 23.5 | 76.5 | 63.6 |
| 10 to 29 percent of area median | 67.1 | 32.9 | 11.4 |
| 30 to 49 percent of area median | 69.2 | 30.8 | 4.4 |
| 50 percent or more of the area median | 76.1 | 24.0 | 1.8 |
| Largest source of income | | | |
| Wages | 67.8 | 32.2 | 9.2 |
| Government (welfare, Social Security, etc.) | 62.3 | 37.7 | 16.7 |
| Race/ethnicity of household | | | |
| Asian/Pacific Islands | 68.3 | 31.7 | 11.5 |
| African American—not Hispanic | 60.1 | 39.9 | 19.8 |
| American Indian/Alaska Native | 60.5 | 39.5 | 16.1 |
| White—not Hispanic | 62.1 | 37.9 | 14.4 |
| Hispanic—any race | 65.6 | 34.4 | 15.5 |

Notes: Rent burden is calculated as total tenant payment (rent plus utility allowance) as a percentage of adjusted gross income. A household is included only if it reported income greater than zero. Entry is shown in **bold** if it differs from the total population of HCV households by more than 3 percentage points.

Source: Multifamily Tenant Characteristics System data for fiscal year 2002

Three percentage points was chosen somewhat arbitrarily as an indicator of a significantly high incidence of high housing cost burden. The data set comprises nearly the entire population of HCV Program households, with more than 1.3 million households. As such, normal statistical tests for significance of difference between samples have little meaning. In addition, with samples this large, even the smallest of differences between the samples in the proportion of households suffering from a high housing cost burden are statistically significant. As a result, tests for statistical significance provide little guidance in identifying which characteristics of the population are associated with high housing cost burden. Review of the incidence of high housing cost burden among the various samples drawn from the entire population of HCV Program households suggests that 3 percentage points is a reasonable dividing point. The results found in this examination generally are not sensitive to the selection of a 3 percentage point differential as the dividing line. Any number of other dividing lines would lead to essentially the same conclusions with regard to which factors are associated with a high housing cost burden among participating households.

Single-parent, female-headed households with children have a high incidence of high housing cost burden. About 43 percent pay more than 31 percent of income on housing and 22 percent pay more than 40 percent, 5 percentage points over the average for all HCV households. Larger households have a higher incidence of high housing cost burden, as do households with children.

Households with disabled heads of household generally have a housing cost burden below the norm, suggesting that the many programs to help the disabled are protecting these households from hardship.

Household size is a factor, with larger households being associated with a higher incidence of high housing cost burden.

Race is not a significant factor. No racial or ethnic group was more than 2 percentage points above the population as a whole in terms of paying more than 31 percent of income toward housing. At the next level up, paying more than 40 percent of income toward housing, only one group had a disproportionate representation. About 20 percent of African-American HCV households pay more than 40 percent of income on housing, which is about 3 percentage points above the norm for the population.

The primary source of income is not associated with a high housing cost burden. Those households with wages did prove to have lower housing cost burdens, but those with Temporary Assistance for Needy Families (TANF) and/or Aid to Families with Dependent Children as the primary source were in line with the population as a whole in terms of housing cost burden.

Income level, rather than its source, proved to be associated with high housing cost burden, but only at the lowest levels of income. The households with the lowest incomes, those with income from 0 to 9 percent of AMFI, suffer from a disproportionately high housing cost burden. As might be expected with households that have such low incomes, about 77 percent have housing cost burdens above 31 percent, and about 64 percent pay more than 40 percent of their limited income toward housing. The scale of this disproportionate incidence of high housing cost burden suggests that income, or the lack of it, is the driving force behind high housing cost burden.

Under the HCV Program rules, participating households make a contribution to rent that is the greater of 30 percent of income adjusted for various factors (such as disabilities or the presence of children) or 10 percent of gross income without adjustments (HUD, 2001). Very few households make a tenant contribution based on this 10 percent of gross income rule. Less than 2 percent of the households fall into this category, and of these, only about half have any income. Of those households paying under the 10 percent rule and that have income, nearly all are paying in excess of 40 percent of income on housing costs. This condition exists because these households are overwhelmingly low income. Of the approximately 24,000 households making contributions under the 10 percent rule, the mean gross income is about \$2,100 a year and, after adjustments, the mean annual income is less than \$400 a year.

Question: Where are the households who are paying a high housing cost burden?

Analysis was made of various characteristics of the housing unit and the implementation of the HCV Program. See exhibit 3.

Unit size has a clear pattern corresponding to the finding that larger families tend to have housing cost burden problems. Each successively larger unit has a higher incidence of

high housing cost burden. Single-room, efficiency apartments and one-bedroom units are all below average. All unit sizes from two bedrooms and larger have above average levels of high housing cost burden. In very large units, those with five or more bedrooms, more than half of all households suffer a high housing cost burden.

Exhibit 3

Distribution of Rent-burdened Families in the HCV Program by Housing Market Characteristics, Fiscal Year 2002

| Housing and Market Characteristic | Percentage of All Households With Rent Burden | | |
|---|---|---------------|---------------|
| | 31% or less | More Than 31% | More Than 40% |
| All households, fiscal year 2002 | 62.0 | 38.0 | 16.6 |
| Unit size | | | |
| Single room occupancy | 90.8 | 9.2 | 4.1 |
| Efficiency/0 bedrooms | 74.4 | 25.6 | 9.3 |
| 1 bedroom | 73.0 | 27.0 | 7.7 |
| 2 bedrooms | 59.3 | 40.7 | 17.4 |
| 3 bedrooms | 57.7 | 42.3 | 21.8 |
| 4 bedrooms | 51.9 | 48.2 | 25.3 |
| More than 4 bedrooms | 48.2 | 51.8 | 28.0 |
| Market characteristic | | | |
| Central city | 64.2 | 35.8 | 16.3 |
| Suburban | 63.8 | 36.2 | 15.1 |
| Metropolitan | 64.0 | 36.0 | 15.7 |
| Nonmetropolitan/rural | 52.6 | 47.4 | 20.9 |
| Northeast Region | 65.8 | 34.2 | 11.4 |
| South Region | 55.8 | 44.2 | 22.8 |
| Midwest Region | 63.6 | 36.4 | 15.3 |
| West Region | 66.1 | 33.9 | 11.5 |
| Tract poverty rate 15% or less | 61.1 | 38.9 | 15.5 |
| Tract poverty rate between 15 and 25% | 62.2 | 37.8 | 16.8 |
| Tract poverty rate 25% or more | 64.0 | 36.0 | 17.5 |
| County vacancy less than 5% | 69.9 | 30.1 | 10.9 |
| County vacancy 5 to 8% | 62.5 | 37.5 | 16.4 |
| County vacancy greater than 8% | 55.5 | 44.5 | 21.3 |
| Rent below \$400 per month | 62.0 | 38.0 | 18.1 |
| Rent \$400 to \$800 per month | 62.5 | 37.5 | 9.6 |
| Rent above \$800 per month | 54.4 | 45.6 | 12.4 |

Notes: Rent burden is calculated as total tenant payment (rent plus utility allowance) as a percentage of adjusted gross income. A household is included only if it reported income greater than zero.

Entry is shown in **bold** if it differs from the total population of HCV households by more than 3 percentage points.

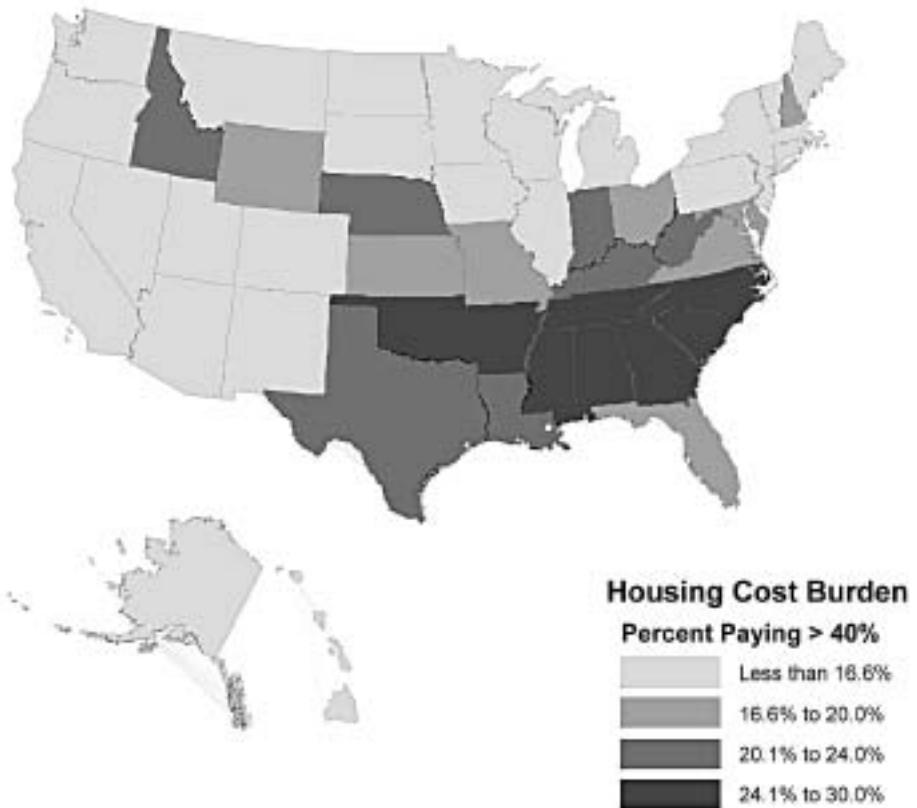
Source: Multifamily Tenant Characteristics System data for fiscal year 2002

Examining the type of markets finds that within urban areas no significant difference exists between central city and suburban areas. The nonmetropolitan households, however, do experience a higher level of high housing cost burden.

Across regions of the nation, the South alone stands out with a high housing cost burden. The map in exhibit 4 illustrates this regional difference. Alabama, Arkansas, Georgia, Mississippi, Oklahoma, North Carolina, South Carolina, and Tennessee all have more than 24 percent participating households paying more than 40 percent of income toward housing costs. This amount may be due to low levels of welfare payments in the South. Annualized payments under TANF and food stamps as a percent of the poverty level are 11 percentage points lower in the South than in other states (U.S. House of Representatives, 2000).

Exhibit 4

Distribution of Rent-burdened Families Paying in Excess of 40 Percent of Income in the HCV Program by State, Fiscal Year 2002



Paradoxically, a higher incidence of high housing cost burden occurs in counties with very high vacancy rates. Very low-income people may have access only to tracts suffering from significant deterioration; thus, it is not low vacancy rate but the low income of residents in these deteriorated soft markets that triggers high housing cost burden. Data are available only at the county level, which is large. A county can contain significant variation within its boundaries. Some neighborhoods in the county could have high or low vacancy rates. Vouchers are portable, permitting movement across markets, such as counties. If a household confronts very tight conditions within any one neighborhood, it should be able to find substitute housing elsewhere in the county where vacancy rates are higher. Thus, it would be expected that the mobility provided by the HCV Program would operate to permit households suffering from a high housing cost burden to more readily find relief by moving to areas with high vacancy rates. Movement to areas with high vacancy, and presumably lower rents, however, has not reduced the incidence of high housing cost burden. More research is needed on this topic.

Equally, the level of poverty in the neighborhood is not a factor in the incidence of high housing cost burden. Whether the level of poverty in the tract is low, average, or high, the incidence of high housing cost burden is normal.

Tenants with high average rents are associated with high housing cost burdens. Here it is likely that the market itself is the source of the problem with high rents leading to high housing cost burden. Those households paying rent above \$800 a month were more likely to have disproportionately high incidence of high housing cost burden. About 46 percent of the HCV households paying more than \$800 per month suffer from a housing cost burden above 31 percent of income.

Question: Do administrative decisions factor into the incidence of high housing cost burden?

As expected, those PHAs that set the payment standard very low, below 90 percent of FMR, are associated with high housing cost burden. Findings show that, for the HCV households assisted through PHAs with extremely low payment standards, 44 percent of households pay in excess of 31 percent of income toward housing and 22 percent pay in excess of 40 percent. Unexpectedly, those PHAs with payment standards set at exactly 100 percent of FMRs had a somewhat high level of HCV households paying more than 31 percent of income on housing. In this group of PHAs, 41 percent of households pay above this standard. Those PHAs with payment standards above 100 percent of FMRs had below normal incidence of housing cost burden as would be expected. See exhibit 5.

Exhibit 5

Distribution of Rent-burdened Families in the HCV Program by Housing Authority Characteristics, Fiscal Year 2002

| Housing Authority Characteristic | Percentage of All Households With Rent Burden | | |
|--|---|---------------|---------------|
| | 31% or less | More Than 31% | More Than 40% |
| All households, fiscal year 2002 | 62.0 | 38.0 | 16.6 |
| Payment standard as a percentage of FMR | | | |
| Less than 90% of FMR | 56.1 | 44.0 | 21.6 |
| 90 to less than 100% of FMR | 63.1 | 36.9 | 16.8 |
| 100% of FMR | 58.9 | 41.1 | 16.8 |
| Greater than 100 to 110% of FMR | 65.3 | 34.7 | 14.4 |
| Greater than 110 to 120% of FMR | 63.7 | 36.3 | 13.9 |
| Greater than 120% of FMR | 69.4 | 30.6 | 12.9 |
| Agencies with 50th percentile FMRs | 68.2 | 31.8 | 13.9 |
| Size of agency (nonstate agencies only) | | | |
| 5,000 vouchers | 71.3 | 28.7 | 13.1 |
| 1,000 to 5,000 vouchers | 61.7 | 38.3 | 17.0 |
| 500 to 1,000 vouchers | 57.6 | 42.4 | 18.3 |
| 250 to 500 vouchers | 57.4 | 42.6 | 17.8 |
| 100 to 250 vouchers | 58.6 | 41.4 | 17.3 |
| Fewer than 100 vouchers | 56.7 | 43.3 | 19.6 |
| Type of agency | | | |
| All nonstate agencies | 62.1 | 37.9 | 16.6 |
| All state agencies | 60.7 | 39.3 | 17.2 |
| Households new to the program | 77.5 | 22.5 | 7.4 |

Notes: Rent burden is calculated as total tenant payment (rent plus utility allowance) as a percentage of adjusted gross income. A household is included only if it reported income greater than zero.

Entry is shown in **bold** if it differs from the total population of HCV households by more than 3 percentage points.

Source: Multifamily Tenant Characteristics System data for fiscal year 2002

Agencies with 50th percentile rents are associated with lower levels of housing cost burden. Setting FMRs higher permits greater choice and higher payment standards to the participating households. This higher level translates into a lower incidence of participating households paying a high housing cost burden. While 38 percent of all HCV households pay more than 31 percent of income on housing, those households served by PHAs with 50th percentile rents find only 32 percent of their households with high cost burden.

In the event that a household in the HCV Program has so little income that its total tenant contribution falls to very low levels, the program guidelines provide that local housing authorities may adopt minimum rents, typically of \$25 per month or \$50 per month (HUD, 2001). Exemptions from this minimum rent requirement may be granted in situations in which the minimum rent would pose an undue hardship. If the hardship is temporary in nature, however, the minimum rent may be imposed despite its short-term harm. Within the national database of 1.3 million HCV households, about 76,000 are estimated to be making a tenant contribution based on a minimum rent of either \$25 a month or \$50 a month. A large portion of these households, about 46,000, has a reported adjusted gross income of zero. Examining the burden of housing costs on those with income, 90 percent or more pay in excess of 40 percent of income on housing costs. It does not appear to be the minimum rents that generate this problem, because these rents are, by any standard, very low. These households have such low incomes, however, that rent at any level would create a burden. The typical HCV household had an annual income of more than \$10,000 in 2002. Among those paying the minimum rents, the average gross reported income is less than \$900 a year. It is important to remember that housing authorities have the power to waive these rents and, thus, the imposition of these minimum rents on households that have such low incomes may result from a determination by the housing authority that the extremely low income is transitory.

Smaller agencies are associated with high housing cost burden, while the very largest have a very low incidence of this problem. Those agencies with 500 or fewer vouchers all have at least 41 percent of their households with a high housing cost burden. The agencies with 1,000 to 5,000 vouchers have a normal incidence of high housing cost burden. The few agencies in the nation with more than 5,000 vouchers have a very low incidence at 29 percent. Nothing about the voucher mechanism should dictate this result. More research is needed to see if the smaller agencies confront markets where high rents and/or extremely low-income households create this high housing cost burden.⁵

PHAs began as the offspring of municipal government. The portability of vouchers should make the ties to a municipality less of an issue as households may choose to locate outside the immediate jurisdiction. Voucher holders, however, have tended to stay in close proximity to their original residence with long moves as the exception (Varady et al., 1999). The state agency is an alternative administrative mechanism to facilitate households in their use of vouchers. The distinction between a state agency and a conventional agency is not significant, at least in terms of the incidence of high housing cost burden. State agencies had 39 percent of their households with high housing cost burden, while nonstate agencies had 38 percent of their households with a high housing cost burden.

One last program administration issue remains. Are households that are new to the program able to avoid high housing cost burden? A little more than 7 percent of all households that are new to the program suffer from a housing cost burden in excess of 40 percent of income. This result is interesting because the administering agency is not supposed to accept a rental arrangement with a household in which this 40 percent threshold is exceeded. In 2002, however, about 1 in every 14 households newly admitted to the HCV Program entered with housing costs in excess of 40 percent of household income.

Question: Which households are suffering from an extremely high housing cost burden?

Exhibit 6 explores the characteristics of those households who suffer from an extremely high housing cost burden. An extremely high housing cost burden is defined as housing costs in excess of 60 percent of household income. It is important to note that inclusion in this category requires the household to report an adjusted gross income above zero. These households have an income, making calculation of a rent burden possible. In 2002, about 82,000 households in the HCV Program did have income with a rent burden of more than 60 percent. These households represent about 6.6 percent of the households in the program. See exhibit 6.

Exhibit 6

Distribution of Rent-burdened Families in the HCV Program Comparing Households With High Rent Burden to All Households, Fiscal Year 2002

| Characteristics | Households by Rent Burden as Percent of Income | |
|---|--|----------------|
| | Burden > 60% | All Households |
| Count of households | 81,626 | 1,228,413 |
| Household characteristics | | |
| Mean total annual household income | \$3,352 | \$10,959 |
| Mean age of head of household | 35 | 44 |
| Number of persons in household | 3.16 | 2.14 |
| Percentage with rent burden greater than 60% | | |
| All households | 6.6% | |
| African American households | 9.3% | |
| Hispanic households | 6.6% | |
| Elderly households | 1.3% | |
| Disabled households | 1.7% | |
| Unit characteristics | | |
| Mean number of bedrooms | 2.57 | 2.14 |
| Mean gross rent | \$734 | \$721 |
| Mean tenant rent | \$47 | \$182 |
| Neighborhood characteristics | | |
| Mean tract percent poverty | 20.8% | 18.9% |
| Mean county percent vacant | 8.2% | 7.0% |

Notes: Rent burden is calculated as total tenant payment (rent plus utility allowance) as a percentage of adjusted gross income. A household is included only if it reported income greater than zero.

Source: Multifamily Tenant Characteristics System data for fiscal year 2002

What characteristics set households with extremely high housing cost burden apart from other households in the HCV Program? The clear difference is income. These households have an average total annual household income of only \$3,352, compared to almost \$11,000 for the typical HCV household. The households tend to be somewhat younger and somewhat larger than other households. Race is a factor insofar as African Americans are overrepresented. Although 6.6 percent of all HCV households suffer from an extremely high housing cost burden, 9.3 percent of African Americans suffer a burden at this level. Hispanics by comparison are in line with the population as a whole. The elderly and the disabled are well below the average for the population.

The housing arrangements of these households with an extremely high housing cost burden do not fully explain the problem. Given the larger household size, the units occupied by these households are somewhat larger and the mean gross rent is correspondingly higher. Given the workings of the HCV Program, however, the tenant contribution toward rent (exclusive of utilities) is much lower, at only \$47 per month. These households tend to

live in neighborhoods with only a marginally higher incidence of poverty and with a slightly higher vacancy rate, as might be expected. Given the especially low incomes of these households, they seek out the units with the lowest rent for the unit size, and these would be found in soft markets.

Taken jointly, about 150,000 households in the HCV Program have income that is either zero or is very low, making a high housing cost burden unavoidable. In round numbers, these households comprise one in every nine households in the HCV Program. The data do not indicate whether this extremely low income is chronic or transitory. As such, it is not possible to determine whether these households have hit on hard times and will bounce back or whether their problems will continue over time. It is expected that some households will confront a loss of income due to loss of employment or break up of the household, which can cause a very high housing cost burden in the short term. New employment may be found, however, or the household may adjust its housing consumption to reflect the new household composition. With these adjustments, the housing cost burden may return to an acceptable range. If the household is unable to regain its footing and find some source of income, then the high housing cost burden may continue.

Conclusion

The goal of the HCV is to help low-income households consume housing at reasonably affordable rates. Administration of this program is cumbersome given the complexities of housing markets and the variation across the many housing markets of the nation. The HCV Program has developed restrictions to encourage prudent use of scarce resources and to prevent abuse. The restrictions and the many decisions made by both program administrators and participating households make some level of housing cost burden unavoidable. Over time, the program seems to be improving with the level of high housing cost burden dropping to about 38 percent of all participating households paying more than 31 percent of income on housing and about 17 percent paying more than 40 percent of income on housing.

To the extent that it can be determined, households who suffer from this high housing cost burden do so largely because of having little or no income. While some household characteristics and some market characteristics are associated with a high housing cost burden, the single strongest predictor of high housing cost burden is household income. This problem is heightened for families with children and families in rural areas and in the South. The problem is worse for those households served by PHAs that set payment standards very low. The almost complete lack of income, however, remains the strongest reason that households suffer from high housing cost burden despite the subsidy provided through the program.

Rent burden in the HCV Program has been declining over time; however, problems remain. About 1 in 6 households in the program suffers from high housing cost burden, and about 1 in 14 households enters the program with a housing cost burden above 40 percent. The implication of this research is that the program does not accommodate the housing problems of families with extremely low or no income.

It is not clear if this failure to accommodate those with no income is a problem. Olsen (2001) argues that the program should serve only those households with the lowest incomes among low-income households. He suggests that the eligibility limits should be more restrictive than the current ceiling of 50 percent of AMFI. With this more restrictive eligibility rule, Olsen argues for reducing the subsidy given to each household in the program to serve more households in aggregate, moving the program toward an entitlement level. The research reported here indicates that movement toward an entitlement status would involve a tradeoff. The problems of a very high housing cost burden are greatest

among very low-income people. The problems are also greater where the subsidy level is reduced by lowering the payment standard relative to the FMR. Movement toward this type of entitlement approach would combine these two factors. More very low-income households would be assisted, but the incidence of a high housing cost burden would rise.

If this increase is to be avoided, then the program needs to be modified to help those households with very low incomes through such steps as waiving minimum rents and basing tenant payment only on adjusted income and not on gross income. Such steps would ultimately increase the subsidy level to participating households, requiring that fewer households be served or that more funds be committed to the HCV.

Author

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Notes

1. Other agencies that administer the Housing Voucher Choice Program include statewide housing agencies, such as state housing finance agencies, and specialized agencies serving metropolitan areas.
2. Alternative definitions were examined using gross income rather than adjusted income and tenant payment to rent net of utility allowances. Reducing the tenant contribution and increasing the income included in the calculations lowered the incidence of high housing cost burden. The conventional use of the concept of housing cost burden, however, involves adjusted income and rent plus utility allowance; this approach has been used in this study.
3. For purposes of this study, a household is deemed to pay 30 percent of income on housing if payment is greater than 29 and less than or equal to 31 percent of income. This adjustment is necessary due to some rounding on both reported income and reported tenant payment.
4. These data cover all reporting Public Housing Authorities (PHAs) for which valid records were obtained. Some PHAs, however, did not report or did not report fully. For this reason, some bias may exist in the results because of the nonreporting PHAs. All results in this study are reported across the nation and large regions. Given this aggregation of the data, significant bias due to nonreporting is unlikely.
5. The U.S. Department of Housing and Urban Development (HUD) is monitoring those PHAs with a high incidence of families paying a high percentage of income toward housing costs. HUD prepared two lists. The first list identifies those PHAs for which at least 50 percent of the assisted households were paying more than 40 percent of income on housing during fiscal year 2002. This list is referred to as the High Concentration List. The second list identifies those PHAs for which at least 40 percent of the assisted households were paying more than 31 percent of income on housing during fiscal year 2002. This list is referred to as the Watch List.

The data include reports from 2,394 agencies administering HCVs. Of these, 76 are on the High Concentration List. These 76 agencies are disproportionately small. Of the 76 agencies, 55 (72 percent) have fewer than 100 vouchers, yet agencies with fewer than 100 vouchers comprise less than 35 percent of all agencies. The Watch List contains more than half of all PHAs administering the program.

References

- Betancur, John J. 1996. "The Settlement Experience of Latinos in Chicago: Segregation, Speculation, and the Ecology Model," *Social Forces* 74 (4): 1299–1324.
- Devine, Deborah J., et al. 2000. *The Uses of Discretionary Authority in the Tenant-Based Section 8 Program: A Baseline Inventory of Issues, Policy, and Practice*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.
- Finkel, Meryl, and Larry Buron. 2001. *Study of Section 8 Voucher Success Rates Volume I: Quantitative Study of Success Rates in Metropolitan Areas*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.
- Kennedy, Stephen D., and Mireille L. Leger. 1990. *Final Comprehensive Report of the Freestanding Housing Voucher Demonstration, Volume I*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.
- Krivo, Lauren J. 1995. "Immigrant Characteristics and Hispanic-Anglo Housing Inequality," *Demography* 32 (4): 599–615.
- Lubell, Jeffrey M. 2001. "Recent Improvements to the Section 8 Tenant-Based Program," *Cityscape: A Journal of Policy Development and Research* 5 (2): 85–88.
- Olsen, Edgar O. 2001. "Housing Programs for Low-Income Households." Working Paper 8208. Cambridge, MA: National Bureau of Economic Research. <http://papers.nber.org/papers/W8208>.
- Pendall, Rolf. 2000. "Why Voucher and Certificate Users Live in Distressed Neighborhoods," *Housing Policy Debate* 11 (4): 881–910.
- South, Scott J., and Kyle D. Crowder. 1998. "Avenues and Barriers to Residential Mobility Among Single Mothers," *Journal of Marriage and the Family* 60: 866–877.
- Turner, Margery Austin. 1998. "Moving Out of Poverty: Expanding Mobility and Choice through Tenant-Based Housing Assistance," *Housing Policy Debate* 9 (2): 373–394.
- U.S. Department of Housing and Urban Development (HUD). 2001. *Housing Choice Voucher Program Guidebook*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.
- . 2000. *Section 8 Tenant-Based Housing Assistance: A Look Back After 30 Years*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.
- . 1998. *Using the MTCS Support System for Monitoring: A Guide for Field Office Staff*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Public and Indian Housing.
- U.S. House of Representatives, Committee on Ways and Means. 2000. *2000 Green Book*. Washington, DC: U.S. Government Printing Office.
- Varady, David P., et al. 1999. "Helping Families Move: Relocation Counseling for Housing-Voucher Recipients," *Netherlands Journal of Housing and the Built Environment* 14 (1): 33–59.
- Yinger, John. 1998. "Housing Discrimination Is Still Worth Worrying About," *Housing Policy Debate* 9 (4): 893–927.

Geographic Mobility in the Housing Choice Voucher Program: A Study of Families Entering the Program, 1995–2002

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Abstract

This article presents the results from a study examining the geographic mobility of families with children that entered the Housing Choice Voucher Program between 1995 and 2002. Using a specially constructed longitudinal data set developed from U.S. Department of Housing and Urban Development administrative records, it analyzes the residential moves made by these families to see whether moves within the voucher program—particularly moves after the initial lease up—are associated with improvements in the neighborhoods where the families live and/or with increases in their economic self-sufficiency. We find that subsequent to program entry (that is, after the moves to lease up), a small but consistent tendency exists for families making later moves to choose slightly better neighborhoods. The data show reductions across a number of indicators of concentrated poverty and improvements across a number of neighborhood opportunity indicators for households that moved.

Introduction

Nationwide, the Housing Choice Voucher (HCV) Program assists 1.9 million households and is the largest of the federal housing assistance programs. The goals of the HCV Program, which provides tenant-based housing assistance, include better housing quality, more geographic mobility, and increased self-sufficiency for very low-income renters, in addition to alleviating their housing affordability problems. Among these goals, geographic mobility is the one on which the U.S. Department of Housing and Urban Development (HUD) has placed increased emphasis in recent years—by, for example, changing maximum rents in some metropolitan areas to make a larger portion of the rental stock accessible to program participants¹ and rewarding local program administrators for encouraging participants to locate in better quality neighborhoods.²

Moving to better neighborhoods is expected to benefit voucher program participants, providing access to more pleasant living environments, better services, and lower exposure to crime. For families with children, neighborhood quality is believed to be particularly important because it may help parents become more economically self-sufficient and may increase the life chances of children through such mechanisms as positive role models and better quality education.³

To what extent do HCV participants use their vouchers to move to better quality neighborhoods? Previous research has found that, among families first entering the HCV Program, those that use their voucher to move to a new location are not much more likely to locate in low-poverty neighborhoods than families that use their voucher to lease in place.⁴ It may be, however, that families are able to get to lower poverty neighborhoods as a result of *subsequent* moves.

The question addressed in this study is whether greater HCV participant geographic mobility is associated with improved neighborhood quality and increased economic self-sufficiency. Because it appears that first-time movers do not usually improve their neighborhood quality, we examine whether improvements in neighborhood quality occur more often on second or subsequent moves and for which participants. We also examine which participants are most likely to move and whether longer distance moves are associated with larger improvements in neighborhood quality.

Background

In a report published early in 2003 (Devine et al.), HUD analysts examined the residential locations of HCV participants and the implications of those locations for participant and neighborhood welfare. Using microdata on the characteristics of HCV participants linked to 1990 census data, the report analyzed participant locations relative to the supply of affordable rental housing, the poverty rates in the neighborhoods where participants were living, the relationship between those poverty rates and participant welfare, and whether the presence of concentrations of program participants might adversely affect neighborhoods.

HUD's report provided a valuable snapshot of the HCV Program, showing that HCV-assisted families are residing in most neighborhoods with affordable rental housing, that more than half of the participants live in neighborhoods with poverty concentrations below 20 percent, and that few neighborhoods have high concentrations of HCV-assisted households (Devine et al., 2003). But the report also noted that

. . . [F]or families who move to a new location upon first entering the program, the study shows that there is not much benefit in terms of avoiding poverty concentrations. Mover households are only slightly more likely than non-movers to avoid neighborhoods with moderate- and high poverty concentrations. It may be that families are able to get to lower-poverty neighborhoods as a result of subsequent moves, *but determining whether, or how often, this happens is beyond the scope of this study* [italics added for emphasis] (Devine et al., 2003: ix).

The limitation noted in HUD's report represents the starting point for the present research effort.

The present study has two important advantages over the earlier study, enabling us to address the core question. The first advantage stems from the enhanced HCV Program data we were able to use. HUD has constructed a data file with longitudinally linked records of HCV participants spanning 8 years, from 1995 to 2002. The longitudinal structure allows us to examine sequences of moves over time. Further, because the file contains records for the same households from the public housing and project-based

assisted housing programs (if a program change was made), it also allows analysis of patterns of HCV Program entry from public or assisted housing developments and how this might affect location.⁵

The second advantage this study enjoys is the availability of census tract-level data from the 2000 Census. During the 1990s, marked changes took place in the concentration of poverty in many U.S. cities (Jargowsky, 2003; Kingsley and Pettit, 2003). Between 1970 and 1990, there had been a trend of increasing poverty concentration in many large American cities, which had alarmed researchers and policymakers concerned about the effects of such environments on those living in neighborhoods with high poverty rates (Jargowsky, 1997; Wilson, 1987, 1996). Between 1990 and 2000, however, the proportion of low-income people living in high-poverty census tracts (those with poverty rates of 40 percent or more) declined. Although 17 percent of the metropolitan poor were living in concentrated poverty areas in 1990, this share fell to 12 percent in 2000. At the same time, the number of low-income families living in mid-range neighborhoods increased. Balancing the 5-percent population reduction in the concentrated poverty tracts were increases of 5 percent in the tracts with 10- to 30-percent poverty rates (Kingsley and Pettit, 2003). Use of the most recent census data enables this study to update the picture of HCV locations from the HUD report as they relate to the mobility of voucher families with children.

Data and Methods

Longitudinal Data on HCV Participants

The primary data source for this analysis was HUD's longitudinal Multifamily Tenant Characteristics System (MTCS)/Tenant Rental Assistance Certification System (TRACS) file, an 8-year file with household-level data for all recipients of federal housing assistance over the years 1995 through 2002.⁶ We restricted our analysis to recipients of Section 8 certificates, Section 8 vouchers, and Housing Choice Vouchers.

This data set provided annual information on each HCV participant's household composition, employment, amount and sources of income, and unit location during the period of program participation. The data also contained geocode information for most unit addresses—about 87 percent of the more than 10 million certificate and voucher records from 1995 through 2002. Records from 1995 had the worst geocoding rate, about 60 percent. The more recent years had geocoding rates of 80 percent or more.

The longitudinal HCV data set provides a tremendously rich source of information about participants in the HCV Program; however, the data set also poses several unique challenges for analysts. We made the following choices when constructing the analytical file used in this paper.

- **Discontinuities in the longitudinal data.** Just under half the sample households (48 percent) had possible missing records over the period of observation. About 31 percent had one single-year discontinuity in the observed time series, while the remaining households had multiple single-year discontinuities (11 percent), longer (multiyear) discontinuities (8 percent), or both (2.5 percent.) Such discontinuities could represent missing data during a continuous period of HCV participation, or they could mean the household exited and reentered the program. Due to this ambiguity, all observations with data gaps of more than 1 year were dropped from the sample. This restriction reduced the number of analysis households from 650,658 program entrants to 628,124. We retained participants with multiple gaps in their sequence of records as long as none of the individual gaps were more than 1 year in length. A single-year gap in records (in which no program exit or entry was indicated in the data) was assumed to represent continuous program participation.

- **Discontinuities and geographic mobility.** Some households with discontinuities in the observed time series were at different addresses before and after the discontinuity. Lacking information on when the move actually occurred, we used simple interpolation between the effective dates of the two records to infer a move date.
- **Using all sources of information on preprogram location.** In most of the records for new program entrants in the longitudinal file, the only information provided about preprogram location was the household's ZIP Code before admission. A small percentage of households were participating in another housing assistance program immediately before entering the HCV Program, so that preprogram address data (geocoded to the census tract level) were available for them. In these cases (just less than 5 percent of the analysis sample), we used the data to obtain tract-level neighborhood characteristics data on households' prior neighborhoods.
- **Identifying participants who leased in place at program entry.** The HCV longitudinal data set contains a variable for each year indicating whether the family moved into the housing unit that year (the "family-moving-into-unit" indicator). Theoretically, for the initial year of HCV participation, this indicator would tell us whether the household leased in place or moved to use the housing voucher. This variable, however, is known to be frequently missing or unreliable. Therefore, we took advantage of additional information to build a more accurate indicator of entry moves. We compared preprogram address (where present) or ZIP Code to initial program address or ZIP Code to supplement information from the family-moving-into-unit indicator.⁷
- **Identifying moves during HCV participation.** The availability of address data in the HCV file, combined with warnings about the family-moving-into-unit indicator, led us to develop an independent way to identify moves for analysis of mobility during HCV participation. Our approach used geocode data (the latitude and longitude of the unit address) to calculate the distance between pairs of consecutive locations.⁸ After examination of the data, we adopted a decision rule that distances of a quarter mile or more (at least 1,320 feet) would be treated as moves, with a new "mover flag" set to 1 for the records with these distances. For cases with positive distances smaller than a quarter mile, the "mover flag" was set to 0 so that they were treated as nonmovers in the mobility analysis.

U.S. Census Data

We used census tract-level data from 1990 and 2000 and census ZIP Code-level data from 2000 to measure neighborhood characteristics for each dwelling occupied by a household in the HCV sample. After defining a set of variables to characterize the locations of the study sample, tract-level or ZIP Code-level census variables were linked to HCV locations. These measures were used to characterize the areas where sample members lived when they entered the HCV Program and where they were living each year during the period covered by the HUD longitudinal data file. Interpolations were used to estimate the value of each neighborhood characteristic measure between the years covered by the HCV longitudinal file—1995 and 2002.⁹

We were able to construct neighborhood indicators for preprogram locations for 57 percent of the analysis sample. Where tables in this report use preprogram location information, the sample for the comparison with program addresses is therefore restricted to the 57 percent of cases for which we have both preprogram and program addresses.¹⁰

The Study Sample

This study focuses on families with children that entered the HCV Program between 1995 and 2002. We restricted the sample to families with children and with heads that

were neither elderly nor disabled, because this is the population using vouchers for whom mobility might offer benefits that are particularly associated with neighborhood quality.

We further restricted the data to those households that were observed entering the HCV Program during the time span covered in the HUD data. We defined program entrants as households with a certificate or voucher record from the MTCS recording a transaction type of “new admission.” We had to augment this definition, however. This period of time included the conversion of households participating in the predecessor Section 8 certificate and Section 8 voucher programs to the HCV Program. Some housing authorities coded records as “new admission” when participants’ subsidies were converted from certificates to vouchers. To ensure that we did not inadvertently code program conversions as program entries, we applied the following criteria:

- First, for each household head with any certificate or voucher records during this time span, we examined all records that existed before the effective date in the “new admission” record. If there was another HCV record (either voucher or certificate) for that participant in the 2 program years prior to the “new admission” record, we did not consider the “new admission” transaction flag to be a valid indicator of program entry (because it is unlikely that the household would have exited and reentered the program within such a short time) and we treated the household as an ongoing participant, excluding it from the “new entrants” sample.
- If there was a prior HCV record for that participant, but the record date was more than 2 program years prior to the “new admission” record, we examined the transaction type of the prior HCV record. If the transaction type was “end of participation,” then we considered the “new admission” record to be a valid indicator of program entry. Otherwise, we did not consider the “new admission” record to be valid and we did not retain the household in the sample.
- Third, a household was considered as a valid program entrant only if the listed date of admission to the program was equal to the effective date of the program entry record. Applying this rule was another way of ensuring that we were identifying true program entrants rather than ongoing participants who had a miscoded transaction type.

After applying these decision rules for defining program entry, we found that, of the 2.2 million families with children with any HCV records in the original file, some 628,000 were identified as HCV Program entrants over the period of observation. Exhibit 1 summarizes the number of households retained in the study sample out of the total data file provided by HUD.^{11, 12}

Exhibit 1

Summary of Sample Selection

| Included in Sample | Number | Percentage of All Households | Percentage of Families With Children |
|--|---------------|-------------------------------------|---|
| All households in MTCS/TRACS file, 1995–2002 | 8,856,409 | 100 | — |
| Nonelderly, nondisabled households with children, with any certificate or voucher participation | 2,220,994 | 25.1 | 100 |
| Nonelderly, nondisabled households with children, with reliable records indicating HCV entry between 1995 and 2002 | 628,124 | 7.1 | 28.3 |

Source: HCV Longitudinal Data File

Entry to the HCV Program in the Analysis Sample

The sample of families with children entering the voucher program between 1995 and 2002 contains a substantial number of cases entering the program each year, as shown by the “new admission” markers in the data. Between 9 and 13 percent of the sample entered the program in each of the first 5 years. This number increased to 15 percent in 2000. Households entering in the final 2 years (2001 and 2002) account for almost 30 percent of the sample (14 percent each). This increase in the last 3 study years could be a result of increased resource use in the HCV Program (more program entrants as Public Housing Authorities attempted to increase the total number of vouchers under lease), better reporting by the agencies administering HCVs, or both.

Exits From the HCV Program vs. Exits From the Sample

Because of the longitudinal nature of the data set, we also expected to be able to make use of sample data on exits from the voucher program. The correct way to do this would be to use the “end of participation” markers that are in the data (one of the transaction types filled in by the housing authority or property manager). A fairly small proportion of the families (22.7 percent), however, have a program exit code in their last records.¹³ Most families have codes in the last records indicating continued participation.

In the years from 1995 to 1999, between 2 and 6 percent of the sample exited the sample—that is, these households had no subsequent records. In 2000, about 8 percent of the sample exited. Cumulatively, 31 percent of the households in the sample had left the program by 2000 and 48 percent had exited by 2001. The remaining 52 percent were in the HCV Program at the end of the observation period. In this study, we treat the sample exits as equivalent to program exits, although they could also result from missing reports.

Sample Households’ Duration in the HCV Program

Based on the families’ first and last records in the longitudinal file, about 25 percent of the households in this sample of voucher program entrants are present in the longitudinal data set for only 1 year. The remaining 75 percent of the households were in the HCV Program 2 years or more during this observation period. Overall, nearly half the sample households (46 percent) used vouchers for at least 3 years from 1995 through 2002, but less than 30 percent used them for 4 years.

Durations for Those Who Moved or Leased in Place at Program Entry

Three-fourths of all the households in this sample moved at the time they entered the HCV Program. Only 25.2 percent of those families with children leased in place. In general, those leasing in place remained in the program longer during this observation period than those; that moved to lease up; 74 percent of in-place leasers were present in the sample for at least 2 years, compared to 67 percent of those that moved to lease up.

Geographic Mobility Among HCV Participants

According to the HUD longitudinal data, most families with children entering the voucher program during the period 1995 through 2002 did not move again after lease up. Just 18.7 percent of the sample households moved more than a quarter mile (the definition of a move for this analysis) after leasing up in the program. Only 4 percent of the whole sample moved twice or more.¹⁴

These low observed mobility rates, however, may be due, in part, to the cutoff of the longitudinal data as of 2002, which limited the observation period for most families to 3 years or less. As discussed above, only a small portion of the sample families have last

reports that are clearly program exits. As a result, it is quite possible that if this time series were continued into 2003 and beyond we would see the families that entered the voucher program in 2000 through 2003 making further moves. Thus, our analysis of mobility rates may somewhat underestimate mobility rates because of the data set’s structure.

Only a small portion of the full study sample participated in the voucher program for the entire 8-year period from 1995 through 2002. The average length of time in the program for this sample was 2 years and 11 months, with a median of 3 years. At the same time, the proportion of the sample making a move from the initial program unit to another dwelling increased with length of time in the program.

Exhibit 2 shows that only 14.5 percent of the sample families moved again in their second year of participation. Of those in the program at least 3 years, however, 25 percent made a move from their initial program address. The proportion of movers increased to more than half the households within 6 years and more than 60 percent within 8 years. Of course, these percentages apply to a smaller and smaller number of families because relatively few sample households participated throughout this entire period. The mobility of these families in the first 2 to 3 years may be underestimated because the time series data end in 2002. Recall, also, that the sample cannot include any of the long-term voucher participants who entered the program before the beginning of the longitudinal data set.

Exhibit 2

Moving Behavior of HCV Participants: Timing of Moves, 1995–2002

| Characteristic | Moves After Lease Up for All Households (%) | Moves After Lease Up for Those Leasing in Place (%) | Moves After Lease Up for Those Moving at Program Entry (%) |
|--|---|---|--|
| BASE | Full Analysis Sample | | |
| HCV Participation Characteristic | | | |
| Timing of moves relative to HCV participation: | | | |
| Moved within first 2 years | 14.5 | 12.1 | 15.4 |
| Moved within 3 years | 25.2 | 22.5 | 26.3 |
| Moved within 4 years | 36.8 | 34.4 | 37.9 |
| Moved within 5 years | 45.3 | 43.2 | 46.3 |
| Moved within 6 years | 51.5 | 49.2 | 52.7 |
| Moved within 7 years | 56.6 | 53.8 | 58.5 |
| Moved within 8 years | 60.8 | 58.1 | 63.4 |

Sample: Families with children entering the HCV Program, 1995 through 2002. Full sample consists of 628,124 families.

Source: HCV Longitudinal Data File

Exhibit 2 also shows that there were some differences in the proportion of movers between families that leased in place and those that moved at HCV Program entry (about three-fourths of the sample households). At each additional year of participation, movers at program entry were more likely to move again than those that leased in place. The differences, however, were only 3 to 5 percentage points.

Geographic Mobility and Neighborhood Characteristics: Preprogram and Initial Program Neighborhoods

Now we turn to the question of neighborhood environments: the characteristics of the neighborhoods where families with children participating in the voucher program were living. HUD’s prior research (Devine et al., 2003) used the poverty rate as the key indicator

of quality. The poverty rate—the proportion of people with incomes below the poverty line living in a particular area—has been widely used to identify adverse living environments in the United States and to examine the clustering of negative conditions in concentrated-poverty areas.¹⁵ The poverty rate has also been used as a benchmark for identifying better quality neighborhoods to which voucher holders can be encouraged to move. For example, the Moving to Opportunity (MTO) program—a HUD-sponsored mobility demonstration for families living in public housing in concentrated-poverty areas—required families with special MTO vouchers to seek housing in neighborhoods with poverty rates below 10 percent (Orr et al., 2003). Throughout the remainder of this article, we use not only the poverty rate but also a larger set of neighborhood quality indicators to describe the areas surrounding HCV unit addresses. These measures were calculated from census data for the census tracts where sample households lived during their HCV participation between 1995 and 2002.¹⁶

The neighborhood quality indicators are listed in exhibit 3. The exhibit's first (upper) panel presents a number of concentrated-poverty indicators: the percentage of people in poverty, the percent of households receiving public assistance income, the rate of high school dropouts, measures of unemployment and labor force participation, and so on. The next (middle) panel presents several opportunity indicators—the types of neighborhood characteristics thought to benefit low-income families able to move to lower poverty areas. This group includes a measure of higher incomes relative to the poverty line, measures of post-secondary education among adults and current school of youths, and an indicator of how many dwellings are owned by their occupants. The last (bottom) panel of the exhibit shows measures of the neighborhoods' racial and ethnic composition.

Exhibit 3 provides a snapshot of the preprogram neighborhoods and initial locations of the families in the study sample. In the first two (unshaded) columns, it compares the neighborhood characteristics for the portion of the sample with both locations known, which is just under 60 percent of all the families in the study. Then, in the shaded column, it shows the characteristics of the initial HCV location for the entire sample. They are virtually identical to the locations for the portion of the sample with preprogram addresses.

The overall pattern is for families with children entering the HCV Program in this period to move to neighborhoods with about a fifth of the population living in poverty. Three-fourths of the households in these neighborhoods have earnings from employment, and about 40 percent of the adults have some education beyond high school. Just more than half the households own their own homes. Consistent with the findings reported by Devine et al. (2003), these neighborhoods are not better off on average than the neighborhoods from which participants moved.

Geographic Mobility and Neighborhood Characteristics: Characteristics of Subsequent Neighborhoods

As noted earlier, fewer than one in five of the sample families moved again during the period between 1995 and 2002. There is considerable interest, however, in these movers and whether they choose better neighborhoods in the next units they rent with HCVs.

Exhibit 4 focuses on the movers in the sample and compares neighborhood indicators for their first and second voucher locations. It shows small changes in characteristics—reductions in the factors associated with concentrated poverty and increases in the opportunity indicators. These changes are in the desired direction but are very small and probably do not indicate any material difference in local conditions.

Exhibit 3

Neighborhood Characteristics of HCV Participants' Preprogram and Initial Program Locations

| Neighborhood Characteristic | Preprogram Location ^a | Initial HCV Location ^b | Initial HCV Location |
|---|--|-----------------------------------|----------------------|
| | Sample with Pre- and Post-Lease-Up Addresses | | Full Analysis Sample |
| Concentrated Poverty Indicators for the Sample's Residential Locations (%) | | | |
| People in poverty | 18.4 | 20.1 | 20.0 |
| Households receiving public assistance income | 6.4 | 7.3 | 7.3 |
| Female-headed families with own children | 28.9 | 32.4 | 32.3 |
| High school dropouts | 15.7 | 16.6 | 16.6 |
| Unemployment rate | 8.2 | 8.8 | 8.7 |
| Labor force participation | | | |
| Males | 67.7 | 67.9 | 68.1 |
| Females | 55.5 | 55.7 | 55.8 |
| Families with no workers | 14.6 | 14.8 | 14.7 |
| Opportunity Indicators for the Sample's Residential Locations (%) | | | |
| People with incomes twice the poverty level | 60.4 | 57.2 | 57.3 |
| Households with wage or salary income | 75.4 | 75.5 | 75.6 |
| People with education beyond high school | | | |
| Some college | 20.2 | 20.3 | 20.3 |
| College graduate | 23.4 | 21.4 | 21.3 |
| 16- to 19-year-olds in school | 76.3 | 74.3 | 74.2 |
| Owner-occupied housing | 59.0 | 54.1 | 54.2 |
| Racial and Ethnic Composition of Population (%) | | | |
| African American | 22.1 | 24.7 | 24.4 |
| Hispanic | 13.6 | 14.2 | 14.2 |
| Minority | 40.7 | 43.8 | 43.6 |

Sample: Families with children entering the HCV Program, 1995 through 2002. Full sample consists of 628,124 families; families with known preprogram and initial HCV location addresses N = 359,978 (57.3 percent of the full sample). A family is defined as a household with a head who is neither elderly nor disabled and with at least one child under 18.

^a Preprogram address characteristics are based on the ZIP Code of the preprogram location.

^b Program address characteristics are based on the census tract of the initial program location.

Notes: Neighborhood characteristics are shown as of the year of the initial location (the first year of HCV participation) or the preprogram year. They were estimated using a simple linear interpolation over the decade between the 1990 Census and the 2000 Census. For example, if the 1990 poverty rate in the destination census tract was 8 percent but in the 2000 Census it was 12 percent, over the decade the rate was assumed to change by .4 percent a year. For a lease up in 1995 in this tract, the estimated poverty rate at that time would be about 10 percent. (The formula used the actual date of the program move and estimated the poverty rate based on days elapsed from April 1, 1990.)

Sources: U.S. Census, HCV Longitudinal Data File

Just 4 percent of the study sample moved a second time. Extending our look at the subsequent neighborhoods of HCV movers shows that all of the concentrated-poverty indicators are reduced at each move, although the changes are very small. All of the opportunity indicators rise, again in very small steps. Because the percentage of participants that move multiple times is quite small, it is difficult to say whether these changes represent material improvements *on average* for all participants, but the pattern of movement in the direction of better neighborhood conditions is clear.

Exhibit 4

HCV Movers: Neighborhood Characteristics of First and Next Program Locations^a

| Tract Characteristic | Initial HCV Location | Second HCV Location |
|---|----------------------|---------------------|
| All Movers in Full Analysis Sample | | |
| Concentrated-Poverty Indicators for the Sample's Residential Locations (%) | | |
| People in poverty | 20.6 | 19.5 |
| Households receiving public assistance income | 7.7 | 6.7 |
| Female-headed families with own children | 33.8 | 33.0 |
| High school dropouts | 17.0 | 16.4 |
| Unemployment rate | 8.9 | 8.6 |
| Labor force participation | | |
| Males | 68.5 | 68.5 |
| Females | 56.2 | 56.7 |
| Families with no workers | 14.7 | 14.1 |
| Opportunity Indicators for the Sample's Residential Locations (%) | | |
| People with incomes twice the poverty level | 56.4 | 57.9 |
| Households with wage or salary income | 75.9 | 76.7 |
| People with education beyond high school | | |
| Some college | 20.3 | 21.0 |
| College graduate | 21.0 | 21.8 |
| 16- to 19-year-olds in school | 73.3 | 74.1 |
| Owner-occupied housing | 53.0 | 55.1 |
| Racial and Ethnic Composition of Population (%) | | |
| African American | 27.1 | 26.8 |
| Hispanic | 13.8 | 14.4 |
| Minority | 45.7 | 46.5 |

Sample: Families with children entering the HCV Program, 1995 through 2002, that moved at least once during that period. N = 117,671 (18.7 percent of family entrants in this period). A family is defined as a household with a head who is neither elderly nor disabled and with at least one child under 18.

Note: All neighborhood data are measured at the census tract level.

^a Neighborhood characteristics are shown as of the year of the initial location (the first year of HCV participation) or the year of the next move. They were estimated using a simple linear interpolation over the decade between the 1990 Census and the 2000 Census. For example, if the 1990 poverty rate in the destination census tract was 8 percent but in the 2000 Census it was 12 percent, over the decade the rate was assumed to change by .4 percent a year. For a lease up in 1995 in this tract, the estimated poverty rate at that time would be about 10 percent. (The formula used the actual date of the program move and estimated the poverty rate based on days elapsed from April 1, 1990.)

Sources: U.S. Census, HCV Longitudinal Data File

Who Moves in the Voucher Program?

Up to this point, we have examined the characteristics of the neighborhoods where HCV entrants lived between 1995 and 2002 with reference only to the households' mobility behavior. Now we turn to the question of whether household characteristics or preprogram neighborhood characteristics made a difference in mobility behavior among participants. Because mobility appears to be associated with at least small neighborhood improvements, there may be subgroups among the HCV entrants that moved more and realized greater changes in neighborhood conditions.

The families with children entering the voucher program in this period varied in size, in the age composition of their members, in the age of the household heads, in their income sources and levels, and in their race or ethnicity. Exhibit 5 shows how the families' moving behavior was related to these characteristics.¹⁷ Smaller households of one or two members (about a third of the sample) were more likely to move to lease up. But after lease up, the largest households (with five or more members, making up 15 percent of the sample) were somewhat more likely to move, both at least once and more than once.

Exhibit 5

Moving Behavior of HCV Participants: Probability of Moving, 1995–2002

| Characteristic | Proportion Moving on Lease Up | Probability of Moving At Least Once | Probability of Moving More Than Once | Probability of Moving At Least Once | Probability of Moving More Than Once |
|--------------------------------------|-------------------------------|-------------------------------------|--------------------------------------|-------------------------------------|--------------------------------------|
| | Full Sample | Leased in Place | Moved at Lease Up | | |
| Base | | | | | |
| Full Analysis Sample | | | | | |
| Household Characteristics (%) | | | | | |
| Number of HH members: | | | | | |
| 1 or 2 | 76.1 | 18.8 | 4.3 | 17.6 | 3.6 |
| 3 or 4 | 74.6 | 20.4 | 5.0 | 18.6 | 3.8 |
| 5 or more | 72.7 | 21.5 | 5.2 | 18.7 | 3.9 |
| Children present: | | | | | |
| Age 3 or younger | 76.5 | 21.9 | 5.5 | 19.6 | 4.2 |
| Ages 4–5 | 75.0 | 22.9 | 5.8 | 20.4 | 4.5 |
| Ages 6–12 | 73.6 | 21.0 | 5.1 | 18.5 | 3.8 |
| Ages 13–17 | 72.1 | 17.3 | 3.7 | 15.3 | 2.7 |
| Number of adults in HH: | | | | | |
| 1 | 75.7 | 21.5 | 5.3 | 19.1 | 4.0 |
| 2 | 72.1 | 14.9 | 2.9 | 14.5 | 2.5 |
| 3 or more | 67.9 | 12.1 | 2.3 | 12.1 | 1.8 |
| Age of HH head: | | | | | |
| 24 or younger | 78.3 | 23.2 | 6.5 | 20.7 | 4.7 |
| 25–44 | 73.6 | 19.6 | 4.5 | 17.6 | 3.4 |
| 45 or older | 71.0 | 13.7 | 2.6 | 13.4 | 2.3 |
| Total HH income: | | | | | |
| < \$5,000 | 76.6 | 23.8 | 6.7 | 21.4 | 5.1 |
| \$5,000–\$9,999 | 74.0 | 21.9 | 5.4 | 20.0 | 4.2 |
| \$10,000–\$14,999 | 73.5 | 17.7 | 3.6 | 16.3 | 2.8 |
| \$15,000–\$19,999 | 74.6 | 14.6 | 2.5 | 13.0 | 1.8 |
| \$20,000 or more | 76.2 | 10.5 | 1.4 | 8.9 | 1.0 |
| Total HH wages: | | | | | |
| < \$5,000 | 74.2 | 23.1 | 6.0 | 21.1 | 4.8 |
| \$5,000–\$9,999 | 75.1 | 17.7 | 3.9 | 16.6 | 2.9 |
| \$10,000–\$14,999 | 75.2 | 15.3 | 2.7 | 14.3 | 2.2 |
| \$15,000 or more | 77.1 | 11.6 | 1.7 | 10.7 | 1.2 |
| Total income from TANF: | | | | | |
| < \$2,500 | 75.5 | 18.0 | 4.0 | 16.2 | 3.0 |
| Total income from TANF: | | | | | |
| \$2,500–\$4,999 | 75.5 | 24.6 | 6.8 | 23.6 | 5.7 |
| Total income from TANF: | | | | | |
| \$5,000 or more | 70.7 | 23.9 | 5.9 | 21.9 | 4.9 |
| Race of HH head: | | | | | |
| White | 73.5 | 16.1 | 3.4 | 15.8 | 2.9 |
| African American | 76.8 | 26.1 | 6.9 | 21.5 | 4.8 |
| Asian/Pacific Islander | 69.4 | 17.2 | 3.4 | 14.0 | 2.3 |
| American Indian/ Alaskan Native | 73.4 | 15.8 | 4.0 | 13.8 | 2.3 |
| HH head is Hispanic | 74.2 | 19.9 | 5.1 | 16.0 | 3.1 |
| All Households | 74.8 | 20.1 | 4.8 | 18.3 | 3.7 |

Sample: Families with children entering the HCV Program, 1995 through 2002. Full sample consists of 628,124 families.

Source: HCV Longitudinal Data File

Moving behavior also varied with the ages of children in the families: households with teenagers (about 16 percent of these families) moved less than those with preschool age children (about a third of the sample). The number of adults in the household and the age of the head both were associated with differences in rates of moving while participating in the voucher program. Families with only one adult (81 percent of the sample) and families with young heads (26 percent of the sample) were more mobile than households with more adults or older heads.

Turning to financial characteristics, exhibit 5 shows mobility patterns in relation to total household income and to the amount of income from wages or Temporary Assistance for Needy Families (TANF). Within the program's income limits, households with more income overall—and those with more wage income—were more likely to move to lease up in the HCV Program. Those with higher amounts of TANF assistance were less likely to move to lease up. After program entry, however, those with higher total incomes and more wage income moved less, regardless of the way they entered.

There were also differences in moving behavior associated with the race of the household head. African Americans—who made up 43 percent of the sample—were the group with the largest proportion of moves to lease up (more than 75 percent) and the highest probability of moving after HCV Program entry. In fact, African Americans showed strikingly higher rates across all the mobility indicators than the other racial or ethnic groups. Families with Hispanic heads (14 percent of the sample) had about the same rate of moving to lease up, but they were less likely than African Americans to move after becoming voucher program participants.

Moving behavior in this sample also varied with the poverty rate of the household's pre-program address or that of the initial voucher unit (results not shown). Those living initially in low-poverty neighborhoods were the least likely to move after becoming voucher program participants, no matter whether they leased in place or moved to their first program unit. Households living in neighborhoods with poverty rates between 20 and 39 percent showed the highest move rates, while these rates were somewhat lower for the families in the poorest neighborhoods. It seems surprising that the families in the most adverse environments did not move more, but this may be due to other factors (for example, the households' characteristics).

The Timing and Direction of HCV Mobility Behavior

We now take a more direct look at the changes in neighborhoods made by HCV participants in this sample and ask what may have influenced their patterns of movement. One factor that may well have shaped the mobility experience of voucher program participants in this period was the general condition of the U.S. economy and its rental housing markets. The late 1990s saw the culmination of a long economic expansion, which reached virtually every part of the country and led to rising home prices and rents in many places. Anecdotal evidence from operators of the HCV Program pointed to the tightening rental market as a factor pushing participants out of low-poverty neighborhoods (as rents increased more rapidly there) and into areas with greater proportions of low-income residents. Under this scenario, deconcentration gains made during the early and mid-1990s did not last; instead, voucher holders had to seek units in poorer neighborhoods where the rents still fell within program requirements.

Exhibit 6 shows the pattern of movement among our sample of families with children entering the voucher program between 1995 and 2002. By calendar year, it categorizes moves according to the poverty levels of the locations from which the participant households were moving and the poverty levels of their destination addresses. In this table, we use the following fairly large categories:

- Low-poverty areas are defined following the convention of MTO (less than 10 percent poverty).
- Mid-level poverty areas are defined as all those with poverty rates between 10 and 39 percent.
- High-poverty areas are defined according to the usual threshold for concentrated poverty areas (40 percent or more).

Exhibit 6

Moving Behavior of HCV Participants: Comparison of Premove and Postmove Neighborhoods, By Year of Move^a

| | 1996 (%) | 1997 (%) | 1998 (%) | 1999 (%) | 2000 (%) | 2001 (%) | 2002 (%) |
|------------------------------|----------|----------|----------|----------|----------|----------|----------|
| Moves from LP to: | | | | | | | |
| LP | 10.2 | 9.4 | 8.5 | 8.7 | 9.6 | 9.6 | 10.6 |
| MP | 10.2 | 9.7 | 9.1 | 9.4 | 9.4 | 8.7 | 9.0 |
| HP | 0.3 | 0.3 | 0.3 | 0.2 | 0.5 | 0.4 | 0.3 |
| Moves from MP to: | | | | | | | |
| LP | 10.5 | 10.9 | 10.8 | 11.5 | 12.1 | 12.9 | 13.9 |
| MP | 59.0 | 60.2 | 60.1 | 59.5 | 57.9 | 57.1 | 55.0 |
| HP | 3.5 | 3.5 | 4.2 | 3.9 | 3.8 | 4.0 | 4.1 |
| Moves from HP to: | | | | | | | |
| LP | 0.4 | 0.4 | 0.4 | 0.5 | 0.6 | 0.6 | 0.6 |
| MP | 4.1 | 4.1 | 5.0 | 4.5 | 4.5 | 4.9 | 4.7 |
| HP | 1.9 | 1.5 | 1.7 | 1.7 | 1.8 | 1.9 | 1.8 |
| All moves | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Total number of moves | 6,496 | 12,327 | 18,663 | 21,917 | 18,803 | 21,488 | 35,999 |

Sample: Families with children entering the HCV Program, 1995 through 2002, that moved during that period. Family entrants made 135,693 moves in this period.

^a Includes moves after lease up only.

Notes: LP indicates neighborhoods with poverty rates below 10 percent.

MP indicates neighborhoods with poverty rates from 10 to 39.9 percent.

HP indicates neighborhoods with poverty rates of 40 percent or more.

Percentages may not add to 100 percent due to rounding.

Sources: HCV Longitudinal Data File, 2000 Census

Across the 7 years in the table, there does seem to be a smaller proportion of moves to low-poverty areas from 1997 through 1999 and a larger proportion leaving mid-level poverty areas in those years. In 1996 and 1997, about 21 percent of the HCV moves by recent program entrants were to low-poverty neighborhoods—10.2 percent from other low-poverty locations and 10.5 percent from areas of mid-level poverty. In 1998 and 1999, the shares were lower (19.3 percent and 20.2 percent, respectively), and a greater share of movers went to areas of mid-level poverty. Then, in 2000 through 2002, the share of all moves to low-poverty areas rose from 22 to 25 percent.

These changes, however, were relatively small, in part because of the low mobility rates among a sample relatively new to the program. Conducting this analysis on a similar sample for a longer period, or on the full set of program participants (including those entering the program before 1995 and those for whom information on entry date is missing) might show stronger patterns.

Multivariate Analysis

Now we turn to a multivariate examination of the relationship of mobility among voucher recipients to the quality of recipients' neighborhoods and to recipients' economic self-sufficiency. Neighborhood quality is measured by two outcomes: the poverty rate and the owner-occupancy rate in the last neighborhood in which the family is observed in the program. Economic self-sufficiency is measured by three outcomes: total household income, the percentage of income that is earned, and the percentage of income from welfare for the last year in which the family is observed. After examining these basic outcomes, we test whether the relationship between mobility and neighborhood quality varies by race and ethnicity for HCV participants. Finally, we present an analysis of whether *distance moved* is an important determinant of outcomes.

For each outcome, three models are estimated (all using ordinary least squares). The first model includes an indicator variable for "household moved at least once" and tests whether there is a significant relationship between whether a household has *ever* moved (has moved at least once) while in the HCV Program and the outcome variable. The second model includes an indicator variable for "household moved exactly once" and an indicator variable for "household moved more than once"; it addresses whether there is an observable difference in outcomes for households that moved once compared to those moving more than once in the HCV Program. The third model includes an indicator variable for "household moved at least once" and a continuous variable measuring the total number of moves the household made while receiving vouchers. This model tests whether there is a linear relationship between the number of moves and the outcome variable, conditional on a household having moved at least once.

In addition to the measures of mobility just described, a number of covariates are included in every regression, as follows:

- The **maximum distance moved**, as measured by the distance between the household's first HCV location and the farthest HCV location to which they ever subsequently moved, is included to test whether moving longer distances is associated with greater changes in household and neighborhood outcomes.
- The **number of years each household is observed** in the HCV Program is measured with a set of indicator variables, permitting a nonlinear relationship to be estimated between years in the program and each outcome variable.
- **Whether the initial lease up was a move** or was an in-place rental is also included in all model specifications.
- A broad set of **household demographic and socioeconomic characteristics** measured during each household's first year in the HCV Program is included, including controls for household size and the number of children, the race and ethnicity of the voucher recipient, the amount and sources of household income, and the household's income-to-poverty line ration.
- Finally, **characteristics of the neighborhood** in which the household lived during the first year of the HCV Program are also included.

We do not report the results for the covariates in the exhibits for this section, except where they are also used in interaction terms.¹⁸

Mobility and Neighborhood Characteristics

Exhibit 7 presents results from regressions of the neighborhood poverty rate on measures of mobility. Model 1 indicates that having moved at least once is significantly associated with living in a lower poverty neighborhood. The size of the coefficient on “ever moved” (household moved at least once) is quite small, however. Households that moved lived in neighborhoods that had poverty rates 1.2 percentage points lower than the neighborhoods of those that did not move. This difference is about 6 percent of the mean poverty rate (19.8 percent). Turning to model 2, we see that households that moved exactly once experienced slightly lower levels of neighborhood improvement (a 1.1 percentage point decline in the poverty rate) than households that moved more than once (a 1.5 percentage point decline in the poverty rate), and an F-test confirms that these differences are statistically significant. Model 3 shows evidence of a linear relationship between the number of moves a household makes and further declines in the neighborhood poverty rate. Each additional move after the initial move is associated with a 0.3 percentage point decline in the neighborhood poverty rate.

Exhibit 7

Mobility and Final Year Neighborhood Poverty Rates

| Model | Model 1 | | | Model 2 | | | Model 3 | | |
|-------------------------------------|--------------|-------|-------|--------------|-------|-------|--------------|-------|-------|
| Outcome | Poverty Rate | | | Poverty Rate | | | Poverty Rate | | |
| Mean of dependent variable | 19.8 | | | 19.8 | | | 19.8 | | |
| R-squared | 0.78 | | | 0.78 | | | 0.78 | | |
| Regression sample size | 522,182 | | | 522,182 | | | 522,182 | | |
| | Est | SE | pr>t | Est | SE | pr>t | Est | SE | pr>t |
| Intercept | 2.434 | 0.142 | 0.000 | 2.441 | 0.142 | 0.000 | 2.442 | 0.142 | 0.000 |
| Moved exactly once | | | | -1.117 | 0.023 | 0.000 | | | |
| Moved more than once | | | | -1.450 | 0.043 | 0.000 | | | |
| Ever moved (moved At least once) | -1.171 | 0.022 | 0.000 | | | | -0.845 | 0.044 | 0.000 |
| Number of Moves | | | | | | | -0.273 | 0.031 | 0.000 |
| Farthest distance moved | -0.001 | 0.000 | 0.000 | -0.001 | 0.000 | 0.000 | -0.001 | 0.000 | 0.000 |
| Moved at program entry | 0.031 | 0.019 | 0.094 | 0.031 | 0.019 | 0.097 | 0.031 | 0.019 | 0.096 |

Sample: Families with children entering the HCV Program, 1995 through 2002. Full sample consists of 628,124 families; sample size for each equation is shown in table.

Note: Additional covariates not shown include household size and family structure, race/ethnicity of head, years in program, initial lease-up status, sources and amount of income, and characteristics of first HCV neighborhood. These are described in detail in the text.

Est = Parameter estimate.

SE = Standard error of the estimate.

pr>t = Probability of estimated value using 2-tailed t-test.

Source: HCV Longitudinal Data File

These results are consistent with the descriptive statistics presented above. For example, exhibit 4 shows that, on average, the poverty rate in the last observed neighborhood was about 1.1 percentage points lower than the poverty rate in the first HCV neighborhood for households that move. Finally, it should be noted that *distance moved* is significantly associated with the last year’s poverty rate (as we discuss below.)

Exhibit 8 presents results from similar models in which the dependent variable is the percentage of owner-occupied units in the neighborhood. The results are quite comparable to those found for the poverty rate. Model 1 in exhibit 8 shows that households that moved at least once ended up in neighborhoods that had significantly higher rates of owner occupancy compared to households that did not move. The difference was not large, however; movers were located in neighborhoods that had owner-occupancy rates averaging just 2.1 percentage points higher than nonmovers. Against an overall mean owner-occupancy rate of 55 percent, this figure represents a 4-percent difference.

Exhibit 8

Mobility and Final Year Neighborhood Owner-occupancy Rates

| Model | Model 1 | | | Model 2 | | | Model 3 | | |
|----------------------------|----------------------|-------|-------|----------------------|-------|-------|----------------------|-------|-------|
| Outcome | Owner-occupancy Rate | | | Owner-occupancy Rate | | | Owner-occupancy Rate | | |
| Mean of dependent variable | 54.6 | | | 54.6 | | | 54.6 | | |
| R-squared | 0.77 | | | 0.77 | | | 0.77 | | |
| Regression sample size | 522,182 | | | 522,182 | | | 522,182 | | |
| | Est | SE | pr>t | Est | SE | pr>t | Est | SE | pr>t |
| Intercept | 12.648 | 0.253 | 0.000 | 12.635 | 0.253 | 0.000 | 12.634 | 0.253 | 0.000 |
| Moved once | | | | 2.028 | 0.041 | 0.000 | | | |
| Moved more than once | | | | 2.601 | 0.076 | 0.000 | | | |
| Ever moved | 2.121 | 0.039 | 0.000 | | | | 1.606 | 0.078 | 0.000 |
| Number of moves | | | | | | | 0.431 | 0.056 | 0.000 |
| Farthest distance moved | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 |
| Moved at program entry | -0.073 | 0.033 | 0.027 | -0.073 | 0.033 | 0.028 | -0.073 | 0.033 | 0.027 |

Sample: Families with children entering the HCV Program, 1995 through 2002. Full sample consists of 628,124 families; sample size for each equation is shown in table.

Note: Additional covariates not shown include household size and family structure, race/ethnicity of head, years in program, initial lease-up status, sources and amount of income, and characteristics of first HCV neighborhood. These are described in detail in the text.

Est = Parameter estimate.

SE = Standard error of the estimate.

pr>t = Probability of estimated value using 2-tailed t-test.

Source: HCV Longitudinal Data File

Model 2 in exhibit 8 indicates that households that moved more than once did appear to locate in slightly better neighborhoods, as measured using the owner-occupancy rate, compared to households moving only once. Households that moved exactly once lived in neighborhoods where the owner-occupancy rate was 2 percentage points higher than in neighborhoods where nonmovers lived, while the difference was 2.6 percentage points for households that moved more than once. An F-test indicates that this difference was statistically significant. Clearly, however, the effect of additional moves is quite small. Turning to model 3, there is evidence for a very modest linear relationship between the number of moves a household makes and the owner-occupancy rate of its last neighborhood; each additional move after the initial move is associated with about half a percentage point increase in the neighborhood owner-occupancy rate. These results, too, are highly comparable to the descriptive findings presented earlier. For example, exhibit 4 shows that, on average, households that move locate into neighborhoods where the average proportion of owner-occupied homes is 2.1 percentage points higher than in their initial neighborhoods.

Mobility and Family Self-sufficiency

In this section we discuss the estimated relationships between mobility measures and three key indicators of family self-sufficiency: total household income, the percent of household income obtained from earnings, and the percent of household income obtained from cash assistance. These indicators are measured at the last year each household is observed to be participating in the HCV Program.

Overall, the results indicate a weaker relationship between mobility and these outcomes than was observed between mobility and the neighborhood quality outcomes discussed above. There are small but statistically significant relationships between the mobility indicators and (1) total household income and (2) the percent of household income from earnings. The relationship between mobility and the percent of household income from cash assistance, however, is not statistically significant.

Model 1 in exhibit 9 shows that HCV households that moved at least once had slightly lower total incomes in their most recent record than households that never moved.¹⁹ The difference is just \$579, however, 5.2 percent lower than the overall mean of \$11,111. It appears that moving more than once is associated with a larger reduction in income (model 2). Those that moved multiple times had, on average, \$1,097 less in total household income than those that never moved. An F-test indicates that this value is significantly larger than the decrease in income associated with moving exactly once, which is \$479. Finally, model 3 shows that there does appear to be a linear relationship between number of moves and total household income; each move is associated with a \$488 reduction in household income.

Exhibit 9

Mobility and Final Year Total Household Income

| Model | Model 1 | | | Model 2 | | | Model 3 | | |
|----------------------------|------------------|-----|-------|------------------|-----|-------|------------------|-----|-------|
| Outcome | Household Income | | | Household Income | | | Household Income | | |
| Mean of dependent variable | \$9,500 | | | \$9,500 | | | \$9,500 | | |
| R-squared | 0.35 | | | 0.35 | | | 0.35 | | |
| Regression sample size | 522,182 | | | 522,182 | | | 522,182 | | |
| | Est | SE | pr>t | Est | SE | pr>t | Est | SE | pr>t |
| Intercept | \$12,068 | 161 | 0.000 | \$12,082 | 161 | 0.000 | \$12,084 | 161 | 0.000 |
| Moved once | | | | -479 | 26 | 0.000 | | | |
| Moved more than once | | | | -1,097 | 49 | 0.000 | | | |
| Ever moved | -579 | 25 | 0.000 | | | | 4 | 50 | 0.940 |
| Number of moves | | | | | | | -488 | 36 | 0.000 |
| Farthest distance moved | -1 | 0 | 0.000 | -1 | 0 | 0.000 | -1 | 0 | 0.000 |
| Moved at program entry | -97 | 21 | 0.000 | -97 | 21 | 0.000 | -97 | 21 | 0.000 |

Sample: Families with children entering the HCV Program, 1995 through 2002. Full sample consists of 628,124 families; sample size for each equation is shown in table.

Note: Additional covariates not shown include household size and family structure, race/ethnicity of head, years in program, initial lease-up status, sources and amount of income, and characteristics of first HCV neighborhood. These are described in detail in the text.

Est = Parameter estimate.

SE = Standard error of the estimate.

pr>t = Probability of estimated value using 2-tailed t-test.

Source: HCV Longitudinal Data File

Exhibit 10 presents the relationship between mobility and the percentage of income from earnings. On average, households that moved at least once had a significantly *lower* percentage of income from earnings than households that never moved (model 1); however, the difference is fairly modest—4.5 percentage points, about 10 percent lower than the overall sample, which averaged 46 percent of income from earnings. Model 2 indicates that households that moved exactly once were 4 percentage points lower in the percent of income from earnings, while households that moved more than once experienced a larger decline—7.4 percentage points—in the percentage of income from earnings relative to households that did not move. An F-test indicates that this difference was statistically significant. Turning to model 3, we find evidence for a linear relationship between the number of moves a household makes and the percentage of income from earnings. Each additional move (after the initial move) is associated with about a 3 percentage point decline in the percentage of income from earnings.²⁰

Exhibit 10

Mobility and Final Year Percentage of Income From Earnings

| Model | Model 1 | | | Model 2 | | | Model 3 | | |
|----------------------------|------------------------------|-------|-------|------------------------------|-------|-------|------------------------------|-------|-------|
| Outcome | Percent Income From Earnings | | | Percent Income From Earnings | | | Percent Income From Earnings | | |
| Mean of dependent variable | 0.46 | | | 0.46 | | | 0.46 | | |
| R-squared | 0.25 | | | 0.25 | | | 0.25 | | |
| Regression sample size | 522,182 | | | 522,182 | | | 522,182 | | |
| | Est | SE | pr>t | Est | SE | pr>t | Est | SE | pr>t |
| Intercept | 0.917 | 0.010 | 0.000 | 0.918 | 0.010 | 0.000 | 0.918 | 0.010 | 0.000 |
| Moved once | | | | -0.039 | 0.002 | 0.000 | | | |
| Moved more than once | | | | -0.074 | 0.003 | 0.000 | | | |
| Ever moved | -0.045 | 0.002 | 0.000 | | | | -0.011 | 0.003 | 0.001 |
| Number of moves | | | | | | | -0.029 | 0.002 | 0.000 |
| Furthest distance moved | 0.005 | 0.001 | 0.000 | 0.005 | 0.001 | 0.000 | 0.005 | 0.001 | 0.000 |
| Moved at program entry | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

Sample: Families with children entering the HCV Program, 1995 through 2002. Full sample consists of 628,124 families; sample size for each equation is shown in table.

Note: Additional covariates not shown include household size and family structure, race/ethnicity of head, years in program, initial lease-up status, sources and amount of income, and characteristics of first HCV neighborhood. These are described in detail in the text.

Est = Parameter estimate.

SE = Standard error of the estimate.

pr>t = Probability of estimated value using 2-tailed t-test.

Source: HCV Longitudinal Data File

We found no evidence for a relationship between mobility and the percentage of household income from cash assistance (results not shown). In sum, moving appears to be associated with significant, but fairly small, *declines* in family self-sufficiency as measured by total household income and the percentage of household income from earnings. Despite these small declines, no correlation was found between moving and household reliance on welfare; therefore, self-sufficiency (or its lack) as measured by reliance on public aid should not be considered higher among movers.²¹

Race, Mobility, and Neighborhood Quality

We next examine whether the relationships between mobility and neighborhood quality differ for households from different racial and ethnic groups. Exhibit 11 presents regressions

of two neighborhood quality measures—the poverty rate and the owner-occupancy rate—on the interaction of household race and household mobility. Mobility is measured by whether the household moved at least once during the observation period.

Exhibit 11

Race-Mobility Interactions and Final Year Neighborhood Outcomes

| Model | Model 1 | | | Model 2 | | |
|---|--------------|-------|-------|----------------------|-------|-------|
| Outcome | Poverty Rate | | | Owner-occupancy Rate | | |
| Mean of dependent variable | 19.8 | | | 54.6 | | |
| R-squared | 0.78 | | | 0.77 | | |
| Regression sample size | 522,182 | | | 522,182 | | |
| | Est | SE | pr>t | Est | SE | pr>t |
| Intercept | 2.553 | 0.141 | 0.000 | 12.433 | 0.252 | 0.000 |
| White x Household ever moved | -0.699 | 0.034 | 0.000 | 1.330 | 0.060 | 0.000 |
| African American x Household ever moved | -1.460 | 0.029 | 0.000 | 2.608 | 0.052 | 0.000 |
| Asian x Household ever moved | -1.554 | 0.146 | 0.000 | 2.784 | 0.261 | 0.000 |
| Native American x Household ever moved | -0.830 | 0.180 | 0.000 | 1.176 | 0.322 | 0.000 |
| Hispanic x Household ever moved | -0.565 | 0.062 | 0.000 | 0.978 | 0.110 | 0.000 |
| Farthest distance moved | -0.001 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 |
| HH head is White | -0.988 | 0.023 | 0.000 | 1.018 | 0.041 | 0.000 |
| HH head is Asian | -0.666 | 0.065 | 0.000 | -0.090 | 0.116 | 0.438 |
| HH head is Native American | -0.754 | 0.075 | 0.000 | 0.302 | 0.133 | 0.023 |
| HH head is Hispanic | 0.686 | 0.031 | 0.000 | -0.927 | 0.056 | 0.000 |

Sample: Families with children entering the HCV Program, 1995 through 2002. Full sample consists of 628,124 families; sample size for each equation is shown in table.

Note: Additional covariates not shown include household size and family structure, years in program, initial lease-up status, sources and amount of income, and characteristics of first HCV neighborhood. These are described in detail in the text.

Est = Parameter estimate.

SE = Standard error of the estimate.

pr>t = Probability of estimated value using 2-tailed t-test

Source: HCV Longitudinal Data File

The model 1 results show that the relationship between household mobility and the neighborhood poverty rate does, indeed, vary significantly by race. The effects of moving are largest for African Americans and Asians; members of these two groups that moved at least once lived in neighborhoods with poverty rates 1.5 to 1.6 percentage points lower compared to the neighborhoods of nonmovers. For Whites, Hispanics, and Native Americans, moving was associated with small (0.6 to 0.8 percentage point) reductions in the neighborhood poverty rate. F-tests indicate that the effects of moving for African Americans and Asians differ significantly from the effects of moving for Whites, but the effects of moving for Whites, Hispanics, and Native Americans do not differ significantly from one another.

Similar results were found when we examined the relationship between household mobility and the neighborhood owner-occupancy rate by race (model 2). Once again, the effects of moving were found to be largest for African Americans and Asians. For Asians, moving is associated with a 2.8 percentage point increase in the owner-occupancy rate in the neighborhood, while for African Americans, moving is associated with a 2.6 percentage point increase in the neighborhood owner-occupancy rate. For Whites, Hispanics, and Native Americans, moving is associated with a 1.0 to 1.3 percentage point increase in the neighborhood owner-occupancy rates. Again, F-tests indicate that the effects of moving for African Americans and Asians differ significantly from the effects of moving for Whites, while the effects of moving for the other groups (Whites, Hispanics, and Native Americans) do not differ significantly from one another.

The Relationship Between Distance Moved and Neighborhood Quality

In the final regression models, we present a slightly different conceptualization of mobility—the distance a household moves while participating in the HCV Program, measured by the distance between the household’s first program location and the household’s farthest location from its first home.

Exhibit 12 shows the relationship between household mobility and the farthest distance moved. Not surprisingly, the more times a household moved, the farther they moved from their initial home. The mean value for farthest distance moved in the analysis sample is 1.2 miles, which of course includes many zero values for households that never moved. Model 1, however, shows that households that moved at least once moved an average of 6 miles from their initial location. Model 2 shows that households that moved *exactly* once moved an average of 5 miles, while households that moved at least twice moved an average of 8 miles. An F-test indicates that these two coefficients are statistically different from each other. Finally, model 3 shows that there appears to be a linear relationship between the number of moves a household makes and the farthest distance moved—on average, households move approximately 2 additional miles with each additional move.

Exhibit 12

Mobility and Farthest Distance Moved

| Model | Model 1 | | | Model 2 | | | Model 3 | | |
|----------------------------|-------------------------|-------|-------|-------------------------|-------|-------|-------------------------|-------|-------|
| Outcome | Farthest distance moved | | | Farthest distance moved | | | Farthest distance moved | | |
| Mean of dependent variable | 1.17 | | | 1.17 | | | 1.17 | | |
| R-squared | 0.41 | | | 0.43 | | | 0.43 | | |
| Regression sample size | 522,182 | | | 522,182 | | | 522,182 | | |
| | Est | SE | pr>t | Est | SE | pr>t | Est | SE | pr>t |
| Intercept | 0.081 | 0.072 | 0.262 | 0.015 | 0.071 | 0.833 | 0.010 | 0.071 | 0.889 |
| Moved once | | | | 5.304 | 0.011 | 0.000 | | | |
| Moved more than once | | | | 8.101 | 0.021 | 0.000 | | | |
| Ever moved | 5.773 | 0.011 | 0.000 | | | | 3.240 | 0.022 | 0.000 |
| Number of moves | | | | | | | 2.106 | 0.016 | 0.000 |
| Moved at program entry | 0.027 | 0.009 | 0.004 | 0.030 | 0.009 | 0.001 | 0.029 | 0.009 | 0.002 |

Sample: Families with children entering the HCV Program, 1995 through 2002. Full sample consists of 628,124 families; sample size for each equation is shown in table.

Note: Additional covariates not shown include household size and family structure, race/ethnicity of head, years in program, initial lease-up status, sources and amount of income, and characteristics of first HCV neighborhood. These are described in detail in the text.

Est = Parameter estimate.

SE = Standard error of the estimate.

pr>t = Probability of estimated value using 2-tailed t-test.

Source: HCV Longitudinal Data File

Exhibit 13 shows the relationship between the farthest distance that a household moves and the neighborhood poverty rate in the household’s last (most recent) location. The results indicate the presence of a significant, although not extremely large, association. Compared to households that moved less than a mile, those that moved 1 to 5 miles experienced declines in the neighborhood poverty rate of about 1 percentage point. Those that moved more than 5 miles experienced declines in the neighborhood poverty rate of about 2 percentage points. Compared to an overall neighborhood poverty rate of about 20 percentage points, moving longer distances is associated with 10- to 20-percent improvements

in the neighborhood poverty rate. Households that use their HCVs to move longer distances do appear to locate into slightly better quality neighborhoods than households that lease in place or do not move very far from their first location on the HCV Program.

Exhibit 13

Distance Moved and Neighborhood Poverty Rate

| Outcome | Tract Poverty Rate | | |
|---|--------------------|-------|-------|
| Mean of dependent variable | 19.8 | | |
| R-squared | 0.78 | | |
| Regression sample size | 522,182 | | |
| | Est | SE | pr>T |
| Intercept | 2.403 | 0.142 | 0.000 |
| Household ever moved | -0.035 | 0.043 | 0.415 |
| Farthest distance moved: 1–5 miles | -1.027 | 0.048 | 0.000 |
| Farthest distance moved: 5–10 miles | -1.837 | 0.059 | 0.000 |
| Farthest distance moved: 10–15 miles | -2.063 | 0.083 | 0.000 |
| Farthest distance moved: More than 15 miles | -2.131 | 0.061 | 0.000 |
| Moved at program entry | 0.033 | 0.019 | 0.078 |

Sample: Families with children entering the HCV Program, 1995 through 2002. Full sample consists of 628,124 families; sample size for each equation is shown in table.

Note: Additional covariates not shown include household size and family structure, race/ethnicity of head, years in program, initial lease-up status, sources and amount of income, and characteristics of first HCV neighborhood. These are described in detail in the text.

Est = Parameter estimate.

SE = Standard error of the estimate.

pr>t = Probability of estimated value using 2-tailed t-test.

Source: HCV Longitudinal Data File

Conclusions

This study examined the geographic mobility of families with children that entered the HCV Program between 1995 and 2002. Using a specially constructed longitudinal data set developed from HUD administrative records, we analyzed the residential moves (of at least a quarter mile's distance) made by these families over the observation period. Our purpose was to see whether moves within the voucher program—particularly moves after the initial lease up—were associated with improvements in the neighborhoods where the families lived and with increases in their economic self-sufficiency.

Overall, about 75 percent of the families in the study sample moved at program entry, rather than leasing up where they had been living before. Families with children entering the HCV Program in this period moved to neighborhoods with poverty rates of around 20 percent and where, on average, three-quarters of all households had income from earnings and half owned their own homes. The preprogram neighborhoods and the areas where families leased their initial units through the voucher program were very similar in terms of neighborhood characteristics, as measured by census data.

Subsequent to program entry (that is, after the moves to lease up), the overall mobility rate of the sample was 19 percent, and just 4 percent of the sample moved more than once. There was a small but consistent tendency for families making later moves to choose slightly better neighborhoods. We observed reductions across a number of indicators of concentrated poverty and improvements across a number of neighborhood opportunity indicators for households that moved. Multivariate analysis confirmed that moving at least once was associated with small improvements in neighborhood quality. Further moves appeared to produce additional movement in the direction of better neighborhood conditions, but the changes remained very small.

This analysis revealed some interesting differences across racial/ethnic groups in the importance of the mobility provided by the HCV Program. African-American households were more likely than others to move after program entry and generally experienced the largest improvements in neighborhood characteristics when they moved. Asian households also experienced larger-than-average gains in neighborhood quality when they moved.

While mobility is clearly associated with positive (albeit small) improvements in neighborhood quality, the relationship between geographic mobility and improvements in economic self-sufficiency was less clear. The number of times a household moved appeared to be associated with very slight *decreases* in total household income and in the percentage of income from earnings. Moving, however, was not significantly associated with changes in the percentage of income from cash assistance.

Finally, consistent with our finding that the number of moves is associated with improvements in neighborhood quality, we also found that the *distance* a household moved was associated with improvements in neighborhood quality. Households moving 1 to 5 miles chose neighborhoods that were about 1 percentage point less poor than the neighborhoods of nonmovers, while households moving more than 5 miles located in neighborhoods that were about 2 percentage points less poor.

In conclusion, the continuing mobility offered by the HCV Program appears to benefit participating families with children, enabling those that move to relocate into somewhat lower poverty neighborhoods. While these benefits of mobility were not observed to translate into improved household-level outcomes, the most immediate goal of moving for most households—attaining a better living environment—seems to be facilitated by the program.

Appendix

Distribution of Household Characteristics in the Analysis Sample

| Household Characteristics | Total N | Percent of Sample | Total on Characteristic | Missing on Characteristic |
|---------------------------|----------------|-------------------|-------------------------|---|
| Number of HH members: | | | | |
| 1 or 2 | 199,626 | 31.79 | | |
| 3 or 4 | 334,705 | 53.31 | | |
| 5 or more | 93,558 | 14.90 | 627,889 | 235 |
| Children present (any): | | | | |
| Age 3 or younger | 322,382 | 33.29 | | Categories are not mutually exclusive, as HH may have children of different ages. |
| Ages 4–5 | 172,579 | 17.82 | | |
| Ages 6–12 | 320,743 | 33.12 | | |
| Ages 13–17 | 152,652 | 15.76 | 968,356 | |
| Number of adults in HH: | | | | |
| 1 | 504,517 | 80.99 | | |
| 2 | 109,831 | 17.63 | | |
| 3 or more | 8,580 | 1.38 | 622,928 | 5,196 |
| Age of HH head: | | | | |
| 24 or younger | 154,644 | 26.01 | | |
| 25–44 | 398,988 | 67.12 | | |
| 45 or older | 40,850 | 6.87 | 594,482 | 33,642 |
| Total HH income: | | | | |
| < \$5,000 | 177,404 | 28.24 | | |
| \$5,000–\$9,999 | 215,214 | 34.26 | | |
| \$10,000–\$14,999 | 135,110 | 21.51 | | |
| \$15,000–\$19,999 | 67,117 | 10.69 | | |
| \$20,000 or more | 33,279 | 5.30 | 628,124 | 0 |
| Total HH wages: | | | | |
| < \$5,000 | 375,560 | 59.79 | | |
| \$5,000–\$9,999 | 93,742 | 14.92 | | |
| \$10,000–\$14,999 | 91,004 | 14.49 | | |
| \$15,000 or more | 67,818 | 10.80 | 628,124 | 0 |
| Total income from TANF: | | | | |
| < \$2,500 | 427,508 | 68.06 | | |
| \$2,500–\$4,999 | 103,233 | 16.44 | | |
| \$5,000 or more | 97,383 | 15.50 | 628,124 | 0 |
| Race of HH head: | | | | |
| White | 333,915 | 53.22 | | |
| African American | 270,569 | 43.12 | | |
| Asian/Pacific Islander | 13,750 | 2.19 | | |
| Native American | 9,201 | 1.47 | 627,435 | 689 |
| HH head is Hispanic | 89,347 | 14.22 | | |
| HH head is Female | 567,108 | 90.29 | | |
| Total | 628,124 | | | |

Sample: Families with children entering the HCV Program, 1995 through 2002. Full sample consists of 628,124 families.

Source: HCV Longitudinal Data File

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Notes

1. Fair market rents (FMRs) have been increased in many major metropolitan areas to allow voucher recipients to rent housing units in more expensive areas. The FMRs control the maximum subsidy level available to participants, depending on where they live and the size housing unit they need.
2. The Section 8 Management Assessment Program (SEMAP) is the performance measurement system for evaluating Housing Choice Voucher (HCV) housing program administrators. SEMAP includes an indicator for “expanding housing opportunities” and a “deconcentration bonus” for increasing the share of participants living in low-poverty areas. See 24 CFR 985.3, indicators (g) and (h).
3. See Gould Ellen and Turner (1997).
4. See Devine et al. (2003).
5. The file draws on both the Multifamily Tenant Characteristics System (MTCS) and Tenant Rental Assistance Certification System (TRACS), with public housing records coming from MTCS and records for privately owned, assisted housing developments coming from TRACS.
6. The completeness of this data file, relative to the actual number of households receiving federal housing assistance, depends on monthly reporting to the U.S. Department of Housing and Urban Development (HUD) by the public housing authorities that operate the HCV and public housing programs and by private owners operating other assisted developments. Reporting rates to the HUD systems fluctuated somewhat during the period 1995 through 2002 as the reporting requirements underwent changes and expansions. But in general the reporting rates increased toward the end of the period.
7. We considered a new entrant to the voucher program as having moved to lease up if one of the following four conditions were met: (1) If the preprogram address (when present) was different from the address in the initial (“new admission”) voucher record; (2) when there was no preprogram address, if the ZIP Code before admission was different from the ZIP Code of the address in the initial (“new admission”) voucher record; (3) when there was no preprogram address and the ZIP Code before admission was the same as the ZIP Code of the address in the initial voucher record, if the family-moving-into-unit indicator showed there was a move; or (4) when there was neither a preprogram address nor a ZIP Code before admission, if the family-moving-into-unit indicator showed there was a move. Thus, we accepted and used the

indicator in the original data when we did not have address information with which to correct it. The result of combining address information with the indicator was to treat 75 percent of the study sample as moving on program entry. The most recent study of lease-up patterns in the voucher program reported that 79 percent of the households that entered the voucher program in 2000 moved, while the figure in 1993 was 63 percent (Finkel and Buron, 2001, citing Kennedy and Finkel, 1994). Because our sample of HCV Program entrants spans the years 1995 through 2002, we think the 75 percent figure is reasonable.

8. All the records were geocoded with the same system and the same underlying geography, so there should not be problems with identical addresses carrying different latitude or longitude values.
9. The estimates were made using a simple linear interpolation over the decade between the 1990 Census and 2000 Census. For example, if the 1990 poverty rate in the destination census tract was 8 percent but in the 2000 Census it was 12 percent, over the decade the rate was assumed to change by .4 percent a year. For a lease up in 1995 in this tract, the estimated poverty rate at that time would be about 10 percent. (The formula used the actual date of the program move and estimated the poverty rate based on days elapsed from April 1, 1990.)
10. For preprogram addresses (when available), the neighborhood indicators were calculated based on ZIP Code areas, which are larger than census tracts and thus less precise. Sensitivity tests on these data showed that the effect of using ZIP Code-level data was to understate the differences between the preprogram neighborhoods and the initial HCV neighborhoods. Details are available from the authors on request.
11. HUD's recent snapshot of the HCV Program in 2000 showed 18 percent of the program population to reside outside metropolitan areas; of the remaining participants, 49 percent were located in central cities and 33 percent were in suburban areas (Devine et al., 2003). By contrast, about 26 percent of the sample for this analysis was living in nonmetropolitan areas at the most recent point in time of the longitudinal file. Of the remainder inside metropolitan statistical areas, 43 percent lived in center cities and 31 percent in suburban areas. We think these differences may be due in part to rural-metropolitan differences in the mix of HCV participants (that is, the share of families with children) and also in part to differences in reporting rates after the MTCS changes made in 2001.
12. Certain other very small deletions and adjustments were made to the data file to make the data fully useable for this analysis. For example, a small number of records with effective dates in 1993 were deleted, but records with effective dates in 1994 (for "program year" 1995) were retained. Note that this is not an estimate of the fraction that were new admissions in this period, but only of those for whom there was good enough evidence to retain them in the study. The balance of families with children is made up of a combination of ongoing participants, records with data problems, and possible missing records.
13. This figure combines "end of participation" and "portability move-out" codes.
14. In this sample, the movers constitute almost 118,000 households nationwide. Second movers amount to about 25,000 households.

15. See, for example, Jargowsky (1997), Wilson (1987, 1996), Jencks and Mayer (1990), and Brooks-Gunn, et al. (1993).
16. For most preprogram locations, the neighborhood indicators were calculated based on ZIP Code areas, which are larger than census tracts and thus less precise. See note 10 above.
17. The appendix table shows the composition of the analysis sample on all these household characteristics.
18. Full results are available from the authors on request.
19. We tested an alternative specification of this model in which we replaced the independent variables measuring the ratio of household income to the poverty line during the household's first year in the program with a variable measuring total household income during the household's first year in the program. The two specifications yielded nearly identical results.
20. We tested alternative specifications of models 1 through 3 for exhibit 10 in which we added the percentage of income from earnings in the household's first year in the program to the standard list of covariates. The new specifications yielded very similar coefficients to those presented here, although the point estimates were very slightly smaller in the new specifications. For example, in the new specification of model 1, the coefficient on "Any Move" is $-.033$, slightly smaller than the value shown here of $-.045$.
21. It should be noted that we have not attempted to control for the fact that families whose incomes increase significantly can become over income and thus ineligible for the program. This selective attrition could bias our results *against* finding positive associations between moving (which is correlated with years in the program) and household income and earnings.

References

- Brooks-Gunn, Jeanne, et al. 1993. "Do Neighborhoods Influence Child and Adolescent Development?" *American Journal of Sociology* 99: 353–95.
- Devine, Deborah J., et al. 2003. *Housing Choice Voucher Location Patterns: Implications for Participants and Neighborhood Welfare*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.
- Gould Ellen, Ingrid, and Margery Austin Turner. 1997. "Does Neighborhood Matter? Assessing Recent Evidence," *Housing Policy Debate* 8: 833–866.
- Finkel, Meryl, and Larry Buron. 2001. *Study on Section 8 Voucher Success Rates Volume 1: Quantitative Study of Success Rates in Metropolitan Areas*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.
- Jargowsky, Paul A. 2003. "Stunning Progress, Hidden Problems: The Dramatic Decline in Concentrated Poverty in the 1990s." Living Cities Census Series. Washington, DC: The Brookings Institution.
- . 1997. *Poverty and Place: Ghettos, Barrios, and the American City*. New York: Russell Sage Foundation.

Jencks, Christopher, and Susan E. Mayer. 1990. The Social Consequences of Growing Up in a Poor Neighborhood. In *Inner-City Poverty in the United States*, edited by L.E. Lynn, Jr., and M.G.H. McGeary. Washington, DC: National Academy Press.

Kennedy, Stephen, and Meryl Finkel. 1994. *Section 8 Rental Certificate and Rental Voucher Utilization Study: Final Report*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.

Kingsley, G. Thomas, and Kathryn L.S. Pettit. 2003. "Concentrated Poverty: A Change in Course." *Neighborhood Change in Urban America* No. 2. Washington, DC: The Urban Institute.

Orr, Larry, et al. 2003. *Moving to Opportunity: Interim Impacts Evaluation*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Department and Research.

Wilson, William J. 1996. *When Work Disappears: The World of the New Urban Poor*. New York: Alfred A. Knopf.

———. 1987. *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy*. Chicago: University of Chicago Press.

Household Composition and Housing Assistance: Examining the Link

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Abstract

The living arrangements of public assistance recipients have been a concern of policymakers and researchers alike. Although the effects of welfare on household composition have been studied extensively, relatively little research has examined how housing assistance might relate to household composition. This research explores the relationship between housing assistance and household composition using data from the New York City Housing Vacancy Survey. The results show that household composition is indeed related to the receipt of housing assistance. In particular, married and cohabiting partners are less likely to be recipients of housing assistance, all else being equal.

Introduction

Welfare reform has been driven in part by a concern over how public assistance influences household composition. To date, however, relatively little research has been done on the relationship between other types of public assistance, including housing assistance, and household composition. This research aims to begin filling this void by focusing on how household composition is related to the receipt of household assistance. To the extent that policymakers are concerned about how housing assistance affects household composition, a first step is ascertaining whether such a relationship even exists and discerning the nature of that relationship.

Conceptual Framework

Economic and social considerations are the prime determinants of whom we choose to live with. Examples of social forces include the desire for companionship that comes with marriage or cohabiting with a romantic partner or the desire to be a parent. Economic factors include the economies of scale achieved by living with others, which are counterbalanced by the inconveniences associated with having to share living space. Economies of scale are achieved because some housing costs can be shared or do not increase at the same rate as increases in household size. Certain additions to a household, such as minor children, may not increase household income enough to offset the additional costs they incur. Household composition thus reflects the balancing of these competing forces, the

desire for companionship and costs saved due to economies of scale, and disadvantages associated with sharing living space and the additional costs associated with each individual in the house.

Housing assistance, to the extent it allows households to consume more housing than they otherwise would, might affect household composition in several different ways. By reducing the importance of the cost component in the household composition calculus, households may have less of an incentive to share their housing; consequently, housing assistance might reduce household size. Using data from the Social Indicators Survey in New York City, Gould Ellen and O'Flaherty (2002) found in their analysis of the determinants of household size that recipients of housing assistance had fewer adults.

In some circumstances, however, housing assistance might make households larger. For example, parents derive some satisfaction from each additional child that they have. The resources needed to take care of each additional child, including living space, puts an upward boundary on the number they are likely to have. Anything that provides additional resources to take care of an additional child might make having more children feasible. Housing assistance, by allowing households to consume more housing than they otherwise would, might induce some households to have more children. In addition, housing assistance might free resources to take care of a child. In this way, the effects of housing assistance might be similar to those of welfare, where a consensus is emerging in the literature that welfare does indeed lead to parents' having more children (Moffitt, 1997).

The literature on welfare and household composition also points to a third way that housing assistance might be expected to affect household composition. Such assistance may increase the prevalence of single-parent households. This theory posits that welfare discourages marriage and/or encourages partners to break up (Murray, 1984). Beyond the regulations that make the receipt of welfare more difficult for married partners, welfare may have also facilitated some partners' fleeing unsatisfactory relationships. Housing assistance, because it augments income, might also affect household composition for the same reasons. One can easily imagine a wife who puts up with a philandering husband, perhaps because he is a good provider and she has few options on her own. Housing assistance might expand those options by making alternative living arrangements—one in which she lives apart from her husband—feasible.

Turner's (2003) results suggest that housing assistance may dampen the likelihood of parents living together by providing the custodial parent with an alternative and feasible living arrangement—living in subsidized housing without the other parent. Turner's research was based on data from the Fragile Families and Child Well-Being Survey. Among the key findings was that cohabitation before birth was much less likely if the mother lived in government-assisted housing rather than unsubsidized rental housing.

Although these studies are important first steps in broadening our understanding of the relationship between household composition and housing assistance, neither Gould Ellen and O'Flaherty's or Turner's study examines whether marriage or childbearing is related to the receipt of housing assistance. The exploratory research presented here thus builds on the findings of Gould Ellen and O'Flaherty (2002) and Turner (2003) by considering a broader set of household composition outcomes, using a data set that will have less respondent error with regard to participation in housing assistance programs, and examining changes in household composition over time. Because of data limitations, which are detailed below, this research should still be considered an exploration of the relationship between housing assistance and household composition rather than a definitive analysis of causality.

Data

This study draws on data from the New York City Housing and Vacancy Survey (NYCHVS). The NYCHVS is a longitudinal survey of approximately 18,000 housing units designed to be representative of all housing units in New York City. It is conducted every 3 years by the Census Bureau for New York City in accordance with the city's rent regulation guidelines. For this analysis, the 1996 and 1999 NYCHVS longitudinal data files are used. Because federal housing assistance is targeted to certain income groups, the sample was limited to households meeting U.S. Department of Housing and Urban z to low- and very low-income households with adjustments for household size. Low income is defined as income at or below 80 percent of the median family income for the area. For this study, HUD's income limits for the New York City Primary Metropolitan Statistical Area were used for the 1996 and 1999 analysis years. The sample was further limited to households in which the head was younger than 63 years of age, which is the age HUD uses to define the elderly. Because the elderly are likely to face a different set of decisions regarding household composition (for example, they are unlikely to have additional children) and HUD has separate housing assistance programs for the elderly, these households were excluded from the analysis. This exclusion leaves a sample of 10,374 low-income renter households for the pooled 1996 and 1999 analysis years.

This NYCHVS has several strengths to recommend it. The NYCHVS includes both households receiving housing assistance and those not. A sample size of approximately 10,374 low-income renter households should be large enough to generate sufficient statistical power to discern any effects housing assistance has on household composition. The NYCHVS also has a wealth of relevant socioeconomic data. These data include the relation of all other people in the unit to the householder; the age, gender, race/ethnicity, place of birth, place of parents' birth, income, and education of the householder; and characteristics of the housing unit, including tenure, cost, rooms, and physical deficiencies. Finally, the longitudinal nature of the NYCHVS allows for modeling changes in household composition over time.

For those receiving project-based housing assistance, the housing assistance status of NYCHVS respondents is determined by using administrative data from the New York State Division of Housing and Community Renewal and the New York City Department of Housing Preservation and Development. All rental units must be classified to determine eligibility for rent regulation. This action results in the classification of all project-based housing assistance, including public housing, other HUD-sponsored developments, and state and local subsidized developments. By relying on administrative data, the NYCHVS circumvents the problem of misclassification of project-based housing assistance due to respondent's misreporting whether they live in assisted housing (Shroder 2002). The data on local housing programs and regulations available in the NYCHVS enable one to discern the effect of these programs on household composition.

The potential problem of inaccurate reporting of tenant-based housing assistance still exists. Unlike project-based housing assistance, the NYCHVS does not use administrative records to determine the status of tenant-based housing assistance such as vouchers. Instead, respondents identify their participation in tenant-based housing assistance in response to the following question:

Is any part of the monthly rent for this apartment (house) paid by any of the following government programs, either to a member of this household or directly to the landlord?¹

- Federal Section 8 certificate or voucher program.
- Another federal housing subsidy program.
- Another city housing subsidy program.

Respondents then choose which program, if any, is applicable. Research conducted by the National Opinion Research Center (NORC) (Rucinski and Athey, 1995) suggests inaccuracies among recipients of certificates and vouchers may be less problematic than those pertaining to the specific identification of project-based housing assistance programs. “Those receiving Certificates/Vouchers appear to know that a certificate is being used,” they write (Rucinski and Athey, 1995: 10). If the results of the NORC study can be generalized to New York City, errors associated with the identification of Section 8 (currently known as Housing Choice Voucher) recipients may be minimal. The two categories of other housing subsidy programs might invite erroneous responses, however, because it is not clear what programs these responses are referring to. In any case, the project-based housing assistance results should be reliable.

Methodology

This research examines the relationship between household composition and housing assistance in two stages. The first stage employs a cross-sectional analytic approach in which differences in household composition are contrasted between recipients of housing assistance and eligible nonrecipients of housing assistance. The second stage examines differences in longitudinal changes in household composition between recipients of housing assistance and eligible nonrecipients of housing assistance. Because the NYCHVS follows housing units rather than people, this second analysis is limited to households that do not move. In the first stage, various measures of household composition will be the dependent variable and the receipt of housing assistance will be the independent variable.

Because housing assistance is not an entitlement and demand far exceeds supply, as evidenced by lengthy waiting lists, eligible nonrecipients of housing assistance can serve as a “control” group in the analyses that follow. Nevertheless, recipients of housing assistance might differ from nonrecipients in ways that affect household composition; thus, the analysis will statistically control for demographic and economic determinants of household composition.

In the second stage, changes in household composition between time t and time $t+3$ will serve as the dependent variable. Receipt of housing assistance at time t will be the independent variable. The analysis will statistically control for demographic and economic determinants of household composition at time t .

Cross-sectional Dependent Variables

Household Composition

The cross-sectional analysis of household composition is conducted in two stages. The first stage limits the sample to households with minor children and examines how household composition is related to the receipt of housing assistance. The second stage examines the relationship between the number of children in a household and the receipt of housing assistance.

The rationale for conducting separate analyses on different types of households is that the factors that influence decisions about household composition are likely to vary. For example, the decision to add another person to the household through marriage or cohabiting is different than the decision to add another person to the household by having a child.

Households With Minor Children

This analysis of the relationship between receipt of housing assistance and household composition will consider both the effect of housing assistance on the type of households people live in and the size of these households, respectively, among households with children.

Limiting the sample to households with children leaves a sample of 5,557 low-income renter households. The dependent variable will consist of the following four categories based on household composition:

1. Married or cohabiting with children. In addition to married couples, this category includes all households with children in which an unrelated adult is classified as a “partner” in the NYCHVS.
2. Married or cohabiting with children and other adults.
3. Single parent with children.
4. Single parent with children and other adults.

Although the NYCHVS does distinguish between married and cohabiting partners, it does not distinguish between biological and stepparents. Because much of the debate over changes in marital patterns stems from concerns about children living with their biological parents, the inability to distinguish between biological and stepparents in the NYCHVS renders the distinction between married and cohabiting partners less important. Consequently, this article treats married and cohabiting partners as one category. The analysis examining the relationship between housing assistance and housing size among households with minor children will use a count of the number of minor children in the household. Demographic and economic characteristics will serve as statistical controls but, in this case, marital status and the number of adults in the household will also be included as controls.

Longitudinal Analysis of Household Composition

This section examines whether housing assistance is related to changes in household composition. The longitudinal nature of the NYCHVS allows one to examine changes in household composition over time. During the 1996–99 study period, 4,050 low-income renter households did not move and, hence, can be analyzed for changes in household composition.

The fact that the NYCHVS follows housing units rather than people, however, is a drawback. Households that move are no longer in the sample. Moreover, mobility is likely to be correlated with changes in household composition as households seek new quarters to meet changes in housing needs due to changes in household composition. This correlation means that any modeling exercise will suffer from sample selection bias. That is, the results will be applicable only to those households that do not move. To attempt to dampen the threat of sample selection bias, Olsen’s (1980) method for using $P-1$ as a correction term was employed where P is the probability of being excluded from the sample.

The life-cycle theory of residential mobility was used to develop a model that predicts the probability of someone’s moving (Speare, 1974; Rossi, 1980). This model uses length of tenure, number of persons per room, and the respondent’s rating of his or her neighborhood as instruments and also includes housing assistance, public assistance, gender, the presence of children, marital status, age, race/ethnicity, immigrant status, income, and educational attainment as covariates. The results of this regression model’s predicting if someone moved are available from the author on request. Olsen’s correction term is calculated as the probability of a household moving minus one.

With the use of Olsen’s correction of sample selectivity, the NYCHVS can be used for an exploratory analysis of the relationship between changes in household composition and housing assistance. Nevertheless, the results of the longitudinal analysis should be interpreted cautiously.

In this analysis of changes in household composition two types of changes are considered: whether a change occurred in the number of children in the household, and, qualitatively,

whether a change occurred in the partnership status of households with children. To discern the effect of housing assistance on changes in household composition over time, the following changes will be examined.

Unattached to Married or Cohabiting. The dependent variable in this case will be whether a household head who is unpartnered in 1996 is married or cohabiting in 1999. The sample will be limited to all unpartnered household heads in 1996.

Married or Cohabiting to Unattached. The dependent variable here will be whether a married or cohabiting household in 1996 is a single head of household in 1999. Because the NYCHVS only asks the relationship of people in the household to the household head, a married or cohabiting person who loses his or her partner through death will be indistinguishable from one who loses his or her partner due to divorce, separation, or an ending of a cohabiting relationship. This lack of information is a drawback because the interest is in determining whether a relationship exists between housing assistance and partners severing ties due to economic incentives, and not due to death. It may not result in biased results if mortality and housing assistance are uncorrelated. I am unaware of any reason to suspect that housing assistance itself would be correlated with mortality. Moreover, statistical controls for age, race/ethnicity, income, and gender should temper any differences in mortality rates between housing assistance recipients and nonrecipients.

Someone who divorces and remarries will also be classified as having remained married and someone who marries and divorces between 1996 and 1999 will be classified as not marrying. This could be viewed as a misclassification and, again, points to caution in interpreting the results of the longitudinal analysis.

Housing Assistance

As described in the conceptual framework, housing assistance could affect housing composition by substituting for the cost savings derived from living with others; by allowing households to consume more space and, consequently, live comfortably with more people; or by facilitating single-parent households among individuals who would prefer not to stay with their partner. This section spells out the operationalization of housing assistance.

Project-based housing assistance subsidizes housing units and in New York City includes federally sponsored programs such as public housing, other HUD-subsidized housing, and Mitchell-Lama Housing, a New York State project-based housing assistance program for moderate- and middle-income households. The federal government, through the Section 8 program, provides tenant-based housing assistance. As mentioned earlier, eligibility for HUD-sponsored programs, including public housing, Section 8, and other HUD developments, is limited to those earning 80 percent or less of the median area income. Income guidelines for the state-sponsored Mitchell-Lama rentals are based on the annual apartment rent. The maximum income allowable is the annual rent multiplied by seven for households of one to three people, or by eight for households of four or more people. Little reason exists to suspect that project-based housing assistance will differ from tenant-based housing assistance in its relation to household composition unless project-based housing units are larger than market units, which is true in public housing, or smaller, as in certain project-based Section 8 units. Nevertheless, because this analysis is exploratory, distinctions will be made between the various types of housing assistance programs.

In addition to having means-tested housing assistance programs, New York City also has rent regulations that effectively keep rents in some units below market rates. Although rent regulation is not targeted toward low-income or moderate-income households, as are housing assistance programs such as public housing or Section 8, households might respond to this type of housing subsidy as they would to federal transfer programs. In any case, regulated units would be comparable to project-based units.

Housing assistance is measured using two distinct approaches. Recognizing the possibility that varying types of housing assistance might affect household composition in varying ways, the first approach categorizes housing assistance. Project-based assistance categories are (1) public housing, (2) other HUD project-based housing assistance, and (3) Mitchell-Lama Housing. Rent regulation comprises (4) rent-controlled units, (5) rent-stabilized units, and (6) *in rem* (tax-foreclosed) housing or other city of New York regulated apartments. Tenant-based housing assistance is operationalized by two measures including (7) Section 8 certificate or voucher and (8) other unidentified government subsidies. This last category corresponds to the second and third responses to the NYCHVS inquiry about housing subsidies listed in the earlier Data section.

In rem housing is housing that the city of New York has acquired through tax foreclosures. Other city-regulated units included in this category are Article 4 buildings, which was a program for moderate-income households. Units in this other “city housing subsidy” category typically have rents that diverge from what the market would dictate.

The second analytic approach takes into account the size of the subsidy that recipients of housing assistance receive. To the extent housing assistance affects housing composition, it seems likely that the amount of housing assistance would be of import as well. The amount of housing assistance is the difference between the actual rent the resident pays and the market rent for that unit. The plethora of housing unit and locational characteristics in the NYCHVS enables one to estimate the market rent for subsidized units using a hedonic regression for all unregulated, unsubsidized units in the NYCHVS sample.

This hedonic regression equation uses the monthly contract rent as the dependent variable and the housing unit and locational characteristics as the independent variables. Housing unit characteristics include the number of bedrooms, total number of rooms, age of the structure, the floor the unit is on, the interviewer’s rating of the building, the number of units in the building, the number of stories in the building, and the number of maintenance deficiencies in the unit. Locational characteristics include whether broken or boarded-up windows are on the block of the unit, the respondent’s rating of the neighborhood, and in which of the 55 subborough areas the unit is located. These subborough areas correspond closely to New York City’s Community Board Districts, the smallest unit of municipal government, which were drawn to represent coherent geographic, demographic, and political entities. They consisted of approximately 131,000 people on average in 1999.

The parameters of this hedonic regression model are used to predict the market rate for subsidized units in the NYCHVS sample. The results of this hedonic regression are available from the author on request. The difference between the predicted market rent and the rent the respondent actually pays is the amount of the subsidy. Descriptive statistics for the estimated subsidy are available from the author on request. The analyses are conducted separately for the type of housing assistance and the amount of housing assistance, respectively.

Demographic, Social, and Economic Controls

The analyses control for race/ethnicity, immigrant status, age, income, educational attainment, and gender of the household head in the estimates of the relationship between housing assistance and household composition. Race and ethnicity need to be taken into account because substantial evidence suggests household composition varies across racial and ethnic groups (Angel and Tienda, 1982; Patterson, 1998; Richards, White, and Tsui, 1987). The use of housing assistance also varies across racial and ethnic groups (Casey, 1992). Likewise, use of public assistance, including housing assistance, and household composition vary between immigrants and natives (Borjas, 2001). Age is a potential confounding factor because the probability of marriage rises and then declines with age. In addition,

differences exist in the propensity to marry across age cohorts. For example, cohorts born during the 1960s are less likely to marry during their 20s than cohorts born during the 1940s (Wilson, 2003). Socioeconomic status has also been found to be a determinant of household composition; hence, the need to control for educational attainment and income is taken into account. (Wilson, 1987). Gender is also included as a control, because gender is related to the receipt of housing assistance (Casey, 1992).

Analytic Strategy

To isolate the effect of housing assistance on household composition while holding constant potentially confounding factors such as age and race/ethnicity, multivariate regression techniques are employed. The measurement scale of the dependent variable dictates the type of regression model to be employed. The effects of housing assistance on dependent variables consisting of two categories, such as changes in partnership status, will be estimated using binomial logistic regression. The effects of housing assistance on partnership status, a dependent variable consisting of three or more unordered categories, will be estimated using multinomial regression. Dependent variables that represent the number of children can be considered count data and are best estimated using Poisson regression models. Count data, measured by nonnegative integers, are relatively rare, and the underlying characteristics are assumed to be a Poisson process (Liao, 1994). Exhibit 1 illustrates the means and frequencies of the variables to be used in the multivariate analyses and exhibit 2 provides frequencies for the dependent variables in the longitudinal analyses.

Exhibit 1

Means of Variables

| Dependent Variable: Household Type | |
|--|----------|
| Married | 27.9% |
| Married or cohabiting with children | 14.5% |
| Married or cohabiting with children and other adults | 6.1% |
| Single-parent household | 20.7% |
| Single-parent household with other adults | 10.5% |
| Number of persons | 2.76 |
| Number of children | 1.05 |
| Independent Variable | |
| Amount of housing subsidy | \$303 |
| Public housing | 11.5% |
| Other HUD housing | 2.6% |
| Mitchell-Lama Housing | 3.5% |
| Rent stabilized | 48.6% |
| Rent controlled | 1.2% |
| Other city regulated | 6.9% |
| Section 8 certificate/voucher | 9.1% |
| Other government subsidy | 4.7% |
| Control Variable | |
| White | 29.7% |
| African American | 32.6% |
| Hispanic | 37.8% |
| Asian | 6.7% |
| Immigrant, non-second generation | 47.8% |
| Second generation | 8.1% |
| Age | 39.9 |
| Household income | \$16,043 |
| High school graduate | 30.8% |
| Some college | 19.5% |
| College graduate | 14.5% |
| Male | 37.4% |
| n | 10,374 |

Exhibit 2

Means of Dependent Variables Used in Longitudinal Analyses

| Dependent Variable: Household Types | |
|--|-------|
| Married between 1996 and 1999 | 13.3% |
| No longer married in 1999 | 9.9% |
| Had additional child between 1996 and 1999 | 16.1% |
| n | 4,727 |

Results

The cross-sectional analyses will be presented first followed by the longitudinal analyses. For each outcome of interest, two models will be presented, one using the amount of housing subsidy as the independent variable, and one using the specific housing programs as the independent variables. The focus of the presentations will be on the housing assistance variables. The other control variables will be discussed for the model that uses the amount of housing subsidy as the independent variable. Only if there are substantial differences in the control variables between the two models will the control variables be discussed in the model that uses the specific housing programs as the independent variables.

Cross-sectional Analyses

Household Composition for Households With Children

The results presented in exhibit 3 are for the multinomial regression analyzing the relationships between housing assistance and household composition for households with children. This analysis tests the notion that housing assistance is related to decisions about living with a partner or other adults. The results are presented in terms of relative risk ratios, which are analogous to odds ratios; but, because more than one comparison is being made in a multinomial logistic regression, they are referred to as relative risk ratios. Four categories are used: married households, married households with other adults, single-parent households, and single-parent households with other adults. The base category was chosen to be single-parent households. This means the results are presented in terms of the increase or decrease in the likelihood of being in one of the three other household composition categories relative to being a single-parent household. Relative risk ratios greater than 1 mean an increase in the likelihood of being in one of the three other household composition categories while relative risk ratios less than 1 mean a decrease in the likelihood of being in one of the three other household composition categories. For the sake of brevity, relative risk ratios for the multinomial logistic regression models without the corresponding p-values are presented. Statistically significant terms at the 95 percent level of confidence are in bold. The models as a whole are statistically significant as indicated by the chi-square statistic.

The results presented in exhibit 3 suggest that housing assistance is most consistently related to household composition when single-parent households are contrasted to either married households or married households with other adults. In contrast, the differences between households with single parents and single parents with other adults are not consistent. The second column and fifth columns of exhibit 3 show the amount of the housing subsidy and only one significant categorical measure of housing assistance for whether a household is a single parent with other adults. That one measure, receiving a Section 8 voucher certificate, suggests that residents receiving this type of housing are less likely to have other adults in the household.

Exhibit 3

Household Type

Estimation Technique: Multinomial Logistic Regression

Independent Variable

| | Relative Risk Ratios | | | | | |
|--|------------------------------|---------------------------|--------------|------------------------------|---------------------------|--------------|
| | Single Parent & Other Adults | Married With Other Adults | Married | Single Parent & Other Adults | Married With Other Adults | Married |
| Amount of housing subsidy* | 1.001 | .99 | .99 | | | |
| Public housing | | | | 1.21 | .63 | .50 |
| Other HUD housing | | | | 1.14 | .57 | .49 |
| Mitchell-Lama Housing | | | | 1.09 | .49 | .48 |
| Rent stabilized | | | | .84 | .77 | .76 |
| Rent controlled | | | | 2.42 | .52 | .37 |
| Other city regulated | | | | 1.23 | .99 | .89 |
| Section 8 certificate/voucher | | | | .74 | .57 | .55 |
| Other government subsidy | | | | .98 | .68 | .61 |
| Control Variable | | | | | | |
| Public assistance | 1.05 | .84 | .39 | 1.04 | .82 | .35 |
| Age | .99 | .95 | .97 | .99 | .93 | .95 |
| Age squared | 1.01 | 1.001 | 1.001 | 1.001 | 1.001 | 1.001 |
| African American (White serves as reference category) | 1.10 | .41 | .16 | 1.12 | .44 | .16 |
| Hispanic (White serves as reference category) | 1.08 | .57 | .23 | 1.14 | .59 | .23 |
| Asian (White serves as reference category) | 1.79 | 3.79 | 2.08 | 1.76 | 3.83 | 2.07 |
| Immigrant (Native, non-second generation serves as reference category) | 1.77 | 2.11 | 2.42 | 1.83 | 2.95 | 2.47 |
| Second generation (Native, non-second generation serves as reference category) | 1.01 | 1.42 | 1.33 | 1.12 | 1.24 | 1.37 |
| Household income | 1.001 | 1.001 | 1.001 | 1.001 | 1.001 | 1.001 |
| High school graduate (Non-HS graduate serves as reference category) | .74 | .67 | .91 | .70 | .69 | .96 |
| Some college (Non-HS graduate serves as reference category) | .69 | .42 | .67 | .67 | .43 | .71 |
| College graduate (Non-HS graduate serves as reference category) | .62 | .37 | .75 | .61 | .38 | .77 |
| Year = 1996 | 1.01 | 1.05 | 1.19 | .99 | 1.14 | 1.27 |
| n | 4,817 | | | 4,872 | | |
| χ^2 statistic | 8,420 | .01 | | 1,214 | .01 | |

Note: Figures in **bold** are statistically significant at the 95 percent level of confidence.

The third, fourth, sixth, and seventh columns of exhibit 3 show significant relationships between housing assistance and household composition. Consider the public housing variable. The relative risk ratio in column six shows residents of public housing are only 63 percent as likely to be in a married household with other adults, as opposed to residing in a single-parent household. A similar relationship is evident when the comparison is made to married households. These results tell us that residents of public housing are substantially less likely to be part of married couple households, even after controlling for other predictors of household composition. Residents of Mitchell-Lama, rent-stabilized, and Section 8 subsidized units are also substantially less likely to be part of married couple

households. All of these relative risk ratios are substantially less than 1, meaning single-parent households, of either type, are more prevalent among recipients of housing assistance, all else being equal. Residents of other HUD developments and other government-subsidized units are more likely to be in single-parent households than married couple households as indicated in column seven, but are not more likely to be in single-parent households in contrast to married households with other adults, as indicated by the insignificant relative risk ratios in column six. No consistent relationship was found between household composition and residence in a rent-controlled or other city-regulated apartment among families with children.

When the contrast is between married couples with other adults to single-parent households, race/ethnicity, immigrant status, income, and educational attainment are significant predictors, as indicated by the statistically significant relative risk ratios in columns three and six. When the contrast is between married couples to single-parent households (shown in columns four and seven), public assistance, race/ethnicity, immigrant status, income, having some college, and the year 1996 are significant predictors.

Number of Children

This section describes the relationship between receipt of housing assistance and the number of children in a household. To the extent housing assistance allows people to live in larger units or frees up resources that would otherwise be used for housing, housing assistance should be correlated with more children. The second and third columns of exhibit 4 present the results of the Poisson regression for the number of children, using the amount of the housing subsidy as the independent variable. The variable is statistically significant, but the size of the relationship is modest. A \$1 increase in the amount of the subsidy is associated with a less than 1/10th of 1 percent increase in household size.

The last two columns in exhibit 4 show how each of the different types of housing assistance is related to the number of children in a household. Public housing, Section 8, and other government subsidies are positively related to the number of children in a household. That is, recipients of these types of housing assistance have a higher number of children. For example, the incidence rate ratio for public housing, 1.16, means that residents of public housing had 1.16 times as many children as residents of unsubsidized apartments, all things being equal. In contrast, some of the other housing assistance variables had a negative relationship with the number of children in a household. Residents of other HUD developments, rent-stabilized, and rent-controlled units all had fewer children. Residents of other HUD developments, for example, had .81 as many children as residents of unsubsidized units. These results appear to be somewhat contradictory, but it should be kept in mind that, even with statistical controls, residents of rent-regulated apartments are likely to differ from recipients of housing assistance. Residents of rent-regulated apartments are known to be much older and, therefore, would be less likely to have children (Salins, 1992). It is therefore not surprising to find a negative relationship between rent regulation and the number of children, whereas most of the other housing assistance variables exhibit a positive effect. The negative relationship between residing in other HUD developments and the number of children in the household could be related to other HUD developments that are targeted specifically for the elderly. These developments are not designed to house children.

Exhibit 4

Number of Children in Household

Estimation Technique: Poisson Regression

Independent Variable

| | Incidence Rate Ratios | P-value | Incidence Rate Ratios | P-value |
|---|--------------------------|---------|--------------------------|---------|
| Amount of housing subsidy* | 1.001 | .01 | | |
| Public housing | | | 1.16 | .01 |
| Other HUD housing | | | .81 | .01 |
| Mitchell-Lama Housing | | | .92 | .23 |
| Rent stabilized | | | .85 | .01 |
| Rent controlled | | | .49 | .01 |
| Other city regulated | | | 1.07 | .13 |
| Section 8 certificate/voucher | | | 1.38 | .01 |
| Other government subsidy | | | 1.19 | .01 |
| Control Variable | | | | |
| Public assistance | 1.37 | .01 | 1.38 | .01 |
| Married or cohabiting | 2.58 | .01 | 2.51 | .01 |
| Single-parent household | 2.75 | .01 | 2.72 | .01 |
| Age | 1.33 | .01 | 1.31 | .01 |
| Age squared | .99 | .01 | .99 | .01 |
| African American (White serves as reference category) | 1.23 | .01 | 1.21 | .01 |
| Hispanic (White serves as reference category) | 1.16 | .01 | 1.18 | .01 |
| Asian (White serves as reference category) | 1.09 | .13 | 1.09 | .08 |
| Immigrant (Native, non-second generation serves as reference category) | 1.11 | .01 | 1.14 | .01 |
| Second generation (Native, non-second generation serves as reference category) | 1.15 | .01 | 1.16 | .01 |
| Household income | 1.001 | .73 | 1.001 | .01 |
| High school graduate (Non-HS graduate serves as reference category) | .84 | .01 | .83 | .01 |
| Some college (Non-HS graduate serves as reference category) | .79 | .01 | .80 | .01 |
| College graduate (Non-HS graduate serves as reference category) | .70 | .01 | .71 | .01 |
| Year = 1996 | .87 | .01 | .86 | .01 |
| n | 8,760 | | 8,919 | |
| χ^2 statistic | 3,733 | .01 | 3,956 | .01 |

Conclusion: Cross-sectional Analysis of Housing Assistance and Household Composition

Despite the somewhat contradictory findings, a general pattern does emerge from the cross-sectional analyses of the relationship between housing assistance and household composition. The amount of the housing subsidy is positively correlated with being a single parent and having more children. The two largest HUD programs, public housing and Section 8, are also positively associated with being a single parent and having more children. Both rent control and rent stabilization are negatively associated with the number of children, while rent stabilization is negatively associated with being part of a married household. Residence in a Mitchell-Lama unit is positively correlated with being a single parent.

These relationships are consistent with the notion that housing assistance is causally related to household composition, but the cross-sectional nature of the analysis does not allow one to draw firm conclusions. Perhaps most problematic, it does not allow one to rule out the possibility that causality between household composition and housing assistance runs from the former to the latter. For example, the evidence presented above demonstrated

a link between larger households and the receipt of household assistance. But this link could be due to larger households seeking out and receiving housing assistance more so than smaller households, other things being equal. From a methodological perspective, the results reported above were likely biased. From a policy perspective, much of the concern is over whether housing assistance influences household composition. Thus, it is paramount that light be shed on whether there is any evidence that the causality runs in this direction. The longitudinal analysis in the next section attempts to do this.

Results of the Longitudinal Analysis

The longitudinal analysis focused on two types of household change between 1996 and 1999 among households that did not move: changes in marital status and having a child.

Changes in Marital Status

Exhibit 5 presents the results of a logistic regression model of the relationship between the receipt of housing assistance in 1996 and marital status in 1999. This analysis tests whether housing assistance is related to the decision to marry. Recall that, for the purposes of this article, cohabiting adults are considered married. The sample is limited to those households that were not married in 1996. The dependent variable thus takes on a value of 1 if the householder was married in 1999, and 0 otherwise. The second and third columns of exhibit 5 show that the amount of the housing subsidy is significantly related to the odds of someone getting married, but only at a 90-percent level of confidence. Householders with children and older householders were more likely to marry, whereas college graduates were substantially less likely to marry during this period. The Olsen correction term is positive and statistically significant, meaning that the probability of moving is positively correlated with getting married, as might be expected.

When the relationship between specific types of housing assistance and getting married is examined, a relatively consistent pattern emerges. The fourth and fifth columns of exhibit 5 show recipients of project-based housing assistance in 1996 were less likely to be married in 1999. The only exception is residents of rent-controlled apartments. Even among that category, the relationship would be significant and negative if a confidence level of 90 percent were being used. Recipients of tenant-based housing assistance, however, were not significantly less likely to marry. Indeed, the direction of the relationship is positive, although the relationship is insignificant. Why tenant-based housing assistance appears unrelated to marital decisions is unclear. Columns four and five of exhibit 5 also show public assistance, having a child, being Asian, and the Olsen correction term to be significant predictors of getting married. Taken together, the results presented in exhibit 5 are consistent with the notion that recipients of housing assistance are less likely to partner with another person.

The results presented in Exhibit 6 consider the converse of marrying—whether a household that is married in 1996 is no longer married in 1999. The hypothesis being tested here is whether housing assistance contributed to marital dissolution, perhaps by making it easier for individuals to live alone. As mentioned earlier, a drawback of the NYCHVS is that it does not distinguish between widowed individuals and those who are separated or divorced. Nonetheless, little reason exists to expect housing assistance to be correlated with mortality. We thus assume that measurement error from death of a partner is a random process that does not bias results.

Exhibit 5

Married Between 1996 and 1999

Estimation Technique: Logistic Regression

Independent Variable

| | Odds Ratios | P-value | Odds Ratios | P-value |
|-------------------------------|-------------|---------|-------------|---------|
| Amount of housing subsidy* | .99 | .10 | | |
| Public housing | | | .33 | .01 |
| Other HUD housing | | | .46 | .05 |
| Mitchell-Lama Housing | | | .40 | .02 |
| Rent stabilized | | | .60 | .01 |
| Rent controlled | | | .33 | .08 |
| Other city regulated | | | .48 | .03 |
| Section 8 certificate/voucher | | | 1.03 | .87 |
| Other government subsidy | | | 1.08 | .84 |

Control Variable

| | | | | |
|--|--------|-----|--------|-----|
| Public assistance | .77 | .10 | .75 | .05 |
| Male | 1.33 | .08 | 1.32 | .07 |
| Has child | 1.91 | .01 | 1.67 | .01 |
| Age | 1.09 | .01 | 1.08 | .08 |
| Age squared | .99 | .16 | .99 | .13 |
| African American (White serves as reference category) | .82 | .30 | .98 | .93 |
| Hispanic (White serves as reference category) | .89 | .58 | 1.10 | .63 |
| Asian (White serves as reference category) | 1.59 | .19 | 2.45 | .01 |
| Immigrant (Native, non-second generation serves as reference category) | 1.32 | .09 | 1.19 | .27 |
| Second generation (Native, non-second generation serves as reference category) | 1.32 | .30 | 1.20 | .48 |
| Household income | .99 | .62 | 1.001 | .79 |
| High school graduate (non-HS graduate serves as reference category) | 1.03 | .83 | 1.10 | .52 |
| Some college (Non-HS graduate serves as reference category) | 1.31 | .14 | 1.25 | .20 |
| College graduate (Non-HS graduate serves as reference category) | .56 | .03 | .63 | .07 |
| Olsen correction term | 97.30 | .01 | 12.08 | .02 |
| n | 1,798 | | 1,913 | |
| χ^2 statistic | 100.04 | .01 | 124.58 | .01 |

For the most part, the results presented in exhibit 6 offer mixed evidence of a relationship between receipt of housing assistance and dissolving a partnership. Housing assistance, measured as the amount of subsidy, is not significantly related to dissolving a partnership. Married couples with children were less likely to separate, while African Americans and Hispanics were more likely to separate. Among the variables measuring receipt of a specific type of housing assistance, shown in the fourth and fifth columns of exhibit 6, only the public housing and rent-stabilized variables are statistically significant at the 95-percent level of confidence. It should be noted that limiting the sample to low-income renters who were married in 1996 substantially reduces the sample size. This reduction increases the likelihood that the lack of evidence of a relationship between housing assistance and separating may be due to the lack of statistical power rather than the lack of such a relationship in the population.

Exhibit 6

Marriage Dissolved Between 1996 and 1999

Estimation Technique: Logistic Regression

Independent Variable

| | Odds Ratios | P-value | Odds Ratios | P-value |
|-------------------------------|-------------|---------|-------------|---------|
| Amount of housing subsidy* | 1.001 | .87 | | |
| Public housing | | | 2.11 | .02 |
| Other HUD housing | | | 2.23 | .21 |
| Mitchell-Lama Housing | | | 1.56 | .29 |
| Rent stabilized | | | 1.35 | .05 |
| Rent controlled | | | 1.32 | .67 |
| Other city regulated | | | .83 | .62 |
| Section 8 certificate/voucher | | | 1.13 | .73 |
| Other government subsidy | | | .49 | .19 |

Control Variable

| | | | | |
|--|-------|-----|-------|-----|
| Public assistance | 1.19 | .34 | 1.18 | .33 |
| Male | .83 | .21 | .80 | .11 |
| Has child | .62 | .01 | .66 | .01 |
| Age | 1.01 | .85 | 1.02 | .61 |
| Age squared | .99 | .75 | .99 | .59 |
| African American (White serves as reference category) | 1.67 | .01 | 1.53 | .03 |
| Hispanic (White serves as reference category) | 1.63 | .01 | 1.40 | .06 |
| Asian (White serves as reference category) | 1.36 | .19 | 1.22 | .39 |
| Immigrant (Native, non-second generation serves as reference category) | .86 | .39 | .89 | .49 |
| Second generation (Native, non-second generation serves as reference category) | 1.21 | .51 | 1.34 | .30 |
| Household income | .99 | .56 | .99 | .55 |
| High school graduate (Non-HS graduate serves as reference category) | .97 | .86 | .89 | .47 |
| Some college (Non-HS graduate serves as reference category) | .81 | .29 | .75 | .13 |
| College graduate (Non-HS graduate serves as reference category) | .88 | .58 | .77 | .24 |
| Olsen correction term | 2.44 | .15 | 5.39 | .14 |
| n | 1,111 | | 1,172 | |
| χ^2 statistic | 32.79 | .01 | 45 | .01 |

Overall, the results presented in exhibit 5 suggest housing assistance dampens the likelihood of marriage. Exhibit 6 shows that marriages are more likely to dissolve in public housing and rent-stabilized units. But given that none of the other assisted housing variables are statistically significant, this finding might be idiosyncratic to these specific programs. In addition, the lack of evidence may be due to the lack of statistical power, although it is also possible that housing assistance is more consistently related to decisions about marrying but not to marital dissolutions.

Having a Child

To the extent that housing assistance subsidizes consumption and allows households to afford more housing than they otherwise might, this subsidy could facilitate having more children.

The results presented in exhibit 7 do not support this hypothesis. None of the variables measuring housing assistance, including the subsidy amount and the other program specific variables, are significant. In general, housing assistance appears unrelated to decisions to procreate.

The model does suggest that being African American or Hispanic, already having a child, and being married increased the likelihood of a household adding a child between 1996 and 1999. Likewise, moving or being lost from the sample for some other reason is positively correlated with having a child, as indicated by the significant and positive Olsen correction term. Higher incomes are associated with a lower likelihood of having an additional child.

Exhibit 7

Has a Child Between 1996 and 1999

Estimation Technique: Logistic Regression

Independent Variable

| | Odds Ratios | P-value | Odds Ratios | P-value |
|-------------------------------|-------------|---------|-------------|---------|
| Amount of housing subsidy* | .99 | .29 | | |
| Public housing | | | .84 | .42 |
| Other HUD housing | | | .71 | .32 |
| Mitchell-Lama Housing | | | .77 | .43 |
| Rent stabilized | | | 1.11 | .37 |
| Rent controlled | | | .67 | .52 |
| Other city regulated | | | .84 | .52 |
| Section 8 certificate/voucher | | | .97 | .87 |
| Other government subsidy | | | 1.14 | .94 |

Control Variable

| | | | | |
|--|-------|-----|-------|-----|
| Public assistance | 1.06 | .62 | 1.01 | .94 |
| Male | .89 | .37 | .96 | .72 |
| Married | 1.56 | .01 | 1.55 | .01 |
| Has child | 2.35 | .01 | 2.54 | .01 |
| Age | 1.01 | .77 | .98 | .60 |
| Age squared | .99 | .21 | .99 | .70 |
| African American (White serves as reference category) | 1.50 | .01 | 1.61 | .01 |
| Hispanic (White serves as reference category) | 1.42 | .03 | 1.57 | .01 |
| Asian (White serves as reference category) | 1.20 | .41 | 1.24 | .33 |
| Immigrant (Native, non-second generation serves as reference category) | 1.03 | .22 | .94 | .63 |
| Second generation (Native, non-second generation serves as reference category) | 1.16 | .44 | 1.01 | .95 |
| Household income | .99 | .03 | .99 | .04 |
| High school graduate (Non-HS graduate serves as reference category) | .82 | .10 | .82 | .10 |
| Some college (Non-HS graduate serves as reference category) | 1.01 | .98 | 1.04 | .78 |
| College graduate (Non-HS graduate serves as reference category) | .78 | .18 | .79 | .19 |
| Olsen correction term | 7.66 | .01 | 7.50 | .01 |
| n | 3,489 | | 3,717 | |
| χ^2 statistic | 145 | .01 | 280 | .01 |

Discussion

The results of the cross-sectional and longitudinal analyses provide important clues about the relationship between housing assistance and household composition. First, the evidence supports the contention that a relationship exists. Measures of housing assistance proved to be significant predictors of household composition across a number of model specifications. The relationship varies and/or diminishes, however, depending on what type of household composition is under consideration. The following discussion sums up the evidence on two categorizations of household composition: marital status and the presence of children.

Marital Status. As discussed earlier, housing assistance may affect marital choices to the extent that economies of scale in household production achieved through marriage are considered in the decision to marry or remain married. The results of the cross-sectional analysis showed that, in most instances, recipients of housing assistance were less likely to be married. The results of the longitudinal analysis were consistent with the cross-sectional findings. Housing assistance was negatively correlated with getting married. These results are consistent with the notion that housing assistance dampens the likelihood of marriage. The results do not rule out the possibility that unmarried households are more likely to seek housing assistance, independent of any effect such assistance might have on the decision to marry. But they certainly point to a conclusion that recipients of housing assistance are less likely to partner. This finding jibes with Turner's (2003) research that showed cohabitation was much less likely if the mother lived in government-assisted housing compared to unsubsidized rental housing.

When we consider the converse, the dissolution of a partnership, the evidence is less conclusive. The longitudinal analysis only found public housing and rent regulation to be related to marital dissolutions, but other types of housing assistance were not. One possible explanation for finding only these two variables significant is the small sample size used with the marital dissolution models. But without additional research it is safer to conclude that housing assistance is associated with lessening the likelihood of marrying rather than concluding that assisted housing contributes to partners splitting up.

The Presence of Children. Housing assistance, by expanding the household budget, might facilitate the adding of children to a household. The cross-sectional results show larger housing subsidies are associated with more children. In addition, those in public housing and Section 8 and recipients of other federal housing assistance tend to have more children, whereas residents of rent-regulated units and other HUD developments have fewer children. These contradictory results defy easy interpretation. The longitudinal analysis finds little in the way of a consistent relationship between housing assistance in 1996 and having a child by 1999. Therefore, the results presented here do not allow for definitive conclusions on the relationship between housing assistance and procreation, but do imply that households with more children may be more likely to seek out housing assistance.

Conclusion and Implications

Taken together, the results of the cross-sectional and longitudinal analyses point to the existence of a relationship between housing assistance and household composition. Consider the two types of household composition addressed in this analysis: marital status and the number of children in a household. Marital status was most consistently related to the receipt of housing assistance. Recipients of housing assistance were less likely to be married and less likely to get married over time. The amount of the housing subsidy was also modestly but negatively associated with getting married. Little evidence was found, however, to suggest that, after people married or started cohabiting, housing assistance contributed to the dissolution of partnerships. This result is consistent with the household production view of marriage or cohabiting, which views partnering as a cost-saving strategy, in part. Recipients of housing assistance might be more selective in choosing a partner because the incentive to reduce housing costs is less when one's housing is being subsidized. These results do not rule out the possibility that unmarried individuals are more likely to seek out housing assistance, but they do imply that, at a minimum, housing assistance influences partnering decisions.

The second set of results considered pertains to the presence of children in a household. Here the cross-sectional results appear to be completely at odds with the longitudinal results. In general, recipients of housing assistance have more children but were less likely to have a new child between 1996 and 1999. These seemingly contradictory results are

consistent with an account that has households with more children more likely to seek out housing assistance but, once they have housing assistance, they are less likely to have additional children. Unlike welfare, housing assistance does not increase automatically with the addition of a child to the household. Obtaining an increase in housing assistance means finding another unit, which is no easy task in a tight housing market like New York City, a task made even more difficult by the need to find a unit that is subsidized or accepts Section 8. Faced with these options, housing assistance recipients may be more likely to forego having additional children.

These results, in conjunction with the findings of Gould Ellen and O'Flaherty (2002) and Turner (2003), should be viewed as the first steps in an exploration of the relationship between housing assistance and household composition. These exploratory analyses clearly illustrate a relationship between housing assistance and household composition. The next steps should be to determine whether this relationship is causal or not and in what direction(s) this causality may run. This research should be pursued using experimental data or panel data that follow people over time and have reliable and valid information on housing assistance receipt. It is also desirable to extend this study beyond New York City, an atypical housing market. Using one of these latter approaches would make clear the direction of causality between housing assistance and household composition and would allow for generalization beyond nonmoving households in New York City.

To the extent policymakers wish to influence household decisions on household composition, and recent changes in welfare law suggests this is clearly the case, these results suggest housing assistance may play a role. But it would be wise to gain a clearer picture of exactly what that role is before attempting to manipulate household composition decisions through housing assistance.

In conclusion, the results suggest that choices about whom to live with are influenced by housing assistance. By subsidizing the largest item in most household budgets, housing assistance provides recipients with living arrangement options they might otherwise not have.

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Note

1. Two other possible responses to this question are (1) the Public Assistance Shelter Allowance Program (PASAP) and (2) the Senior Citizen Rent Increase Exemption (SCRIE). The PASAP refers to the amount of the welfare grant that is applied to housing and is not determined by the cost of the housing unit. Thus, this program is not truly housing assistance and is not considered explicitly here. The SCRIE is an additional subsidy available for elderly householders in rent-regulated apartments. Because the elderly are excluded from this analysis, this program is not applicable here.

References

Angel, Roland, and Marta Tienda. 1982. "Determinants of Extended Household Structure: Cultural Pattern or Economic Need?" *American Journal of Sociology* 87 (6): 1360–1383.

Borjas, George J. 2001. *Heaven's Door*. Princeton, NJ: Princeton University Press.

Casey, Connie H. 1992. *Characteristics of HUD-Assisted Renters and Their Units in 1989*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.

Gould Ellen, Ingrid, and Brendan O'Flaherty. 2002. "Do Housing and Social Policies Make Households Too Small? Evidence from New York." Discussion Paper #0203–07. New York: Columbia University, Department of Economics.

Liao, Tim Futing. 1994. *Interpreting Probability Models: Logit, Probit and Other Generalized Linear Models*. Thousand Oaks, CA: Sage Publications.

Moffitt, Robert A. 1997. "The Effect of Welfare on Marriage and Fertility: What Do We Know and What Do We Need to Know?" Institute for Research on Poverty Discussion Paper No. 1153-97. Madison: University of Wisconsin.

Murray, Charles. 1984. *Losing Ground*. New York: Basic Books.

Olsen, Randall J. 1980. "A Least Squares Correction for Selectivity Bias," *Econometrica* 48 (7): 1815–1820.

Patterson, Orlando. 1998. *Rituals of Blood: Consequences of Slavery in Two American Centuries*. Washington, DC: Civitas.

Richards, Toni, Michael J. White, and Amy Ong Tsui. 1987. "Changing Living Arrangements: A Hazard Model of Transitions Among Household Types," *Demography* 24 (1): 77–97.

Rossi, P.H. 1980. *Why Families Move*. New York: Free Press.

Rucinski, Dianne, and Leslie Athey. 1995. *Identifying Recipients of Housing Assistance Through Survey Questions*. Chicago: National Opinion Research Center.

Salins, Peter. 1992. *Scarcity by Design*. Cambridge, MA: Harvard University Press.

Shroder, Mark. 2002. "Does Housing Assistance Perversely Affect Self-Sufficiency? A Review Essay," *Journal of Housing Economics* 11 (4): 381–417.

Speare, A. 1974. "Residential Satisfaction as an Intervening Variable in Residential Mobility," *Demography* 11 (2): 173–188.

Turner, Mark. 2003. *Cohabitation of Unwed Parents in Federally Subsidized Housing: Effects of Income and Housing Prices*. Draft report. Washington, DC: Urban Institute.

Wilson, James Q. 2003. *The Marriage Problem*. New York: Harper Collins.

Wilson, William J. 1987. *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy*. Chicago: University of Chicago Press.

Additional Reading

Heckman, James. 1979. "Sample Bias as a Specification Error," *Econometrica* 42: 679–694.

Stolzenberg, Ross M., and Daniel A. Relles. 1997. "Tools for Intuition About Sample Selection Bias and Its Correction," *American Sociological Review* 62: 494–507.

A Hazard Rate Analysis of Leavers and Stayers in Assisted Housing Programs

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Abstract

The study described in this article uses a random sample of households in the Multi-family Tenant Characteristics System database and the Tenant Rental Assistance Certification System database to address the following questions: Does a significant difference exist in the mobility patterns of households in each of the three primary assisted housing programs? What household characteristics affect the probability of leaving assisted housing? The analysis shows that individual characteristics play an important role in determining assisted housing tenure, and significant differences in individual characteristics exist across the three primary assisted housing programs. The analysis also shows that location and neighborhood factors do affect household tenure in assisted housing programs. The results from this study clearly confirm that basic economic conditions play a significant role in determining whether a household stays or leaves an assisted housing program.

Introduction

Public assisted housing has a long history in the United States, and the U.S. Department of Housing and Urban Development (HUD) is charged with implementing the nation's assisted housing programs and policies. Public housing policy for low-income individuals revolves around three primary programs: tenant-based certificates or vouchers, public housing, and project-based assistance. Today, more than 4.3 million low-income households receive federal housing support through one of these programs.¹

As a support system for low-income households, HUD's assisted housing programs are part of the overall welfare system. As a result, public assisted housing was not designed to be a long-term housing solution but, rather, short-term assistance for households experiencing temporary economic dislocation. Thus, this article analyzes the duration of households in the various assisted housing programs in an effort to help policymakers in determining the factors that lead households to successfully make the transition out of assisted housing. To focus the analysis, I address the following questions: Does a significant difference exist in the mobility patterns of households in each of the three primary assisted housing programs? What household characteristics affect the probability of leaving assisted housing?

To preview the results, the study finds that individual characteristics play an important role in determining assisted housing tenure. Interestingly, the empirical analysis finds that significant differences in individual characteristics exist across the three primary assisted housing programs. The analysis also shows that location and neighborhood factors do affect household tenure in assisted housing programs. The results from this section should help policy analysts seeking to target specific programs that affect household tenure decisions within the assisted housing programs. Finally, and not surprisingly, the results from this study clearly confirm that basic economic conditions play a significant role in determining whether a household stays or leaves an assisted housing program.

U.S. Housing Programs

Assisted housing programs in the United States fall into three basic classifications: tenant-based vouchers (and formerly certificates), traditional public housing, and project-based assistance (Section 8). Housing vouchers are a tenant-based assistance program in which the subsidy flows directly to the assisted household. In contrast, the public housing and project-based assistance programs tie the federal subsidy to a particular unit.

The Housing Voucher Program

The housing voucher program is the primary tenant-based assistance program. Households provided with housing vouchers are eligible to lease units in the private market. According to Shroder (2002), households with children receiving housing vouchers exceed the number of households with children living in project-based and public housing combined. The housing voucher program is administered by the local public housing agencies, and under the housing voucher program eligible households may reside in any housing unit that meets the program requirements. The local housing agency determines the standard rent required to secure a “moderately priced dwelling” in the local housing market. The household holding the voucher is required to use 30 percent of its monthly adjusted gross income for rent. The housing voucher then covers the difference between the local housing market standard rent and the household’s required contribution. If the household wishes to occupy a unit for which the rent is above the local standard rent, then the household must pay the differential not covered by the voucher. The household, however, may not move to a unit for which the rent is greater than 40 percent of the household’s adjusted monthly income.

Shroder (2002) noted that the housing voucher program grants assisted households the freedom to choose their location at a lower cost than traditional project-based programs. In addition, vouchers provide flexibility to households in projects that no longer meet project-based subsidy guidelines.

Public Housing

Approximately 1.3 million households live in public housing units.² Congress created public housing to ensure safe and decent housing options for low-income families, the elderly, and people with disabilities. HUD provides federal aid to local housing agencies that manage housing for low-income residents. Public housing is targeted at households with incomes below 80 percent of area median income (lower income households) and households with incomes below 50 percent of area median income (very low income). Rent on public housing units is based on the household’s expected gross annual income (less eligible deductions for dependents). Normally, rent is set at the highest of 30 percent of monthly adjusted gross income, 10 percent of monthly income, welfare rent, or a \$25 to \$50 minimum rent set by the local housing agency.

Section 8 Project-based Assistance

Congress created the Section 8 Program, currently known as the Housing Choice Voucher Program, in 1974 to provide rental subsidies to eligible households. The Section 8 Program covers housing units under several categories: Section 8 New Construction, Substantial Rehabilitation, and the Loan Management Set-Aside Programs. The housing assistance provided under the Section 8 Program is project based. Under a project-based assistance program, the federal subsidy resides with the housing unit for a contractually determined period. During this period, the owner receives rental subsidies equal to the difference between the approved contract rent for the unit and the required rental contribution of the tenant. Tenants in Section 8 subsidized properties generally pay rent that is calculated in a way that is similar to other assisted housing programs. Thus, project-based and tenant-based assisted housing programs are relatively transparent to the tenant, with two important exceptions. First, the tenant loses the rent subsidy on vacating a Section 8 Program unit and thus must either move to another project-based subsidized unit or receive a tenant-based voucher to continue to receive housing assistance. Second, project-based subsidies tend to have higher concentrations of poverty.³

Literature Review

Although research on tenure in assisted housing programs is relatively limited, extensive literature exists that examines tenure choice in the broader housing market. These studies concentrate on either rental markets or owner-occupied housing. Regarding the rental housing market, a natural question concerns the role of vacancy in the rental market. Because rental unit vacancy is directly related to tenant mobility and tenure choice, a number of recent studies have examined tenant duration in rental property. For example, Deng, Gabriel, and Nothaft (2003) and Gabriel and Nothaft (2001) examined the tenant duration in the rental housing market. Deng, Gabriel, and Nothaft (2003) estimated a hazard model of tenant duration using data from the Bureau of Labor Statistics' Consumer Price Index housing sample. Combining this data with metropolitan statistical area (MSA) level economic data, Deng, Gabriel, and Nothaft (2003) showed that positive changes in rent levels negatively affect the duration of rental occupancy. Their analysis also shows that areas with high rent costs have shorter tenant durations. These results are consistent with the findings of Gabriel and Nothaft (2001), who also linked tenant residence duration with the equilibrium natural vacancy rate. Their analysis showed that rental rates track tenant outflows and, thus, residential tenant duration is an important factor in determining market rents.

A strand of literature that is closely associated with tenant duration in assisted housing programs concerns the effect of rent control laws on tenant mobility and tenure choice. Beginning with Gyourko and Linneman (1989), a number of studies have empirically examined the effect of rent control regulations on household mobility. Gyourko and Linneman (1989) found that household mobility declines as the benefits associated with rent control increase. Following Gyourko and Linneman (1989), Ault, Jackson, and Saba (1994) and Nagy (1995) reexamined the benefits of rent control using improved econometric methods. While Ault, Jackson, and Saba (1994) confirmed that rent control regulations reduce household mobility, the results reported in Nagy (1995) imply that household characteristics and not regulations explain household mobility. Most recently, Munch and Svarer (2002) revisited the issue of rent control and household mobility using a proportional hazard model that corrects for both truncated tenancy durations and right-censored observations. After correcting for these censoring events, their analysis supports the conclusions of Gyourko and Linneman (1989) and Ault, Jackson, and Saba (1994) that rent control regulations significantly increase household tenancy duration.

This literature makes it clear that a number of factors determine the tenure of an individual in assisted housing. To assess the importance of individual/demographic factors versus economic factors, this article analyzes household tenure in public housing following the proportional hazard rate models in the spirit of Munch and Svarer (2002) and Hungerford (1996). Hungerford (1996) used the Survey of Income and Program Participation 1986, 1987, and 1988 Full Panel Microdata Research files to gather information about households residing in public housing. Similar to the goals of this study, Hungerford (1996) examined the household characteristics (for example, age, race, income) that affect the tenure in public housing. Thus, the results for this article will provide additional insights about the relationships Hungerford identified using a more complete data set covering a wider range of public assisted housing programs.

Data

To analyze the above questions, this study uses a random sample of the Multifamily Tenant Characteristics System (MTCS) database and the Tenant Rental Assistance Certification System (TRACS) database. Combined, these data sets contain information on 8,855,174 households residing in public assisted housing programs. The TRACS database contains information on 3,214,005 (36 percent of total) households living in project-based assisted housing involving such programs as Section 202, Section 236, and Section 8 New Construction and Substantial Rehabilitation. The MTCS database contains information on 2,910,718 (33 percent) households receiving tenant-based assistance under the Housing Choice Voucher Program and 2,530,247 (29 percent) households living in traditional public housing.⁴

The database consists of a series of annual updates from separate data extracts covering an 18-month window for the years ending December 31, 1995, to December 31, 2000. Thus, the complete database contains information on a significant number of households with exceptionally lengthy tenures in assisted housing. Because the database tracks the disposition of households after June 30, 1994 (18 months before December 31, 1995), significant bias exists in the sample. The bias results because no information exists for households that exited the assisted housing programs before June 30, 1994, which leaves the sample overpopulated with households having lengthy assisted housing spells. Thus, to control for this bias, I restrict the analysis to the 4,343,279 households that entered an assisted housing program after June 30, 1994. This figure represents approximately 49 percent of the households in assisted housing and has a slightly different composition of households in various programs. For example, the restricted sample consists of 31 percent residing in tenant-based programs (compared to 33 percent for the complete data set), 22 percent in traditional public housing (compared to 29 percent for the complete data set), and 44 percent in project-based housing (compared to 36 percent for the complete data set). Given the large number of records in these databases and the computational requirements for hazard rate analysis, I drew a 1-percent stratified random sample from each of these files.

Unfortunately, the data contained in the MTCS/TRACS databases contain a significant number of incorrectly coded observations. As a result, after cleaning the data for observations containing either missing or obviously incorrectly coded dates-of-admission or dates-of-action as well as missing demographic data, the sample data set contains 25,336 households that comprise 8,197 tenant-based records (32 percent), 6,288 public housing records (25 percent), and 10,851 project-based records (43 percent).

The preliminary step is to classify households as either still current in an assisted housing program or terminated from assisted housing. For observations in the tenant-based and public housing files (MTCS), I classify households as terminating their public housing

tenure if the household’s final “type of action” variable recorded in the database is coded as either “portability move-out” or “end of participation.” For observations in the project-based assisted database (TRACS), I classify households as terminating their public housing tenure if their final “type of action” variable recorded in the database is coded as “termination” or “move-out.” All other observations in both systems are classified as still current in public housing as of “date_of_action” recorded in the database. Because each household in the database is tracked with a unique record identification number, the longitudinal files allow for tracking households that move from one assisted housing program to another. To control for this possibility, only households that exit from an assisted housing program and do not subsequently enter a new program are classified as terminating. Finally, to control for improvement in data recording and accuracy over time, I only include households not terminating from assisted housing in the analysis if the “date_of_action” is after December 31, 2000.⁵

Exhibit 1 reports the frequency distribution of the sample of households in each program by year of admission. The table indicates a slightly higher proportion of households (19.5 percent) entered the tenant-based housing voucher program in 2001 than the other programs (14.2 percent for project-based housing and 10.6 percent for public housing).⁶

Exhibit 1

Frequency Distribution of the Full Sample by Year of Admission

| Admission Year | Project-based | | Public Housing | | Tenant-based | | Total | |
|----------------|---------------|---------|----------------|---------|--------------|---------|--------|---------|
| | Count | Percent | Count | Percent | Count | Percent | Count | Percent |
| 1994 | 644 | 5.9 | 305 | 4.9 | 322 | 3.9 | 1,271 | 5.0 |
| 1995 | 1,253 | 11.5 | 723 | 11.5 | 729 | 8.9 | 2,705 | 10.7 |
| 1996 | 1,311 | 12.1 | 747 | 11.9 | 713 | 8.7 | 2,771 | 10.9 |
| 1997 | 1,402 | 12.9 | 810 | 12.9 | 980 | 12.0 | 3,192 | 12.6 |
| 1998 | 1,443 | 13.3 | 940 | 14.9 | 1,105 | 13.5 | 3,488 | 13.8 |
| 1999 | 1,526 | 14.1 | 1,091 | 17.4 | 1,231 | 15.0 | 3,848 | 15.2 |
| 2000 | 1,726 | 15.9 | 1,008 | 16.0 | 1,515 | 18.5 | 4,249 | 16.8 |
| 2001 | 1,546 | 14.2 | 664 | 10.6 | 1,602 | 19.5 | 3,812 | 15.0 |
| Total | 10,851 | 100.0 | 6,288 | 100.0 | 8,197 | 100.0 | 25,336 | 100.0 |

Exhibit 2 shows the distribution of the sample households across the 10 HUD regions. Overall, the cleaned random sample matches the general population of assisted households. For example, 5.9 percent of the random sample resides in Region 1 (New England) while 5.5 percent of the population is located in Region 1. Similarly, 21.4 percent of the sample is located in Region 4 (Southeast) while 22.2 percent of the population is located in Region 4. The cleaned random sample, however, does exhibit a slight difference from the overall population with respect to households residing in Region 5 (Midwest) and Region 6 (Southwest). The sample is overweighted in Region 5 (20.2 percent compared to 17.5 percent for the population) and underweighted in Region 6 (12.7 percent compared to 14.2 percent for the population). It is not clear that this discrepancy between the sample and the overall population biases the analysis.

Exhibit 2 does indicate that minor geographic variations exist in the various assisted housing programs. For example, 11.4 percent of the tenant-based households are located in Region 9 (Pacific) compared to 3.2 percent of the public housing households and 8.4 percent of the project-based households. Furthermore, Region 4 (Southeast) has a higher concentration of public housing households (31.4 percent), while Region 5 (Midwest) has a greater concentration of project-based households (23.8 percent).

Exhibit 2

Frequency Distribution of the Full Sample by HUD Region

| HUD Region | Project-based | | Public Housing | | Tenant-based | | Total | |
|------------------------|---------------|---------|----------------|---------|--------------|---------|--------|---------|
| | Count | Percent | Count | Percent | Count | Percent | Count | Percent |
| 1: New England | 722 | 6.7 | 283 | 4.5 | 489 | 6.0 | 1,494 | 5.9 |
| 2: New York/New Jersey | 963 | 8.9 | 540 | 8.6 | 768 | 9.4 | 2,271 | 9.0 |
| 3: Mid-Atlantic | 1,287 | 11.9 | 613 | 9.7 | 676 | 8.2 | 2,576 | 10.2 |
| 4: Southeast | 2,057 | 19.0 | 1,977 | 31.4 | 1,382 | 16.9 | 5,416 | 21.4 |
| 5: Midwest | 2,580 | 23.8 | 1,100 | 17.5 | 1,438 | 17.5 | 5,118 | 20.2 |
| 6: Southwest | 1,129 | 10.4 | 945 | 15.0 | 1,136 | 13.9 | 3,210 | 12.7 |
| 7: Great Plains | 542 | 5.0 | 359 | 5.7 | 602 | 7.3 | 1,503 | 5.9 |
| 8: Rocky Mountains | 376 | 3.5 | 117 | 1.9 | 340 | 4.1 | 833 | 3.3 |
| 9: Pacific | 913 | 8.4 | 199 | 3.2 | 932 | 11.4 | 2,044 | 8.1 |
| 10: Northwest | 282 | 2.6 | 155 | 2.5 | 433 | 5.3 | 870 | 3.4 |
| Total | 10,851 | 100.0 | 6,288 | 100.0 | 8,196 | 100.0 | 25,335 | 100.0 |

Exhibit 3 reports the distribution of the sample households by MSA size. Again, we see a difference in the distribution of households across the assisted housing programs. For example, a greater percentage of public housing households (32.2 percent) reside in areas with a population less than 50,000 than do households receiving tenant-based assistance (26.3 percent). Note, however, that the majority of households (55.2 percent) receiving any type of housing assistance reside in cities with populations exceeding 500,000.

Exhibit 3

Frequency Distribution of the Full Sample by MSA Size

| MSA Size | Project-based | | Public Housing | | Tenant-based | | Total | |
|---------------------|---------------|---------|----------------|---------|--------------|---------|--------|---------|
| | Count | Percent | Count | Percent | Count | Percent | Count | Percent |
| Not in MSA | 2,277 | 21.1 | 2,000 | 32.2 | 2,137 | 26.3 | 6,414 | 25.5 |
| 50,000–99,999 | 119 | 1.1 | 57 | 0.9 | 140 | 1.7 | 316 | 1.3 |
| 100,000–249,999 | 910 | 8.4 | 618 | 9.9 | 756 | 9.3 | 2,284 | 9.1 |
| 250,000–499,999 | 980 | 9.1 | 585 | 9.4 | 699 | 8.6 | 2,264 | 9.0 |
| 500,000–999,999 | 1,031 | 9.6 | 627 | 10.1 | 694 | 8.6 | 2,352 | 9.4 |
| 1,000,000–2,499,999 | 2,024 | 18.8 | 1,003 | 16.1 | 1,156 | 14.2 | 4,183 | 16.7 |
| 2,500,000–4,999,999 | 987 | 9.1 | 372 | 6.0 | 676 | 8.3 | 2,035 | 8.1 |
| 5,000,000 or more | 2,461 | 22.8 | 953 | 15.3 | 1,857 | 22.9 | 5,271 | 21.0 |
| Total | 10,789 | 100.0 | 6,215 | 100.0 | 8,115 | 100.0 | 25,119 | 100.0 |

Note: 216 observations were eliminated from subsequent analysis due to incorrectly coded census tract values.

Baseline Hazard Rates

The purpose of this study is to examine the factors that lead a household to leave an assisted housing program. Hazard rate or duration analysis is a commonly used statistical technique that enables researchers to address this type of question.⁷ I begin by defining the time that a household exits an assisted housing program, T , as a random variable, which has a continuous probability distribution, $f(t)$, where t is a realization of T . The cumulative probability is defined as

$$F(t) = \int_0^t f(s) ds = \Pr(T \leq t) \tag{1}$$

and the survival function is defined as

$$S(t) = 1 - F(t) = \Pr(T > t). \quad (2)$$

The survival function provides an indication of the probability that the time to exit will be of length at least t . The probability (l) that a household will leave the program in the next short interval of time, Δt , given that the household has not left before time t is characterized as

$$l(t, \Delta t) = \Pr(t \leq T \leq t + \Delta t | T \geq t). \quad (3)$$

Furthermore, the function that characterizes this aspect of the distribution is the hazard rate and is defined as

$$h(t) = \lim_{\Delta t \rightarrow 0^+} \frac{\Pr(t \leq T < t + \Delta t | T \geq t)}{\Delta t} = \frac{f(t)}{S(t)}. \quad (4)$$

The hazard rate provides an indication of the rate at which households leave the program at time t , given they remain in the program until t .

A preliminary step in analyzing the propensity to leave requires examining the basic household survival and hazard curves. Given that the data set consists of a large number of observations measured at discrete intervals (months), I compute the survival curves and hazard rates using the life-table method.⁸ The life-table method estimates the conditional probability that a household will leave the program during month i , given that the household was still in the program at the start of i . Thus for month i , the probability of surviving to i is

$$\hat{S}(t_i) = \prod_{j=1}^{i-1} (1 - q_j) \quad (5)$$

where q_j is the conditional probability of failure (leaving the program). For the first interval, the survival probability is set to 1.0. Exhibits 4 and 5 report the survival curves and hazard rates for each program. The survival and hazard rates (exhibits 4 and 5) clearly indicate differences in the underlying pattern of termination.

The above method provides an indication of the baseline hazard for households in each housing program (tenant-based, public housing, and project-based housing). I estimate the log-rank and Wilcoxon statistics testing the null hypothesis that the hazard rates are the same.⁹ The log-rank and Wilcoxon statistics are computed as $\mathbf{v}'\mathbf{V}^{-1}\mathbf{v}$ where \mathbf{v} is the vector $\mathbf{v} = (v_1, v_2, v_3)$ with

$$v_i = \sum_{j=1}^u w_j (d_{ij} - e_{ij}) \quad (6)$$

and \mathbf{V} is the estimated covariance matrix. The summation is over all u unique event times, d_{ij} is the number of terminations in group i ($i = 1, 2, 3$) at time j , e_{ij} is the expected number of terminations in group i at time j , and w_j is the weight where $w_j = 1$ for the log-rank statistic and w_j equals the total number of households at risk at each time point for the Wilcoxon statistic. Both statistics have a chi-square distribution with degrees of freedom equal to the rank of \mathbf{V} . The Wilcoxon and log-rank statistics are computed as 231.8 and 195.4, respectively, and are highly significant (at the 1 percent level), supporting the conclusion that the three hazard rates are significantly different. As a result, in the next section I analyze each program separately.¹⁰

Exhibit 4

Baseline Survival Curves

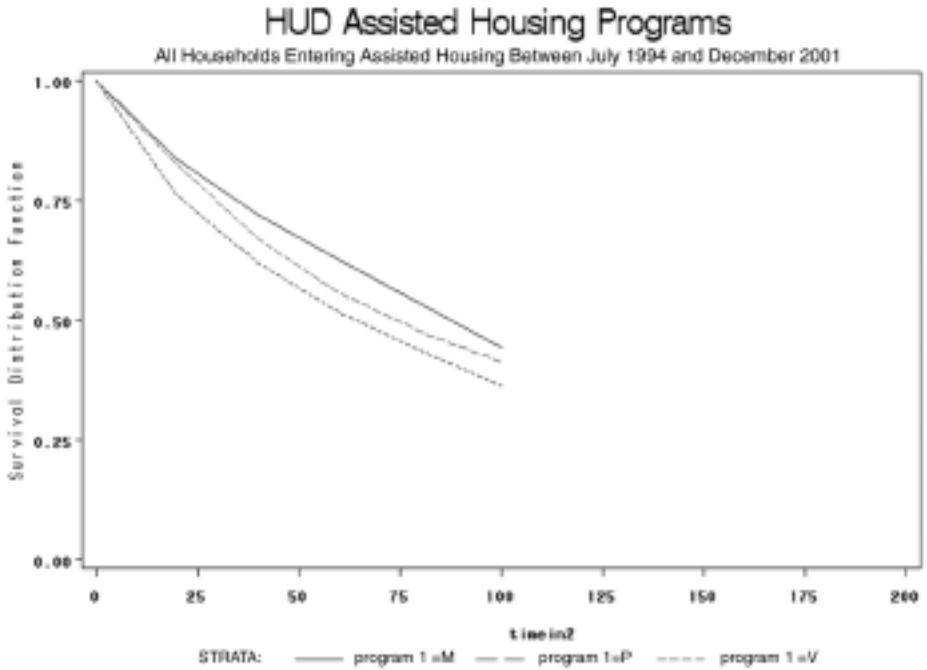


Exhibit 5

Baseline Hazard Rates



Cox Proportional Hazard Analysis

The second step in the analysis incorporates specific individual characteristics and local economic factors into the hazard rates. To accomplish this step, I recognize that during the observation period a household will either leave the program or remain current through the end of the time period of study (censored). For a single spell, the model specifies the joint distribution of two variables: (1) the spell duration, t , assumed to be a continuous variable; and (2) the exit route, r , which is an integer variable taking values in the set $\{1,2\}$ representing the two possible outcomes. Furthermore, I assume a latent duration, T_j , exists for each possible exit route, j , where T_j ($j = 1,2$) is the time required for the spell to end via exit route j . Therefore, the observed duration, t , is the minimum of the T_j .

Conditional on a set of explanatory variables, x_j , that capture time-varying financial/economic and personal characteristics, and parameters, θ_j , the probability density function (*pdf*) and cumulative density function (*cdf*) for T_j are

$$f_j(T_j | x_j; \theta_j) = h_j(T_j | x_j; \theta_j) \exp(-I_j(r_j | x_j; \theta_j)) \quad (7)$$

$$F_j(T_j | x_j; \theta_j) = 1 - \exp(-I_j(r_j | x_j; \theta_j)) \quad (8)$$

where I_j is the integrated hazard for outcome j :

$$I_j(T_j | x_j; \theta) = \int_0^{T_j} h_j(s | x_j; \theta_j) ds \quad (9)$$

and h_j is the hazard function.

The joint distribution of the duration and outcome is

$$f(t, r | x; \theta) = h_r(t | x_r; \theta_r) \exp(-I_0(t | x; \theta)) \quad (10)$$

where $x = (x_1, x_2)$, $\theta = (\theta_1, \theta_2)$ and $I_0 = \sum I_j$ is the aggregated integrated hazard. Thus the conditional probability of an outcome is

$$\Pr(r | t, x; \theta) = \frac{h_r(t | x_r; \theta_r)}{\sum_{j=1}^2 h_j(t | x; \theta_j)} \quad (11)$$

Equation (11) can be easily estimated via maximum likelihood.¹¹ One benefit of the Cox proportional hazard model is that it does not require an assumption about the shape of the baseline hazard functions.

Research Questions and Sample Characteristics

In the section on baseline hazard rates I described the estimation of the baseline hazard functions without respect to independent covariates. The purpose of that analysis was to answer the question of whether tenants in the three assisted housing programs had obviously different expected tenures in assisted housing without regard to individual characteristics. Because the answer was a qualified “yes,” I now turn to a more meaningful analysis that controls for individual household characteristics to determine their effect on whether the individual stays or leaves assisted housing.

First, we must determine the extent to which individual demographic characteristics affect the decision to stay or leave. To answer this question, I include a series of variables in x that control for borrower demographic characteristics. These characteristics include the head of household’s sex, age, and race; family income (relative to area median income); source of income (a dummy variable denoting whether income is from wage/salary); type

of household (with children or not); household size; household size relative to number of bedrooms; disability status; and number of dependents. Tenant age is reported as of the date of record in the database. To test whether the very young or elderly households have different propensities to leave assisted housing, I created dummy variables denoting whether the head of household was a teenager at date of admission (age less than 20 years) or was elderly at date of admission (age greater than 59 years). I also include a series of variables to denote whether the household is a member of the racial/ethnic majority for that particular census tract. Finkel and Kennedy (1992) found that households belonging to the racial/ethnic majority for a particular area have a greater likelihood of successfully leasing a unit under the voucher program. Thus, I test a natural extension of their hypothesis by including the “in majority” variables in the analysis. The “in majority” variables test the hypothesis that households residing in neighborhoods where they are in the ethnic/racial majority have a natural proclivity to remain in place.

The second question of interest is whether any systematic characteristics of the housing program affect tenure in assisted housing. To answer this question, I include variables that control for the program type (for example, Section 8 or Section 236). To the extent that these variables are correctly coded, analysis of individual programs will shed light on areas of future data collection efforts.

The third question is whether any systematic characteristics of the unit location contribute to the individual assisted housing tenure. Characteristics of the location include city size, demographic makeup of the census tract, poverty rate, and characteristics of the housing stock in the census tract.

The final question of interest is the extent that changes in local economic conditions and broader housing markets affect the assisted housing tenure. The local economic conditions that may affect the decision to remain in assisted housing include the local housing market affordability (percent growth in area house prices since admission to the assisted housing program) and general economic factors (such as the local unemployment rate, interest rates, and credit market conditions.) I also include general economic factors (such as mortgage interest rates) to effectively measure the effect of housing affordability constraints on assisted housing program participation.

Exhibit 6 reports the variable means and standard deviations for the total sample as well as for the three assisted housing programs. Exhibit 6 also reports the F-test statistics testing for equality of means across the three housing programs. With the exception of the variables denoting MSA size and racial differences in census tracts, the F-test statistics are significant for all variables, indicating that significant variation exists in the independent variables.

Exhibit 6, panel A, contains the household demographic variables. The mean demographic characteristics indicate that 7.3 percent of households were headed by a teenager at time of admission to the program while 22.2 percent of head of households were elderly. Furthermore, 16.8 percent of household heads were disabled and 51 percent of households contained children. Across the entire sample, 76.4 percent of households were headed by women and 36.3 percent of household heads were White (nonminority). We also note that 74.4 percent of the households resided in areas where their race or ethnicity corresponded to the racial/ethnic majority for that area. Consistent with the mission of serving low-income households, the average household income was 31 percent of area median income and only 18.6 percent of households reported receiving income from wages or salary.

Exhibit 6

Sample Means and Standard Deviations and F-test for Equality Across Housing Programs for the Full Sample

Panel A. Household Characteristic

| Variable | Label | Total Sample | | Multifamily | | Public Housing | | Tenant Based | | F-stat |
|---------------|---|--------------|-------|-------------|-------|----------------|-------|--------------|-------|----------|
| | | MEAN | STDEV | MEAN | STDEV | MEAN | STDEV | MEAN | STDEV | |
| N | Number of households | 25336 | | 10851 | | 6288 | | 8197 | | |
| child | Indicator variable for household with children present | 0.509 | 0.500 | 0.395 | 0.489 | 0.524 | 0.499 | 0.648 | 0.477 | 630.3*** |
| teenager_orig | Indicator variable for household headed by teenager | 0.073 | 0.260 | 0.090 | 0.286 | 0.090 | 0.287 | 0.037 | 0.190 | 114.8*** |
| elderly | Indicator variable for household headed by elderly person | 0.222 | 0.415 | 0.345 | 0.476 | 0.165 | 0.372 | 0.101 | 0.301 | 956.2*** |
| disabled | Indicator variable for disabled head of household | 0.168 | 0.374 | 0.136 | 0.342 | 0.179 | 0.383 | 0.203 | 0.402 | 81.4*** |
| hh_1 | Indicator variable for household consisting of 1 person | 0.414 | 0.492 | 0.531 | 0.499 | 0.390 | 0.488 | 0.277 | 0.447 | 659.1*** |
| hh_2 | Indicator variable for household consisting of 2 people | 0.259 | 0.438 | 0.251 | 0.434 | 0.253 | 0.435 | 0.275 | 0.447 | 7.0*** |
| hh_3 | Indicator variable for household consisting of 3 people | 0.175 | 0.380 | 0.131 | 0.338 | 0.185 | 0.389 | 0.226 | 0.418 | 149.2*** |
| hh_4 | Indicator variable for household consisting of 4 people | 0.090 | 0.286 | 0.059 | 0.236 | 0.095 | 0.294 | 0.126 | 0.332 | 130.5*** |
| hh_5 | Indicator variable for household consisting of 5 or more people | 0.062 | 0.241 | 0.027 | 0.163 | 0.077 | 0.266 | 0.096 | 0.295 | 209.1*** |
| female | Indicator variable if head of household is female | 0.764 | 0.424 | 0.738 | 0.440 | 0.747 | 0.435 | 0.813 | 0.390 | 79.6*** |
| White | Indicator variable if head of household is White | 0.363 | 0.481 | 0.329 | 0.470 | 0.440 | 0.496 | 0.348 | 0.476 | 100.7*** |
| Black | Indicator variable if head of household is African American | 0.010 | 0.097 | 0.006 | 0.075 | 0.012 | 0.109 | 0.013 | 0.112 | 111.1*** |
| Indian | Indicator variable if head of household is American Indian | 0.021 | 0.143 | 0.026 | 0.160 | 0.016 | 0.127 | 0.017 | 0.130 | 14.9*** |
| Asian | Indicator variable if head of household is Asian | 0.104 | 0.306 | 0.088 | 0.283 | 0.114 | 0.318 | 0.118 | 0.323 | 13.9*** |
| Hispanic | Indicator variable if head of household is Hispanic | 0.764 | 0.424 | 0.738 | 0.440 | 0.747 | 0.435 | 0.813 | 0.390 | 26.6*** |

Exhibit 6

Sample Means and Standard Deviations and F-test for Equality Across Housing Programs for the Full Sample (continued)

Panel A. Household Characteristic (continued)

| Variable | Label | Total Sample | | Multifamily | | Public Housing | | Tenant Based | | F-stat |
|----------------------|---|--------------|-------|-------------|-------|----------------|-------|--------------|-------|----------|
| | | MEAN | STDEV | MEAN | STDEV | MEAN | STDEV | MEAN | STDEV | |
| in_majority | Indicator variable if household is member of racial majority in census tract | 0.744 | 0.437 | 0.764 | 0.425 | 0.730 | 0.444 | 0.727 | 0.445 | 16.2*** |
| White_in_majority | Indicator variable if household is White and in majority in census tract | 0.549 | 0.498 | 0.575 | 0.494 | 0.471 | 0.499 | 0.575 | 0.494 | 100.6*** |
| Black_in_majority | Indicator variable if household is African American and in majority in census tract | 0.189 | 0.392 | 0.183 | 0.387 | 0.255 | 0.436 | 0.147 | 0.354 | 140.4*** |
| Indian_in_majority | Indicator variable if household is American Indian and in majority in census tract | 0.000 | 0.021 | 0.000 | 0.021 | 0.000 | 0.022 | 0.000 | 0.019 | 0.1 |
| Asian_in_majority | Indicator variable if household is Asian and in majority in census tract | 0.005 | 0.068 | 0.005 | 0.070 | 0.004 | 0.062 | 0.005 | 0.069 | 0.5 |
| Hispanic_in_majority | Indicator variable if household is Hispanic and in majority in census tract | 0.080 | 0.271 | 0.067 | 0.250 | 0.082 | 0.274 | 0.095 | 0.293 | 25.4*** |
| person_room | Number of persons per bedroom | 1.211 | 0.515 | 1.139 | 0.370 | 1.244 | 0.610 | 1.282 | 0.584 | 199.9*** |
| wage | Indicator variable denoting that income is from wage and salary (0 = otherwise) | 0.186 | 0.389 | 0.127 | 0.332 | 0.218 | 0.413 | 0.242 | 0.428 | 233.3*** |
| income | Household income | 8,421 | 5,791 | 8,745 | 5,943 | 7,406 | 5,643 | 8,771 | 5,606 | 130.8*** |
| pct_med_income | Income as % of census tract median income | 0.311 | 0.263 | 0.322 | 0.274 | 0.327 | 0.303 | 0.286 | 0.207 | 57.8*** |

***Significant at the 1% level.

Note: Indian means Native American.

Exhibit 6

Sample Means and Standard Deviations and F-test for Equality Across Housing Programs for the Full Sample (continued)

| Panel B. Area and Neighborhood Characteristics | | | | | | | | | | | | |
|--|--|--------------|--------|-------------|--------|----------------|--------|--------------|--------|----------|--|--|
| Variable | Label | Total Sample | | Multifamily | | Public Housing | | Tenant Based | | F-stat | | |
| | | MEAN | STDEV | MEAN | STDEV | MEAN | STDEV | MEAN | STDEV | | | |
| N | Number of Households | | | | | | | | | | | |
| msa_size_50 | MSA ≥ 50,000 and MSA < 99,999 | 0.012 | 0.111 | 0.011 | 0.104 | 0.009 | 0.095 | 0.017 | 0.130 | 11.1*** | | |
| msa_size_100 | MSA ≥ 100,000 and MSA < 249,999 | 0.090 | 0.286 | 0.084 | 0.277 | 0.098 | 0.298 | 0.092 | 0.289 | 5.8*** | | |
| msa_size_250 | MSA ≥ 250,000 and MSA < 999,999 | 0.089 | 0.285 | 0.090 | 0.287 | 0.093 | 0.291 | 0.085 | 0.279 | 1.4 | | |
| msa_size_1000 | MSA ≥ 1,000,000 and MSA < 2,499,999 | 0.165 | 0.371 | 0.187 | 0.390 | 0.160 | 0.366 | 0.141 | 0.348 | 34.9*** | | |
| msa_size_2500 | MSA ≥ 2,500,000 and MSA < 4,999,999 | 0.080 | 0.272 | 0.091 | 0.288 | 0.059 | 0.236 | 0.082 | 0.275 | 27.0*** | | |
| msa_size_5000 | MSA ≥ 5,000,000 | 0.208 | 0.406 | 0.227 | 0.419 | 0.152 | 0.359 | 0.227 | 0.419 | 80.0*** | | |
| pct_poverty | Census tract percent poverty rate | 0.220 | 0.137 | 0.213 | 0.135 | 0.273 | 0.154 | 0.189 | 0.114 | 725.2*** | | |
| pct_old_units | Percentage of units in census tract built before 1940 | 0.199 | 0.189 | 0.185 | 0.183 | 0.214 | 0.175 | 0.207 | 0.205 | 59.3*** | | |
| pct_owner_occupied | Percentage of units in census tract that are owner occupied | 0.499 | 0.224 | 0.482 | 0.226 | 0.480 | 0.231 | 0.534 | 0.212 | 152.9*** | | |
| pct_old | Percentage of population in census tract that is elderly | 0.137 | 0.064 | 0.145 | 0.070 | 0.138 | 0.056 | 0.126 | 0.060 | 203.1*** | | |
| pct_vacant | Percentage of units in census tract that are vacant | 0.143 | 0.072 | 0.139 | 0.068 | 0.148 | 0.079 | 0.143 | 0.071 | 37.1*** | | |
| pct_college | Percentage of population in census tract that have college degree | 0.108 | 0.073 | 0.118 | 0.076 | 0.087 | 0.064 | 0.111 | 0.071 | 387.8*** | | |
| pct_high_school | Percentage of population in census tract that have high school diploma | 0.195 | 0.041 | 0.196 | 0.040 | 0.188 | 0.043 | 0.201 | 0.040 | 174.6*** | | |
| pct_isolated | Percentage of population in census tract that are language isolated | 0.048 | 0.073 | 0.047 | 0.073 | 0.041 | 0.065 | 0.053 | 0.079 | 48.9*** | | |
| pct_hh_poverty | Percentage of households in census tract that are below poverty line | 0.632 | 0.179 | 0.634 | 0.179 | 0.585 | 0.200 | 0.665 | 0.153 | 850.8*** | | |
| pct_married | Percentage of population in census tract that are married | 30,875 | 12,906 | 31,558 | 13,597 | 26,191 | 11,414 | 33,555 | 12,060 | 367.4*** | | |
| P53_1 | Census tract median income | 0.108 | 0.073 | 0.118 | 0.076 | 0.087 | 0.064 | 0.111 | 0.071 | 629.8*** | | |
| pct_Black | Percentage of population in census tract that are African American | 0.246 | 0.300 | 0.249 | 0.298 | 0.307 | 0.324 | 0.197 | 0.273 | 246.3*** | | |

Exhibit 6

Sample Means and Standard Deviations and F-test for Equality Across Housing Programs for the Full Sample (continued)

Panel B. Area and Neighborhood Characteristic (continued)

| Variable | Label | Total Sample | | Multifamily | | Public Housing | | Tenant Based | | F-stat |
|--------------|--|--------------|-------|-------------|-------|----------------|-------|--------------|-------|----------|
| | | MEAN | STDEV | MEAN | STDEV | MEAN | STDEV | MEAN | STDEV | |
| pct_Hispanic | Percentage of population in census tract that are Hispanic | 0.121 | 0.191 | 0.111 | 0.180 | 0.111 | 0.186 | 0.141 | 0.207 | 66.0*** |
| pct_Indian | Percentage of population in census tract that are African Indian | 0.009 | 0.026 | 0.008 | 0.026 | 0.010 | 0.030 | 0.009 | 0.021 | 11.2*** |
| pct_Asian | Percentage of population in census tract that are Asian | 0.025 | 0.058 | 0.027 | 0.061 | 0.016 | 0.047 | 0.029 | 0.062 | 91.9*** |
| pct_White | Percentage of population in census tract that are White | 0.634 | 0.309 | 0.635 | 0.307 | 0.590 | 0.324 | 0.668 | 0.294 | 112.5*** |
| pct_male | Percentage of population in census tract that are male | 0.476 | 0.038 | 0.474 | 0.040 | 0.470 | 0.041 | 0.482 | 0.031 | 211.1*** |
| pct_young_hh | Percentage of households in census tract headed by teenager | 0.077 | 0.062 | 0.078 | 0.064 | 0.078 | 0.058 | 0.074 | 0.061 | 14.0*** |
| Sec 8 | Section 8 program = 1 | 0.358 | 0.479 | 0.835 | 0.371 | 0.000 | 0.000 | 0.000 | 0.000 | |
| Sec 236 | Section 236 program = 1 | 0.036 | 0.185 | 0.083 | 0.276 | 0.000 | 0.000 | 0.000 | 0.000 | |
| region_1 | HUD Region 1: New England | 0.059 | 0.236 | 0.067 | 0.249 | 0.045 | 0.207 | 0.060 | 0.237 | 16.2*** |
| region_2 | HUD Region 2: New York/New Jersey | 0.090 | 0.286 | 0.089 | 0.284 | 0.086 | 0.280 | 0.094 | 0.291 | 1.3 |
| region_3 | HUD Region 3: Mid-Atlantic | 0.102 | 0.302 | 0.119 | 0.323 | 0.097 | 0.297 | 0.082 | 0.275 | 33.7*** |
| region_4 | HUD Region 4: Southeast | 0.214 | 0.410 | 0.190 | 0.392 | 0.314 | 0.464 | 0.169 | 0.374 | 267.6*** |
| region_5 | HUD Region 5: Midwest | 0.202 | 0.402 | 0.238 | 0.426 | 0.175 | 0.380 | 0.175 | 0.380 | 73.6*** |
| region_6 | HUD Region 6: Southwest | 0.127 | 0.333 | 0.104 | 0.305 | 0.150 | 0.357 | 0.139 | 0.346 | 46.9*** |
| region_7 | HUD Region 7: Great Plains | 0.059 | 0.236 | 0.050 | 0.218 | 0.057 | 0.232 | 0.073 | 0.261 | 23.9*** |
| region_8 | HUD Region 8: Rocky Mountains | 0.033 | 0.178 | 0.035 | 0.183 | 0.019 | 0.135 | 0.041 | 0.199 | 30.6*** |
| region_9 | HUD Region 9: Pacific | 0.081 | 0.272 | 0.084 | 0.278 | 0.032 | 0.175 | 0.114 | 0.317 | 166.1*** |
| region_10 | HUD Region 10: Northwest | 0.034 | 0.182 | 0.026 | 0.159 | 0.025 | 0.155 | 0.053 | 0.224 | 63.2*** |

Exhibit 6, panel B, reports the mean values for the location control variables. Using the HUD regions as natural state geographic groupings, I categorize each household based on its geographic location. The values for HUD region and MSA size summarize the frequency counts reported in exhibits 2 and 3. The mean census tract poverty rate for households receiving housing assistance is 22 percent. The neighborhood factors reflecting education confirm the findings of Newman and Harkness (2000) that households living in public housing units reside in neighborhoods with lower levels of educational attainment as reflected in the lower proportion of the populations having high school or college degrees. Given the nature of the data set, census tract racial variables are calculated from the 2000 census and thus may not reflect the rates at move-in or any changes over time. Given that the majority of households exited assisted housing between 2000 and 2002, however, using information from the 2000 census most closely matches the conditions experienced by the household at the time of departure.

Hazard Estimation Results

Exhibit 7 presents the estimation results of the Cox proportional hazard model of household termination from the three primary assisted housing programs. For each variable in the model, exhibit 7 reports the estimated coefficient, standard error, chi-square statistic, and the hazard ratio or marginal coefficient. The table is divided into three panels reflecting the results for each model. For dummy variables, the hazard ratio is the estimated hazard rate when the variable is 1 divided by the hazard rate when the variable is 0, controlling for the other covariates. For example, the public housing hazard ratio (panel A) for the elderly variable indicates that the hazard of leaving public housing for elderly households is 56 percent of the hazard of leaving public housing for households not headed by an elderly person. In other words, elderly households are significantly less likely to leave public housing, all else being equal, than younger households.

Consistent with expectations that elderly households are less likely to leave assisted housing programs, the coefficients for the variable *elderly* (indicating that the household was elderly at admission to the program) are significantly negative with the hazard ratios indicating that elderly households in tenant-based vouchers, public housing, and project-based housing have termination hazards that are 48.2 percent, 56.2 percent, and 59.3 percent, respectively, of nonelderly households. At the other end of the spectrum, the variable indicating that the household was a teenager at origination is significantly positive. The positive coefficients indicate that households headed by teenagers in tenant-based voucher programs, public housing, and project-based housing are 31.1 percent, 16.3 percent, and 19.8 percent more likely to exit, respectively, than other households.

The variable *disabled* indicates whether the head of household is disabled. The estimated coefficients are significantly negative indicating that households headed by an individual who is disabled are much less likely to leave assisted housing programs.

Gender is also a significant factor in determining the likelihood of leaving assisted housing. The significantly negative coefficients indicate that women are less likely to leave an assisted housing program than men. The hazard ratios indicate that women have a termination hazard that is between 69 percent and 78 percent of the termination hazard for men, all else held constant.

In general, household race and ethnicity are also important factors in determining the probability that a household will exit from assisted housing. For example, the significantly negative coefficients for *Black* indicate that African-American households have a much lower probability of leaving an assisted housing program than White households (the control group). The public housing termination hazard rate for African-American households is 62 percent of the termination hazard for White households. In other words, the probability

Exhibit 7

Cox Proportional Hazard Model

Panel A. Public Housing Model

| Variable | Parameter Estimate | Standard Error | Chi-Square Statistic | P-value | Hazard Ratio |
|----------------------|--------------------|----------------|----------------------|---------|--------------|
| child | - 0.104 | 0.080 | 1.667 | 0.197 | 0.902 |
| teenager_orig | 0.151 | 0.067 | 5.051 | 0.025 | 1.163 |
| elderly | - 0.577 | 0.078 | 54.498 | < .0001 | 0.562 |
| disabled | - 0.274 | 0.067 | 16.746 | < .0001 | 0.760 |
| hh_2 | 0.257 | 0.081 | 10.053 | 0.002 | 1.293 |
| hh_3 | 0.312 | 0.097 | 10.401 | 0.001 | 1.366 |
| hh_4 | 0.358 | 0.110 | 10.491 | 0.001 | 1.430 |
| hh_5 | 0.323 | 0.120 | 7.214 | 0.007 | 1.382 |
| female | - 0.262 | 0.048 | 29.341 | < .0001 | 0.769 |
| Black | - 0.481 | 0.115 | 17.386 | < .0001 | 0.618 |
| Indian | 0.155 | 0.194 | 0.642 | 0.423 | 1.168 |
| Asian | - 0.603 | 0.246 | 6.032 | 0.014 | 0.547 |
| Hispanic | - 0.419 | 0.163 | 6.623 | 0.010 | 0.657 |
| in_majority | - 0.079 | 0.483 | 0.027 | 0.870 | 0.924 |
| White_in_majority | 0.022 | 0.496 | 0.002 | 0.965 | 1.022 |
| Black_in_majority | 0.073 | 0.489 | 0.022 | 0.882 | 1.075 |
| Indian_in_majority | - 0.234 | 0.879 | 0.071 | 0.790 | 0.791 |
| Hispanic_in_majority | 0.236 | 0.181 | 1.714 | 0.190 | 1.267 |
| person_room | - 0.093 | 0.042 | 4.969 | 0.026 | 0.911 |
| wage | 0.100 | 0.052 | 3.744 | 0.053 | 1.105 |
| pct_med_income | 0.182 | 0.088 | 4.319 | 0.038 | 1.200 |
| region_2 | - 0.405 | 0.160 | 6.400 | 0.011 | 0.667 |
| region_3 | 0.291 | 0.137 | 4.480 | 0.034 | 1.338 |
| region_4 | 0.446 | 0.137 | 10.679 | 0.001 | 1.563 |
| region_5 | 0.365 | 0.130 | 7.947 | 0.005 | 1.441 |
| region_6 | 0.674 | 0.140 | 23.247 | < .0001 | 1.963 |
| region_7 | 0.488 | 0.144 | 11.441 | 0.001 | 1.629 |
| region_8 | 0.243 | 0.187 | 1.698 | 0.193 | 1.275 |
| region_9 | 0.153 | 0.179 | 0.736 | 0.391 | 1.166 |
| region_10 | 0.106 | 0.189 | 0.311 | 0.577 | 1.111 |
| msa_size_50 | - 0.127 | 0.214 | 0.351 | 0.554 | 0.881 |
| msa_size_100 | - 0.093 | 0.066 | 1.984 | 0.159 | 0.911 |
| msa_size_250 | - 0.126 | 0.069 | 3.281 | 0.070 | 0.882 |
| msa_size_1000 | - 0.144 | 0.064 | 5.031 | 0.025 | 0.866 |
| msa_size_2500 | - 0.394 | 0.106 | 13.767 | 0.000 | 0.674 |
| msa_size_5000 | - 0.443 | 0.095 | 21.534 | < .0001 | 0.642 |
| pct_poverty | - 0.416 | 0.375 | 1.232 | 0.267 | 0.660 |
| pct_old_units | 0.131 | 0.142 | 0.849 | 0.357 | 1.140 |
| pct_owner_occupied | 0.221 | 0.200 | 1.222 | 0.269 | 1.247 |
| pct_old | - 0.241 | 0.450 | 0.287 | 0.592 | 0.786 |
| pct_vacant | 0.386 | 0.251 | 2.364 | 0.124 | 1.471 |
| pct_college | - 0.078 | 0.486 | 0.026 | 0.873 | 0.925 |
| pct_high_school | 0.698 | 0.663 | 1.109 | 0.292 | 2.009 |
| pct_isolated | - 0.870 | 0.480 | 3.292 | 0.070 | 0.419 |
| pct_married | 0.255 | 0.299 | 0.728 | 0.394 | 1.290 |
| P53_1 | - 4.80E-06 | 4.64E-06 | 1.069 | 0.301 | 1.000 |
| cum_house_retn | 0.459 | 0.440 | 1.090 | 0.296 | 1.583 |
| mortgage_rate | - 0.051 | 0.040 | 1.592 | 0.207 | 0.950 |
| mortg_spread | - 0.192 | 0.106 | 3.278 | 0.070 | 0.825 |
| unemploy_rate | 0.066 | 0.022 | 9.023 | 0.003 | 1.068 |
| Likelihood Ratio | 1110.1 | | | < .0001 | |

Notes: Year and month of admission control variables not reported. Indian means Native American.

Exhibit 7

Cox Proportional Hazard Model (continued)

Panel B. Tenant-based Model

| Variable | Parameter Estimate | Standard Error | Chi-Square Statistic | P-value | Hazard Ratio |
|----------------------|---------------------------|-----------------------|-----------------------------|----------------|---------------------|
| child | - 0.055 | 0.076 | 0.521 | 0.470 | 0.946 |
| teenager_orig | 0.271 | 0.085 | 10.236 | 0.001 | 1.311 |
| elderly | - 0.730 | 0.088 | 68.115 | < .0001 | 0.482 |
| disabled | - 0.610 | 0.067 | 83.478 | < .0001 | 0.543 |
| hh_2 | 0.061 | 0.081 | 0.579 | 0.447 | 1.063 |
| hh_3 | 0.032 | 0.094 | 0.115 | 0.735 | 1.032 |
| hh_4 | - 0.025 | 0.106 | 0.054 | 0.817 | 0.976 |
| hh_5 | - 0.159 | 0.119 | 1.792 | 0.181 | 0.853 |
| female | - 0.246 | 0.051 | 23.231 | < .0001 | 0.782 |
| Black | - 0.491 | 0.122 | 16.262 | < .0001 | 0.612 |
| Indian | 0.317 | 0.181 | 3.060 | 0.080 | 1.373 |
| Asian | - 0.278 | 0.221 | 1.584 | 0.208 | 0.757 |
| Hispanic | - 0.398 | 0.175 | 5.139 | 0.023 | 0.672 |
| in_majority | 0.164 | 0.388 | 0.178 | 0.674 | 1.178 |
| White_in_majority | - 0.242 | 0.408 | 0.353 | 0.552 | 0.785 |
| Black_in_majority | - 0.396 | 0.398 | 0.990 | 0.320 | 0.673 |
| Indian_in_majority | - 9.141 | 86.362 | 0.011 | 0.916 | 0.000 |
| Hispanic_in_majority | 0.178 | 0.190 | 0.871 | 0.351 | 1.195 |
| person_room | 0.024 | 0.037 | 0.415 | 0.520 | 1.024 |
| wage | 0.015 | 0.047 | 0.098 | 0.755 | 1.015 |
| pct_med_income | 0.542 | 0.114 | 22.776 | < .0001 | 1.720 |
| region_2 | 0.248 | 0.129 | 3.694 | 0.055 | 1.282 |
| region_3 | 0.589 | 0.125 | 22.080 | < .0001 | 1.803 |
| region_4 | 0.821 | 0.126 | 42.728 | < .0001 | 2.273 |
| region_5 | 0.690 | 0.114 | 36.538 | < .0001 | 1.994 |
| region_6 | 1.086 | 0.128 | 71.984 | < .0001 | 2.961 |
| region_7 | 0.931 | 0.122 | 58.257 | < .0001 | 2.538 |
| region_8 | 0.655 | 0.140 | 21.780 | < .0001 | 1.924 |
| region_9 | 0.442 | 0.134 | 10.846 | 0.001 | 1.556 |
| region_10 | 0.629 | 0.146 | 18.617 | < .0001 | 1.875 |
| msa_size_50 | - 0.237 | 0.133 | 3.170 | 0.075 | 0.789 |
| msa_size_100 | - 0.137 | 0.063 | 4.678 | 0.031 | 0.872 |
| msa_size_250 | - 0.304 | 0.073 | 17.281 | < .0001 | 0.738 |
| msa_size_1000 | - 0.253 | 0.064 | 15.650 | < .0001 | 0.777 |
| msa_size_2500 | - 0.432 | 0.088 | 24.315 | < .0001 | 0.649 |
| msa_size_5000 | - 0.319 | 0.080 | 15.864 | < .0001 | 0.727 |
| pct_poverty | - 0.687 | 0.388 | 3.136 | 0.077 | 0.503 |
| pct_old_units | - 0.020 | 0.126 | 0.025 | 0.876 | 0.981 |
| pct_owner_occupied | 0.247 | 0.185 | 1.776 | 0.183 | 1.280 |
| pct_old | - 0.964 | 0.411 | 5.516 | 0.019 | 0.381 |
| pct_vacant | 0.237 | 0.254 | 0.867 | 0.352 | 1.267 |
| pct_college | - 0.705 | 0.428 | 2.705 | 0.100 | 0.494 |
| pct_high_school | 1.362 | 0.660 | 4.254 | 0.039 | 3.904 |
| pct_isolated | - 2.512 | 0.454 | 30.621 | < .0001 | 0.081 |
| pct_married | 0.807 | 0.294 | 7.516 | 0.006 | 2.240 |
| P53_1 | - 1.20E-05 | 4.34E-06 | 7.678 | 0.006 | 1.000 |
| cum_house_retn | 1.139 | 0.356 | 10.257 | 0.001 | 3.123 |
| mortgage_rate | 0.007 | 0.040 | 0.034 | 0.855 | 1.007 |
| mortg_spread | - 0.313 | 0.103 | 9.175 | 0.003 | 0.731 |
| unemploy_rate | 0.013 | 0.021 | 0.362 | 0.548 | 1.013 |
| Likelihood Ratio | 1439.2 | | | < .0001 | |

Notes: Year and month of admission control variables not reported. Indian means Native American.

Exhibit 7

Cox Proportional Hazard Model (continued)

Panel C. Multifamily Model

| Variable | Parameter Estimate | Standard Error | Chi-Square Statistic | P-value | Hazard Ratio |
|----------------------|--------------------|----------------|----------------------|---------|--------------|
| child | 0.282 | 0.080 | 12.395 | 0.000 | 1.325 |
| teenager_orig | 0.180 | 0.055 | 10.577 | 0.001 | 1.198 |
| elderly | - 0.523 | 0.059 | 79.662 | < .0001 | 0.593 |
| disabled | - 0.569 | 0.065 | 76.740 | < .0001 | 0.566 |
| hh_2 | - 0.230 | 0.079 | 8.587 | 0.003 | 0.794 |
| hh_3 | - 0.211 | 0.100 | 4.424 | 0.035 | 0.810 |
| hh_4 | - 0.210 | 0.119 | 3.145 | 0.076 | 0.810 |
| hh_5 | - 0.332 | 0.146 | 5.179 | 0.023 | 0.718 |
| female | - 0.379 | 0.041 | 84.752 | < .0001 | 0.685 |
| Black | - 0.230 | 0.095 | 5.879 | 0.015 | 0.795 |
| Indian | 0.379 | 0.200 | 3.599 | 0.058 | 1.461 |
| Asian | - 0.357 | 0.167 | 4.576 | 0.032 | 0.700 |
| Hispanic | - 0.411 | 0.162 | 6.427 | 0.011 | 0.663 |
| in_majority | - 0.864 | 0.525 | 2.711 | 0.100 | 0.421 |
| White_in_majority | 0.861 | 0.533 | 2.615 | 0.106 | 2.366 |
| Black_in_majority | 0.758 | 0.531 | 2.041 | 0.153 | 2.135 |
| Indian_in_majority | - 0.301 | 1.150 | 0.068 | 0.794 | 0.740 |
| Hispanic_in_majority | 0.291 | 0.177 | 2.707 | 0.100 | 1.338 |
| person_room | - 0.076 | 0.059 | 1.658 | 0.198 | 0.927 |
| wage | - 0.011 | 0.059 | 0.032 | 0.859 | 0.990 |
| pct_med_income | 0.132 | 0.080 | 2.712 | 0.100 | 1.142 |
| region_2 | 0.118 | 0.103 | 1.321 | 0.250 | 1.125 |
| region_3 | 0.187 | 0.096 | 3.782 | 0.052 | 1.206 |
| region_4 | 0.264 | 0.098 | 7.303 | 0.007 | 1.302 |
| region_5 | 0.309 | 0.088 | 12.318 | 0.000 | 1.363 |
| region_6 | 0.159 | 0.106 | 2.265 | 0.132 | 1.172 |
| region_7 | 0.198 | 0.107 | 3.397 | 0.065 | 1.219 |
| region_8 | 0.246 | 0.119 | 4.265 | 0.039 | 1.279 |
| region_9 | 0.019 | 0.113 | 0.028 | 0.867 | 1.019 |
| region_10 | 0.016 | 0.140 | 0.013 | 0.909 | 1.016 |
| msa_size_50 | - 0.015 | 0.148 | 0.010 | 0.920 | 0.985 |
| msa_size_100 | - 0.034 | 0.060 | 0.319 | 0.572 | 0.967 |
| msa_size_250 | - 0.043 | 0.059 | 0.530 | 0.466 | 0.958 |
| msa_size_1000 | - 0.175 | 0.052 | 11.518 | 0.001 | 0.839 |
| msa_size_2500 | - 0.190 | 0.070 | 7.311 | 0.007 | 0.827 |
| msa_size_5000 | - 0.453 | 0.067 | 45.231 | < .0001 | 0.636 |
| pct_poverty | - 0.003 | 0.289 | 0.000 | 0.992 | 0.997 |
| pct_old_units | 0.115 | 0.114 | 1.017 | 0.313 | 1.122 |
| pct_owner_occupied | 0.127 | 0.159 | 0.633 | 0.426 | 1.135 |
| pct_old | - 0.133 | 0.306 | 0.189 | 0.664 | 0.875 |
| pct_vacant | 0.119 | 0.245 | 0.235 | 0.628 | 1.126 |
| pct_college | - 0.903 | 0.359 | 6.325 | 0.012 | 0.405 |
| pct_high_school | - 0.074 | 0.561 | 0.018 | 0.895 | 0.928 |
| pct_isolated | - 1.202 | 0.398 | 9.145 | 0.003 | 0.301 |
| pct_married | 0.292 | 0.228 | 1.644 | 0.200 | 1.339 |
| P53_1 | - 2.50E-07 | 3.31E-06 | 0.006 | 0.940 | 1.000 |
| sec8 | - 0.022 | 0.067 | 0.111 | 0.740 | 0.978 |
| sec236 | 0.175 | 0.085 | 4.199 | 0.041 | 1.191 |
| cum_house_retn | - 0.714 | 0.300 | 5.673 | 0.017 | 0.490 |
| mortgage_rate | - 0.159 | 0.036 | 19.860 | < .0001 | 0.853 |
| mortg_spread | - 0.196 | 0.091 | 4.618 | 0.032 | 0.822 |
| unemploy_rate | 0.055 | 0.018 | 8.979 | 0.003 | 1.056 |
| Likelihood Ratio | 1286.5 | | | < .0001 | |

Notes: Year and month of admission control variables not reported. Indian means Native American.

of an African-American household leaving public housing is 38 percent lower than the probability of a White household leaving public housing, all else being equal. While still significantly lower, the difference between the African-American and White household project-based program termination hazard is smaller. The coefficients also indicate that Asian and Hispanic households have significantly lower assisted housing termination hazard rates than White households. In contrast, Native American households have significantly higher probabilities of leaving tenant-based and project-based programs than White households. Finally, I also test for the effect that a household is a member of the neighborhood majority racial or ethnic group.¹² The hypothesis is that households may feel an affinity toward an area where their racial or ethnic group represents the majority and thus would be less likely to leave. None of the coefficients are significant, however, indicating that being a member of the majority population within the census tract does not affect the probability of leaving assisted housing.

Turning to characteristics of the household with respect to income and housing consumption, the variable *person_room* is significantly negative only in the public housing model. This condition indicates that as the number of persons per bedroom increases, the less likely the household will leave public housing. The hazard ratio suggests that each additional person per bedroom reduces the hazard of leaving public housing by 8.9 percent ($[.919-1]*100$). This implication is counter to expectations that the probability of leaving should increase as the number of persons per bedroom unit increases. As a result, this suggests that the model may suffer from omitted variables bias.

The significantly positive coefficient for *pct_med_income* indicates that every one point increase in the ratio of the household income to the area median income increases the hazard of leaving the tenant-based program by 72 percent ($[1.72-1]*100$), public housing by 20 percent ($[1.20-1]*100$), and project-based housing by 14 percent ($[1.142-1]*100$). The coefficient for *wage* income is significant and positive in the public housing model, suggesting that households earning income from wage or salary have a higher probability of leaving public housing. *Wage* is not significant in the tenant-based or project-based models, however, suggesting that wage or salary income does not affect the tenure in these assisted housing programs.

The final set of individual characteristics captures the number of persons living in the housing unit. The most consistent results appear in the public housing and project-based models. The significantly positive coefficients for *hh_2* through *hh_5* indicate that the hazard of leaving public housing increases as the number of people living in the unit increases. For example, the marginal effect for *hh_4* suggests that households with four people are 43 percent more likely to terminate than a single-person household, and households with five or more people are 38 percent more likely to leave public housing than households with a single person. The negative coefficients for project-based housing indicate the opposite effect. The estimated coefficients indicate that program-specific factors do not affect the hazard of leaving the program.

Examining the variables controlling for household location and city size, I find significant variation in the statistical significance of the coefficients. To provide a more meaningful test of these control variables, exhibit 8 reports the chi-square statistics testing the linear hypotheses that the various sets of variables are equal. For example, the regional equality row reports the test statistics that the regional dummy variable coefficients are equal. The test statistics confirm that the individual regional dummy variables are significantly different, indicating that regional variation in the hazard of leaving the assisted housing programs does exist. I also find that for the public housing and project-based programs, the coefficients for MSA size are significantly different.

Exhibit 8

Wald Chi-square Statistic Tests of Linear Hypotheses

| | | Full Sample | | |
|---------------------|----------------------------|--------------|----------------|---------------|
| | | Tenant-based | Public Housing | Project-based |
| Regional equality | Region 2 = ... = Region 10 | 97.3*** | 76.8*** | 20.1* |
| City size | MSA50 = ... = MSA5000 | 10.1* | 17.2*** | 37.4*** |
| Number in household | hh_2 = ... = hh_5 | 7.7** | 2.0 | 1.3 |

*** Significant at the 1% level.

** Significant at the 5% level.

* Significant at the 10% level.

The analysis also includes a number of variables designed to capture neighborhood variation at the census tract level. For example, I include variables that provide information on the housing market (percentage of old housing units, percentage of owner-occupied units, and percentage of vacant units), and demographic characteristics (percentage of elderly in population, percentage with a college degree, percentage with high school diploma, percentage of households with married couples, the area median income, and percentage of households living in census tracts that are language isolated). Overall, the results are mixed, with only the tenant-based model having consistently significant coefficients. The negative coefficients for *pct_isolated* indicates that as the proportion of the population that does not speak the majority language increases, the less likely the household is to leave assisted housing. Because this variable is a proxy for areas with significant immigrant populations, this suggests that households in these areas are more dependent on assisted housing programs. In the tenant-based model, the poverty and education characteristics have the expected effect. The significantly negative coefficient for *pct_poverty* indicates that the probability of leaving assisted housing declines as the household's census tract poverty rate increases. The significantly positive coefficients for *pct_high_school* and *pct_married*, however, indicate that the probability of exiting assisted housing is positively related to the number of residents in the household's census tract with a high school education and the percentage of households with a married couple. Finally, consistent with the effect of household age on tenure, the tenant-based model indicates that the probability of leaving assisted housing is negatively related to the proportion of elderly residing in the census tract.

Turning to the final question concerning the extent that changes in local economic conditions and broader housing markets affect assisted housing tenure, I include four time-varying variables to capture changes in local economic conditions during the household's tenure in assisted housing. All variables are measured starting at the month the household entered the assisted housing program (admission date) and are tracked monthly until either the household terminated from assisted housing, or the end of the sample data collection period (the censoring date). The first variable, *cum_house_retn*, measures the cumulative house price return for the state where the household is located. State level house price returns are collected from the Office of Federal Housing Enterprise Oversight repeat sales index. The cumulative return provides an overall measure of house price appreciation (or depreciation) from the date the household entered assisted housing and thus provides a proxy for the general level of housing affordability. Given the overall price appreciation that occurred nationwide between 1994 and 2001, in general, the longer a household remains in assisted housing, the greater the cumulative house price return and the less likely that housing will become more affordable.

The second and third variables measure the housing finance system. First, the *mortgage_rate* is the 1-month lagged conventional 30-year mortgage interest rate as reported by Freddie Mac. Because *mortgage_rate* is an interest rate level, higher values translate into lower housing affordability. Mortgage interest rates, however, also track the overall health of the economy, and higher rates, in general, are an indicator that the economy is in an expansion phase.¹³ In addition to the level of mortgage interest rates, I also include the difference between the mortgage interest rates and the 10-year Treasury rate (*mortg_spread*). This variable captures the overall market risk premium assessment. During periods of economic uncertainty, investors seek safer investments and thus demand higher risk premiums (spreads over Treasury) to invest in investments that are not risk free. As with *mortgage_rate*, the mortgage spread is lagged by 1 month.

Finally, the fourth variable designed to capture variations in local economic risk is the state-level unemployment rate (*unemploy_rate*). I collect the monthly state-level (nonseasonally adjusted) unemployment rates from the Bureau of Labor Statistics. As with the mortgage rates and house price return, I lag the current unemployment rate by 1 month.

Overall, the time-varying variables are statistically significant and carry the expected signs. For *cum_house_retn*, the negative coefficient in the project-based model indicates that the greater the cumulative housing price return since entering the program, the less likely the household is to leave assisted housing. The marginal effect indicates that higher cumulative house prices have a significant effect. The results also indicate that current mortgage interest rates have the expected effect. For households in all three assisted housing programs, the estimated coefficient for the current mortgage interest rate (lagged 1 month) is negative and significant. This indicates that during periods when mortgage interest rate levels are higher, the probability of termination from assisted housing is lower. The mortgage spread measures the difference between the current mortgage interest rate and the 10-year Treasury rate and thus is a measure of the market credit risk premium. During periods of economic contraction, market credit spreads widen as investors seek safer investments. Thus, the negative coefficients for *mortg_spread* confirm that during periods of economic uncertainty, households are less likely to leave assisted housing programs. Interestingly, and counter to expectations, the coefficients for the monthly state level unemployment rate (*unemploy_rate*) are positive and statistically significant in the public housing and project-based models. Overall, the economic factors do have the expected effect on tenure in assisted housing and the marginal effects indicate that some variation exists in the sensitivity of households in the three programs to these factors. For example, households in the project-based program are most sensitive to the level of mortgage interest rates.

Comparing the results in this study with the findings of Hungerford (1996), it is interesting to note the similarities. Recall that the data set in Hungerford (1996) covered the period from 1986 to 1989, while this study covers the period from 1994 to 2002. Although roughly a decade exists between study periods, a number of similarities in the results exist. First, both studies find a strong negative relationship between female head of household and tenure. That is, households headed by women are much less likely to leave assisted housing programs than households headed by men. Second, both studies find a negative relationship between elderly households and tenure in assisted housing with households headed by the elderly being much less likely to leave assisted housing. Finally, both studies find an unexpected positive and significant relationship between unemployment rates and assisted housing tenure. Hungerford (1996) speculates that this positive relationship may reflect the tendency for households to leave areas with higher unemployment rates for areas with greater employment opportunities. The primary difference between the Hungerford (1996) study and this analysis is in the incorporation of neighborhood factors and time-varying economic factors in this study.

Summary and Policy Implications

This study sought to estimate a proportional hazard model of leaving versus staying in an assisted housing program. I frame the analysis around four questions regarding factors that might lead to differences in assisted housing tenure. The first question is to what extent individual demographic characteristics affect the stay or leave decision. The results indicate that individual characteristics do play a significant role in assisted housing tenure and that significant differences in individual characteristics exist across the three primary housing programs. For example, the estimated coefficients indicate that households headed by a disabled individual at origination are significantly less likely to leave assisted housing programs. Furthermore, comparing the marginal effects across the three assisted housing programs shows that the sensitivity to this factor is about the same. Significant differences across the programs, however, occur in the responsiveness of households to changes in income (as a percent of area median). For instance, the results indicate that a one-point increase in household income relative to area median income greatly increases the odds that a household will leave a tenant-based assisted housing unit or a public housing unit. The marginal effects indicate that a one-point increase in household income relative to area median increases the probability of leaving public housing by 20 percent, while the same increase in income results in a 72 percent greater likelihood of leaving the tenant-based housing program. In addition, the results clearly indicate that households in public housing with income from wage or salary have a significantly higher probability of leaving public housing. The interesting finding across programs is that the wage effect is not present in households residing in tenant-based or project-based programs.

The second question considers whether housing program characteristics affect assisted housing tenure. Looking at the project-based programs, the results indicate that differences exist in the housing tenure of households depending on the type of assistance attached to the unit. For example, households living in units receiving assistance under Section 236 have a higher probability of leaving the assisted housing program.

The third question examines the effect of location and neighborhood factors on tenure in assisted housing programs. Here, the results consistently indicate that neighborhood characteristics (measured at the census tract level) do have an effect on the probability that a household will leave the tenant-based assisted housing program, but the results are less clear for the public housing and project-based assisted housing programs. One factor, *pct_isolated*, appears to be significant in all three models. This factor represents the percentage of the population in a census tract that is language isolated, which is a rough proxy for the proportion of recent immigrants living in the census tract. The significantly negative coefficients in the three models indicate that households living in census tracts with high proportions of people who do not speak English are significantly less likely to leave assisted housing. All else being equal, this result suggests that programs focused on reducing language isolation may help reduce the tenure in assisted housing. In addition, the results from this study suggest that neighborhood education level is an important factor, all else being equal, in determining whether a household stays or leaves the tenant-based assisted housing program.

Finally, the fourth question examines the effect that changes in local economic conditions have on assisted housing tenure. Again, the results show that local economic factors play a significant role in determining whether a household stays or leaves assisted housing. As expected, the results show that households are more likely to leave assisted housing during periods of economic expansion and less likely to leave during periods of economic uncertainty. Furthermore, significant differences exist in the sensitivity of households in the various housing programs to changes in economic conditions. For example, households residing in public housing units are significantly less sensitive to changes in local economic conditions than households receiving tenant-based housing assistance.

To conclude, this analysis has examined the hazard rates of termination from the three primary housing assistance programs. The results indicate that the baseline hazard rate differs significantly across the three programs. I also analyzed the effect of demographic, location, program-specific, and economic factors. The results indicate that these factors do play a role in determining the probability that a household will either leave or stay in an assisted housing program.

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Notes

1. *Questions and Answers About HUD* (<http://www.hud.gov/about/qaintro.cfm>).
2. *HUD's Public Housing Program Fact Sheet* (www.hud.gov/renting/phprog.cfm).
3. See Shroder (2002) for a discussion of poverty concentration by tenant and project-based subsidies.
4. An additional 200,204 (2 percent) households reside in units under the modified rehabilitation program. Because this program is significantly smaller than the other programs and program participation does not cover the complete analysis period, I eliminate these households from the analysis.
5. Effectively, this restriction eliminates from the analysis households that entered assisted housing in the 1990s if current information about their status is not available.
6. Analysis of the population of households residing in assisted housing between 1994 and 2001 indicates that the cleaned random sample roughly matches the overall population. For example, 15.2 percent of the random sample entered assisted housing in 1999, while 13.6 percent of the overall population entered assisted housing in 1999.
7. See Kiefer (1988) for an overview of duration models applied to economic data.
8. See Greene (1990) for a brief discussion of models of duration data with references to the extended literature.
9. See Allison (1995).

10. Pair-wise comparisons of the program hazard rates produced the following log-rank and Wilcoxon statistics:

| Statistic | Tenant-based vs. Project-based | Tenant-based vs. Public Housing | Project-based vs. Public Housing |
|-----------|--------------------------------|---------------------------------|----------------------------------|
| Log-rank | 48.4 | 48.7 | 493.4 |
| Wilcoxon | 34.0 | 83.9 | 225.8 |

All statistics are significant at the 1-percent level.

11. See Cox (1972).
12. The neighborhood is broadly defined as the census tract where the household is located. Thus, for example, an African-American household is coded as being in the majority (*in_majority* = 1) if African Americans make up the largest population segment within that census tract.
13. During an economic expansion, inflation is a major concern, and the Federal Reserve has followed a policy of increasing interest rates in an effort to prevent inflation.

References

- Allison, Paul D. 1995. *Survival Analysis Using the SAS System*. Cary, NC: SAS Institute.
- Ault, R.W., J.D. Jackson, and R.P. Saba. 1994. "The Effect of Long-Term Rent Control on Tenant Mobility," *Journal of Urban Economics* 35: 140–158.
- Cox, D. 1972. "Regression Models and Life Tables," *Journal of the Royal Statistical Society, Series B* 34: 187–220.
- Deng, Y., S.A. Gabriel, and F. E. Nothaft. 2003. "Duration of Residence in the Rental Housing Market," *Journal of Real Estate Finance and Economics* 26 (2/3): 267–286.
- Finkel, M., and S.D. Kennedy. 1992. "Racial/Ethnic Differences in Utilization of Section 8 Existing Rental Housing Vouchers and Certificates," *Housing Policy Debate* 3 (2): 463–508.
- Gabriel, S., and F.E. Nothaft. 2001. "Rental Housing Markets, the Incidence and Duration of Vacancy, and the Natural Vacancy Rate," *Journal of Urban Economics* 49: 121–149.
- Greene, W.H. 1990. *Econometric Analysis 2nd Edition*. Englewood Cliffs, NJ: Prentice Hall.
- Gyourko, J., and P. Linneman. 1989. "Equity and Efficiency Aspects of Rent Control: An Empirical Study of New York City," *Journal of Urban Economics* 26 (1): 54–74.
- Hungerford, Thomas L. 1996. "The Dynamics of Housing Assistance Spells," *Journal of Urban Economics* 39 (2): 193–208.
- Kiefer, Nicholas M. 1988. "Economic Duration Data and Hazard Functions," *Journal of Economic Literature* 26: 646–679.
- Munch, J.R., and M. Svarer. 2002. "Rent Control and Tenancy Duration," *Journal of Urban Economics* 52: 542–560.
- Nagy, J. 1995. "Increase Duration and Sample Attrition in New York City's Rent Controlled Sector," *Journal of Urban Economics* 38: 127–137.

Newman, Sandra, and Joseph Harkness. 2000. "Assisted Housing and the Educational Attainment of Children," *Journal of Urban Economics* 9: 40–63.

Shroder, Mark. 2002. "Locational Constraint, Housing Consoling, and Successful Lease-up in a Randomized Housing Voucher Experiment," *Journal of Urban Economics* 51 (2): 315–338.

Additional Reading

Lubell, J., M. Shroder, and B. Steffen. 2003. "Basic Facts on Work Participation and Length of Tenure in HUD-Assisted Housing." U.S. Department of Housing and Urban Development Working Paper. Washington, DC: U.S. Department of Housing and Urban Development.

Explaining Attrition in the Housing Voucher Program

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Abstract

This article uses administrative data on families that participated in the U.S. Department of Housing and Urban Development's Section 8 Housing Voucher Program between 1995 and 2002 combined with data from other sources to estimate the differences in attrition rates among families with demographic characteristics of greatest interest for housing policy and the effects on attrition of changes in the program's main parameters. The most important results are that large decreases in the program's payment standard and increases in the tenant contribution to rent will have small effects on program attrition. These results suggest that the overwhelming majority of voucher recipients receive substantial benefits from program participation. The empirical analysis also indicates that whether the head of the household is elderly and whether the head is disabled are by far the most important influences on the likelihood that the family will exit the tenant-based voucher program. Families with disabled heads of the household are about 37 percent less likely to exit the program and families with elderly heads of the household are about 23 percent less likely to exit the program each year than otherwise similar families. Differences in attrition rates based on other family characteristics are much smaller.

Introduction

Attrition in low-income housing programs has important effects on program performance. The success of these programs clearly depends in part on program parameters that can be changed without fundamental program reform. For example, an increase in the Section 8 Housing Voucher Program's payment standard or a decrease in the recipient's minimum contribution to rent will reduce the program's attrition rate. Reducing program attrition in this manner will reduce local housing authorities' workload in recycling vouchers, but it will also reduce the number of families that receive housing assistance and will further exacerbate the horizontal inequities of the current system of low-income housing programs. Changing these program parameters in the opposite direction will improve horizontal equity, albeit at the expense of additional administrative cost.

Despite the importance of program attrition for program performance, there have been few studies of its determinants (Freeman, 1998; Hungerford, 1996; Susin, 1999). A primary motivation of these studies has been to assess the validity of the concern that longer duration

of housing assistance itself increases the likelihood of remaining in assisted housing. These studies also estimate differences in attrition rates of families that have different characteristics, participate in different combinations of welfare programs, and live in areas with different market characteristics. In addition to making substantive contributions, Susin (1999) makes an important methodological contribution to the study of program attrition by showing that the uncritical use of national surveys such as the Survey of Income and Program Participation (SIPP) will lead to gross overestimates of the fraction of housing assistance spells that are short. Susin shows that the SIPP reports many spells that last for only one period and most of these spells involve the misreporting of housing assistance during that period.

The primary purpose of this article is to estimate statistical relationships explaining attrition in the Section 8 Housing Voucher Program that are useful for policy analysis. Unlike previous studies, this study estimates the effects of changes in program parameters on attrition.¹ These parameters are the major tools available to housing policymakers to influence attrition. As with previous studies, we estimate differences in attrition rates across families that have different demographic characteristics and live in housing markets with different characteristics. High attrition rates reflect low benefits from program participation. If housing policymakers consider attrition rates of some types of families to be too high relative to the attrition rates of other types of families, program parameters can be changed to decrease the former and increase the latter without spending more on housing assistance.

Our study has several advantages over previous research. First, our results are based on administrative data on program participation. Therefore, they are not subject to Susin's criticism of earlier studies based on the Panel Study of Income Dynamics and the SIPP. Second, the results are based on enormous samples. Our smallest sample is more than a million observations. Third, our empirical work is tied more closely to an explicit model of the decision about continued program participation. Our economic model provides guidance concerning what variables should be included in the statistical analysis and how these variables should be combined. Fourth, our results are based on a much better index of differences in rental housing prices than previous studies. Finally, we account for differences in income and Social Security taxes. These taxes affect what is possible for families in the presence and the absence of housing assistance.

Our general approach to studying program attrition is as follows. We first analyze theoretically the net benefit to a family from receiving a housing voucher. Families leave the program because the program's net benefit to them is no longer positive. In other words, such a family chooses to exit because its circumstances change in such a way that it would be better off without receiving a housing voucher. Consequently, the determinants of the decision to exit the voucher program are factors that influence the program's net benefit to a family. The program's net benefit to a family depends on the family's preferences and the combinations of housing and other goods that are possible for the family in the presence and absence of the program. Our analysis of net benefit takes account of participation costs, including stigma, and moving costs, including the costs of searching for a unit.

After establishing which factors will or might affect the net benefit a family receives from the voucher program, appropriate variables from administrative data and other sources are used to construct any of the variables not directly provided in the data. The variables suggested as possible determinants of program exit are then included as covariates in a Cox proportional hazard model.² The proportional hazard model specifies a functional form for the hazard rate that facilitates examination of the effect that each of the included covariates has on the likelihood that a family will exit the voucher program at a given time, conditional on the family's not having left the program before that time.

The results of the hazard rate analysis indicate that whether the head of the household is elderly and whether the head is disabled are by far the most important influences on the likelihood that the family will exit the tenant-based voucher program; families with disabled heads of the household are about 37 percent less likely to exit and families with elderly heads of the household are about 23 percent less likely to exit the program each year than other families that are the same with respect to the other covariates included in the analysis. Differences in attrition rates based on other family characteristics are much smaller.

The results of the hazard rate estimation indicate that program parameters have a modest influence on attrition rates in the expected direction. Based on data for the 75 largest metropolitan statistical areas (MSAs), the results show that, all else being equal, a \$100 per month decrease in the local payment standard will be associated with about a 3 percent increase in the rate of program exit and an increase of \$100 per month in the minimum tenant contribution to rent would increase program attrition by about 12.6 percent.³ These results suggest that the overwhelming majority of voucher recipients receive substantial benefits from program participation.

Simple Model of Program Attrition

This section presents a simple model that explains voucher program attrition in terms of a family's preferences and what is possible for the family in the presence and absence of continued program participation. Throughout our analysis, we assume that each family has some fixed disposable income in each time period and uses that income to purchase two things: housing services H and other goods X . A family's disposable income Y is its earnings and cash assistance minus income and Social Security taxes. Our index of the quantity of housing services Q_H is the market rent of the housing unit divided by a housing price index P_H . The housing price index reflects the differences in market rents of identical units in identical neighborhoods across geographical locations. Within a single housing market, P_H is assumed to be the same for all dwelling units and differences in market rents reflect differences in the quantity of housing services provided by the unit. Across different housing markets, identical dwelling units can have different rents. If the value of P_H is 1 in area A and rents of identical units in identical neighborhoods are twice as high in area B as in area A, then P_H is 2 in area B.⁴ Our index of the quantity of other goods Q_X is the amount spent on other goods divided by an index of the market prices of the goods in this category P_X . Initially, we assume that participation and moving costs are zero. Later, we discuss how we account for these costs in our estimation.

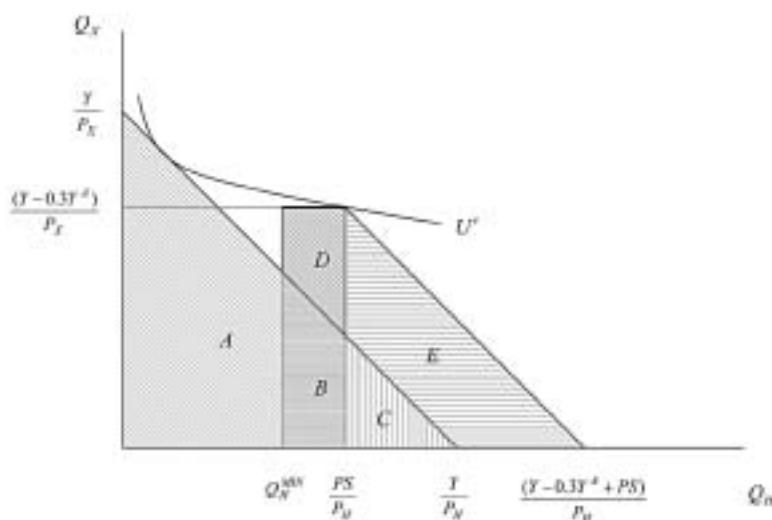
Exhibit 1 depicts what is possible for a voucher family if it continues to participate in the program and if it exits the program. In the absence of the housing voucher program, the quantity of housing services the family could purchase if it were to spend all of its income on housing is Y/P_H . Should the family spend none of its income on housing, but instead spend it on other goods, the family could purchase Y/P_X units of the other goods. Clearly, the family has many options between these two extremes. The prices of housing services and other goods, along with the family's income, determine the set of feasible consumption bundles that the family may purchase if it exits the voucher program. This set is areas A, B, and C in exhibit 1.⁵

Participation in the voucher program makes it possible for the family to purchase certain combinations of housing and other goods that are unattainable in the absence of housing assistance. The Housing Choice Voucher Program adds consumption bundles in areas D and E in exhibit 1.⁶ Under this voucher program, a participating family is required to contribute at least 30 percent of its adjusted income Y^A to its housing expenses. This requirement places an upper limit on the family's consumption of other goods, namely, $(Y - 0.3Y^A)/P_X$. In addition, the voucher program's minimum housing standards essentially specify a minimum quantity of housing services a participating family is allowed to

consume. In exhibit 1, this amount is labeled Q_H^{MIN} . A participating family can receive a subsidy for the difference between the market rent of a unit that meets or exceeds the program's minimum housing standards and 30 percent of its adjusted income, subject to that figure not exceeding the difference between the local payment standard PS and 30 percent of Y^A . Thus, the maximum subsidy a family can receive is the difference between the local payment standard and 30 percent of its adjusted income. If a family chooses, it can occupy a dwelling unit renting for more than the payment standard, but the subsidy does not increase on that account. To participate in the Housing Choice Voucher Program, the family must choose a bundle of housing and other goods in the areas B , C , D , or E .

Exhibit 1

Consumption Possibilities With and Without the Voucher Program



Ignoring participation and moving costs, the family will continue to participate if it prefers some consumption bundle in area $B+C+D+E$ to every bundle in area $A+B+C$. This decision depends in part on the locations of these areas. A family that would continue to participate if the program greatly expands its budget set might not participate if the program adds little to what is possible for the family. For example, a family might continue to participate if the payment standard is high and might exit the program if it is sufficiently low. Exhibit 1 illustrates this point. Suppose that the family whose situation is depicted in this figure is indifferent between any two combinations of housing services and other goods on the curve U' , prefers any bundle above this curve to any bundle on it, and prefers any bundle on U' to any bundle below it. With the budget constraint parameters depicted in the figure, the family is indifferent between continuing to participate and dropping out of the program. If the payment standard were higher and all other budget constraint parameters were the same, the family would continue to participate. If the payment standard were lower and all other budget constraint parameters were the same, the family would exit the program.

The preceding model implies not only that program attrition depends on particular variables such as disposable income, the program's payment standard, and the housing price index but also that these variables should be combined in particular ways in the statistical analysis. Two families with different values of Y , P_H , P_X , PS , and Y^A but the same values of Y/P_H , Y/P_X , $(Y - 0.3Y^A)/P_X$, and PS/P_H are able to consume the same bundles of goods

if they continue to participate in the voucher program and are able to consume the same bundles if they exit the program. For example, if family A's disposable income and adjusted income are twice as great as family B's and if family A lives in a location where the voucher payment standard and all market prices are twice as great, then these families face the same real situation. Therefore, they will not make different decisions based on differences in what is possible. To be consistent with this insight, our statistical model explaining attrition includes as explanatory variables the four ratios rather than the five underlying variables.

The decision about whether to exit the program depends not only on how the program affects what is possible for the family but also on the family's preferences. Two families that could choose the same bundles of goods by participating in the program and the same bundles by leaving the program might make different decisions because they have different tastes.⁷ Exhibits 2 and 3 illustrate this point. The budget constraints with and without the program are the same in the two exhibits. The family whose situation is depicted in exhibit 2 is indifferent about choosing between any two combinations of housing services and other goods on the curve U' , prefers any bundle above this curve to any bundle on it, and prefers any bundle on U' to any bundle below it. This family will occupy an apartment renting for the payment standard and will devote 30 percent of its adjusted income to housing. It will continue to participate in the program because it prefers the consumption bundle R to any bundle possible if it leaves the program. Its net benefit as usually measured is V . This is the unrestricted cash grant that would be just as satisfactory to the family as participating in the voucher program. The family whose situation is depicted in exhibit 3 has different preferences. In particular, it places a lower value on better housing. It is indifferent about choosing between any two combinations of housing services and other goods on the curve U'' , prefers any bundle above this curve to any bundle on it, and prefers any bundle on U'' to any bundle below it. All consumption bundles on the curve U'' are equally satisfactory to this family. This family will exit the program and choose the bundle S . These actions enable the family to consume more nonhousing goods than it could otherwise consume given its best choice under the program, albeit at the cost of living in worse housing.

Exhibit 2

Families With Strongest Tastes for Housing Will Not Exit the Program

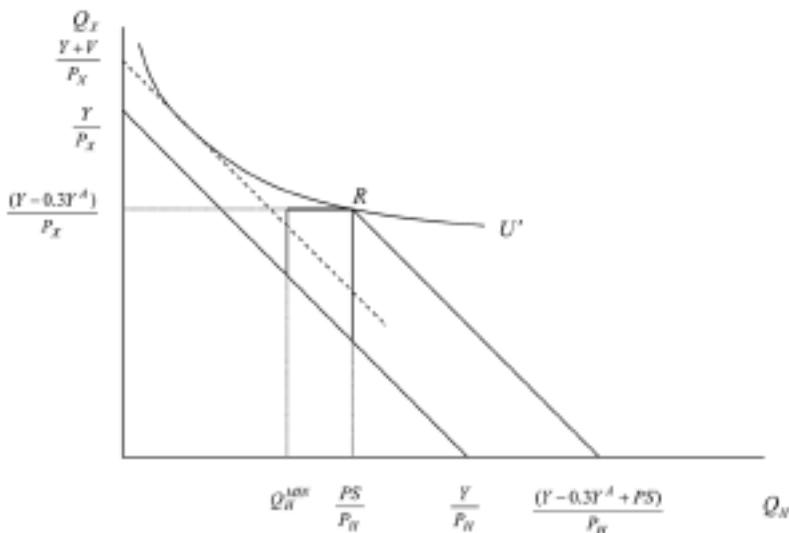
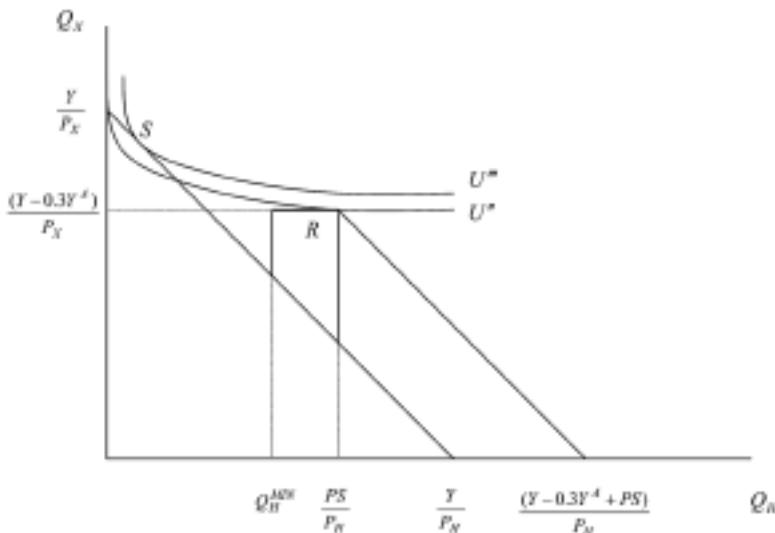


Exhibit 3

Families With Weakest Tastes for Housing Will Exit the Program



Economic theory does not suggest what accounts for differences in tastes. It also does not rule out differences in average tastes among different types of families. To allow for the possibility of these differences, we include family characteristics such as family size and age, race, sex, and marital status of the head of the household as explanatory variables in our statistical models. As will be mentioned later, these characteristics may affect the decision to exit the program for reasons other than differences in tastes for housing and other goods. This study does not attempt to disentangle how much of the effect of a given household characteristic on attrition is due to differences in tastes associated with that characteristic and how much of the effect is due to the other reasons to be discussed later. Indeed, it is not possible to disentangle these effects with the data available.

Up to this point in the analysis, we have ignored program participation and moving costs. Our study accounts for both to some extent. To continue receiving subsidies, participants must spend time filling out paperwork and dealing with program administrators, and they must reveal personal information. These activities are all inherent in operating a means-tested housing program. Furthermore, few enjoy accepting public or private charity. These participation costs reduce the program's net benefit to the families involved. As a result, some families that would continue to participate in the program in the absence of participation costs might leave the program. We do not have direct measures of participation cost, but previous research has indicated that participation cost in welfare programs is different for families with different characteristics. Thus, we try to account for differences in participation cost by the inclusion of family characteristics.

For project-based housing assistance, the effect of moving costs on continued participation is theoretically unambiguous. Since leaving the program almost always requires a family to move, higher moving costs will deter exit from the program. Under the voucher program, however, the family can move and remain in the program or exit the program without moving. It can be shown that in theory, the addition of moving costs may either increase or decrease program attrition.⁸ Nevertheless, since moving cost can affect program attrition, we should attempt to account for it in our empirical analysis. We do not have direct

measures of moving costs. It is reasonable to believe, however, that they are higher for certain types of families. For example, housing search may be more difficult if the head of the household is disabled. So we account for differences in moving costs in part by the inclusion of family characteristics. We also estimate a separate hazard model for the 75 largest MSAs for which annual data on vacancy rates is available. This additional analysis enables us to include the rental housing vacancy rate as an explanatory variable that affects moving cost and hence program attrition.

All the variables mentioned above are relevant for explaining the net benefit of continued program participation. It is reasonable to believe that families that receive the smallest benefit from program participation in one period are the most likely to experience a change in their circumstances that causes their net benefit from continuing to participate to become negative. Our empirical analysis of program exit is based on data for departing families at the time of their last recertification before leaving the program. Consequently, our analysis explains departures from the program between years t and $t + 1$ based on variables that explain the level of net benefit in year t . We explain the details of this approach in greater detail in a later section outlining the proportional hazard estimation procedure.

Data

The primary database for this study is the recently created Longitudinal Occupancy, Demography, and Income (LODI) file that contains data from HUD's Multifamily Tenant Characteristics System (MTCS) and Tenant Rental Assistance Certification System for 1995 through 2002. This database provides information on the characteristics of all HUD-assisted families collected when they are admitted to a housing program and recertified for continued participation. It also identifies the primary program providing the housing assistance and the voucher program's local payment standard or fair market rent. This section explains how we used data from the LODI file and other sources to construct the analysis variables and how we dealt with certain problems that we encountered in attempting to determine when a spell of housing assistance had ended. Exhibit 4 provides the details about all variables used in the analysis.

In our analysis, disposable income Y is the family's total expenditure on housing and other private goods. The LODI file contains information on many sources of income such as labor earnings and Temporary Assistance for Needy Families payments. It does not contain information on assistance from the earned income tax credit or the Food Stamp program or on taxes paid. In order to accurately account for how much was available for each family to spend on housing and other goods each year, we subtracted each family's estimated state and federal tax burden from their reported income and added the dollar value of the amount of assistance for which the family was eligible under the Food Stamp program.⁹ Details regarding the calculation of estimated tax burdens and Food Stamp eligibility appear in the variable descriptions provided in exhibit 4. Although the Food Stamp program is not literally a cash-assistance program, it was treated as such for the purposes of this study. Previous research has found that this is close to the truth. That is, replacing food stamps with equally costly cash assistance would have little effect on the consumption patterns of recipients.

Since reliable indices of the prices of nonhousing goods across all geographical areas are not available and previous research has indicated that housing prices vary much more than the prices of other goods across areas (Citro and Michael, 1995), we assume that the prices of other goods are the same everywhere at any point in time and construct a cross-sectional housing price index for one year.¹⁰ We then account for changes in the prices of housing and other goods over time using the relevant components of the national Consumer Price Index (CPI).

Exhibit 4

Variable Descriptions

| Variable Name | Description |
|--------------------------|--|
| AgeHead | The age of the head of household. Households for which the age of the household head was either missing, less than 15, or greater than 90 were excluded. |
| Disabled | A dummy variable equal to 1 if the household is classified as disabled and 0 otherwise. Households for which the value of Disabled was missing were excluded. |
| Elderly | A dummy variable equal to 1 if the household is classified as elderly and 0 otherwise. Households for which the value of Elderly was missing were excluded. |
| FamilySize | The number of people in the household. Households with values of FamilySize that were either missing, 0, or greater than 10 were excluded. |
| Hispanic | A dummy variable equal to 1 if the head of household was Hispanic and 0 otherwise. Households for which the ethnicity of the head of the household was either missing or not coded as 1 or 2 were excluded. |
| HsgPrice | A geographical index of housing prices. Details regarding the calculation of the index appear in the text. Index is 1 in Washington, D.C., in 2002. Values of the index for other years were calculated using the national Consumer Price Index (CPI) for housing, U.S. city average. |
| Kids | Equal to the number of children ages 17 and younger. Households for which information on the number of children (in any one of the given age ranges) was missing were excluded. |
| Male | A dummy variable equal to 1 if the head of household was male and 0 otherwise. Households for which the sex of the household head was either missing or not equal to 'm', 'M', 'f', or 'F' were excluded. |
| Married | A dummy variable equal to 1 if there is a spouse present in the household (such that one of the household members was classified as 's' or 'S') and 0 otherwise. |
| MaxOtherGoods Vouch | One of the budget constraint parameters appearing in exhibit 1. Equal to the value of TotIncome minus 30 percent of adjusted income divided by 1,200 times the value of OtherPrice so that MaxOtherGoodsVouch is in hundreds of dollars per month. |
| MTCSIncome | The total annual income of the household. Households with total incomes that were either missing or greater than \$61,200 were excluded. |
| OtherPrice | An index of the prices of other goods based on the national CPI for all items minus shelter, U.S. city average. Index is 1 in all locations in 2002. |
| PayStand/ HsgPrice | One of the budget constraint parameters appearing in exhibit 1. When the local payment standard is nonmissing or nonzero, equal to the payment standard divided by 100 times HsgPrice so that PayStandard/HsgPrice is in hundreds of dollars per month. When the local payment standard is either missing or 0, equal to the fair market rent divided by 100 times HsgPrice. Households for which the local payment standard and the fair market rent are missing were excluded. In addition, households with a maximum subsidy (the payment standard when it is nonmissing and nonzero, the fair market rent otherwise) greater than 1.2 times the greatest 2002 fair market rent for the appropriate bedroom size were excluded. |
| TotIncome | The total amount of money available for the household to spend on housing and other goods in a particular year. Calculated by subtracting estimated yearly federal and state taxes from Multifamily Tenant Characteristics System Income and adding the total dollar value of federal food stamps for which the household was eligible each year. Yearly federal and state tax liabilities were estimated using the National Bureau of Economic Research's TAXSIM program, version 5.1, which accounts for the Earned Income Tax Credit. Households for which TotIncome was negative were excluded. |
| TotIncome/ HsgPrice | One of the budget constraint parameters appearing in exhibit 1. Equal to the value of TotIncome divided by 1,200 times the value of HsgPrice so that TotIncome/HsgPrice is in hundreds of dollars per month. |
| TotIncome/ OtherPrice | One of the budget constraint parameters appearing in exhibit 1. Equal to the value of TotIncome divided by 1,200 times the value of OtherPrice so that TotIncome/OtherPrice is in hundreds of dollars per month. |
| VacancyRate | For the 75 largest metropolitan statistical areas, equal to the yearly rental vacancy rate as indicated in the U.S. Census Bureau's Housing Vacancies and Homeownership Annual Statistics: 2002, Table 5. |

Exhibit 4

Variable Descriptions (continued)

| Variable Name | Description |
|---------------|--|
| Wage | The total amount of wage income received by the household. Households for which the value of wage was either missing or greater than \$61,200 were excluded. |
| White | A dummy variable equal to 1 if the head of household was White and 0 otherwise. Households for which information on the race of the head of the household was either missing or was outside the range 1 through 5 were excluded. |

Notes: Unless otherwise stated, the data come from the U.S. Department of Housing and Urban Development's Longitudinal Occupancy, Demography, and Income file described in the text. Caps for MTCSIncome and Wage were determined by adding \$10,000 to the largest 50-percent income limit for a family of four in the country in 2000. For information regarding TAXSIM, see Feenberg and Coutts (1993). TAXSIM 5.1 is available on line at <http://www.nber.org/taxsim/>. Assistance from Dan Feenberg regarding the use of TAXSIM for this work is gratefully acknowledged. CPI data are available on line at <http://www.bls.gov/cpi/home.htm#data>. Housing vacancy rate data for the 75 largest MSAs are available on line at <http://www.census.gov/hhes/www/hvs.html>. Food stamp eligibility and monthly benefits were determined using program eligibility tests and benefit calculations described at http://www.fns.usda.gov/fsp/applicant_recipients/fs_Res_Ben_Elig.htm. Food stamp program parameters for the relevant time period were graciously supplied by Patrick Waldron of the Program Development Division of Food and Nutrition Service at the U.S. Department of Agriculture. Cutoff values for the maximum subsidy were determined using the following fair market rents for 2002: 0 BR—\$1,131 (San Jose, CA), 1 BR—\$1,382 (San Francisco, CA), 2 BR—\$1,747 (San Francisco, CA), 3 BR—\$2,396 (San Francisco, CA), and 4 BR—\$2,536 (San Francisco, CA).

Our geographical housing price index is based on data on the gross rent and numerous housing characteristics of tenant-based voucher units from HUD's 2000 Customer Satisfaction Survey (CSS) as well as information about the characteristics of the census tract of each unit from the 2000 decennial census.¹¹ The gross rent of a voucher unit is the rent received by the landlord plus any tenant-paid utilities. Previous research has indicated that the rents paid to the landlords of voucher units are very close to the rents of unsubsidized units with identical characteristics.

We used these data to estimate two general forms of a hedonic rent equation and used the one that best fit the data to create a cross-sectional housing price index. Both specifications assume that the percentage difference in rents between two areas is the same for any combination of housing and neighborhood characteristics. The two specifications are as follows:

$$MR_{ij} = (1 + \alpha_1 Z_{1ij} + \dots + \alpha_m Z_{mij})(\beta_0 + \beta_1 X_{1ij} + \dots + \beta_n X_{nij}) + v_{ij} \quad (1)$$

and

$$\ln MR_{ij} = \beta_0 + \beta_1 X_{1ij} + \dots + \beta_n X_{nij} + \alpha_1 Z_{1ij} + \dots + \alpha_m Z_{mij} + v_{ij}. \quad (2)$$

In these equations, MR_{ij} represents the gross rent of unit i in locality j , the Z s are dummy variables for each locality (with one locality omitted), the X s represent housing and neighborhood characteristics, and v_{ij} represents unobserved determinants of gross rent. To create the dummy variables for localities, observations were grouped into m localities by geographical area. Several levels of aggregation were explored. In the end, we produced a separate housing price index for each metropolitan area and the nonmetropolitan part of each state.

To determine which of the two specifications to use in constructing the geographical price index, equations (1) and (2) were estimated separately for 23 MSAs and the nonmetropolitan areas of two states with a large number of observations, using a subset of the housing and neighborhood characteristics as explanatory variables.¹² Although the error variances were similar across the two specifications for most areas, the second model predicted rent more accurately in 18 of the 25 areas. Consequently, we constructed the geographical housing price index by estimating equation (2) using the full set of dwelling unit characteristics

from the CSS and more neighborhood information from the decennial census than were employed in the performance comparisons.

The fit of the hedonic equation was excellent ($R^2 = .80$), and the coefficients used to create the price indices were estimated with considerable precision. The estimated price index was usually consistent with popular views about differences in housing prices. Among the most expensive places to rent an apartment were San Francisco and San Jose, California; Stamford and Danbury, Connecticut; Boston, Massachusetts; and Nassau-Suffolk and New York City, New York. The least expensive places to rent tended to be nonmetropolitan parts of states and small metropolitan areas in the South.

The estimated hedonic equation and the national CPI for housing were used to produce a housing price index equal to 1 in Washington, D.C., in 2002. This assumes that relative housing prices across areas did not change over the period of our data.

Because good geographical indices of the prices of other goods are not available for all areas and previous research has indicated that housing prices vary much more across areas than the prices of other goods, we assume that the prices of other goods are the same everywhere at each point in time. We use the national CPI for all items minus shelter to construct a price index for other goods that is 1 for all areas in 2002.

The LODI file contains each family's adjusted income Y^A as well as information on the local payment standard PS in its area. Minimum housing standards that determine the location of Q_H^{MIN} are nationally uniform. Therefore, differences in this variable cannot explain differences in exit rates.

Before estimating the proportional hazard model, some effort was made to clean the data. Because we are seeking to explain program exits, the first step is to define what it means in our data for a family to exit the program. Each observation in the LODI file contains information on one family in one year. The number of observations for a particular family ranges from one to eight. We define an indicator variable for program exit as equal to 1 if, excluding End of Participation (EOP) reports, the observation satisfies two conditions: (1) it is the last observation for the family, and (2) the year of the observation is not 2002. Our reasons for this definition are given below.

If EOP records were available for and contained reliable information about each family that exited the program, it would be desirable to use this information to estimate the hazard model. Many families that appear in the LODI file in some years between 1995 and 2002, however, do not have records for the later years or EOP records. We assume that these families have exited the program without completing EOP forms. If we had used information in EOP records for families with these records and information in the last recertification record for other families, the data for these two types of families would have referred to a somewhat different period. For families with EOP records, it would refer to the period immediately before leaving the program. For other departing families, it would refer to an earlier period. These families leave the program sometime during the year after their last recertification; the information in the last recertification record refers to the period before that recertification. Furthermore, it seems plausible that the information in the EOP record is not as reliable as the information in recertification records because it is never checked for accuracy. Therefore, we ignore the information in EOP records and base our analysis on the information in the admission and recertification records. That is, for families with EOP records, we use the information in their last recertification record.

During the year after a recertification, a family may choose to stay in the voucher program or exit. A decision to exit during this period appears in one of two ways in the LODI file: either there is no recertification record for the family at the end of the period, or there is

an EOP record for the family during the period. After EOP records are eliminated, the only way for an exit to appear in the data is to observe a family at time t but not at time $t + 1$. However, because not all families are interviewed every year or the results are not reported to HUD, it is possible that a family is not observed at time $t + 1$ only to reappear in the data at time $t + 2$. In such an instance, condition (1) serves to avoid categorizing the gap as an exit and re-entry. Throughout this study, it is assumed that families that exit the voucher program between 1995 and 2002 do not re-enter it during this period.

Condition (2) simply takes right censoring of the data into account. If the last non-EOP observation of a family is in 2002, we do not know whether the family exits the program within the next year. All we can say for certain for those families is that they have remained in the program through their recertification in 2002.

In addition to defining program exit, it was necessary to eliminate from the data set families for which the values of one or more important variables appeared erroneous or were missing. Errors were assumed to be attributable to data entry or misreporting. Because of the nature of the study, it was imperative that entire families be dropped from the sample due to missing values or data errors, not just the single observation of the year in which the data problem occurred. To understand why, suppose we observed Family 1 in 1995, 1996, and 1997; that the observation in 1997 is not an EOP; and that in 1997 the family's total income is missing. Simply dropping the observation from 1997 would cause us to mistakenly regard the family as exiting the program in 1996. Deleting all three observations for Family 1 from the sample avoids this problem. Because of the LODI file's size, eliminating entire families due to data problems still leaves an extremely large number of observations to use in estimation. Since there is no reason to expect the deleted families' exit behavior to differ from the exit behavior of the other families with the same observed characteristics, there is no reason to believe that our results are biased on this account.

Descriptions of the final set of variables included at various points in the analysis appear in exhibit 4, along with details regarding what values (if any) of each variable resulted in the family's being eliminated from the sample. Exhibit 5 reports summary statistics. The original LODI file contained 10,052,673 observations on 3,356,640 families with housing vouchers. The final samples used in estimating the proportional hazard models consisted of 2,430,956 observations on 1,101,825 families (data from all areas) and 1,270,975 observations on 571,519 families (data from the 75 largest MSAs). Exhibit 5 indicates that the mean income of these families (in 2002 Washington, D.C., prices) was about \$10,700 and the mean family size was about 2. Of the households, 64 percent were White, 32 percent had elderly heads of the household, and 30 percent had disabled heads of the household.

Statistical Methods

The data described in the previous section was used to estimate a Cox proportional hazard model. This model assumes that the hazard rate can be specified as

$$h(t) = h_0(t)e^{X(t)\beta} \quad (3)$$

where $h_0(t)$ represents the baseline hazard function, $X(t)$ is the set of covariates described in the previous section, and β is a vector of coefficients to be estimated.

The hazard rate gives the likelihood of exit at time t for a family with observed characteristics $X(t)$. One important implication of this simple model is that the percentage difference between the hazard rates for families with two different combinations of characteristics that have been in the program the same number of years is the same no matter how many years they have been in the program. For example, if a family with one child is twice as

Exhibit 5

Means and Standard Deviations of Explanatory Variables

| | 1995 | | 2002 | | 1995–2002 | |
|------------------------|-------------------|------------------|-------------------|-------------------|-------------------|-------------------|
| | All Areas | 75 Largest MSAs | All Areas | 75 Largest MSAs | All Areas | 75 Largest MSAs |
| TotIncome/OtherPrice | 10.77 (4.946) | 11.18 (5.116) | 11.68 (5.300) | 12.25 (5.534) | 10.70 (4.926) | 11.24 (5.156) |
| MaxOtherGoodsVouch | 8.54 (3.748) | 8.77 (3.827) | 9.17 (4.077) | 9.56 (4.225) | 8.39 (3.790) | 8.75 (3.937) |
| PayStand/HsgPrice | 7.76 (2.035) | 7.91 (1.890) | 8.35 (2.417) | 8.73 (2.305) | 7.62 (2.080) | 7.87 (1.995) |
| TotIncome/HsgPrice | 14.18 (6.787) | 12.78 (5.993) | 13.83 (6.428) | 12.96 (6.033) | 13.07 (6.134) | 12.12 (5.681) |
| FamilySize | 2.26 (1.468) | 2.20 (1.475) | 2.17 (1.407) | 2.21 (1.454) | 1.95 (1.364) | 1.99 (1.408) |
| AgeHead | 47.58 (18.658) | 49.31 (18.66) | 46.06 (18.431) | 47.01 (18.496) | 50.11 (18.758) | 51.45 (18.705) |
| White | 0.67 (0.471) | 0.60 (0.490) | 0.60 (0.491) | 0.50 (0.500) | 0.64 (0.479) | 0.56 (0.497) |
| Black | 0.31 (0.463) | 0.38 (0.484) | 0.37 (0.484) | 0.46 (0.498) | 0.33 (0.469) | 0.41 (0.491) |
| Male | 0.21 (0.409) | 0.21 (0.405) | 0.22 (0.411) | 0.21 (0.407) | 0.24 (0.425) | 0.23 (0.422) |
| Kids | 0.92 (1.219) | 0.86 (1.220) | 0.95 (1.278) | 0.99 (1.326) | 0.72 (1.181) | 0.74 (1.221) |
| Married | 0.12 (0.320) | 0.09 (0.292) | 0.08 (0.274) | 0.08 (0.278) | 0.09 (0.281) | 0.09 (0.283) |
| Hispanic | 0.07 (0.256) | 0.08 (0.275) | 0.14 (0.348) | 0.16 (0.365) | 0.12 (0.328) | 0.14 (0.346) |
| Disabled | 0.23 (0.418) | 0.22 (0.412) | 0.30 (0.459) | 0.28 (0.447) | 0.30 (0.459) | 0.28 (0.447) |
| Elderly | 0.28 (0.451) | 0.31 (0.464) | 0.24 (0.424) | 0.25 (0.434) | 0.32 (0.467) | 0.35 (0.476) |
| VacancyRate | 7.22 (2.491) | 7.22 (2.491) | 7.81 (3.301) | 7.80 (3.301) | 7.29 (3.323) | 7.29 (3.323) |
| Number of Observations | 168,290 | 76,105 | 604,531 | 324,180 | 2,430,956 | 1,270,975 |

Notes: Variables are defined in Exhibit 4. Standard deviations are in parentheses.

likely to exit after 1 year of program participation as an otherwise identical family with no children, then a family with one child is also twice as likely to exit after 3 years of program participation as an identical family with no children. This does not mean that the *rate* of exit is the same for both families at both points in time, but rather that the *ratio* of the two rates of exit is identical.

This simple specification of the hazard rate allows us to estimate the β coefficients without specifying a particular baseline hazard function. The estimated coefficients can be used to analyze the effects of the individual covariates on the rate at which families will exit the voucher program. In general, if the coefficient of an explanatory variable is positive, an increase in that explanatory variable increases the likelihood of exit. More specifically, the percentage difference in the hazard rate between two families that differ by one in the value of variable X_i and not at all with respect to other explanatory variables is $100(e^{\beta} - 1)$. For example, if one of the included covariates is a binary variable that takes the value of 1 if the head of the household is White and 0 otherwise and its estimated coefficient is .05, the results imply that the likelihood of exit for a family with a White head of the household is about 5.13 percent greater than the likelihood of exit of a family with a non-White head of the household. If the estimated coefficient is $-.05$, the likelihood of exit is about 4.88 percent less for White families.

Empirical Results

Exhibit 6 reports the parameter estimates of the Cox proportional hazard models based on data from all areas (column 1) and from the 75 largest MSAs (column 3). Standard errors of the parameter estimates are given in parentheses. In every case in which there is a good basis to expect a coefficient of a determinant of exit from the voucher program to have a particular sign, the estimated coefficient had that sign. Because of the sample's tremendous size, we were able to estimate the coefficients in each of the models with an extraordinarily high degree of precision. With very few exceptions, a Wald test rejects the null hypothesis that the coefficient was equal to 0 at the less than 1-percent level.

Exhibit 6

Cox Proportional Hazard Estimation Results

| | All Areas | | 75 Largest MSAs | |
|------------------------|---------------------|---------------------|---------------------|---------------------|
| | (1) Coefficient | (2) Hazard Ratio | (3) Coefficient | (4) Hazard Ratio |
| TotIncome/OtherPrice | 0.0437 (0.0021) | 1.045 | 0.0468 (0.0029) | 1.048 |
| MaxOtherGoodsVouch | -0.1139 (0.0031) | 0.892 | -0.1189 (0.0043) | 0.888 |
| PayStand/HsgPrice | -0.0411 (0.0009) | 0.960 | -0.0307 (0.0014) | 0.970 |
| TotIncome/HsgPrice | 0.0402 (0.0004) | 1.041 | 0.0465 (0.0009) | 1.048 |
| FamilySize | 0.1506 (0.0028) | 1.162 | 0.1443 (0.0038) | 1.155 |
| AgeHead | -0.0075 (0.0001) | 0.993 | -0.0044 (0.0002) | 0.996 |
| White | -0.0632 (0.0075) | 0.939 | -0.0884 (0.0099) | 0.915 |
| Black | -0.1697 (0.0077) | 0.844 | -0.1705 (0.0100) | 0.843 |
| Male | 0.0670 (0.0035) | 1.069 | 0.0934 (0.0051) | 1.098 |
| Kids | -0.0426 (0.0029) | 0.958 | -0.0397 (0.0039) | 0.961 |
| Married | 0.0205 (0.0052) | 1.021 | -0.0119 (0.0077) | 0.988 |
| Hispanic | -0.0697 (0.0043) | 0.933 | -0.0591 (0.0060) | 0.943 |
| Disabled | -0.4673 (0.0041) | 0.627 | -0.4454 (0.0061) | 0.641 |
| Elderly | -0.2614 (0.0065) | 0.770 | -0.2772 (0.0093) | 0.758 |
| VacancyRate | - | - | -0.0068 (0.0007) | 0.993 |
| Number of observations | 2,430,956 | | 1,270,975 | |

Notes: Variables are defined in exhibit 4. Standard errors are in parentheses. For all but one estimated coefficient, Wald tests of the null hypotheses that an individual coefficient is equal to zero reject the null hypotheses at the less than 1-percent level. The lone exception is that the coefficient on Married in column 3 is significant at the 15-percent level.

For ease of analysis, exhibit 6 also reports estimated hazard ratios. Column 2 provides ratios for all areas and column 4 provides ratios for the 75 largest MSAs. Each hazard ratio is the ratio of the estimated rates of exit of families that differ by one unit with respect to a particular covariate. If a given hazard ratio is greater than 1, then all else being equal, an increase in the value of the corresponding variable will increase the rate of program exit. On the other hand, if the hazard ratio is less than 1, an increase in the

value of the covariate decreases the rate of program exit, all else being equal. If the hazard ratio is exactly equal to 1, then holding everything else constant, the covariate does not affect the rate of exit. The farther away the hazard ratio is from 1, the greater the effect of the covariate. Consequently, examining the estimated hazard ratios presented in exhibit 6 provides straightforward insight into what factors affect a family's likelihood of exiting the program as well as the relative influence of each factor. Specifically, the estimated fractional increase in the likelihood of attrition associated with a one unit increase in a particular variable is equal to the hazard ratio reported in exhibit 6 minus 1.

Budget Constraint Parameters Without Housing Assistance

The simple model underlying the estimation assumes that what is possible for a family in the absence of assistance is determined by two variables, namely, *TotIncome/HsgPrice* (Y/P_H) and *TotIncome/OtherPrice* (Y/P_X). The model implies that families with the same values of the other explanatory variables and higher values of either of these variables will exit at a higher rate. That is, the expected sign of their coefficients is positive. To understand this theoretical expectation, it is important to remember that *PayStand/HsgPrice* (PS/P_H) and *MaxOtherGoodsVouch* ($(Y - .3Y^A)/P_X$) are among the other explanatory variables in the hazard model. These variables describe what is possible for the family under the voucher program. Holding what is possible under the voucher program constant, the higher the family's income, the less the voucher program adds to what is possible for the family. (See exhibit 1.) It is important to recognize that families with different incomes can have the same value of *MaxOtherGoodsVouch* due to differences in the adjustments used in calculating the tenant's adjusted income. Based on data for the largest 75 MSAs, the results indicate that families whose maximum monthly expenditure on housing in the absence of housing assistance is \$100 greater have an attrition rate that is about 4.8 percent higher than otherwise similar families and families whose maximum monthly expenditure on other goods in the absence of housing assistance is \$100 greater have an attrition rate that is about 4.8 percent higher than otherwise similar families.¹³

Payment Standard and Minimum Tenant Contribution

Based on the data for the 75 largest MSAs, the estimated coefficient of variable *PayStand/HsgPrice* indicates that, all else being equal, a \$100 increase in the monthly value of the local payment standard will be associated with a 3.0 percent reduction in the rate of program exit. A decrease of \$100 per year in the minimum tenant contribution to rent (currently 30 percent of adjusted income) would increase *MaxOtherGoodsVouch* by this amount and decrease program attrition by about 11.2 percent. The difference in the coefficients of these two variables shows clearly that program attrition depends on the magnitudes of the individual parameters that determine the maximum subsidy rather than the maximum subsidy itself. The two changes in program parameters mentioned above have the same effect on the maximum subsidy but very different effects on attrition.

Elderly and Disability Status

By far, the two largest influences on a family's decision to leave the voucher program are whether the head of the household is elderly and whether the head is disabled. At a given point in time after entering the program, a family with an elderly head of the household is about 23 percent less likely to leave the program than an otherwise similar family with a head of the household who is not elderly. The effect of being disabled is even more pronounced. For two families that are identical in all respects included in these models, but one head of the household is disabled and the other is not, the family with the disabled head of the household is roughly 37 percent less likely to leave the voucher program. Because a family will exit the voucher program only when its circumstances change in such a way that the program's net benefit to the family is no longer positive, these two

results are not surprising. Families with elderly and disabled heads of the household are less likely to experience significant changes in their circumstances than similar families with nonelderly, nondisabled heads of the household. Furthermore, moving costs are likely to be higher for these families. Consequently, we would expect that such families should also be less likely to exit the program.

Race

The race of the head of the household has a modest effect on the likelihood that the family will exit the voucher program. Because dummy variables for both White and African-American races were included in each model specification, the estimated hazard ratios for those variables are relative to non-White, non-African-American families (that is, American Indian, Alaskan Native, Asian, or Pacific Islander). The estimated hazard ratios in exhibit 6 indicate that a White family is about 8.5 percent less likely to leave the voucher program than an otherwise identical non-White, non-African-American family. Similarly, an African-American family is around 15.7 percent less likely to exit the program than an otherwise identical non-White, non-African-American family. It is difficult to pinpoint the causal relationship responsible for these results. As mentioned earlier, the differences in likelihood of exit could reflect differences in average tastes for housing and other goods across different races. The results could be due to differences across race in the average amount of perceived stigma associated with program participation or moving costs. Other explanations are surely possible. Unfortunately, we cannot determine how much of the observed influence of race is attributable to each possibility. Whatever the reason, these results suggest that, compared to non-White, non-African-American families, White families are somewhat less likely to exit the program, and African-American families are even less likely than White families to exit.

Other Family Characteristics

The estimated hazard ratios in exhibit 6 also indicate the effects of the other included family characteristics on the rate of program exit. The likelihood of leaving the voucher program increases with the size of the family, and it is higher if the head of the household is male. It decreases with the age of the head of the household, the number of children present, and if the family is Hispanic. In the large sample, families with a spouse present are more likely to exit. In the sample from the 75 largest MSAs, however, families with a spouse present are less likely to exit.

Vacancy Rates

The coefficient estimates in exhibit 6, column 3, are very similar to those in column 1. The only difference between the two specifications is that the model specified in column 3 includes the prevailing rental housing vacancy rate and it is estimated with the subset of families that live in the 75 largest MSAs. The estimated hazard ratio indicates that if the vacancy rate increases by 1 percentage point, a family is seven-tenths of a percent less likely to leave the voucher program. In the article's theoretical section, we justified the inclusion of the vacancy rate as a covariate to capture the effects of moving costs. We argued that moving costs had a theoretically ambiguous effect on attrition in the voucher program. The empirical results in the third column indicate that higher moving costs lead to more attrition, albeit by a miniscule amount.

Conclusion

This study provides insight into what determines the likelihood that a family will leave a tenant-based voucher program. The hazard rate analysis indicates that whether a head of the household is elderly and whether the head is disabled are by far the most important

influences on the likelihood that the family will exit the program. Families with disabled heads of the household are about 37 percent less likely to exit and families with elderly heads of the household are about 23 percent less likely to exit each year than otherwise similar families. Differences in attrition rates based on other family characteristics are much smaller. White families are about 9 percent less likely to leave the program than non-White, non-African-American families, and African-American families are around 16 percent less likely to leave than non-White, non-African-American families. The likelihood of leaving the voucher program increases with the size of the family, and it is higher if the head of the household is male. It decreases with the age of the head of the household, with the number of children present, and if the family is Hispanic.

The results of the hazard rate estimation indicate that program parameters have a modest influence on attrition. Based on data for the 75 largest MSAs, the results indicate that, all else being equal, a \$100 per month decrease in the local payment standard will be associated with a 3 percent increase in the rate of program exit and an increase of \$100 per month in the minimum tenant contribution to rent would increase program attrition by 12.6 percent.

Although exit rates could be reduced by increasing payment standards or decreasing tenant contributions, these facts do not imply that they should be reduced by these means. The families that would be induced to remain in the program would be the least needy among those currently served, there are long waiting lists for participation in the voucher program in almost all localities, and the waiting lists contain many needier families. Decreasing the payment standard or increasing the tenant contribution to rent would induce few recipients to leave the voucher program, but it would provide the resources to serve many additional families that are as needy as the neediest current recipients without spending more money on the program. Congress could increase the number of vouchers without increasing the program's budget and limit these additional vouchers to those families on the waiting list that have the lowest incomes.

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Notes

1. Hungerford (1996) included the Section 8 fair market rent as a determinant of attrition but viewed it as a rental housing price index as well as an indication of the generosity of the housing subsidy. We disentangle these two determinants of attrition by including as explanatory variables a housing price index as well as the voucher program's local payment standard.
2. Altman (1991), Kahn and Sempos (1989), and Selvin (1996) provide introductions to this model. Lancaster (1990) provides a more detailed account.
3. The local payment standard determines a family's maximum subsidy. Specifically, the maximum subsidy a family can receive is the difference between the local payment standard and 30 percent of its adjusted income. The payment standard is larger for larger families, and the subsidy is lower if the family occupies a unit renting for less than the payment standard.
4. In reality, the percentage difference between the rents of identical units may be different for units with different combinations of housing and neighborhood characteristics. We ignore this complication.
5. If a minimum amount of either good is necessary for survival, then consumption bundles involving less than this amount of the good involved are not feasible. Accounting for this aspect of reality does not affect the conclusions of the analysis.
6. As with all attempts to model what is possible under a government program, this description is a simplification of reality. For example, some of the data used in the analysis is for years prior to the Housing Choice Voucher Program. The budget constraints of the earlier certificate and voucher programs were slightly different. Furthermore, the description in the text does not accurately describe the Housing Choice Voucher Program. For example, the minimum tenant contribution to rent is 10 percent of gross income rather than 30 percent of adjusted income for a small fraction of recipients.
7. In economics, "tastes" and "preferences" refer to all factors other than what is possible that determine an individual's choices. When two people with the same options choose different consumption bundles, they are said to have different tastes. Tastes for particular goods are relative concepts. To say that a person has a stronger than average taste for a particular good means that the person has a weaker than average taste for at least one good. As economists use these terms, no one has stronger than average tastes for all goods.
8. The proof is available on request.
9. Since many eligible families do not participate in the Food Stamp program, their incomes are overstated on this account. These nonparticipants tend to be the families eligible for the smallest subsidies; thus, the overstatement will typically be small. Offsetting this overstatement of income is the underreporting of income by many recipients of housing assistance (Edin and Lein, 1997).

10. An alternative was to limit the analysis to the urban areas covered by the American Chamber of Commerce Researchers Association (ACCRA) Cost of Living Index and use its index of the prices of nonhousing goods. These areas account for about 70 percent of the U.S. urban population. In addition to recognizing the limited geographical coverage of the ACCRA index, it is important to realize that the consumption bundle underlying the ACCRA index is intended to be typical of affluent professional and managerial families rather than the low-income families in our study. Our housing price index is unambiguously better than the ACCRA housing index because it accounts for many more housing and neighborhood characteristics. For the same reason, it is better than Malpezzi, Chun, and Green's (1998) housing price index. Their hedonic equation explaining rent has 19 regressors representing 11 underlying characteristics. Ours has 182 regressors representing many more characteristics. Our housing price index is also better than Thibodeau's (1995) because it has somewhat more detail about housing and neighborhood characteristics and it is available for all locations throughout the country. We are happy to share our housing price index and the underlying hedonic equation with others at any time.
11. University of Illinois at Urbana-Champaign (1998) describes the pilot studies that led up to the survey. Olsen can provide the questionnaire used in the 2000 Customer Satisfaction Survey.
12. Because it is not linear in its parameters, estimation of equation (1) using all the available data and explanatory variables was not feasible with the computers and statistical programs used.
13. Throughout this section, all dollar amounts are in 2002 Washington, D.C., prices.

References

- Altman, Douglas G. 1991. *Practical Statistics for Medical Research*. London: Chapman & Hall.
- Citro, Constance F., and Robert T. Michael, eds. 1995. *Measuring Poverty: A New Approach*. Washington, DC: National Academy Press.
- Edin, Kathryn, and Laura Lein. 1997. *Making Ends Meet*. New York: Russell Sage Foundation.
- Feenberg, Daniel, and Elizabeth Coutts. 1993. "An Introduction to the TAXSIM Model," *Journal of Policy Analysis and Management* (1): 189–194.
- Freeman, Lance. 1998. "Interpreting the Dynamics of Public Housing: Cultural and Rational Choice Explanations," *Housing Policy Debate* 9 (2): 323–353.
- Hungerford, Thomas L. 1996. "The Dynamics of Housing Assistance Spells," *Journal of Urban Economics* 39 (2): 193–208.
- Kahn, Harold A., and Christopher T. Sempos. 1989. *Statistical Methods in Epidemiology*. New York: John Wiley & Sons.
- Lancaster, Tony. 1990. *The Econometric Analysis of Transition Data*. Cambridge: Cambridge University Press.

Malpezzi, Stephen, Gregory H. Chun, and Richard K. Green. 1998. "New Place-to-Place Housing Price Indexes for U.S. Metropolitan Areas and Their Determinants," *Real Estate Economics* 26 (2): 235–274.

Selvin, Steve. 1996. *Statistical Analysis of Epidemiologic Data*. Cambridge: Cambridge University Press.

Susin, Scott. 1999. "Durations in Subsidized Housing." Working Paper 99–5. New York: New York University Center for Real Estate and Urban Policy.

Thibodeau, Thomas G. 1995. "Housing Price Indices From the 1984-1992 MSA American Housing Surveys," *Journal of Housing Research* 6 (3): 439–482.

University of Illinois at Urbana-Champaign. 1998. *Resident Assessment of Housing Quality: Lessons from Pilot Surveys*. Washington, DC: U.S. Department of Housing and Urban Development.

Does Housing Assistance Lead to Dependency? Evidence From HUD Administrative Data

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Abstract

The research presented in this article uses event history methods to describe and explain the dynamics of housing assistance exits. The results show that a plurality of housing assistance spells ends within 5 years and a majority ends within 10 years. Being White, younger, and not disabled, not having children, and a higher vacancy rate in the local housing market were associated with shorter spells of housing assistance receipt. The results also suggest that life-cycle factors that predict residential mobility, in general, play an important role in determining exits from housing assistance. In addition, the availability of housing alternatives for low-income minorities would appear to be an important determinant of housing assistance exits. The results imply that, to the extent policymakers wish to shorten the durations of housing assistance spells, consideration will have to be given to the lack of suitable housing alternatives in addition to the traditional human capital approaches.

Introduction

Americans have always been ambivalent about providing public assistance to the indigent. This ambivalence stems from a desire to help truly needy or “deserving” low-income people but a reluctance to help those who could help themselves and the suspicion that assistance breeds dependency and encourages sloth (Katz, 1990). In the 19th century this suspicion manifested itself in work requirements for recipients of public assistance. During the Great Depression, this suspicion appeared in the targeting of Aid to Families with Dependent Children only to households with absentee husbands who were the presumed breadwinners. More recently, this suspicion has manifested itself in welfare reform legislation, entitled the Personal Responsibility and Work Opportunity Reconciliation Act, which was designed to combat potential dependency among recipients.

Although much of the focus on dependency has been associated with welfare, policymakers have also begun to consider how housing assistance might be linked to dependency. Beginning in 1990, the U.S. Department of Housing and Urban Development (HUD)

began requiring housing authorities to develop and implement the Family Self-Sufficiency Program. This program aims to increase family income through the provision of education, social services, and training so that families will no longer need housing or any other type of public assistance. In 1998, the Quality of Housing and Work Responsibility Act mandated adult members of a public housing household to contribute 8 hours a month of community service in the community in which the adults reside or to participate in an economic self-sufficiency program for 8 hours a month. The implicit motivation behind this requirement is to preclude public housing residents getting something for nothing and to discourage dependency. Critics of housing assistance have also argued that housing assistance should be seen as a temporary handup and not a permanent handout (Husock, 2002). These criticisms and policy changes illustrate the extent to which dependency among housing assistance recipients is a concern of policymakers.

To the extent policymakers wish to transform housing assistance into temporary assistance for the truly needy, a first step is to comprehend the current housing assistance dynamics. How long are housing assistance spells? Does dependency appear to be a problem? What factors predispose someone to longer spells of housing assistance receipt? A thorough understanding of questions such as these should inform any attempts to address dependency among recipients of housing assistance.

Unlike the topic of welfare, however, in which a large body of research has documented and described the dynamics of welfare receipt, relatively little research has been done on the dynamics of housing assistance receipt. Therefore, the answers to the above questions are poorly understood. The research that has been conducted has used data that generally falls into two camps. The first camp relies on data that may be unreliable because it is based on survey respondents making self-reports that have been found to be error prone (Hungerford, 1996; Freeman, 1998; Susin, 1999). The second camp relies on administrative data for public housing residents in New York City, an atypical housing market, and consequently the findings are not generalizable to the rest of the country or to recipients of tenant-based housing assistance (Bahchieva and Hosier, 2001). Thus, our understanding of housing assistance dynamics is far from complete. This article aims to fill this void by employing event history methods to examine the dynamics of housing assistance receipt using data provided by HUD.

Prior Research on Housing Assistance Dynamics

Although nowhere as voluminous as the literature on welfare dynamics, a small body of literature has begun to emerge that examines durations of housing assistance receipt and the factors that influence these durations. Hungerford (1996), using data from the Survey of Income and Program Participation (SIPP), found that the nonelderly, men, those with more education, and those not receiving other public assistance exit housing assistance more quickly. Hungerford also addressed the key question of whether it becomes more difficult to exit housing assistance the longer one receives it, a phenomenon known as duration dependence. Hungerford found little evidence to support the notion that duration dependence is a determinant of housing assistance exits.

Freeman (1998) used data from the Panel Study of Income Dynamics (PSID) to examine the dynamics of residence in public housing. Along with the usual demographic and locational characteristics that might be expected to influence durations of public housing residence, Freeman also tested whether cultural factors—including where the public housing residents grew up, their childhood socioeconomic status, and their parents' educational attainment—affected the length of public housing spells. He discovered that growing up in a two-parent household, being non-Latino, having more than a primary school education,

having additional work experience, being divorced, living in an area with a higher vacancy rate and more affordable housing units, and residing outside a central city in the Northeast or Midwest were associated with quicker exits from public housing. Freeman also did not find evidence of duration dependence.

Susin (1999) studied what factors were associated with the termination of housing assistance spells, focusing on changes in income and household composition and using data from the SIPP. Susin's main finding was that changes in household composition were more important than income or earnings changes as predictors of housing assistance exits. He also found that having a high school degree, having higher earnings and income, welfare receipt, the local area's median rent, and the state vacancy rate were important predictors of exiting housing assistance. All three studies (Hungerford, 1996; Freeman, 1998; Susin, 1999) found exit rates to be highest in the earliest periods of a spell.

The Hungerford (1996), Freeman (1998), and Susin (1999) studies of housing assistance dynamics, moreover, all relied on data sets that determine housing assistance status by the self-reporting of respondents. Evidence suggests that such self-reporting may be unreliable, particularly when respondents are asked to identify the specific type of housing assistance they receive (Shroder, 2002). Moreover, none of these data sets have particularly large samples of assisted housing residents. The small sample sizes makes it difficult to analyze housing assistance dynamics for long spells with any degree of precision because the sample of long-term housing assistance recipients is likely to be very small. Hence, while the overall patterns observed in these earlier studies may be informative, they are also likely to be somewhat inaccurate.

Bahchieva and Hosier (2001) circumvent the problem of respondent misreporting by using administrative data from the New York City Housing Authority (NYCHA). Public housing durations in the Bahchieva and Hosier (2001) study were found to be especially long. Half of all spells lasted at least 42 years, and a quarter lasted 55 years. New York City is, of course, an especially tight housing market, and NYCHA is known for its high-quality developments. Both of these factors would contribute to long spells of public housing residence. It seems doubtful that such lengthy spells would be the norm across the country. Nevertheless, these results are striking. Unlike the studies cited above, Bahchieva and Hosier (2001) found exit rates to peak around the 10th year of a spell, as opposed to the earliest ones. Being young, very old, single, White, a non-Latino recent immigrant, and nonwelfare recipient; having a higher income; and living in a smaller apartment were associated with quicker exits from public housing in this study.

Relying on administrative data from NYCHA limits the generalization of Bahchieva and Hosier's findings to New York City. Bahchieva and Hosier's research also focused exclusively on public housing residents and, thus, sheds little light on what administrative data would say about the dynamics of other types of housing assistance. In addition, as the data are collected for administrative purposes, information of interest to social scientists, such as educational attainment rates, are not available.

The extant literature thus paints an incomplete picture of housing assistance dynamics. The earliest work relied on self-reported data that may not be reliable. Later work by Bahchieva and Hosier (2001) uses more reliable administrative data but is limited to public housing residents in the atypical housing market of New York City. Further, Bahchieva and Hosier did not examine spells for recipients of other types of housing assistance besides public housing. This article, by analyzing housing assistance dynamics using administrative data from a nationwide data set for both public housing and other types of housing assistance, will paint a more comprehensive picture of housing assistance dynamics.

Methodology

This research uses event history methods to describe the dynamics of housing assistance receipt in the United States from 1995 through 2002 and to identify the determinants of exits from housing assistance using multivariate statistical methods. The time periods will be measured in years because the data do not provide the exact date of the exit. The Multifamily Tenant Characteristics System (MTCS)/Tenant Rental Assistance Certification System (TRACS) data provide an indication of what type of transaction is generating the record (that is, new admission, annual reexamination, termination). Conversations with HUD staff who manage the MTCS/TRACS data, however, suggest that some households will have exited housing assistance without the local Public Housing Authority generating a corresponding record.

This problem can be addressed with at least two options. The first is to assume that those without a recorded exit date have not indeed exited housing assistance. This option would understate the hazard or rate at which households are exiting housing assistance. Alternatively, households that disappear from the data set without generating an exit record could be recorded as exiting housing assistance. This option would overstate the hazard for exiting housing assistance to some degree. Comparing the results of both approaches with what is known about the number of households receiving housing assistance at any point in time suggests it is preferable to treat households that disappear from the data set without generating an exit record as having exited housing assistance. This approach produces the more believable results. Thus, this approach will be the focus of this article. The results of the hazard rate analysis when households without an exit record are treated as right censored are available from the author on request.

Life-table Analysis

How long is the typical spell of housing assistance receipt? How common are relatively short spells? What is the probability of a housing assistance spell lasting 5 years? The survivor function (named by epidemiologists studying how long people survive) for housing assistance recipients answers these questions. The life-table method is one of the better known methods for estimating survivor functions and is well suited for large data sets with many unique event times (Allison, 1995). The MTCS/TRACS data that will be used for this analysis have both of these characteristics.

Although descriptive in nature, the life-table analysis paints a vivid portrait of the dynamics of housing assistance receipt. From the life-table analysis, we can get a sense of how long the typical housing assistance spell lasts, the extent to which most spells are short or long, when exits are most likely to occur from the hazard, and so on. By examining the effects of covariates, such as type of housing assistance or race/ethnicity, the picture of housing assistance dynamics painted by the life-table method can be further enhanced. For example, to test whether dynamics differ substantially between public housing residents and Section 8 (now known as Housing Choice Voucher Program) recipients, separate survivor and hazard functions were estimated for these two groups, respectively. This research will make the following life-table comparisons:

- Public housing compared to Section 8 compared to other project-based housing assistance.
- Race/ethnicity for Whites, African Americans, Latinos and Asians, and other races.
- Elderly compared to nonelderly.

Although the descriptive life-table analysis will clearly shed much light on the nature of housing assistance dynamics, it does not rule out the influence of confounding factors. For example, we may find that residents of public housing have much longer spells than Section 8 recipients. Yet this finding could be because public housing residents are more

likely to have lower incomes or live in metropolitan areas where housing is more expensive. To control for these and other possible confounding factors, multivariate methods are required.

Multivariate Models

To determine how various factors influence the hazard or the rate at which households exit housing assistance, a discrete-time logistic regression approach is used to model the probability of exiting housing assistance within each yearly interval. The discrete-time approach has the advantage of easily handling data in which many observations have the same event times. In addition, it does not require assumptions about the distribution of the hazard. Instead, it can be modeled explicitly by including covariates representing each time period. Time-varying covariates, such as age, are also easily handled using discrete-time methods (Allison, 1995). The discrete-time approach requires the data to be assembled in a household-year format. Each record represents a household at a given time t . The discrete-time logistic regression model can be written for individual i exiting housing assistance at time t as:

$$\log\left(\frac{P_{it}}{1 - P_{it}}\right) = \alpha_t + \beta_1 x_{it1} + \beta_2 w_{it2} \dots + \beta_k x_{ikt}$$

where P_{it} is the hazard of exiting housing assistance at time t for an individual with unvarying covariates X_{it} and time-varying covariates W_{it} . B_1 and B_2 are unknown parameters.

A rational choice perspective is used to inform the modeling of exiting housing assistance (Freeman, 1998). The rational choice perspective assumes individuals make choices about using housing assistance based on a cost-benefit calculus. Housing assistance, which is designed to provide decent housing to households that otherwise would not be able to afford it, would be used until the household can obtain better housing without the use of housing assistance. This perspective suggests that upwardly mobile households and those living in housing markets with more options for better housing should be the quickest to exit housing assistance. When thinking about upward mobility and housing assistance, it is important to note that housing is the largest item in most household budgets and has very high transaction costs. Consequently, after a household chooses a certain level of housing consumption, it is likely to be “stuck” with it for a while. Furthermore, housing assistance is not an entitlement and, in many localities, the demand far outstrips the supply. These characteristics of housing and housing assistance mean that the decision to leave housing assistance is likely to be influenced more by long-term or permanent changes in one’s economic or household status, rather than by more transitory changes.

Because exiting housing assistance will often entail moving, factors that influence residential mobility might also affect exits from housing assistance. The life-cycle model of residential mobility, the dominant paradigm for explaining mobility, is therefore also controlled for in the analysis (Rossi, 1980; Speare, 1974). Outlined below is the specific operationalization of the dependent variable and the covariates to be used in the discrete-time logistic regression model.¹ Because the decision to exit housing assistance may occur simultaneously with other household decisions, such as how much to work, whether to marry, and so forth, the modeling exercise, which does not take this simultaneity into account, is best viewed as associative rather than causal in nature.

Dependent Variable. The dependent variable is exiting housing assistance in year t .

Relative Purchasing Power. This component is measured as the ratio of adjusted annual household income to fair market rents. Because this study uses a nationwide data set, failing to adjust for differences in purchasing power between a high-cost area such as San

Francisco and a low-cost area such as Alabama would likely understate the importance of income in determining housing exits. By comparing a household's income to housing prices in the surrounding locality, we get a sense of how much this income is worth in that particular housing market. Higher ratios should be associated with quicker exits from housing assistance.

Disability Status. All things being equal, households headed by disabled individuals should have fewer prospects for upward mobility. Disability status is thus likely to dampen the likelihood of exiting housing assistance.

Age of Household Head. The annual measure of household income will capture the earnings potential of a household, and it will also capture fluctuations in income. Moreover, decisions about exiting housing assistance are likely to be influenced by what households perceive to be their long-term income stream rather than solely what they earned last year. Because age is highly correlated with income, with older individuals earning more, age can serve as a partial proxy for permanent income. Age also serves to capture the stage of an individual's life cycle. Younger households move more often, and to the extent those mobility decisions might entail exiting housing assistance, age is likely to be an important predictor of exiting housing assistance. At the other end of the age spectrum, elderly households are less likely to move and are often on fixed incomes, meaning their chances for upward mobility are nil. Therefore, one would expect elderly households to be much less likely to exit housing assistance. Age is operationalized using the following categories: less than 25, 25–34, 35–44, 45–54, 55–62, and more than 62 years. The age 62 was used as the threshold for the oldest category because that is the age HUD uses to distinguish its elderly and nonelderly populations.

Gender. Female-headed households have been found to be especially vulnerable to persistent poverty, which would also seem to make them susceptible to long-term housing assistance receipt.

Race/Ethnicity. A large body of research has demonstrated the persistence housing discrimination for non-Whites (Turner et al., 2002). To the extent this discrimination contributes to fewer housing options, non-Whites may face more difficulty exiting housing assistance. The racial/ethnic categories controlled for in the analysis include Asian, African American, Latino, White, and other. The racial and ethnic composition of the local housing authority clientele may also influence how quickly a household leaves housing assistance. Finkel and Kennedy (1992) showed that success in obtaining an apartment using a certificate or voucher was influenced by whether the voucher or certificate holder resided in an area where their own race/ethnicity dominated the Section 8 clientele. In other words, African Americans had more success utilizing Section 8 where most other Section 8 recipients were African American, and Latinos had more success utilizing Section 8 where most other Section 8 recipients were Latinos. Finkel and Kennedy hypothesized that voucher holders had more success finding an apartment when their own racial/ethnic identity was the predominant group because Section 8 landlords form a distinct housing market and these submarkets are racially distinct. Therefore, a city such as Atlanta might have a predominantly African-American Section 8 clientele and landlords who accept Section 8 might be concentrated in African-American neighborhoods. This concentration would make it easier for African-American certificate/voucher holders to find a unit relative to Whites or Latinos, because these latter two groups would be less likely to search for units in African-American neighborhoods.

Adapted to a study of exits from housing assistance, the Finkel-Kennedy thesis suggests housing assistance recipients might be less likely to exit housing assistance when their racial/ethnic group is the predominant clientele for that particular housing authority. Housing assistance recipients might be less likely to exit housing assistance when their

racial/ethnic group is the predominant clientele for that particular housing authority or the neighborhood in the case of Section 8 vouchers or certificates, and hence have less reason to alter their housing arrangements. The Finkel-Kennedy hypothesis is operationalized as a dummy variable equal to one if a household head resided in a housing authority area where most of the clients shared their same race/ethnicity, and zero otherwise.

Household Composition. Household composition is likely to influence exits from housing assistance in several ways. Married households have potentially more income earners and a more likely stable situation. Thus, married households might be expected to leave housing assistance more quickly because their future income streams are likely to be larger. Because leaving housing assistance might quite often involve moving, however, the fact that married households are less likely to move suggests a countervailing force that renders the expected effect of marital status on exiting housing assistance ambiguous.

The presence of children in a household will likely dampen prospects for exiting housing assistance. Households with children typically prefer stability in location and, because exiting housing assistance often requires a change in location, the presence of children should be associated with fewer exits.

The larger the housing unit the more difficult it will be to find comparable or better housing. Housing unit size should therefore be inversely related to exiting housing assistance.

Amount of Subsidy. The amount of housing assistance a household receives varies to some extent, depending on the program in which they are enrolled. Perhaps more importantly, in housing markets where housing is relatively expensive, housing assistance will be worth more. The smaller the subsidy, the more likely it is that a household will leave housing assistance. After all, if the amount of the subsidy is negligible, why remain on housing assistance? The amount of subsidy each household receives is estimated as the fair market rent minus the tenant rent.

Housing Market Conditions. The vacancy rate in the housing market will serve as a measure of the local housing market. In areas where vacancy rates are lower, fewer housing options will exist, and households may be more reluctant or unable to exit housing assistance.

Welfare Receipt. Recipients of welfare will find that their benefit decreases as their income increases. Likewise, housing assistance recipients will see their rent increasing when their income increases. Thus a person receiving housing assistance and welfare who experiences an increase in income will see their rent increase and their welfare payments decline. Such a double disincentive to increase one's income may make it difficult for housing assistance recipients on welfare to become upwardly mobile and afford to exit housing assistance. Whether someone received welfare in a given year is included as an indicator variable.

Neighborhood Effects. Evidence strongly suggests that residence in a high-poverty neighborhood can have deleterious consequences on upward mobility (Gould Ellen and Turner, 1997; Goering, 2003; Wilson, 1987). For recipients of housing assistance, these neighborhood effects might manifest themselves in two ways. First, in high-poverty neighborhoods dependence on housing assistance might be viewed as acceptable. Second, high-poverty neighborhoods may not provide access to employment networks. We might therefore expect households residing in high-poverty neighborhoods to have more difficulty exiting housing assistance. Following the conventions of the neighborhood-effects literature, high poverty was defined as a neighborhood where at least 40 percent of the residents had low incomes. The other two categories used are neighborhoods with poverty rates ranging from 20 to 30 percent and neighborhoods with poverty rates below 20 percent.

Duration Dependence. According to the notion of duration dependence, the longer someone receives housing assistance the more they come to acquire a “taste” for it. (Bane and Ellwood, 1994). They may come to rely on the subsidy in making ends meet. Moreover, the notion of their rent not being dependent on how much they will earn might seem unsettling. If this is true, the longer someone has been receiving housing assistance, the less likely they should be to exit housing assistance.

Type of Housing Program. The various types of housing programs may have different hazards for exiting housing assistance. For example, because leaving project-based housing assistance necessarily entails physically moving, the exit rates for this type of housing assistance might be lower than for tenant-based programs. In addition, the participants of the various housing assistance programs might differ in unobserved ways that affect their likelihood of exiting housing assistance. Consequently, the analysis will control for the type of housing assistance the household receives, using the following three categories: (1) public housing, (2) Section 8, and (3) all other types of housing assistance programs, including the Below Market Interest Rate Program, Section 202, Section 236, Section 811, Rent Supplement, and Rental Assistance Programs. Public housing is the nation’s oldest housing program and subsidizes units in developments of varying sizes. These developments are typically built and managed by a local housing authority. Section 8 provides subsidies to tenants in the form of vouchers (and formerly certificates) and, in some cases, has subsidized new construction whereby the new units are leased using certificates or vouchers. The other housing assistance programs typically began during the 1960s and 1970s in response to what was then viewed as flaws in the public housing program. For the most part, these other programs were designed to have the private market play a bigger role in the production of affordable housing by having this sector develop and/or manage subsidized housing.

Calendar Year. In early 2000, HUD warned clients of the dire consequences for underreporting of income, perhaps scaring some housing assistance recipients who were engaging in such activities to leave housing assistance altogether.²

Results

Exhibit 1 illustrates the descriptive statistics for variables to be used in the discrete-time logistic regression model.

When Do Households Exit Housing Assistance?

The life-table method gives the following informative statistics illustrated in exhibit 2:

- Number exiting housing assistance.
- Number censored: households that do not exit from housing assistance during the observation period.
- Survival column: the probability that a person will exit housing assistance at a time greater than or equal to time t . This can also be interpreted as the portion of the population that continues receiving housing assistance until time t .
- Hazard: the estimated rate at which households exit housing assistance for a given year t .

Exhibit 1

Frequencies and Means for Variables Used in Multivariate Analysis

| Variable | Frequency or Mean |
|---|-------------------|
| Exited housing assistance | 10% |
| Public housing | 25.9% |
| Section 8 | 32.8% |
| Other assisted housing | 41.2% |
| White | 45.2% |
| African American (White serves as reference category) | 37.5% |
| Latino (White serves as reference category) | 13.5% |
| Asian (White serves as reference category) | 2.5% |
| Other race (White serves as reference category) | 1% |
| Respondent's own race is majority of housing authority (Finkel-Kennedy thesis) | 39.2% |
| Female | 78.5% |
| Married | 8.6% |
| Has children | 44.3% |
| Age 24–35 (Age 18–24 serves as reference category) | 20.2% |
| Age 36–44 (Age 18–24 serves as reference category) | 18.3% |
| Age 45–54 (Age 18–24 serves as reference category) | 11.7% |
| Age 55–61 (Age 18–24 serves as reference category) | 7.3% |
| Aged 62 or over (Age 18–24 serves as reference category) | 31.7% |
| Disabled | 17% |
| Missing data for disabled | 18.4% |
| Ratio of median HH income to housing value | 14.5 |
| Received welfare | 19% |
| Amount of housing subsidy | \$429 |
| Neighborhood poverty rate 20–39% (Poverty rate less than 20% serves as reference category) | 14.1% |
| Neighborhood poverty rate greater than 40% (Poverty rate less than 20% serves as reference category) | 34.9% |
| Number of bedrooms in unit | 1.75 |
| N | 29,021,457 |

Exhibit 2 illustrates the results of the life-table analysis for the full population. Columns 5 and 6 provide parameters for the survivor function and the hazard, respectively. Except for the first year, the results suggest that the likelihood of exiting housing assistance is greatest in the earliest years, as evidenced by the steepest declines in the survivor function being found in the earlier years and the hazard being highest in the earlier years. Recall that the survival function gives an indication of the likelihood of a household remaining a recipient of housing assistance to a given year. As column 5 in exhibit 2 shows, the steepest decline in the survivor function is between the second and third years. After that period, the declines in the survivor function decrease at a decreasing rate, leveling off after the 10th year or so. Likewise, the hazard is highest in the second year and declines steadily after that, leveling off after about the 10th year. The hazard does spike upward for those in the midst of extremely long housing spells—beyond 58 years. But at this point the population size is very small and, hence, this pattern is applicable only to a very small portion of all housing assistance recipients.

Exhibit 2

Life-table Analysis

| Time From Entering Housing Assistance | Number Leaving Housing Assistance | Number Censored | Effective Population Size | Survival | Hazard |
|---------------------------------------|-----------------------------------|-----------------|---------------------------|----------|----------|
| Year 1 | 419,612 | 534,302 | 7,574,473 | 1.0000 | 0.056976 |
| Year 2 | 1,110,675 | 476,471 | 6,649,474.5 | 0.9446 | 0.182253 |
| Year 3 | 800,834 | 363,102 | 5,119,013 | 0.7868 | 0.169719 |
| Year 4 | 502,663 | 265,569 | 4,003,843.5 | 0.6637 | 0.133954 |
| Year 5 | 351,206 | 212,015 | 3,262,388.5 | 0.5804 | 0.113777 |
| Year 6 | 258,947 | 166,924 | 2,721,713 | 0.5179 | 0.099893 |
| Year 7 | 197,231 | 131,646 | 2,313,481 | 0.4686 | 0.089049 |
| Year 8 | 157,547 | 114,267 | 1,993,293.5 | 0.4287 | 0.082291 |
| Year 9 | 131,308 | 97,129 | 1,730,048.5 | 0.3948 | 0.078892 |
| Year 10 | 111,593 | 81,856 | 1,509,248 | 0.3648 | 0.076778 |
| Year 11 | 97,711 | 70,963 | 1,321,245.5 | 0.3379 | 0.076793 |
| Year 12 | 85,479 | 64,728 | 1,155,689 | 0.3129 | 0.076804 |
| Year 13 | 76,432 | 56,644 | 1,009,524 | 0.2897 | 0.07869 |
| Year 14 | 67,694 | 49,501 | 880,019.5 | 0.2678 | 0.08 |
| Year 15 | 61,052 | 43,016 | 766,067 | 0.2472 | 0.083003 |
| Year 16 | 54,920 | 37,280 | 664,867 | 0.2275 | 0.086162 |
| Year 17 | 48,795 | 31,648 | 575,483 | 0.2087 | 0.088543 |
| Year 18 | 43,040 | 28,428 | 496,650 | 0.1910 | 0.090586 |
| Year 19 | 38,107 | 26,101 | 426,345.5 | 0.1745 | 0.093562 |
| Year 20 | 33,481 | 24,254 | 363,061 | 0.1589 | 0.096676 |
| Year 21 | 29,121 | 22,363 | 306,271.5 | 0.1442 | 0.099828 |
| Year 22 | 24,245 | 19,519 | 256,209.5 | 0.1305 | 0.099329 |
| Year 23 | 19,754 | 17,544 | 213,433 | 0.1182 | 0.097045 |
| Year 24 | 16,877 | 13,819 | 177,997.5 | 0.1072 | 0.099535 |
| Year 25 | 13,842 | 10,559 | 148,931.5 | 0.0971 | 0.097472 |
| Year 26 | 10,503 | 8,574 | 125,523 | 0.0880 | 0.087327 |
| Year 27 | 8,617 | 7,029 | 107,218.5 | 0.0807 | 0.083733 |
| Year 28 | 7,509 | 5,008 | 92,583 | 0.0742 | 0.084534 |
| Year 29 | 6,357 | 4,572 | 80,284 | 0.0682 | 0.082445 |
| Year 30 | 5,597 | 2,478 | 70,402 | 0.0628 | 0.082792 |
| Year 31 | 4,787 | 2,402 | 62,365 | 0.0578 | 0.079821 |
| Year 32 | 4,228 | 2,314 | 55,220 | 0.0533 | 0.079614 |
| Year 33 | 4,016 | 2,232 | 48,719 | 0.0493 | 0.085975 |
| Year 34 | 3,267 | 1,850 | 42,662 | 0.0452 | 0.079628 |
| Year 35 | 2,764 | 1,693 | 37,623.5 | 0.0417 | 0.076266 |
| Year 36 | 2,364 | 1,557 | 33,234.5 | 0.0387 | 0.073754 |
| Year 37 | 2,241 | 1,219 | 29,482.5 | 0.0359 | 0.079014 |
| Year 38 | 2,002 | 1,178 | 26,043 | 0.0332 | 0.079946 |
| Year 39 | 1,612 | 915 | 22,994.5 | 0.0306 | 0.07265 |
| Year 40 | 1,564 | 756 | 20,547 | 0.0285 | 0.07913 |
| Year 41 | 1,396 | 680 | 18,265 | 0.0263 | 0.079467 |
| Year 42 | 1,421 | 571 | 16,243.5 | 0.0243 | 0.091483 |
| Year 43 | 1,378 | 494 | 14,290 | 0.0222 | 0.101316 |
| Year 44 | 1,355 | 430 | 12,450 | 0.0200 | 0.115099 |
| Year 45 | 1,330 | 433 | 10,663.5 | 0.0179 | 0.13302 |
| Year 46 | 1,133 | 349 | 8,942.5 | 0.0156 | 0.135267 |
| Year 47 | 1,062 | 464 | 7,403 | 0.0137 | 0.15454 |
| Year 48 | 1,005 | 369 | 5,924.5 | 0.0117 | 0.185356 |
| Year 49 | 741 | 521 | 4,474.5 | 0.00971 | 0.180556 |
| Year 50 | 492 | 354 | 3,296 | 0.00810 | 0.161311 |
| Year 51 | 406 | 205 | 2,524.5 | 0.00689 | 0.174887 |
| Year 52 | 398 | 94 | 1,969 | 0.00578 | 0.224859 |
| Year 53 | 194 | 178 | 1,435 | 0.00462 | 0.144993 |
| Year 54 | 185 | 60 | 1,122 | 0.00399 | 0.179699 |
| Year 55 | 139 | 47 | 883.5 | 0.00333 | 0.170762 |
| Year 56 | 98 | 24 | 709 | 0.00281 | 0.148485 |
| Year 57 | 90 | 21 | 588.5 | 0.00242 | 0.165593 |
| Year 58 | 61 | 17 | 479.5 | 0.00205 | 0.135857 |
| Year 59 | 73 | 22 | 399 | 0.00179 | 0.201379 |

Exhibit 2

Life-table Analysis (continued)

| Time From Entering Housing Assistance | Number Leaving Housing Assistance | Number Censored | Effective Population Size | Survival | Hazard |
|---------------------------------------|-----------------------------------|-----------------|---------------------------|----------|----------|
| Year 60 | 62 | 19 | 305.5 | 0.00146 | 0.225865 |
| Year 61 | 69 | 30 | 219 | 0.00117 | 0.373984 |
| Year 62 | 31 | 49 | 110.5 | 0.000798 | 0.326316 |
| Year 63 | 15 | 15 | 47.5 | 0.000574 | 0.375 |
| Year 64 | 8 | 4 | 23 | 0.000393 | 0.421053 |
| Year 65 | 8 | 2 | 12 | 0.000256 | 1 |
| Year 66 | 2 | 1 | 2.5 | 0.000085 | – |

If 5 years is used as the cutoff for short-term spells and 10 years is used as the cutoff for long-term spells, admittedly arbitrary cutoffs, the survivor function shows that the probability of a household receiving housing assistance beyond 5 years is 58 percent. The probability of a household receiving housing assistance beyond 10 years is 36 percent. To the extent that policymakers are concerned about long-term housing assistance receipt, there appears to be a sizable proportion of the housing-assisted population to be concerned about.

The results presented here are consistent with some prior research that showed the greatest likelihood of housing assistance exits occurs in the earliest years. Freeman (1998), Hungerford (1996), and Susin (1999) all found the highest hazards for leaving housing assistance in the earliest years of a spell. Bahchieva and Hosier (2001) did not find exits from public housing to be greater during the early portions of a spell, but, as mentioned earlier, their focus on the New York City housing market could explain their anomalous results.

The results also suggest that some of the earlier studies that relied on self-reported data, such as Freeman’s use of the Panel Study of Income Dynamics (Freeman, 1998), may have overstated the extent to which exits from housing assistance were occurring in the early years of a spell. Freeman’s results showed relatively few households remaining beyond 5 years, which is clearly not the case here. The discrepancies could be due to the relatively small size in the PSID (only 1,000 observations) or the misreporting of errors as described above.

Exhibits 3, 4, and 5 illustrate the hazard rates for different subsets of the population, focusing on variations across type of housing assistance, race/ethnicity, and elderly status. The hazards fluctuate wildly in the late years of a spell, reflecting the small number of households who receive housing assistance for such long periods of time. Consequently, the focus is on the earlier stages before the 50th year of a spell.

Exhibit 3 depicts the hazards for public housing residents, Section 8 recipients, and other HUD-assisted housing, respectively. The general pattern is similar to that discussed for the full population. The hazards are highest in the earliest years, followed by a relatively steady decline. Up to about year 8, Section 8 recipients have the lowest hazards. After the 15th year, Section 8 recipients have the highest hazards. The lower hazards among Section 8 recipients in earlier years of a spell could be indicative of greater residential satisfaction among these recipients and thus less motivation to alter one’s housing situation.

Exhibit 4 shows how the hazard differs for different racial/ethnic groups. Whites generally have the highest hazard, followed by African Americans and then Latinos. There are two reasons Whites might leave housing assistance more quickly. First, non-Whites might

face housing discrimination, which might limit the opportunities for non-Whites seeking unsubsidized housing. Second, Whites may be more upwardly mobile and, hence, have an easier time leaving housing assistance.

The hazard rates for the elderly and nonelderly are depicted in exhibit 5. Because the elderly are apt to be in a settled stage of life in which dramatic life changes of the type that would precipitate exiting housing assistance, such as changes in household composition or income, are less likely, this group might be expected to have a relatively low hazard. In the early years of a spell, this is indeed the case. The hazard for the elderly portion of the housing assistance spells is lower. Around year 15, the hazards converge and fluctuate thereafter.

Exhibit 3

Hazard Rate by Program Type

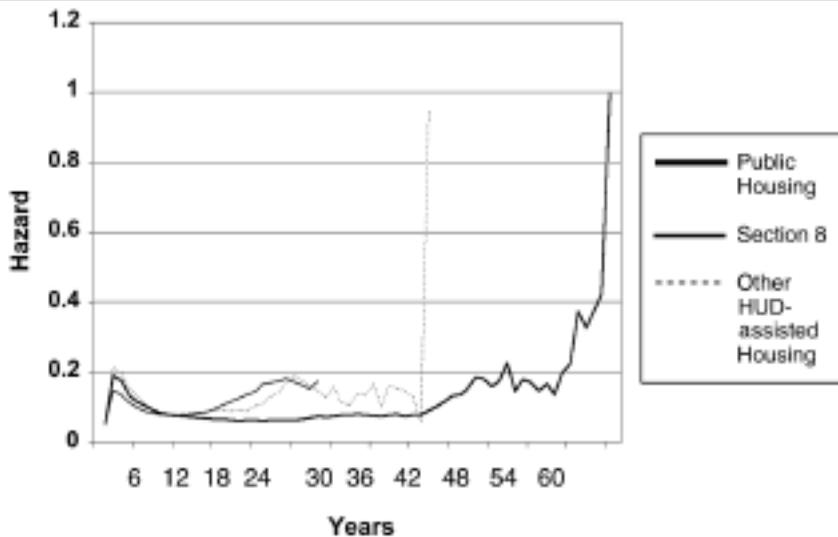


Exhibit 4

Hazard Rate by Race/Ethnicity

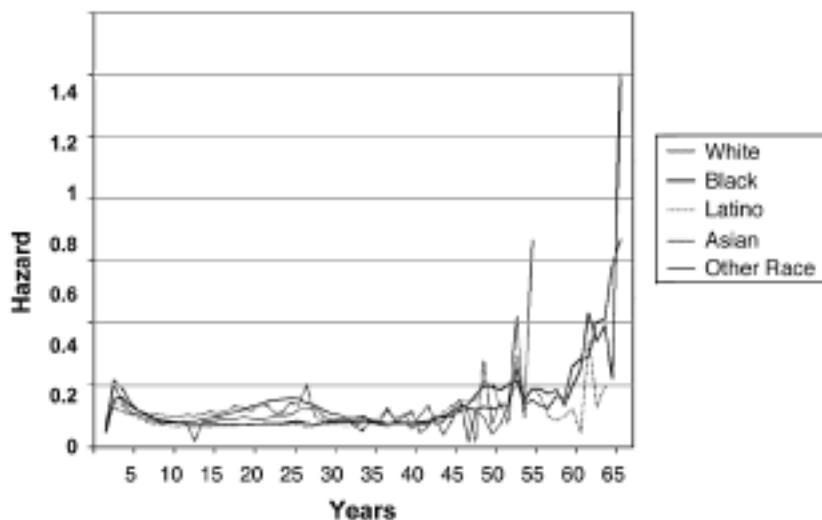
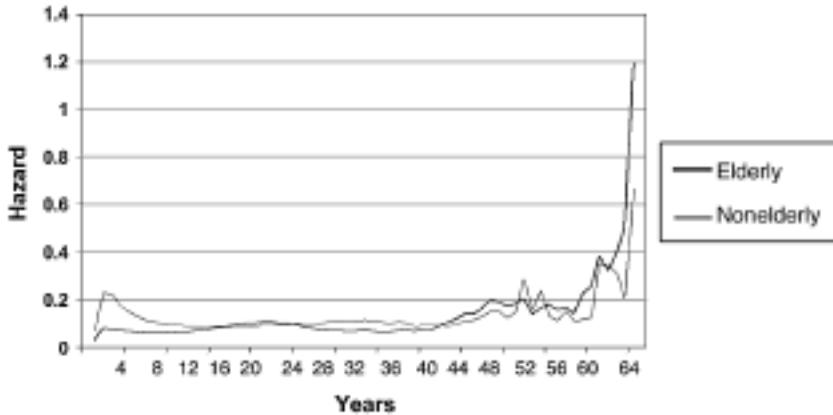


Exhibit 5

Hazard Rate by Age



The results of the life-table analysis begin to paint a picture of the dynamics of housing assistance receipt. They show that a sizable portion of housing assistance recipients ceased receiving housing assistance within the first 5 years. Certainly long-term receipt does not accurately describe the entire housing assistance population. Yet long-term receipt does accurately describe some of this population. The survivor function presented in Exhibit 2 shows recipients have about a 36 percent chance of remaining recipients for at least 10 years and about a 16 percent chance for at least 20 years. The life-table analyses also show that some Section 8 recipients, non-Whites, and the elderly typically leave housing assistance at slower rates than public and other assisted housing residents, Whites, and the nonelderly, respectively. The multivariate analyses are used to gain a more complete picture of the factors that affect housing assistance spells, taking into account housing and neighborhood conditions and considering multiple individual characteristics simultaneously.

Multivariate Analyses

Exhibit 6 illustrates the results of the multivariate analyses. The relationships of each independent variable to exiting housing assistance are presented as odds ratios. Because the data represents the entire population of housing assistance recipients, levels of statistical significance are not relevant. The odds ratios can be interpreted as the true population parameters. Conversely, an alternative school of thought would say that statistical significance is still pertinent because we only observe the population at a given point in time from an infinite universe of populations or super population and, hence, the data used in this analysis represent a sample (Deaton, 1997). For that reason, the probabilities of obtaining each odds ratio by chance is also presented. As will be seen, given the large size of the population, some 20,661,538 observations,³ almost all of the parameters are statistically significant anyway.

Odds ratios greater than 1 indicate a positive relationship with the likelihood of exiting housing assistance, whereas odds ratios less than 1 indicate a negative relationship. The distance of the odds ratio from 1 indicates the magnitude of the relationship. Thus, an odds ratio of 3 indicates a stronger positive relationship than an odds ratio of 2. The relationships between individual level, environmental, and temporal factors and exiting housing assistance are considered in turn.

Exhibit 6

Discrete-time Logistic Regression Model

| Independent Variable | Odds Ratio | P-value |
|---|------------|---------|
| African American (White serves as reference category) | .81 | < .01 |
| Latino (White serves as reference category) | .88 | < .01 |
| Asian (White serves as reference category) | .84 | < .01 |
| Other race (White serves as reference category) | 1.10 | < .01 |
| Respondent's own race is majority of housing authority (Finkel-Kennedy thesis) | .96 | < .01 |
| Female | .84 | < .01 |
| Married | 1.05 | < .01 |
| Has children | .84 | < .01 |
| Age 25–34 (Age 18–24 serves as reference category) | .89 | < .01 |
| Age 35–44 (Age 18–24 serves as reference category) | .76 | < .01 |
| Age 45–54 (Age 18–24 serves as reference category) | .63 | < .01 |
| Age 55–61 (Age 18–24 serves as reference category) | .54 | < .01 |
| Aged 62 or over (Age 18–24 serves as reference category) | .46 | < .01 |
| Disabled | .72 | < .01 |
| Missing data for disabled | .83 | < .01 |
| Section 8 recipient | .79 | < .01 |
| Other housing assistance | .76 | < .01 |
| Received welfare | .94 | < .01 |
| Amount of housing subsidy | .99 | < .01 |
| Number of bedrooms in unit | 1.12 | < .01 |
| Vacancy rate | 2.53 | < .01 |
| Ratio of median HH income to housing value | 1.002 | < .01 |
| Neighborhood poverty rate 20–39% (Poverty rate less than 20% serves as reference category) | .99 | < .01 |
| Neighborhood poverty rate greater than 40% (Poverty rate less than 20% serves as reference category) | .94 | < .01 |
| Midwest (Northeast serves as reference category) | 1.05 | < .01 |
| South (Northeast serves as reference category) | 1.11 | < .01 |
| West (Northeast serves as reference category) | 1.09 | < .01 |
| Calendar year 1996 (1995 serves as reference category) | .83 | < .01 |
| Calendar year 1997 (1995 serves as reference category) | .88 | < .01 |
| Calendar year 1998 (1995 serves as reference category) | 1.51 | < .01 |
| Calendar year 1999 (1995 serves as reference category) | 26.75 | < .01 |
| Calendar year 2000 (1995 serves as reference category) | .68 | < .01 |
| Calendar year 2001 (1995 serves as reference category) | .86 | < .01 |
| Calendar year 2002 (1995 serves as reference category) | .67 | < .01 |
| Year 2 | 1.34 | < .01 |
| Year 3 | 1.04 | < .01 |
| Year 4 | .91 | < .01 |
| Year 5 | .85 | < .01 |
| Year 6 | .81 | < .01 |
| Year 7 | .83 | < .01 |
| Year 8 | .81 | < .01 |
| Year 9 | .82 | < .01 |
| Year 10 | .82 | < .01 |
| Year 11 | .82 | < .01 |
| Year 12 | .83 | < .01 |
| Year 13 | .86 | < .01 |
| Year 14 | .87 | < .01 |
| Year 15 | .89 | < .01 |
| Year 16 | .91 | < .01 |
| Year 17 | .92 | < .01 |
| Year 18 | .94 | < .01 |
| Year 19 | .94 | < .01 |
| Year 20 | 1.38 | .78 |
| Year 21 | .69 | .75 |
| Year 22 | .67 | .73 |
| Year 23 | .68 | .74 |
| Year 24 | .65 | .72 |
| Year 25 | .63 | .69 |
| Year 26 | .60 | .66 |
| Year 27 | .56 | .62 |

Exhibit 6

Discrete-time Logistic Regression Model (continued)

| Independent Variable | Odds Ratio | P-value |
|-----------------------------------|--------------|-------------------|
| Year 28 | .58 | .64 |
| Year 29 | .55 | .61 |
| Year 30 | .55 | .60 |
| Year 31 | .54 | .60 |
| Year 32 | .54 | .59 |
| Year 33 | .53 | .58 |
| Year 34 | .50 | .54 |
| Year 35 | .55 | .60 |
| Year 36 | .51 | .56 |
| Year 37 | .49 | .54 |
| Year 38 | .56 | .62 |
| Year 39 | .51 | .56 |
| Year 40 | .54 | .59 |
| Year 41 | .53 | .59 |
| Year 42 | .58 | .63 |
| Year 43 | .54 | .59 |
| Year 44 | .48 | .53 |
| Year 45 | .53 | .58 |
| Year 46 | .54 | .59 |
| Year 47 | .52 | .57 |
| Year 48 | .51 | .56 |
| Year 49 | .48 | .52 |
| Year 50 | .55 | .61 |
| Year 51 | .51 | .57 |
| Year 52 | .59 | .64 |
| Year 53 | .75 | .81 |
| Year 54 | .63 | .69 |
| Year 55 | .69 | .75 |
| Year 56 | .75 | .80 |
| Year 57 | .44 | .49 |
| Year 58 | .42 | .46 |
| Year 59 | 1.02 | .98 |
| Year 60 | .44 | .49 |
| Year 61 | .44 | .49 |
| Year 62 | 1.81 | .62 |
| Year 63 | .63 | .45 |
| Measure of Goodness of Fit | | |
| Wald χ^2 | 3,661,762.97 | 96 d.f. P < .0001 |
| Percent concordant | | 78.0% |
| Percent discordant | | 21.6% |
| Tied | | .4% |
| N | | 24,661,649 |

Consider how individual level characteristics are related to the odds of exiting housing assistance. Race and age emerge as especially strong predictors of exiting housing. Asians, African Americans, and Latinos are less likely than Whites to exit housing assistance even after controlling for a host of other factors. This tendency may be because these groups have fewer housing opportunities due to the racially and ethnically segmented nature of housing markets. While all of the older age groups have a lower likelihood of exiting housing assistance than those in the 18 to 24 group, the difference is especially pronounced for those in the oldest age brackets. For example, the odds ratios for the categories representing those 45 or older are substantially smaller than the ones representing younger categories. Being disabled, a welfare recipient, a woman, or having children is also associated with a lower likelihood of exiting housing assistance. Disabled people, welfare recipients, female heads of households, and those with children might be expected to be less likely to exit housing assistance; the former three are likely to face obstacles

achieving the upward mobility necessary to exit housing assistance. The disabled face obstacles to upward mobility because they cannot work. Welfare recipients are typically more disadvantaged than nonrecipients and will find increases in earned income offset by reductions in welfare benefits. It may thus be difficult to increase one's income sufficiently to be able to afford to exit housing assistance. Because of typically earning less than men, women might also find it harder to exit housing assistance. Households with children may be reluctant to move, which is often necessary when exiting housing assistance. Therefore, this pattern of results conforms to expectations.

Among the categories of housing assistance, both Section 8 recipients and other assisted housing recipients exited housing assistance more slowly than public housing residents. This finding is consistent with the hazard rates presented in exhibit 3, which show public housing clients to generally have the highest hazards for exiting housing assistance. This result could represent the fact that these recipients of housing assistance outside of public housing are more satisfied with their housing arrangements than public housing residents are and, hence, are less likely to want to change their current housing situation, which leaving housing assistance might often require. In addition, the family self-sufficiency initiatives started in recent years have targeted public housing residents as opposed to other types of housing assistance recipients. These programs may be having some effect by hastening exits from public housing relative to the other housing assistance programs.

Given that larger apartments are generally scarcer, one would expect housing assistance recipients with the largest units to be reluctant to part with their unit and thus less likely to exit housing assistance. Contrary to this expectation, however, residing in a larger apartment is associated with slightly higher odds of exiting housing assistance. The amount of the subsidy had the expected negative relationship, meaning the larger the subsidy, the less likely the recipients are to exit housing assistance. Yet the size of the relationship was modest.

Turning to environmental factors, the local vacancy rate demands attention as a very important determinant of exiting housing assistance. More than any other factor, having housing alternatives, as indicated by a higher vacancy rate, seems to be an important determinant of exiting housing assistance. Surprisingly, the ratio of a household's income to local fair market rents was only modestly related to housing assistance exits. The level of poverty in the surrounding neighborhood was also only modestly related to exiting housing assistance. Those in neighborhoods with poverty rates greater than 40 percent are modestly less likely to leave housing assistance and those in neighborhoods with poverty rates between 20 and 40 percent are only slightly less likely to exit housing assistance. Taken together, this pattern provides modest support for the notion that neighborhood effects influence housing assistance exits.

The results presented in exhibit 6 also provide some support for the Finkel-Kennedy hypothesis. As adapted to this analysis, the Finkel-Kennedy hypothesis suggests that individuals residing in localities where their racial/ethnic group predominates should be less likely to exit housing assistance. The odds ratio does indicate these individuals are less likely to exit housing assistance.

Compared to housing assistance residents in the Northeast, those residing elsewhere are more likely to exit housing assistance in a given year. Many of the tightest and most expensive housing markets, such as Boston and New York City, are in the Northeast. Thus, this result is not so surprising.

The last set of factors discussed is temporal. The odds ratios for the calendar years 1996 through 2002 do not exhibit a consistent pattern that lends itself to any explanation. Indeed, the year 1999 appears quite anomalous; the likelihood of exiting housing assistance

appears to have increased dramatically for this year. The possibility that changes in the recording of administrative data created the resulting puzzling pattern cannot be ruled out.

The length of the housing assistance spell is clearly related to the odds of exiting housing assistance, but, as with the odds ratios representing calendar years, the pattern defies easy explanation. Compared to the likelihood of exiting housing assistance in the first year of a spell, the likelihood is greater in the second and third years of a spell, lower in the 4th through 19th years, and inconsistent after that. The standard errors (not presented here) are also relatively large in the years beyond the 19th year of a spell, reflective of the small sample sizes for longer spells. Although the data represent a population and the normal meaning of statistical significance is not applicable, the large standard errors for spells 20 years and longer do suggest a great deal of dispersion around each of the parameters representing each of these later years of a spell. This dispersion means the odds ratios might not summarize the data as well for the later years of a spell as it does for the earlier years.

The pattern for the years of housing assistance duration is certainly inconsistent with what would be expected if duration dependence were prevalent among housing assistance recipients. If duration dependence were a factor, the odds ratios for the length of spells should all be less than 1 and be gradually decreasing the longer the spell. This scenario would indicate that it was becoming more difficult to exit housing assistance the longer one was a housing assistance recipient. Most likely, unobserved heterogeneity is responsible for the pattern observed. That is, individuals enter housing assistance with different proclivities for exiting housing assistance. These different proclivities for exiting housing assistance would explain why the likelihood of exiting housing assistance is lower in the first year than in the second and third years. Most people probably enter housing assistance planning to stay at least a year. Thus, relatively few exits occur during the first year. Those planning to leave early, however, might do so in the second or third year, leaving behind those who planned to stay long term. Taken together, the results of the life-table analysis and the multivariate analysis suggest duration dependence is not widespread among housing assistance recipients.

The multivariate analyses suggest the availability of alternative housing options, race/ethnicity, disability status, and life-cycle factors—including marital status, age, and the presence of children—are among the most important predictors of exiting housing assistance.

Conclusion and Implications

Concern about dependency has been a driving force in shaping public assistance policy in recent years. The political consensus that has emerged dictates public assistance should be temporary for those willing to help themselves. Housing assistance has not been immune to this trend. To date, information on the nature and extent of dependency among housing assistance recipients has been sketchy. The research presented here begins to fill in some of the missing pieces of the picture of housing assistance dynamics.

If we take an expansive view of dependency, meaning those who remain on housing assistance for long periods of time, this research suggests dependency is widespread among housing assistance recipients. The odds are that the typical housing assistance recipient will have a spell that lasts at least 5 years. A more nuanced and perhaps more appropriate view of dependency, however, would define it as those who lose motivation due to the experience of receiving housing assistance. This more nuanced view would also see an unwillingness to take advantage of other opportunities as indicative of dependency. Under this more nuanced view, the elderly and infirm, although long-term users of housing assistance, would not be considered dependent.

The results presented here are, for the most part, inconsistent with this more nuanced notion of dependency. Little evidence exists of duration dependence and some of the strongest predictors of exiting housing assistance, including vacancy rates and the race and ethnicity of the client, suggest housing assistance serves as a substitute for decent affordable housing that is unavailable in the private market, especially for low-income minorities. The results presented here also show that life-cycle factors such as age, having children, or being married depress the likelihood of exiting housing assistance.

In particular, the elderly are a major group among the long-time users of vouchers. This large group of elderly implies that exiting housing assistance often necessitates a major change in residence, that housing assistance recipients will be governed by the same life-cycle factors that govern residential mobility in general, and that people will likely see a requirement to move as a major disruption in their lives.

The policy implications of these findings are that reforming housing assistance into a short-term program may be more complex than doing the same for welfare. As with the case for welfare recipients, housing assistance recipients are likely to need job readiness training and other human capital investments to compete successfully in the labor market and achieve a modicum of upward mobility. Yet this investment is unlikely to be enough to significantly hasten their exiting housing assistance if other housing opportunities are scarce. Moreover, to the extent that leaving housing assistance requires moving, some households may be reluctant to disrupt their current life patterns. Policymakers will have to take account of these issues if they wish to make short-term housing assistance more of the norm.

Author

Lance Freeman is an assistant professor in the Graduate School of Architecture, Planning, and Preservation at Columbia University. The research reported in this article was supported by the U.S. Department of Housing and Urban Development.

Notes

1. Participation in the Family Self-Sufficiency Program, prior homelessness status, and net family assets are three factors that likely influence exits from housing assistance. Unfortunately, the high number of missing observations for these three variables precluded their inclusion in the multivariate models.
2. Thanks to Mark Shroder of the U.S. Department of Housing and Urban Development for pointing this out to me.
3. Some observations were lost due to missing values.

References

- Allison, Paul D. 1995. *Survival Analysis Using the SAS System*. Cary, NC: SAS Institute.
- Bahchieva, R., and A. Hosier. 2001. "Determinants of Tenure Duration in Public Housing: The Case of New York City," *Journal of Housing Research* 12 (2): 307–348.
- Bane, Mary Jo, and David Ellwood. 1994. *Welfare Realities*. Cambridge: Harvard University Press.
- Deaton, Angus. 1997. *The Analysis of Household Surveys*. Baltimore: The Johns Hopkins University Press.

- Finkel, M., and S.D. Kennedy. 1992. "Racial/Ethnic Difference in Utilization of Section 8 Existing Rental Vouchers and Certificates," *Housing Policy Debate* 3 (2): 463–508.
- Freeman, Lance. 1998. "Interpreting the Dynamics of Public Housing: Cultural and Rational Choice Explanations," *Housing Policy Debate* 9 (2): 323–353.
- Goering, John. 2003. "The Impacts of New Neighborhoods on Poor Families: Evaluating the Policy Implications of the Moving to Opportunity Demonstration," *Economic Policy Review* 9 (2): 113–140.
- Gould Ellen, Ingrid, and Margery A. Turner. 1997. "Does Neighborhood Matter? Assessing Recent Evidence," *Housing Policy Debate* 8 (4): 833–866.
- Hungerford, Thomas L. 1996. "The Dynamics of Housing Assistance Spells," *Journal of Urban Economics* 39 (2): 193–208.
- Husock, Howard. 2002. "Moving Out of Public Housing," *Public Interest* 150: 89–100.
- Katz, M.B. 1990. *The Undeserving Poor: From the War on Poverty to the War on Welfare*. New York: Pantheon.
- Rossi, P.H. 1980. *Why Families Move*. New York: Free Press.
- Shroder, Mark. 2002. "Does Housing Assistance Perversely Affect Self-sufficiency? A Review Essay," *Journal of Housing Economics* 11 (4): 381–417.
- Speare, A. 1974. "Residential Satisfaction as an Intervening Variable in Residential Mobility," *Demography* 11 (2): 173–188.
- Susin, Scott. 1999. "Durations in Subsidized Housing," Working Paper 99–5. New York: New York University Center for Real Estate and Urban Policy.
- Turner, M., et al. 2002. *Discrimination in Metropolitan Housing Markets: National Results from Phase I HDS 2000*. Washington, DC: Urban Institute.
- Wilson, William J. 1987. *The Truly Disadvantaged: The Inner City, The Underclass, and Public Policy*. Chicago: University of Chicago Press.

Additional Readings

- Guo, Guang. 1993. "Event History Methods for Left-Truncated Data," *Sociological Methods* 23: 217–243.
- Jencks, Christopher. 1994. *The Homeless*. Cambridge, MA: Harvard University Press.
- Rohe, William M., and Rachel Garshick Kleit. 1999. "Housing, Welfare Reform, and Self Sufficiency: An Assessment of the Family Self-Sufficiency Program." *Housing Policy Debate* 10 (2): 333–369.

The Effects of Housing Assistance on Income, Earnings, and Employment

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Abstract

Policymakers have started examining the long-term impacts of housing assistance on families. In particular, policymakers want to determine whether assisted housing can act as a barrier or a bridge to economic self-sufficiency. In this article we use a longitudinal data set of households receiving housing assistance and compare their trajectories on three outcomes—income, earnings, and employment—across types of housing programs and household characteristics. Using descriptive and multivariate analyses, we find notable differences in these three outcomes across different housing programs and populations. These findings imply that, while housing assistance need not be an impediment to increasing household income, earnings, and employment rates, program- and household-specific policies and interventions would likely have the most success in helping assisted households achieve economic self-sufficiency.

Background

Housing assistance is a very valuable type of subsidy. Most households must wait for years and go through extensive application and certification procedures to obtain and retain such assistance. After they are accepted into assisted housing programs, many households remain for years. Policymakers have started examining the long-term impacts of housing assistance on families. In particular, policymakers want to determine whether assisted housing can act as a barrier or a bridge to economic self-sufficiency. They want to know whether assisted housing leads to long-term, full-time employment and independence from economic assistance programs such as welfare. While some would point out that housing assistance provides an important level of support and stability for families attempting to raise themselves out of poverty, others would argue that a prolonged presence in assisted housing may create a long-term dependency that saps households of their motivation to find employment. Furthermore, certain housing programs may contribute to the concentration of low-income households, which can create an environment that severely limits opportunities for families.

This study explores some of these issues by measuring the relationship between housing assistance and income, earnings, and employment over time.¹ In particular, we attempted to answer the following questions:

1. What happens to households' earnings and incomes while they are in subsidized housing?
2. Do certain types of households experience greater earning and income increases than other types of households, such as Temporary Assistance for Needy Families (TANF) recipients and employed people?
3. How does income trajectory vary by type of assistance?

These questions suggest a number of plausible theories, namely that income and employment are affected by baseline characteristics (for example, race or ethnicity, age of children, disability status); receipt of housing and cash assistance; location (neighborhood effects, spatial mismatch); and external conditions that change over time (changes in law and policy, economic conditions). To explore these questions further, we conducted descriptive (univariate) and multivariate analyses of publicly assisted households' income, earnings, and employment using a linked, time-series administrative data set provided by the U.S. Department of Housing and Urban Development (HUD). Other data sources were used to provide contextual and explanatory data.

In preparing for this analysis we benefited from a very recent literature review that examined the effects of housing assistance on labor supply, human capital accumulation, family formation, and neighborhood choice (Shroder, 2002). Although our study focuses on labor supply and earnings, the other outcomes are related.

Shroder concludes that the current research indicates mixed and inconclusive impacts of assisted housing on short-term employment effects and insufficient and possibly conflicting impacts on long-term human capital but positive and significant impacts on family formation and neighborhood choice. Shroder also identifies a number of methodological weaknesses in many of the studies, including self-reporting bias, simultaneity bias, and several sources of selection bias. Although simultaneity bias is not an issue when using longitudinal administrative data, our analysis is subject to self-reporting bias (in the survey control group) and several sources of selection bias. We will discuss each of these in turn.

In addition, Shroder points out that any national data set is likely to be vulnerable to omitted variable bias due to differences in local economic conditions and assistance policies and changes in both of these variables over time. We believe we have good sources of data to address economic conditions and cash assistance policies. We are not aware of comparable data on local housing assistance policies that would be compatible with our analysis.²

Overall, we observed an increase in income and earnings for households receiving housing assistance over the period of observation. From 1995 to 2002, income rose an average of 34.1 percent and earnings rose 93.1 percent. The rates of increase varied across the housing programs. Households that experienced the most rapid income and earnings growth participated in the Moderate Rehabilitation Program (Mod Rehab) and received tenant-based assistance (formerly known as vouchers and certificates and now known as the Housing Choice Voucher program). Nevertheless, we attributed much of this variation to differences in the populations served by the programs.

The initial employment rates were highest for households that were in the Below Market Interest Rate (BMIR) program, Rental Assistance Program (RAP), and voucher and certificate programs.³ We observed that households that remained in housing assistance for

longer periods had lower initial employment rates and slower rates of employment increase than households that remained in housing assistance programs for shorter periods of time.

The remainder of this article provides additional details on our results and findings.

Data and Methods

MTCS/TRACS

Our primary research data set is a linked Multifamily Tenant Characteristics System (MTCS)/Tenant Rental Assistance Certification System (TRACS) file from HUD that provides detailed data on individual and household characteristics, income by source, and assisted households' program participation over time. This data set includes observations of assisted households by year, from 1995 to 2002.⁴ The MTCS/TRACS file contains about 29 million records on more than 8 million households that received housing assistance between 1995 and 2002. The forms of housing assistance include public housing, vouchers and certificates, and a variety of project-based programs, including Section 8, Mod Rehab, Rent Supplement, RAP, Section 236, Section 202 Project Rental Assistance Contract (PRAC), Section 811 PRAC, and Section 202/162 PRAC. Using a unique household identifier, HUD has linked data records to make it possible to follow a household through the housing assistance system over time. The data record contains a variety of characteristics, including the type of housing program; the date when the household moved into the current unit; household members' income (and income sources); and household members' race, ethnicity, age, and disability status.

Housing authorities and subsidized housing owners collected household income information—the first outcome of interest to HUD—to certify program eligibility. Household income is reported to HUD annually. Since income in the MTCS/TRACS data was reported for individual household members by income source, we were able to derive the second outcome of interest—total household earnings—by adding up all household members' income from wages and business income.⁵

The third outcome of interest to HUD was the employment rate for households receiving housing assistance. Unfortunately, the MTCS/TRACS data do not contain a simple indicator for household members' employment status nor data on hours worked. Therefore, we devised an employment status indicator based on 50 percent of the annual, full-time minimum wage applicable in the year in question. If the total household earnings were greater than or equal to this amount, we categorized the household as “employed”; otherwise, the household was designated “unemployed.”

In principle, household income should be verified and entered into the administrative tracking systems annually. Nonetheless, we found very few instances in which households had observations in every year during the period covered by the data file. In fact, only about 339,000 households (3.8 percent) had a complete set of observations for all years between 1995 and 2002. This lack of data was partly due to households entering and leaving the housing assistance system at different times but was also due to missing data. Unfortunately, it is very difficult or impossible to consistently distinguish between these two conditions in the data. Although a “move-out code” indicates when a household leaves housing assistance, in practice this information is entered very rarely. Therefore, we did not attempt to distinguish between missing data and exits from the system.

To add usable series for the descriptive analysis, we imputed income and earnings to households that had missing data for year t by taking the average of years $t-1$ and $t+1$. Records with more than one consecutive year of missing data were not imputed. About 1.6 million households (18 percent) had a single year of imputed data; an additional

364,000 households (4 percent) had 2 to 4 years of imputed data. We also made some other simple imputations, such as filling in missing HUD household types based on the elderly or disabled flags the files contained.

Supplemental Controls

Additional control variables for the descriptive and multivariate analysis were created from characteristics provided in the MTCS/TRACS data. We also merged three sets of longitudinal control variables from other sources: state-level welfare policy variables, metropolitan statistical area (MSA) or county-level unemployment rates, and location measures. These data sources, which are described in the next three sections, were used to supplement the household and housing program characteristics available from the MTCS/TRACS data.

Welfare Policy Variables

Because of the significant population overlap between households that receive housing assistance and those that participate in cash welfare programs (Aid to Families with Dependent Children [AFDC], TANF, and Supplemental Security Income [SSI]) and the significant expected effect of welfare policy on labor force participation and income, it is important to control for differences in welfare policy across states and over time whenever earnings or employment is examined.

Welfare policies in most states experienced a great deal of change during the study period. At first, a few individual states received waivers of federal AFDC rules. Later, all states implemented heterogeneous policies using the significant flexibility offered by the TANF block grants that replaced AFDC. As a result, welfare policies that affect benefit levels, the benefit reduction rate, job search and employment requirements, and time limits on welfare spells and lifetime assistance vary by state.

Our approach was to describe differences in welfare policy across states and over time using variables derived from the Welfare Rules Database (Rowe and Roberts, 2004), an Urban Institute project. This database contains welfare policies in effect in each state and the District of Columbia for each year from 1996 through 2000. In discussion with Lynne Fender, author of *Linking State TANF and Related Policies to Outcomes: Preliminary Typologies and Analysis* (2002), we decided to include in the variables the initial earned income disregard, the maximum sanction amount, and whether job search is required for welfare program enrollment (diversion).⁶

Another welfare-derived variable we included was a measure of state caseload decline. Our intent in using this variable was to capture unobserved differences in welfare policy, and perhaps state economic conditions, over time. In essence, the state caseload is a summary variable and is likely to be correlated with welfare policy variables such as time limits, sanctions, and diversion and with local economic variables such local employment rates. In states with rapidly falling caseloads, employment levels among low-income populations are almost certain to be rising⁷ although income may actually decline.

Economic Variables

The primary explanatory economic variable we used was the local unemployment rate, derived from the Bureau of Labor Statistics (BLS) Local Area Unemployment Statistics (Bureau of Labor Statistics, n.d.) series. We expected that the local unemployment rate would be quite important although possibly correlated with welfare caseload decline. We downloaded this data from the BLS and matched it on the MSA/primary metropolitan statistical area level if the housing unit was located in an MSA and at the county level if the housing unit was not.

Location Variables

One research question asked whether income trajectory differed by location. We included location-related variables in both the descriptive analysis and the multivariate analysis, including the census tract poverty rate and whether the unit was located in a center city, in a suburb, or outside an MSA. These variables were derived by matching the 2000 Census tract identifier included in the MTCS/TRACS data to the Urban Institute’s Neighborhood Change Database file (Tatian, 2003), which is derived from decennial census data.

Descriptive Analysis

The primary analysis, which describes differences in earnings and labor force participation among groups of assisted households, is relatively straightforward. Exhibit 1 presents the outcomes of interest: average and cumulative percent change in household income, average and cumulative percent change in household earnings,⁸ and average employment rate from 1995 to 2002. This table was created for the cohort of assisted households that started receiving housing assistance in 1995 and had complete data for the following 7 years. There were 679,190 such households, after imputing the missing data described in the MTCS/TRACS section. By focusing our analyses on the cohort that had complete data over time, we control for the possibility of changes in the composition of households in these programs. Exhibits 2 through 6 summarize trends in the three outcome variables by major housing program and by year.

Exhibit 1

Change in Average Income, Earnings, and Employment Rate for Households in HUD-assisted Housing, 1995–2002

| | No. of Households | Average Income | | | Average Earnings | | | Employment Rate (%) | |
|--------------------------------|-------------------|----------------|--------|---------------|------------------|--------|---------------|---------------------|------|
| | | 1995 | 2002 | Pct. Chg. (%) | 1995 | 2002 | Pct. Chg. (%) | 1995 | 2002 |
| | | | | | | | | | |
| TOTAL | 679,190 | 8,191 | 10,986 | 34.1 | 1,778 | 3,434 | 93.1 | 14.8 | 20.4 |
| Program | | | | | | | | | |
| Section 8 | 300,904 | 8,209 | 10,601 | 29.1 | 1,274 | 2,336 | 83.3 | 11.3 | 14.8 |
| Public housing | 162,653 | 7,951 | 10,961 | 37.8 | 2,001 | 3,869 | 93.4 | 15.7 | 21.7 |
| Certificates | 134,182 | 7,835 | 11,144 | 42.2 | 1,965 | 4,403 | 124.0 | 17.5 | 27.1 |
| Vouchers | 42,845 | 8,145 | 11,739 | 44.1 | 2,130 | 5,108 | 139.8 | 19.1 | 31.0 |
| Sec. 236 | 12,094 | 12,843 | 14,263 | 11.1 | 4,931 | 4,580 | -7.1 | 32.9 | 24.5 |
| Mod Rehab | 9,279 | 6,743 | 10,230 | 51.7 | 1,729 | 4,074 | 135.6 | 16.4 | 26.3 |
| Sec. 202 PRAC ^a | 4,415 | 8,506 | 10,186 | 19.7 | 271 | 208 | -23.0 | 2.8 | 1.5 |
| Rental Assistance Program | 4,269 | 10,252 | 13,075 | 27.5 | 3,593 | 4,953 | 37.8 | 24.0 | 25.7 |
| Rent Supplement | 3,437 | 9,295 | 11,704 | 25.9 | 2,250 | 3,188 | 41.7 | 15.3 | 17.3 |
| Below Market Interest Rate | 2,647 | 18,864 | 22,364 | 18.6 | 13,685 | 14,815 | 8.3 | 67.9 | 54.2 |
| Sec. 202/162 PRAC ^a | 1,332 | 7,753 | 9,501 | 22.5 | 429 | 486 | 13.1 | 3.6 | 3.4 |
| Sec. 811 PRAC ^a | 1,127 | 7,235 | 9,045 | 25.0 | 910 | 1,220 | 34.1 | 7.4 | 8.0 |
| (Missing = 6) | | | | | | | | | |
| Race/Ethnicity | | | | | | | | | |
| Non-Hisp. White | 331,220 | 8,378 | 10,566 | 26.1 | 1,007 | 1,748 | 73.7 | 8.9 | 11.0 |
| Non-Hisp. African Am | 238,788 | 7,788 | 11,272 | 44.7 | 2,521 | 5,053 | 100.4 | 20.8 | 29.9 |
| Non-Hisp. Am. Indian/AK Native | 2,934 | 8,213 | 11,319 | 37.8 | 1,888 | 4,178 | 121.2 | 16.4 | 24.2 |
| Non-Hisp. Asian/Pac. Islander | 21,468 | 9,773 | 12,694 | 29.9 | 1,929 | 4,192 | 117.3 | 15.3 | 22.9 |
| Hispanic | 83,667 | 8,201 | 11,374 | 38.7 | 2,555 | 4,963 | 94.3 | 19.3 | 27.5 |
| (Missing = 1,113) | | | | | | | | | |

Exhibit 1

Change in Average Income, Earnings, and Employment Rate for Households in HUD-assisted Housing, 1995–2002 (continued)

| | No. of Households | Average Income | | | Average Earnings | | | Employment Rate (%) | |
|-------------------------------------|-------------------|----------------|--------|---------------|------------------|--------|---------------|---------------------|------|
| | | 1995 | 2002 | Pct. Chg. (%) | 1995 | 2002 | Pct. Chg. (%) | 1995 | 2002 |
| Age of Household Head | | | | | | | | | |
| 18–21 years | 16,234 | 4,796 | 10,458 | 118.0 | 1,438 | 6,447 | 348.4 | 15.3 | 40.9 |
| 22–25 years | 33,427 | 6,221 | 12,047 | 93.7 | 2,227 | 7,580 | 240.4 | 21.2 | 45.8 |
| 26–35 years | 112,553 | 7,821 | 12,670 | 62.0 | 2,985 | 7,523 | 152.1 | 25.6 | 44.0 |
| 36–51 years | 157,198 | 8,435 | 11,391 | 35.0 | 3,008 | 5,264 | 75.0 | 23.7 | 30.2 |
| 52–61 years | 76,886 | 8,083 | 10,018 | 23.9 | 2,208 | 1,817 | –17.7 | 16.4 | 10.3 |
| 62+ years | 276,619 | 8,668 | 10,227 | 18.0 | 344 | 208 | –39.6 | 3.0 | 1.4 |
| (Missing = 6,273) | | | | | | | | | |
| Working-age Adults Present | | | | | | | | | |
| Nonelderly household | 265,322 | 8,504 | 10,084 | 18.6 | 248 | 173 | –30.2 | 2.3 | 1.2 |
| 1 | 324,169 | 7,261 | 10,958 | 50.9 | 2,082 | 4,880 | 134.4 | 18.4 | 29.8 |
| 2 | 72,762 | 10,207 | 13,373 | 31.0 | 4,591 | 6,978 | 52.0 | 34.6 | 38.1 |
| 3 | 12,083 | 12,006 | 14,757 | 22.9 | 6,075 | 7,968 | 31.2 | 40.7 | 39.6 |
| 4 | 2,864 | 14,216 | 17,358 | 22.1 | 8,155 | 10,294 | 26.2 | 46.7 | 43.8 |
| 5 | 537 | 14,845 | 17,765 | 19.7 | 8,690 | 11,226 | 29.2 | 47.2 | 44.6 |
| 6 or more | 529 | 18,404 | 24,217 | 31.6 | 12,230 | 18,308 | 49.7 | 54.4 | 53.4 |
| (Missing = 924) | | | | | | | | | |
| Household Type | | | | | | | | | |
| Elderly, no children | 273,516 | 8,648 | 10,217 | 18.1 | 331 | 194 | –41.3 | 2.8 | 1.3 |
| Disabled, no children | 113,772 | 7,424 | 9,392 | 26.5 | 1,058 | 1,551 | 46.6 | 7.3 | 7.7 |
| Other, no children | 56,037 | 8,158 | 11,161 | 36.8 | 4,286 | 5,102 | 19.0 | 33.5 | 29.6 |
| Elderly, with children | 6,279 | 10,316 | 11,386 | 10.4 | 1,580 | 1,600 | 1.3 | 12.5 | 10.1 |
| Disabled, with children | 24,383 | 10,147 | 11,267 | 11.0 | 606 | 1,948 | 221.6 | 5.7 | 12.6 |
| Other, with children | 204,279 | 7,720 | 12,808 | 65.9 | 3,354 | 8,123 | 142.2 | 28.3 | 47.8 |
| (Missing = 924) | | | | | | | | | |
| Disabled Household | | | | | | | | | |
| Nondisabled | 519,524 | 8,113 | 11,224 | 38.4 | 2,009 | 4,003 | 99.3 | 17.0 | 24.0 |
| Disabled | 138,192 | 7,905 | 9,724 | 23.0 | 978 | 1,623 | 65.9 | 7.0 | 8.6 |
| (Missing = 21,474) | | | | | | | | | |
| Elderly Household | | | | | | | | | |
| Nonelderly | 392,556 | 7,818 | 11,517 | 47.3 | 2,740 | 5,596 | 104.2 | 22.5 | 32.8 |
| Elderly | 279,795 | 8,686 | 10,243 | 17.9 | 359 | 226 | –37.0 | 3.1 | 1.5 |
| (Missing = 6,839) | | | | | | | | | |
| Age of Youngest Child | | | | | | | | | |
| 0–3 years | 87,927 | 7,260 | 12,481 | 71.9 | 2,542 | 7,494 | 194.8 | 22.2 | 45.0 |
| 4–5 years | 36,455 | 8,041 | 13,116 | 63.1 | 3,169 | 7,874 | 148.5 | 27.1 | 46.5 |
| 6–12 years | 78,764 | 8,618 | 12,920 | 49.9 | 3,438 | 7,491 | 117.9 | 28.8 | 44.0 |
| 13–17 years | 31,795 | 8,770 | 11,621 | 32.5 | 3,328 | 6,077 | 82.6 | 27.4 | 35.4 |
| (Missing/not applicable = 444,249) | | | | | | | | | |
| Spouse/Co-head Present | | | | | | | | | |
| No | 620,516 | 7,843 | 10,633 | 35.6 | 1,574 | 3,226 | 105.0 | 13.6 | 19.6 |
| Yes | 58,674 | 11,880 | 14,720 | 23.9 | 3,963 | 5,654 | 42.7 | 27.9 | 29.1 |
| Spouse/Co-head With Earnings | | | | | | | | | |
| No | 675,186 | 8,155 | 10,952 | 34.3 | 1,720 | 3,388 | 97.0 | 14.4 | 20.2 |
| Yes | 4,004 | 14,253 | 16,716 | 17.3 | 11,253 | 10,910 | –3.0 | 78.4 | 54.5 |

Exhibit 1

Change in Average Income, Earnings, and Employment Rate for Households in HUD-assisted Housing, 1995–2002 (continued)

| | No. of Households | Average Income | | | Average Earnings | | | Employment Rate (%) | |
|------------------------------------|-------------------|----------------|--------|---------------|------------------|--------|---------------|---------------------|------|
| | | 1995 | 2002 | Pct. Chg. (%) | 1995 | 2002 | Pct. Chg. (%) | 1995 | 2002 |
| Household Income | | | | | | | | | |
| Lowest decile | 52,953 | 2,317 | 8,066 | 248.1 | 235 | 4,028 | 1,612 | 0.3 | 28.1 |
| 2nd decile | 57,155 | 4,268 | 9,778 | 129.1 | 522 | 4,848 | 827.8 | 5.7 | 32.2 |
| 3rd decile | 96,548 | 5,544 | 7,936 | 43.1 | 233 | 1,399 | 501.2 | 3.8 | 9.2 |
| 4th decile | 65,297 | 6,012 | 8,713 | 44.9 | 377 | 1,934 | 413.3 | 5.4 | 12.5 |
| 5th decile | 81,526 | 6,825 | 9,541 | 39.8 | 566 | 2,274 | 302.0 | 7.6 | 14.4 |
| 6th decile | 79,439 | 7,769 | 10,209 | 31.4 | 763 | 1,999 | 162.1 | 9.4 | 12.9 |
| 7th decile | 71,749 | 9,009 | 11,479 | 27.4 | 1,487 | 2,889 | 94.3 | 16.8 | 18.5 |
| 8th decile | 67,980 | 10,700 | 12,855 | 20.1 | 2,368 | 3,451 | 45.7 | 24.5 | 21.4 |
| 9th decile | 60,707 | 13,222 | 14,971 | 13.2 | 4,036 | 4,781 | 18.5 | 35.4 | 27.2 |
| Highest decile | 45,836 | 20,050 | 20,625 | 2.9 | 11,365 | 10,724 | -5.6 | 63.0 | 44.3 |
| Welfare Income Present | | | | | | | | | |
| No | 526,309 | 8,772 | 10,895 | 24.2 | 2,156 | 2,726 | 26.4 | 17.8 | 15.7 |
| Yes | 152,881 | 6,191 | 11,301 | 82.5 | 541 | 5,753 | 963.7 | 5.0 | 35.7 |
| SSI Present | | | | | | | | | |
| No | 610,806 | 8,180 | 11,118 | 35.9 | 1,924 | 3,647 | 89.6 | 15.9 | 21.6 |
| Yes | 68,384 | 8,291 | 9,810 | 18.3 | 451 | 1,491 | 230.4 | 4.0 | 9.6 |
| SS/Pension Income Present | | | | | | | | | |
| No | 304,645 | 7,853 | 12,055 | 53.5 | 3,463 | 6,722 | 94.1 | 27.9 | 38.8 |
| Yes | 374,545 | 8,467 | 10,116 | 19.5 | 298 | 545 | 82.8 | 2.7 | 3.6 |
| Homeless at Admission | | | | | | | | | |
| No | 670,773 | 8,205 | 10,987 | 33.9 | 1,781 | 3,422 | 92.1 | 14.8 | 20.4 |
| Yes | 8,417 | 7,075 | 10,880 | 53.8 | 1,547 | 4,340 | 180.5 | 14.2 | 26.6 |
| Tract Poverty Rate | | | | | | | | | |
| 0–10% | 114,598 | 9,151 | 11,693 | 27.8 | 1,500 | 2,666 | 77.7 | 12.2 | 15.1 |
| 11–20% | 164,136 | 8,236 | 10,833 | 31.5 | 1,554 | 2,882 | 85.5 | 13.4 | 17.5 |
| 21–30% | 118,122 | 7,972 | 10,795 | 35.4 | 1,793 | 3,510 | 95.7 | 15.0 | 21.0 |
| 31–40% | 78,376 | 7,916 | 10,828 | 36.8 | 2,007 | 3,862 | 92.5 | 16.4 | 23.0 |
| 41–50% | 46,221 | 8,110 | 11,000 | 35.6 | 2,201 | 4,094 | 86.0 | 17.0 | 24.0 |
| 51% or more (Missing = 123,727) | 34,010 | 7,929 | 11,268 | 42.1 | 2,397 | 4,782 | 99.5 | 18.4 | 27.3 |
| Tract Location | | | | | | | | | |
| Central city | 301,999 | 8,329 | 11,246 | 35.0 | 1,993 | 3,812 | 91.2 | 15.8 | 21.9 |
| Suburbs | 159,163 | 8,774 | 11,545 | 31.6 | 1,679 | 3,177 | 89.2 | 14.0 | 18.8 |
| Nonmetro | 218,028 | 7,575 | 10,218 | 34.9 | 1,554 | 3,099 | 99.4 | 14.0 | 19.7 |

Notes: Income and earnings are in nominal dollars and are not adjusted for inflation. Earnings are the sum of all household member wages and business income. Employment status is based on 50 percent of the annual, full-time minimum wage applicable in the year in question. If total household earnings were greater than or equal to this amount, the household was designated as “employed”; otherwise, the household was “unemployed.” For more information on missing cases, please contact the authors.

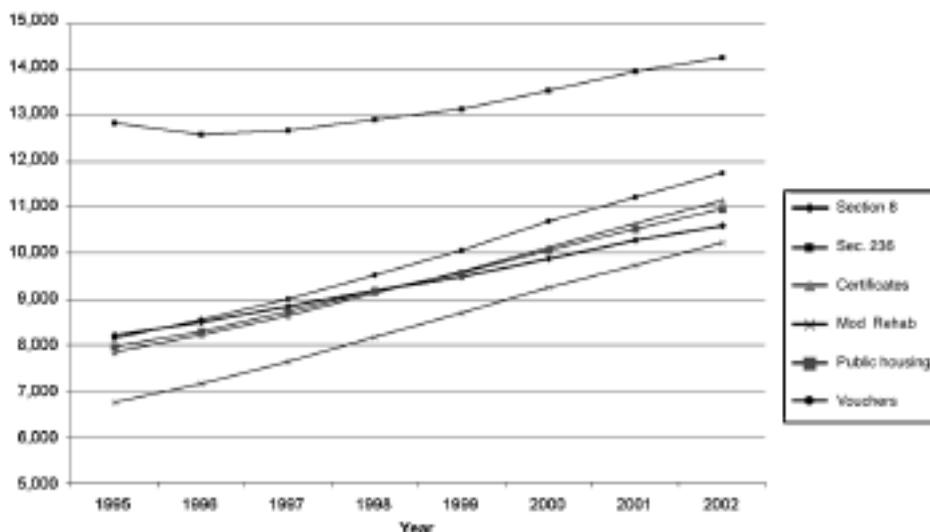
^a PRAC = Project Rental Assistance Contract.

Source: U.S. Department of Urban Development Multifamily Tenant Characteristics System/Tenant Rental Assistance Certification System longitudinal data compiled by the Urban Institute

Note that the construction of the cohort for the descriptive analysis was based not on the start of housing assistance but on the presence of data in each of the included years. We chose this time specification to avoid dropping households with pre-1995 admission or move-in dates (about 36 percent) and a substantial portion of households with missing admission or move-in dates (about 25 percent). Clearly, this approach limits our ability to isolate the effect of time spent in assisted housing. In any case, since the descriptive analysis cannot isolate the independent effects of various influences, we thought this was a worthwhile tradeoff. The multivariate analysis, described in the Multivariate Analysis section, uses the most recent admission date for MTCS households and the most recent move-in date for TRACS households as the initial period (t_0). Since households get new dates when they change programs (for example, switch from public housing to vouchers) or units, these dates are not a perfect measure of assisted time. The multivariate analysis does have the advantage of using the most current program. As a result, the earnings of a household with a voucher are not misassociated with the household's prior public housing because it would be in the descriptive series, which are based on baseline characteristics.

Exhibit 2

Average Nominal Household Income by Housing Program for Households in HUD-assisted Housing, 1995–2002

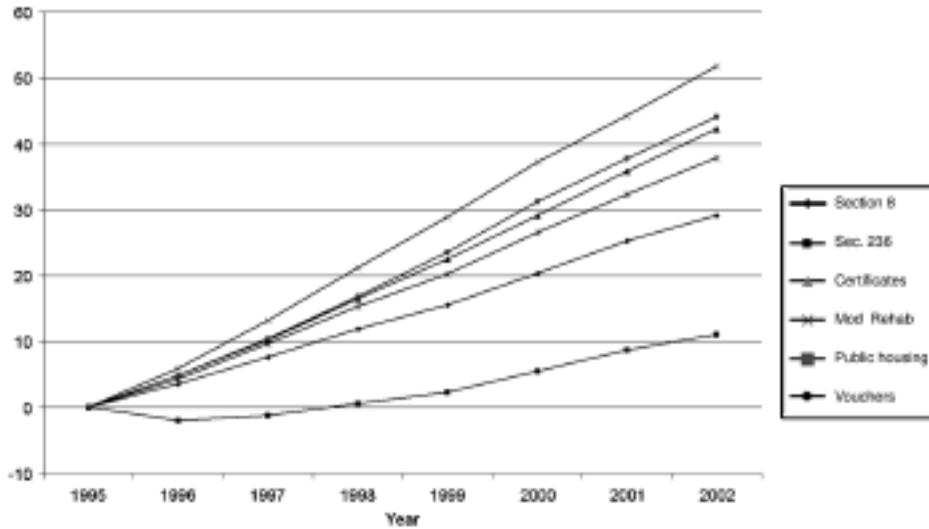


Note: N = 679,184.

Source: U.S. Department of Urban Development Multifamily Tenant Characteristics System/Tenant Rental Assistance Certification System longitudinal data compiled by the Urban Institute

Exhibit 3

Cumulative Percent Change in Nominal Household Income by Housing Program for Households in HUD-assisted Housing, 1995–2002

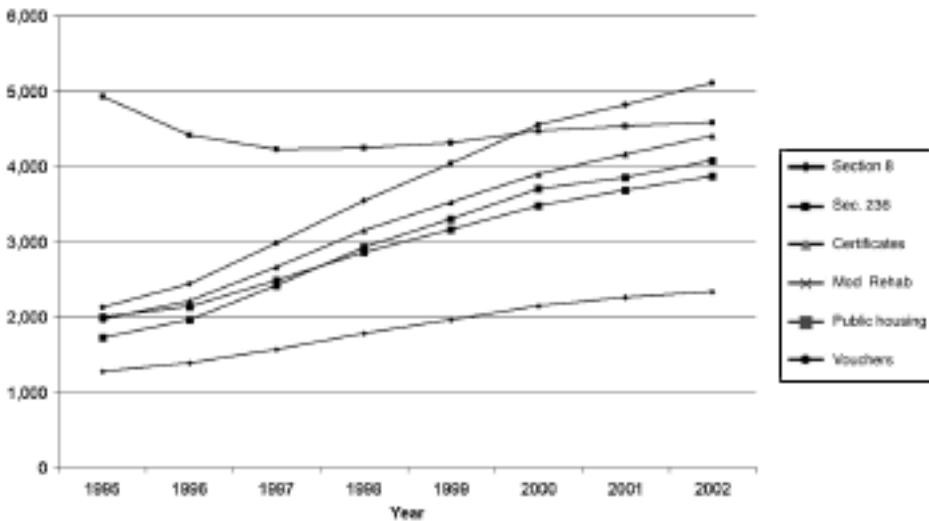


Note: N = 679,184.

Source: U.S. Department of Urban Development Multifamily Tenant Characteristics System/Tenant Rental Assistance Certification System longitudinal data compiled by the Urban Institute

Exhibit 4

Average Nominal Household Earnings by Housing Program for Households in HUD-assisted Housing, 1995–2002

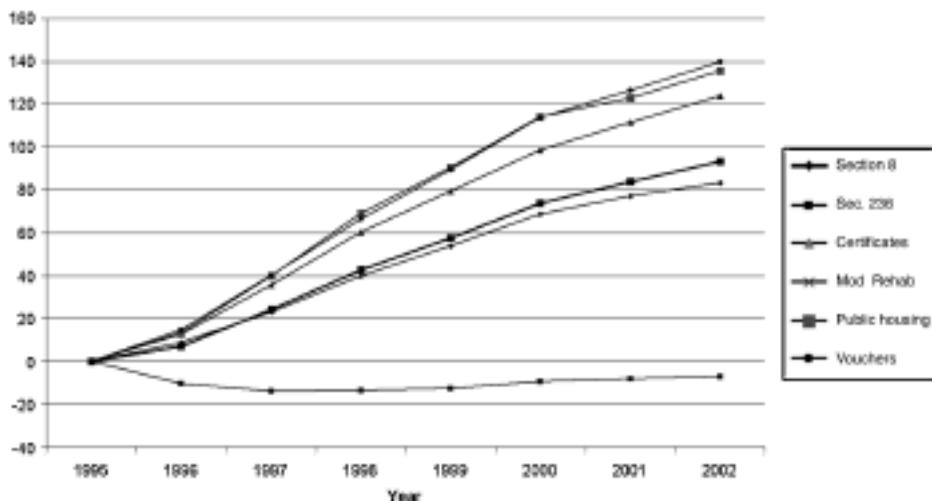


Notes: N = 679,184. Earnings are the sum of all household members' wages and business income.

Source: U.S. Department of Urban Development Multifamily Tenant Characteristics System/Tenant Rental Assistance Certification System longitudinal data compiled by the Urban Institute

Exhibit 5

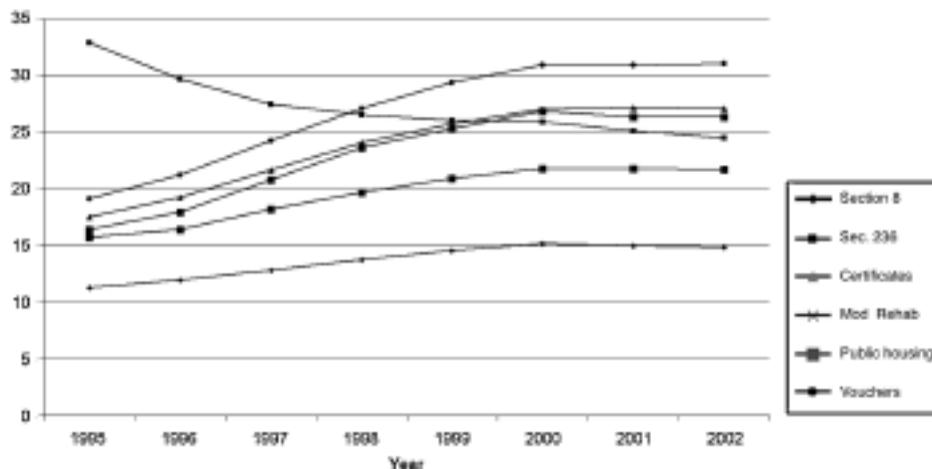
Cumulative Percent Change in Nominal Household Earnings by Housing Program for Households in HUD-assisted Housing, 1995–2002



Notes: N = 679,184. Earnings are the sum of all household members' wages and business income. Source: U.S. Department of Urban Development Multifamily Tenant Characteristics System/Tenant Rental Assistance Certification System longitudinal data compiled by the Urban Institute

Exhibit 6

Percent Employed by Housing Program for Households in HUD-assisted Housing, 1995–2002



Notes: N = 679,184. Employment status is based on 50 percent of the annual, full-time minimum wage applicable in the year in question. If total household earnings were greater than or equal to this amount, the household was designated as “employed”; otherwise, the household was “unemployed.” Source: U.S. Department of Urban Development Multifamily Tenant Characteristics System/Tenant Rental Assistance Certification System longitudinal data compiled by the Urban Institute

Income and Earnings

The average income for households observed from 1995 to 2002 rose 34.1 percent (from \$8,191 in 1995 to \$10,986 in 2002).⁹ The steepest income increases were for households that participated in Mod Rehab (51.7 percent income growth from 1995 to 2002), received vouchers (44.1 percent income growth), and received certificates (42.2 percent income growth). Households participating in Section 236 (which had the second highest incomes among the assisted housing population after the BMIR program) and project-based Section 8 programs experienced the lowest 1995-to-2002 income growth rates at 11.1 percent and 29.1 percent, respectively.

Average household earnings followed a similar pattern but with substantially higher growth rates. Average earnings of the 1995-to-2002 cohort rose 93.1 percent, from \$1,778 in 1995 to \$3,434 in 2002. As shown in exhibits 4 and 5, the highest 1995 average earnings for households participating in the largest housing programs were for Section 236 households, but the level of earnings for these households actually declined from \$4,931 to \$4,580 in 2002 (a loss of 7 percent). Households in other programs all experienced growth in earnings. The largest earnings growth was for voucher recipients (140 percent), Mod Rehab participants (136 percent), and certificate recipients (124 percent).

Examining income differences by baseline household characteristics, non-Hispanic Asian/Pacific Islander households had the highest average income in 1995 (\$9,773).¹⁰ Next highest were non-Hispanic White households (\$8,378), followed by non-Hispanic American Indian/Alaskan Native households (\$8,213), then Hispanic households (\$8,201), and non-Hispanic African-American households (\$7,788). African Americans had the largest cumulative income growth between 1995 and 2002 (44.7 percent). White households and Asian/Pacific Islanders had the lowest cumulative income growth at 26.1 and 29.9 percent, respectively.

Hispanic and non-Hispanic African-American households had the highest average earnings in 1995 at \$2,555 and \$2,521, respectively. Non-Hispanic White households had the lowest average earnings in 1995 at \$1,007. Among all racial/ethnic groups, Non-Hispanic American Indian/Alaskan Native households had the fastest 1995-to-2002 earnings growth rate (121 percent). Hispanics and African Americans had the slowest growth in earnings, at 94 and 100 percent, respectively.

As might be expected, income and earnings trajectories were age dependent; 1995 income and 2002 income for remaining households rose as the ages of the household heads increased. The income trajectory slope flattens with the starting age of the household head, however, ranging from an 118-percent cumulative increase for household heads aged 18 to 21 to an 18-percent change for those aged 62 and over in 1995. The pattern for earnings is understandably different, with average earnings rising as the age of household heads reached 36 to 51 years (\$3,008 average household earnings in 1995), and then dropped sharply for household heads aged 62 and over (\$344 in 1995). Younger households had the fastest growth in earnings; 1995-to-2002 earnings growth was 348 percent for households with household heads 18 to 21 years old.

Although households with more than one working-age adult had higher income and earnings, the effect is not directly multiplicative. That is, a household with two working-age adults does not have twice as much income as one with only one adult. Nor is there a perfect pattern to the income trajectories; single-adult households had the highest 1995-to-2002 income growth at 50.9 percent. Income growth tended to decline with the number of adults in a household, but in a nonlinear way. There were varying drops in income growth from an additional adult and an increase in income growth between households with five and six adults (a small number of households). A similar pattern was generally observed

for earnings. The fastest growth in earnings (134 percent from 1995 to 2002) was for households with a single working-age adult. The earnings growth rate dropped to 26.2 percent for households with four working-age adults. It increased, however, to 29.2 percent for households with five working-age adults and 49.7 percent for households with six working-age adults.

HUD household types, which mix the presence of children with elderly and disability status, show a mixed pattern regarding the presence of children and income trajectory. Elderly and disabled households with children had somewhat higher income levels but lower income growth than those without children. Among nonelderly and nondisabled households (labeled “other” in the exhibits), those with children had lower initial incomes but much higher income growth. Among those 1995 families with children who were still assisted in 2002, income had risen by an average of 66 percent and earnings by 142 percent. This rate compares to 36.8 percent income growth and 19.0 percent earnings growth for those households without children (the fourth-highest earnings growth rate). Disabled households with children had the largest growth in earnings, at 222 percent. It is unclear whether the higher earnings pattern for families with children is an age effect, as household heads and their spouses mature and gain skills and experience, or whether it might be driven by welfare reform pushing recipients into work.

The age of a household’s youngest child is a characteristic closely related to the presence of children and the age of the household head; we expected the youngest child’s age to have a significant effect on income and employment. The older a family’s youngest child is, the higher income and earnings were in 1995, but the lower the income and earnings growth rate was through 2002. The average 1995 income ranged from \$7,260 for households with a youngest child less than 3 years old to \$8,770 for households with a youngest child 13 to 17 years old. The range for earnings was \$2,524 to \$3,328, respectively.

The presence of a spouse or co-head of the household, especially one with earnings, raised average income and average earnings, although as with the presence of other working-age adults in a household, it does not double them. Moreover, single household heads in the 1995-to-2002 cohort had steeper income and earnings growth rates.

Households with welfare income in 1995 had a lower starting income but much higher income growth, 82.5 percent by 2002, compared to 24.2 percent income growth for non-welfare households. Income growth was so great, in fact, that by 2002 households with welfare in the base year had surpassed those without welfare in average income. (The multivariate analysis will be able to measure this effect while controlling for the age of the household head and the age of youngest child; these variables are also strong predictors of a steep income and earnings trajectory.) At 96.4 percent, earnings growth was dramatically higher for welfare families, compared to 26.4 percent for nonwelfare families. Welfare families started out with much lower earnings (\$542), however, compared to nonwelfare families’ initial earnings (\$2,156).

Households with SSI or Social Security/pension income had slightly higher average incomes in 1995, but their income growth rates were much slower. As a result, households with these income sources had lower average incomes by 2002 than those without such sources. In contrast, earnings for households with SSI or Social Security/pension income were much lower than those without such income sources, but the growth in earnings was much higher for households with SSI or Social Security/pension income.

The household income level generally declined as the household’s census tract poverty rate rose. Income declined from \$9,151 (in 1995) for households living in tracts with less than 10 percent poverty to \$7,929 for households in tracts with 50 percent poverty or higher.¹¹ The opposite pattern was observed for earnings, however. Housing-assisted

households living in high-poverty tracts had higher earnings than did those in low-poverty tracts. Average earnings increased from \$1,500 for households living in tracts with less than 10 percent poverty to \$2,397 for households in tracts with 50 percent poverty or higher.

Somewhat surprisingly, a household's location in a central city, suburb, or nonmetro area did not seem to have a large effect on income or earnings, average levels or growth rates. The average income in 1995 varied from \$8,774 in suburban tracts to \$8,329 in central city tracts and \$7,575 in nonmetro tracts. Income growth rates for central cities and nonmetro areas were virtually identical, 35.0 and 34.9 percent, respectively. The slowest income growth was in the suburbs (31.6 percent). The highest earnings levels were in central cities (\$1,993) followed by the suburban (\$1,679) and nonmetro tracts (\$1,554). Earnings growth was fastest in nonmetro areas (99.4 percent from 1995 to 2002), followed by central cities (91.2 percent) and suburban areas (89.2 percent).

Employment Rates

Households that entered assisted housing in 1995 and were still observed in assisted housing in 2002 had average employment rates that increased from 14.8 to 20.4 percent during this period. Employment rates varied across housing programs. The highest average employment rates among the larger housing programs were for households in the Section 236 program. Average employment levels for Section 236 households declined from 32.9 percent to 24.5 percent between 1995 and 2002.

Employment rates in 1995 ranged from 10 to 20 percent among households participating in the five remaining large housing programs. Certificate and voucher households had the highest employment rates of this group at 17.5 and 19.1 percent, respectively. Households living in Section 8 project-based units had the lowest average employment rate (11.3 percent).

Except for Section 236 participants, average employment rates for households participating in other housing programs rose from 1995 to 2000 and then leveled off. The steepest employment rate rise was for households in the voucher and Mod Rehab programs, which increased by 11.9 and 9.9 percentage points, respectively. The rise was flattest for the Section 8 project-based households; the employment rate increased by only 3.5 percentage points from 1995 to 2002.

Non-Hispanic White households had the lowest employment rates among all racial/ethnic groups. Employment rates for Non-Hispanic White households started at 8.9 percent in 1995 and rose to 11.0 percent by 2002. Non-Hispanic African-American households and Hispanic households almost doubled the 1995 employment rates of White households at 20.8 and 19.3 percent, respectively. Non-Hispanic American Indian/Alaska Native and Asian/Pacific Islander households had the lowest employment rates after White households, at 16.4 and 15.3 percent, respectively.

Employment rates rose as the age of the household head reached 26 to 35 years but fell after that point. In 1995, employment rates for households with household heads aged 18 to 21, 26 to 35, and 62 or older were 15.3 percent, 25.6 percent, and 3.0 percent, respectively. Employment rates for all age groups up to 51 years old increased throughout the observation period except for two older groups—52 to 61 years and 62 years and older—in which employment rates declined over time. Employment rates increased with the presence of more working-age adults in the household. This increase, however, is largely an artifact of our constructed employment measure, which is based on an earnings-level threshold. With more wage-earning adults present, it is more likely that a household will reach the threshold. Similarly, households with spouses or co-heads of the household present or households that have earnings had higher employment rates than those without spouses or co-heads of the household.

Disability status had a negative effect on employment rates. Disabled households had a 1995 employment rate of 7.0 percent, less than half of the employment rate for nondisabled households, which was 17.0 percent. The difference in employment rate widened over time to 8.6 percent for disabled households and 24.0 percent for nondisabled households.

Families with children generally had lower employment rates than those without children (28.3 percent for the former versus 33.5 percent for the latter). Although average employment rates for households without children declined over time, employment rates for households with children rose. By 2002, the employment rate for households with children was 47.8 percent, higher than households without children, which was 29.6 percent.

As might be expected, households with higher income levels also had higher employment rates. Households in the lowest income decile in 1995 had an employment rate of only 0.3 percent, while those in the highest decile had an average employment rate of 63.0 percent. Employment rates for the lower income groups rose through 2002, however, while employment rates for households in the top three deciles declined over the same period.

Households with welfare, SSI or Social Security/pension income had lower employment rates than those without such income sources. Households with welfare income in 1995 had average employment rates less than one-third of those not receiving welfare. Over time, however, the employment rates for these households rose to more than double that of the nonwelfare group. Throughout the observation period, employment rates for households with SSI or Social Security/pension income remained lower than rates for other households.

Being homeless at the time of housing assistance admission seemed to make no difference in employment status. The initial employment rates for homeless and nonhomeless households were virtually identical, 14.2 percent and 14.8 percent, respectively. Over time, the formerly homeless households increased their employment rate to 26.6 percent, higher than the 20.4-percent rate for nonhomeless households. Households living in census tracts with higher poverty rates had higher employment rates than those living in lower poverty tracts. Households in the tracts with the most severe concentrations of poverty (50 percent or more) had an employment rate of 18.4 percent in 1995. Those in very low-poverty tracts (less than 10 percent) had an employment rate of only 12.2 percent.

Central city households had slightly higher employment rates in 1995 (15.8 percent) than households in the suburbs or nonmetro areas (14.0 percent for each). By the end of the observation period, the employment rate for suburban households (18.8 percent) fell behind the rate for nonmetro households (19.7 percent). The employment rate for central city households increased to 21.9 percent.

Multivariate Analysis

To identify the separate influences of observed variables, we used a series of linear regression models to model household income and earnings as a function of time since program entry (t) and household characteristics. Probability of employment was also modeled using logistic (logit) regressions.¹² For each outcome, we ran the following specifications:

1. All variables except transfer income (welfare, SSI, or Social Security/pension income) with no interaction terms.
2. Specification 1 plus interactions of t with all remaining explanatory variables.
3. Specification 2 plus presence of transfer income (welfare, SSI, or Social Security/pension income) and their interactions with t .

To simplify the specification and interpretation of the models, we organized HUD housing programs into four categories: public housing, Section 8 site-based assistance, other site-based programs, and vouchers and certificates. We omitted the public housing category in our model specifications; thus, all housing program effects are measured relative to this population.

Although we expected that presence of transfer income was an important predictor, we left it out until specification 3 because it is endogenous to income. As expected, most terms in most models were highly statistically significant, as were the F values. The high levels of significance are simply an effect of the very large size of the MTCS/TRACS data set, but it means that we will generally not need to discuss statistical significance and can focus on the coefficients. Because linear and logistic regressions cannot employ cases with missing data, approximately 11 million of the 29 million MTCS/TRACS observations were deleted, or just more than one-third. Note, however, that these deletions includes the 25 percent of households that did not have move-in dates in the file. Regression results are summarized in exhibits 7 through 9.

Exhibit 7

Results of Linear Regression of Household Characteristics on Household Income (Nominal \$ per Year)

| | Regression Coefficients | | |
|---|-------------------------|--------------|--------------|
| | Model 1 | Model 2 | Model 3 |
| R² | 0.1700 | 0.1746 | 0.2310 |
| Adjusted R² | 0.1700 | 0.1746 | 0.2310 |
| Independent Variable | | | |
| Intercept | 6859.31 *** | 6306.98 *** | 6907.47 *** |
| Years in program | 12.08 *** | 129.73 *** | 116.53 *** |
| Program: Section 8 site-based | -178.32 *** | -193.49 *** | -332.79 |
| Program: Other site-based | 3297.42 *** | 3586.97 *** | 3213.45 *** |
| Program: Certificates/vouchers | -69.65 *** | 196.52 *** | 232.31 *** |
| African-American household head | -49.21 *** | -44.37 *** | 31.43 *** |
| American Indian household head | -517.70 *** | -647.45 *** | -361.99 *** |
| Asian household head | 70.19 *** | 81.93 *** | 731.27 *** |
| Hispanic household head | 82.28 *** | 264.40 *** | 360.39 *** |
| Disabled | -1587.20 *** | -1405.19 *** | -1279.31 *** |
| Household head aged 22–25 | 204.85 *** | 400.84 *** | 267.15 *** |
| Household head aged 26–35 | 1679.73 *** | 1868.87 *** | 1566.12 *** |
| Household head aged 36–51 | 1872.33 *** | 2032.31 *** | 1718.96 *** |
| Household head aged 52–61 | 1782.39 *** | 1872.28 *** | 1501.20 *** |
| Household head aged 62 plus | 3388.25 *** | 3683.99 *** | 3049.20 *** |
| Youngest child aged 0–3 | -136.57 *** | 103.79 *** | 1445.76 *** |
| Youngest child aged 4–5 | 784.65 *** | 957.86 *** | 2073.43 *** |
| Youngest child aged 6–12 | 1225.18 *** | 1355.30 *** | 2351.02 *** |
| Youngest child aged 13–17 | 968.67 *** | 1046.39 *** | 1893.08 *** |
| Spouse or co-head with earnings present | 5784.99 *** | 5725.18 *** | 5125.64 *** |
| Spouse or co-head present | 1796.33 *** | 1768.13 *** | 1439.58 *** |
| Working-age adults present | 1956.60 *** | 1867.89 *** | 1948.05 *** |
| Social Security/pension income present | | | 661.94 *** |
| SSI present | | | -728.33 *** |
| Welfare income present | | | -3946.93 *** |
| Tract poverty rate | -46.17 *** | -46.31 *** | -38.41 *** |
| Local unemployment rate | -13.73 *** | -14.23 *** | -5.01 *** |
| Suburbs | 71.36 *** | 94.94 *** | 45.20 *** |
| Nonmetro | -1451.77 *** | -1400.78 *** | -1512.24 *** |
| TANF caseload change since 1993 | 2324.97 *** | 2281.25 *** | 1867.04 *** |
| TANF worst sanction = case closure | -683.79 *** | -620.26 *** | -679.43 *** |
| TANF sanction length | -4.65 *** | -2.28 *** | -4.25 *** |
| TANF initial earned income disregard (\$) | -1.50 *** | -1.35 *** | -1.50 *** |
| TANF initial earned income disregard (%) | -2.59 *** | -2.17 *** | -3.04 *** |
| TANF job search required | -286.92 *** | -219.59 *** | -288.80 *** |

Exhibit 7**Results of Linear Regression of Household Characteristics on Household Income
(Nominal \$ per Year) (continued)**

| | Regression Coefficients | | |
|---|-------------------------|------------|------------|
| | Model 1 | Model 2 | Model 3 |
| Interaction Terms | | | |
| Years in Program | | | |
| Program: Section 8 site-based | | 8.13 *** | 3.47 *** |
| Program: Other site-based | | -48.34 *** | -41.63 *** |
| Program: Certificates/vouchers | | -54.16 *** | -47.06 *** |
| African-American household head | | -5.16 *** | -2.72 *** |
| American Indian household head | | 53.55 *** | 53.95 *** |
| Asian household head | | -3.03 ** | -10.67 *** |
| Hispanic household head | | -35.75 *** | -30.10 *** |
| Disabled | | -19.17 *** | -10.47 *** |
| Household head aged 22–25 | | -55.19 *** | -50.57 *** |
| Household head aged 26–35 | | -57.61 *** | -53.33 *** |
| Household head aged 36–51 | | -57.12 *** | -51.35 *** |
| Household head aged 52–61 | | -52.23 *** | -43.33 *** |
| Household head aged 62 plus | | -76.69 *** | -59.53 *** |
| Youngest child aged 0–3 | | -23.14 *** | -23.09 *** |
| Youngest child aged 4–5 | | -16.11 *** | -15.94 *** |
| Youngest child aged 6–12 | | -11.39 *** | -12.53 *** |
| Youngest child aged 13–17 | | -6.66 *** | -7.83 *** |
| Spouse or co-head with earnings present | | 10.46 *** | 6.20 *** |
| Spouse or co-head present | | 10.44 *** | 13.15 *** |
| Working-age adults present | | 14.16 *** | 14.32 *** |
| Social Security/pension income present | | | -9.56 *** |
| SSI present | | | -14.32 *** |
| Welfare income present | | | -1.84 *** |
| Tract poverty rate | | -0.04 *** | -0.12 *** |
| Local unemployment rate | | -0.93 *** | -0.78 *** |
| Suburbs | | -3.74 *** | -4.58 *** |
| Nonmetro | | 0.42 | 2.65 *** |
| TANF caseload change since 1993 | | 9.92 *** | 21.57 *** |
| TANF worst sanction = case closure | | -10.67 *** | -10.30 *** |
| TANF sanction length | | -0.49 *** | -0.35 *** |
| TANF initial earned income disregard (\$) | | -0.03 *** | -0.03 *** |
| TANF initial earned income disregard (%) | | -0.08 *** | -0.06 *** |
| TANF job search required | | -13.03 *** | -14.05 *** |

Notes: N = 17,948,607. Outcomes are in nominal dollars, not adjusted for inflation.

Statistically significant at: 0.05 * 0.01 ** 0.001 ***

Public housing households are comparison group for interaction models.

Source: U.S. Department of Urban Development Multifamily Tenant Characteristics System/Tenant Rental Assistance Certification System longitudinal data compiled by the Urban Institute

Exhibit 8

Results of Linear Regression of Household Characteristics on Household Earnings (Nominal \$ per Year)

| | Regression Coefficients | | |
|---|-------------------------|--------------|--------------|
| | Model 1 | Model 2 | Model 3 |
| R² | 0.3039 | 0.3056 | 0.4236 |
| Adjusted R² | 0.3039 | 0.3056 | 0.4236 |
| Independent Variable | | | |
| Intercept | 2742.13 *** | 2708.90 *** | 5149.00 *** |
| Years in program | 8.79 *** | 19.94 *** | 31.92 *** |
| Program: Section 8 site-based | -75.84 *** | -26.65 *** | -721.62 *** |
| Program: Other site-based | 3325.35 *** | 3513.47 *** | 2364.74 *** |
| Program: Certificates/vouchers | -302.88 *** | -83.39 *** | 67.45 *** |
| African-American household head | 565.82 *** | 500.11 *** | 633.17 *** |
| American Indian household head | -306.87 *** | -475.55 *** | -85.84 *** |
| Asian household head | 398.31 *** | 351.62 *** | 887.62 *** |
| Hispanic household head | 761.31 *** | 848.39 *** | 917.79 *** |
| Disabled | -5776.66 *** | -5672.52 *** | -3864.07 *** |
| Household head aged 22–25 | 1493.69 *** | 1439.44 *** | 927.69 *** |
| Household head aged 26–35 | 2422.49 *** | 2344.23 *** | 1626.01 *** |
| Household head aged 36–51 | 2122.86 *** | 1990.70 *** | 1420.22 *** |
| Household head aged 52–61 | 1486.02 *** | 1241.90 *** | 806.64 *** |
| Household head aged 62 plus | -1937.99 *** | -2144.81 *** | -1269.37 *** |
| Youngest child aged 0–3 | -631.57 *** | -586.21 *** | 1312.39 *** |
| Youngest child aged 4–5 | 59.43 *** | 103.57 *** | 1690.04 *** |
| Youngest child aged 6–12 | 371.24 *** | 396.83 *** | 1866.23 *** |
| Youngest child aged 13–17 | 297.13 *** | 303.14 *** | 1620.27 *** |
| Spouse or co-head with earnings present | 8810.46 *** | 8706.06 *** | 7394.66 *** |
| Spouse or co-head present | 412.09 *** | 508.98 *** | 236.47 *** |
| Working-age adults present | 2251.67 *** | 2113.50 *** | 2151.82 *** |
| Social Security/pension income present | | | -2321.69 *** |
| SSI present | | | -2393.31 *** |
| Welfare income present | | | -6627.65 *** |
| Tract poverty rate | -36.52 *** | -37.16 *** | -24.54 *** |
| Local unemployment rate | -72.20 *** | -71.47 *** | -60.75 *** |
| Suburbs | -64.74 *** | -39.87 *** | -95.22 *** |
| Nonmetro | -714.36 *** | -724.60 *** | -898.38 *** |
| TANF caseload change since 1993 | 1853.27 *** | 1947.37 *** | -3.87 |
| TANF worst sanction = case closure | -243.37 *** | -204.41 *** | -154.02 *** |
| TANF sanction length | -4.87 *** | -3.04 *** | -5.13 *** |
| TANF initial earned income disregard (\$) | -1.28 *** | -1.21 *** | -1.39 *** |
| TANF initial earned income disregard (%) | -2.71 *** | -2.17 *** | -4.33 *** |
| TANF job search required | -169.35 *** | -132.66 *** | -224.97 *** |
| Interaction Terms: | | | |
| Years in Program | | | |
| Program: Section 8 site-based | | -3.38 *** | -21.23 *** |
| Program: Other site-based | | -31.01 *** | -30.21 *** |
| Program: Certificates/vouchers | | -44.77 *** | -40.28 *** |
| African-American household head | | 7.85 *** | 4.41 *** |
| American Indian household head | | 56.59 *** | 58.04 *** |
| Asian household head | | 10.28 *** | -0.59 |
| Hispanic household head | | -17.13 *** | -13.92 *** |
| Disabled | | -17.43 *** | -15.02 *** |
| Household head aged 22–25 | | 23.65 *** | 13.27 *** |
| Household head aged 26–35 | | 27.89 *** | 16.10 *** |
| Household head aged 36–51 | | 35.46 *** | 23.17 *** |
| Household head aged 52–61 | | 45.27 *** | 33.75 *** |
| Household head aged 62 plus | | 27.37 *** | 22.22 *** |
| Youngest child aged 0–3 | | -8.68 *** | -9.19 *** |
| Youngest child aged 4–5 | | -8.30 *** | -8.48 *** |
| Youngest child aged 6–12 | | -4.34 *** | -5.50 *** |
| Youngest child aged 13–17 | | -1.32 ** | -2.90 ** |
| Spouse or co-head with earnings present | | 23.21 *** | 17.50 *** |
| Spouse or co-head present | | -5.93 *** | -1.83 *** |

Exhibit 8

Results of Linear Regression of Household Characteristics on Household Earnings (Nominal \$ per Year) (continued)

| | Regression Coefficients | | |
|---|-------------------------|------------|-----------|
| | Model 1 | Model 2 | Model 3 |
| Working-age adults present | | 10.83 *** | 10.38 *** |
| Social Security/pension income present | | | -7.95 *** |
| SSI present | | | -4.86 *** |
| Welfare income present | | | -0.20 |
| Tract poverty rate | | 0.01 | -0.09 *** |
| Local unemployment rate | | -0.71 *** | -1.26 *** |
| Suburbs | | -4.16 *** | -2.67 *** |
| Nonmetro | | 7.72 *** | 21.20 *** |
| TANF caseload change since 1993 | | -16.06 *** | -4.26 *** |
| TANF worst sanction = case closure | | -7.49 *** | -6.53 *** |
| TANF sanction length | | -0.37 *** | -0.19 *** |
| TANF initial earned income disregard (\$) | | -0.01 *** | -0.01 *** |
| TANF initial earned income disregard (%) | | -0.09 *** | -0.06 *** |
| TANF job search required | | -7.32 *** | -5.74 *** |

Notes: N = 17,948,607. Outcomes are in nominal dollars, not adjusted for inflation.

Statistically significant at: 0.05 * 0.01 ** 0.001 ***

Earnings are the sum of all household member wages and business income.

Public housing households are comparison group for interaction models.

Source: U.S. Department of Urban Development Multifamily Tenant Characteristics System/Tenant Rental Assistance Certification System longitudinal data compiled by the Urban Institute

Exhibit 9

Results of Logistic Regression of Household Characteristics on Household Employment (Probability of Being Employed)

| Independent Variable | Logistic Regression Odds Ratios | | |
|---|---------------------------------|-----------|-----------|
| | Model 1 | Model 2 | Model 3 |
| Intercept | | | |
| Years in program | 1.00 *** | 0.93 *** | 0.97 *** |
| Program: Section 8 site-based | 0.98 *** | 1.02 *** | 0.84 *** |
| Program: Other site-based | 2.65 *** | 2.89 *** | 2.10 *** |
| Program: Certificates/vouchers | 0.99 *** | 1.08 *** | 1.20 *** |
| African-American household head | 1.18 *** | 1.12 *** | 1.20 *** |
| American Indian household head | 0.85 *** | 0.78 *** | 0.79 *** |
| Asian household head | 1.21 *** | 1.14 *** | 1.48 *** |
| Hispanic household head | 1.32 *** | 1.32 *** | 1.41 *** |
| Disabled | 0.09 *** | 0.09 *** | 0.23 *** |
| Household head aged 22–25 | 1.57 *** | 1.36 *** | 1.31 *** |
| Household head aged 26–35 | 1.87 *** | 1.59 *** | 1.56 *** |
| Household head aged 36–51 | 1.64 *** | 1.37 *** | 1.46 *** |
| Household head aged 52–61 | 1.20 *** | 0.90 *** | 1.13 *** |
| Household head aged 62 plus | 0.11 *** | 0.08 *** | 0.20 *** |
| Youngest child aged 0–3 | 1.06 *** | 1.03 *** | 1.78 *** |
| Youngest child aged 4–5 | 1.26 *** | 1.24 *** | 1.98 *** |
| Youngest child aged 6–12 | 1.37 *** | 1.34 *** | 2.08 *** |
| Youngest child aged 13–17 | 1.37 *** | 1.34 *** | 1.91 *** |
| Spouse or co-head with earnings present | 17.41 *** | 14.03 *** | 16.45 *** |
| Spouse or co-head present | 1.00 | 1.06 *** | 0.89 *** |
| Working-age adults present | 1.79 *** | 1.64 *** | 1.89 *** |
| Social Security/pension income present | | | 0.22 *** |
| SSI present | | | 0.22 *** |
| Welfare income present | | | 0.07 *** |
| Tract poverty rate | 0.99 *** | 0.99 *** | 0.99 *** |

Exhibit 9

Results of Logistic Regression of Household Characteristics on Household Employment (Probability of Being Employed) (continued)

| | Logistic Regression Odds Ratios | | |
|---|---------------------------------|----------|----------|
| | Model 1 | Model 2 | Model 3 |
| Local unemployment rate | 0.97 *** | 0.97 *** | 0.98 *** |
| Suburbs | 1.04 *** | 1.05 *** | 1.04 *** |
| Nonmetro | 0.91 *** | 0.91 *** | 0.80 *** |
| TANF caseload change since 1993 | 1.59 *** | 1.63 *** | 0.56 *** |
| TANF worst sanction = case closure | 0.95 *** | 0.97 *** | 0.96 *** |
| TANF sanction length | 1.00 *** | 1.00 *** | 1.00 *** |
| TANF initial earned income disregard (\$) | 1.00 *** | 1.00 *** | 1.00 *** |
| TANF initial earned income disregard (%) | 1.00 *** | 1.00 *** | 1.00 *** |
| TANF job search required | 0.96 *** | 0.97 *** | 0.94 *** |
| Interaction Terms | | | |
| Years in Program | | | |
| Program: Section 8 site-based | | 0.99 *** | 0.98 *** |
| Program: Other site-based | | 0.98 *** | 0.98 *** |
| Program: Certificates/vouchers | | 0.98 *** | 0.98 *** |
| African-American household head | | 1.01 *** | 1.01 *** |
| American Indian household head | | 1.03 *** | 1.03 *** |
| Asian household head | | 1.02 *** | 1.01 *** |
| Hispanic household head | | 1.00 | 1.00 *** |
| Disabled | | 0.99 *** | 1.00 *** |
| Household head aged 22–25 | | 1.08 *** | 1.04 *** |
| Household head aged 26–35 | | 1.09 *** | 1.04 *** |
| Household head aged 36–51 | | 1.09 *** | 1.05 *** |
| Household head aged 52–61 | | 1.10 *** | 1.05 *** |
| Household head aged 62 plus | | 1.09 *** | 1.06 *** |
| Youngest child aged 0–3 | | 1.00 *** | 1.00 *** |
| Youngest child aged 4–5 | | 1.00 *** | 1.00 *** |
| Youngest child aged 6–12 | | 1.00 *** | 1.00 *** |
| Youngest child aged 13–17 | | 1.00 * | 1.00 *** |
| Spouse or co-head with earnings present | | 1.06 *** | 1.05 *** |
| Spouse or co-head present | | 1.00 | 1.01 *** |
| Working-age adults present | | 1.00 *** | 1.01 *** |
| Social Security/pension income present | | | 0.99 *** |
| SSI present | | | 0.99 *** |
| Welfare income present | | | 1.00 *** |
| Tract poverty rate | | 1.00 *** | 1.00 *** |
| Local unemployment rate | | 1.00 *** | 1.00 *** |
| Suburbs | | 1.00 *** | 1.00 *** |
| Nonmetro | | 1.00 *** | 1.01 *** |
| TANF caseload change since 1993 | | 1.00 *** | 1.00 *** |
| TANF worst sanction = case closure | | 1.00 *** | 1.00 *** |
| TANF sanction length | | 1.00 *** | 1.00 *** |
| TANF initial earned income disregard (\$) | | 1.00 *** | 1.00 *** |
| TANF initial earned income disregard (%) | | 1.00 *** | 1.00 |
| TANF job search required | | 1.00 *** | 1.00 *** |

Notes: N = 17,948,607. Outcomes are in nominal dollars, not adjusted for inflation.

Statistically significant at: 0.05 * 0.01 ** 0.001 ***

Employment status is based on 50 percent of the annual, full-time minimum wage applicable in the year in question. If total household earnings were greater than or equal to this amount, the household was designated as “employed”; otherwise, the household was “unemployed.”

Public housing households are the comparison group for interaction models.

Source: U.S. Department of Urban Development Multifamily Tenant Characteristics System/Tenant Rental Assistance Certification System longitudinal data compiled by the Urban Institute

Income and Earnings Levels

Income

In the first model specification (exhibit 7, model 1), we measured the effects of current year characteristics on current year income without time interactions or transfer income, not income trajectory. The R^2 and Adjusted R^2 for this model were relatively low, explaining only 17 percent of the variance. All terms were highly statistically significant however.

The largest increase in income is associated with having an employed spouse or co-head of the household (\$5,785 per year), which is in the same direction as in the descriptive analysis but is even more substantial. Having a spouse or co-head of the household, regardless of employment status, raised income by nearly \$1,800 per year; this increase is probably driven by the presence of employed spouses.

Controlling for everything else, the second largest coefficient is associated with a household head aged 62 or older, resulting in \$3,388 more income. The magnitude of the coefficient is not consistent with the descriptive analysis, in which elderly households had higher incomes only in 1995 and 1996 and had flatter income trajectories than nonelderly households. The regression results suggest that the average income of elderly households is held down by other variables that are controlled for by the regression.

The largest negative coefficient was associated with disability status. Disabled households have \$1,587 less income per year than nondisabled households have. Characteristics with large positive effects on income included the presence of a household head older than 25 (at least \$1,475), the presence of an additional working-age adult (\$1,956, including income from spouses or co-heads of the household), and living in a state with a large welfare caseload decline since 1993 (\$2,325).

Other welfare policy variables had much less effect. Living in a state that completely eliminates welfare payments as a consequence of program rule violation (as opposed to grant amount reductions)¹³ was associated with a decline in average income of \$684 but may, in part, reflect regional differences. States that required employment search before offering welfare (which generally has the effect of diverting families from receiving welfare) had slightly lower average incomes. Again, the different income effects across states could reflect regional differences. In any case, a minority of states required employment search. Other measured welfare policies (sanction length and initial earned income disregards) essentially had no effect.

Among HUD programs, households with Section 8 site-based or tenant-based assistance (vouchers or certificates) had statistically significant but not markedly different incomes than public housing residents had, when controlling for everything else. As a group, residents of other, smaller programs (Section 236, BMIR, Mod Rehab, etc.) had much higher average income (\$3,297 more per year) than public housing households had.

The presence in a household of a child younger than 4 years was associated with a slightly lower income level (\$137 less per year) than the base case household without children. Households with older children, however, had higher incomes than those without children (controlling for the household head's age and disability status).

Finally, the poverty level of the assisted household's census tract had very little effect on income, as did living in the suburbs instead of the central city. The only location measure that made a large difference in average income was living in a nonmetro county, which was associated with \$1,452 lower average income per year.

Earnings

The multivariate results for earnings level (exhibit 8, model 1) showed similar but greater positive or negative effects than the income results, suggesting that the included characteristics acted on household income mainly by changing household earnings. An example is disability status, which was associated with only \$1,587 less income but with \$5,777 less earnings. Earnings effects of a household head's age showed higher earnings than income effects for younger household heads in prime wage-earning years (22–25, 26–35, and 36–51), but lower effects on earnings for older households (52–61). For those aged 62 or older, a positive income increment of \$3,388 becomes a negative earnings increment of -\$1,938. The age of the household's youngest child has a smaller effect on earnings than on income. Having a spouse or co-head of the household with earnings increases earnings more than income, but having a spouse without earnings increases earnings less than income (\$412 more earnings compared to \$1,796 more total income a year).

Income and Earnings Trajectories

Our second model (exhibits 7 and 8, model 2) interacted every independent variable with years since program entry to measure the changing effects of the independent variables on household income and earnings trajectories with increasing time spent in assisted housing. Basically, this specification controlled not only for elderly or disabled status and the like, but also for incomes and earnings trends for each particular characteristic of households in housing assistance.

In this case, all the assisted housing programs had a net positive trend. Only Section 8 site-based residents had a higher trend than public housing residents.¹⁴ Controlling for all other measured characteristics and their income trend effects, the base case public housing resident gained an average of \$130 per year throughout the observation period, while Section 8 site-based households gained \$138 per year. Households receiving tenant-based assistance gained only about \$76 per year.

Almost all the time and household characteristic interactions lowered the household income trend from the base case of \$130 per year. Minority status, disabled status, being over 21 years old, or having children at home all lowered the income trend by a few dollars per year, although not enough to make it completely negative, in nominal terms, even in combination. Exceptions are generally what one might expect based on the descriptive analysis: the number of working-age adults, presence of a spouse or co-head of the household, and presence of a spouse or co-head of the household with earnings all had modest positive effects on household income and earnings. One exception to expectations is that households with American Indian or Alaskan Native ethnicity had one of the largest positive effects on the base income trend, adding \$54 per year, more than households with White ethnicities.

Most of these characteristics had similar but smaller effects on earnings, as compared to total income. Exceptions include the household head's minority status, which had a small but positive effect (large in the case of American Indians, but this is consistent with the total income effect), and age of the head of the household, which has a negative effect on total income but a positive effect on earned income (peaking \$52 to \$61 in the prime earning years).

Effects of Transfer Income on Income and Earnings Levels and Trajectories

Our third income and earnings models (exhibits 7 and 8, Model 3) added three more characteristics and their interactions: presence of welfare, presence of SSI, and presence of Social Security/pension income. We expected these to be important characteristics,

and this appeared to be confirmed by the descriptive tables, but we omitted them from the previous regressions because they are endogenous to income and earnings.

The presence of transfer income—welfare, SSI, or Social Security/pension income—had a very large negative effect on earnings levels, even more so than on total incomes, as might be expected from programs limited to families with very low income and earnings. Households with SSI or Social Security income had approximately \$2,300 less earnings per year. Households with welfare income had \$3,947 less total income and \$6,628 less earned income.

Adding the transfer income variables and their interactions changed the other parameter estimates, increasing some and decreasing others, but without significantly changing the sign or magnitude of most of the other parameters. Exceptions were the household head being non-Hispanic African American, which went from \$44 to \$31, and being non-Hispanic Asian, which increased from \$82 to \$731.

The most significant effects, however, were on the income levels of households with children, which were much higher when controlling for receipt of transfer income. This indicates that the average income level of assisted housing families with children was lower for those families with children receiving welfare, which is what one might expect. Although SSI was associated with a reduced income and earnings growth trend, however, the presence of welfare had essentially no effect. The income and earnings growth trends for welfare recipients were essentially equal to that of nonwelfare families with the same characteristics.

While it is encouraging to see that assisted-housing residents receiving welfare do not have lower income and earnings growth, note that the descriptive statistics showed much higher growth rates for welfare recipients than for nonrecipients—as much as 82.5 percent income growth and 964 percent earnings growth for still-assisted households by 2002, compared to just 24.2 percent income growth and 26.4 percent earnings growth for nonwelfare households. The multivariate results demonstrate that the very high average income and earnings growth of assisted-housing residents on welfare was in fact explained by other characteristics, such as their ages and the ages of their children. This explanation is also consistent with the fact that the state-level welfare policy variables generally had little effect. Controlling for transfer income also had the effect of removing the effect associated with strict TANF sanction policies, implying that the two are strongly associated and that the declines in income and increases in earnings associated with living in a state with strict sanction policies are real because they affect mainly welfare recipients.

Employment

As in the descriptive analysis, we coded employment as a “yes” or “no” variable based on the earnings level in the administrative data. The definition had to be binary, in fact, to calculate a traditional employment or unemployment rate. If total household earnings were greater than the product of the minimum wage times 1,000 hours (20 hours per week, 50 weeks per year), we considered the household to be “employed.” Clearly a household with two or more adults could reach this threshold more easily, but this fact does not seem to detract from the basic test.

Because employment was structured as a binary outcome variable, we modeled the effects of household characteristics on employment using logit regressions. As with the linear regressions on income and earnings, the very large size of the data set makes the results highly statistically significant. For the most part, we can discuss the results without discussing significance tests. To aid in interpretation, the logit model coefficients have been transformed into odds ratios. The odds ratio is the ratio of the odds of households with a

particular characteristic being employed, over the odds that the base case households are employed.¹⁵ For example, based on the first logit regression specification, households with African-American household heads have 18 percent higher odds of being employed than the base case households with White household heads, all other things being equal.

The first logit regression for employment (exhibit 9, model 1) is equivalent to the first linear regression used for income and earnings. That is, it includes years since program entry, all the predictive variables except the presence of welfare, SSI, or Social Security/pension income, and no time interaction terms. Therefore, with this specification we are modeling the odds of being employed in any given year with no time trend. In general, the other odds ratios behave as expected and are consistent with the linear regressions on earnings and the descriptive results.

The greatest effect on the odds of employment is associated with having an employed spouse or co-head of the household. Such households are 17.4 times more likely to be employed. The higher odds of employment for these households are in part because we did not change the earnings thresholds for such families, meaning if both adults worked even a few hours they would more easily reach the threshold for being coded “employed.” The presence of each additional working-age adult also increased the odds of employment by 1.8 times. Merely having a spouse present, however, controlling for his or her employment, had no effect.

The odds of employment are essentially the same for residents of Section 8 site-based, tenant-based, and public housing programs. Examined as a whole, however, households participating in the smaller privately owned site-based programs (that is, excluding Section 8) have the highest odds of employment (2.65 times those of public housing residents), all else being equal.

Non-Hispanic White households are slightly more likely to be employed than are American Indian/Alaskan Native households, but slightly less likely than African-American, Asian/Pacific Islander, or Hispanic-headed households.

The odds of being employed are higher for households with household heads aged 22 to 61 (compared to the base case 18-to-21-year-old household head). A household is less likely to be employed if the head of the household is 62 years or older. The peak employment odds are for households with household heads aged 26 to 35; these households are 1.87 times more likely to be employed. The odds of employment also rise as the age of the youngest child increases; however, even those households with a youngest child up to 3 years old have 6 percent greater odds of being employed than those without children, probably because households without children include most of the elderly.

Local unemployment, tract poverty rate, metro/nonmetro location, and most state-level welfare policies have essentially no substantial effect on the odds of employment. The exception is state TANF caseload changes since 1993; greater percentage declines in TANF cases are associated with greater odds of employment (odds ratio of 1.59). The odds ratio for years in assisted housing program was 1.00, indicating that any differences in employment rates identified in the descriptive exhibits are associated with characteristics that were controlled for, such as the head of the household’s age or the age of the household’s youngest child, rather than with time in the program itself.

Our second logit model (exhibit 9, model 2), like our second models of income and earnings, retained all the variables from the first model and added interactions for each of them with years in a program to estimate a trend in the odds of employment over time. The odds of employment associated with the noninteracted characteristics changed very little,

as was the case with income and earnings. The odds ratios for the characteristics that were interacted with time in a program represent the increment to the odds of employment that are associated with a year in an assisted housing program. These odds ratios were also very nearly 1, indicating that the employment trends for groups defined by those characteristics were also explained by characteristics that were controlled for, rather than by time in a program itself.

Our third model (exhibit 9, model 3) added the presence of welfare, SSI, and Social Security/pension income and their interactions with the time-in-program trend. The odds ratios for the presence of transfer income were some of the lowest so far; households receiving SSI and Social Security/pension income were only 22 percent as likely to reach our employment threshold as other households were, all else being equal. Lower still were the odds of families receiving welfare to be employed at least half time; welfare families were only 7 percent as likely as nonwelfare families to be employed at least half time. Having transfer income in the model also significantly lowered the odds of employment associated with living in a state with large caseload declines. This last result may mean that remaining welfare recipients in states with large caseload drops are even less likely to be employed than those in other states, which would be consistent with the less disadvantaged recipients leaving the rolls as caseloads declined.

Conclusion

The purpose of this analysis was to attempt to answer a series of questions regarding the relationship between housing assistance programs and household income, earnings, and employment. To do this, we looked at the economic trends of households that spent at least 8 consecutive years in housing supported by one of HUD's assistance programs. The reader should bear in mind that our conclusions may not apply to households with shorter assisted housing tenures.

In summary, our key findings were as follows:

- Although we cannot easily compare these results with a comparable set of unassisted households, overall housing assistance did not seem to be an impediment to increasing incomes and earnings. Income and earnings for households receiving housing assistance rose by 34.1 and 93.1 percent, respectively, from 1995 to 2002.
- According to the descriptive analysis, the steepest increases in income were for households in the Mod Rehab (51.7 percent from 1995 to 2002), vouchers (44.1 percent), and certificates (42.2 percent) programs. The lowest rates of growth were for Section 236 households (11.1 percent growth from 1995 to 2002) and project-based Section 8 households (29.1 percent growth). Nonetheless, when controlling for other trends and household characteristics in the multivariate analysis, the steepest increase in income was for households in project-based Section 8 units and the flattest was for voucher/certificate programs and non-Section 8 site-based programs. These increases indicate that the income trends in the descriptive analysis were explained by differences in household characteristics among the programs.
- The income trajectories were highest for non-Hispanic African-American households and Hispanic households that had household heads aged 18 to 25, had a single working-age adult, had children, were neither disabled nor elderly, had a youngest child less than 3 years old, had no spouse or co-head of the household present, had an income level in the lowest deciles, received welfare, did not receive SSI or Social Security/pension income, were homeless at the time of admission to housing assistance, lived in high-poverty census tracts, and lived in the central city or outside a metro area.

- The initial employment rates were highest for households that were in the BMIR, Rental Assistance, and voucher and certificate programs; were non-Hispanic African American or Hispanic; had household heads aged 26 to 35; had no children; were neither disabled nor elderly; did not have welfare, SSI, or Social Security/pension income; and lived in central cities.
- The largest increase in income was associated with having an employed spouse or co-head of the household present in the household.
- State-level TANF policies seemed to have a significant relationship to incomes of households in housing assistance programs. Total state TANF caseload decline had a positive effect on incomes, but applying a “worst case” sanction (case closure) or requiring a job search had a negative effect on incomes.
- The presence of transfer income—welfare, SSI, or Social Security/pension income—had a very large negative effect on earnings levels of assisted housing households. Such income did not have a substantial effect on income or earnings trajectories, however.
- After controlling for household characteristics, the odds of being employed are essentially the same for residents of Section 8 site-based, tenant-based, and public housing programs. Households living in smaller, privately owned site-based programs (that is, excluding Section 8) have the highest odds of employment, however.

These findings imply that, while housing assistance need not be an impediment to increasing household income, earnings, and employment rates, program- and household-specific policies and interventions would likely have the most success in helping assisted households achieve economic self-sufficiency. Certain household types will understandably have a more difficult time finding and keeping employment than others. Specific assistance and counseling strategies need to be focused on specific subgroups of the assisted housing population.

For example, welfare-assisted and nonwelfare-assisted households in assisted housing had equal income and earnings growth rates, which suggest that welfare-to-work policies have not been particularly effective for the assisted housing population. Elderly and disabled households have lower income growth rates than other assisted housing households do, indicating that additional special efforts will be needed to improve the economic conditions of these subpopulations. In addition, when controlling for other household characteristics, living in a high-poverty tract had a negative effect on initial household income and earnings and on long-term income and earnings growth. This last finding has particular importance for housing mobility programs, such as Housing Choice Vouchers, suggesting that economic self-sufficiency efforts for these programs will be more likely to succeed if they are coupled with policies promoting poverty deconcentration.

Even after controlling for household characteristics, however, we found significant differences across programs in all three measures of economic success. While some of these differences may be attributed to unobservable differences in the populations served by these programs, specific program effects are also likely part of the explanation. HUD, local housing authorities, and others interested in promoting financial success among assisted housing households need to keep these differences in mind when developing and implementing interventions.

Future research efforts on this topic might examine more of these subpopulations and program differences in greater detail. In particular, as noted earlier, we were not able to control for local differences in housing assistance policies and practices. For example, after 1997 Public Housing Authorities (PHAs) were free to form their own waiting lists

for vouchers and public housing units, which enabled PHAs to target vouchers to special populations. An additional policy change was that PHAs must now balance their waiting list preferences so that at least 75 percent of households that receive vouchers and 40 percent of households that receive public housing have incomes less than 30 percent of the area median income.¹⁶ How individual PHAs may choose to go about this balancing is another local policy variation that could affect income, earning, and employment outcomes. Additional research might better explore what effect these local policy choices have on economic outcomes for assisted housing households.

Finally, it should be noted that although our findings did show improvement in HUD-assisted households' overall economic status, they indicated only modest increases in income, earnings, and employment. For example, the average increase in incomes for assisted households during this period was only about \$400 per year; earnings increased only \$237 per year. Future research may be able to focus more on why these gains are so modest. An important component of such research would be to analyze differences between HUD-assisted households and comparable households that are not benefiting from housing assistance.

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Notes

1. This article is adapted from a report originally prepared for the U.S. Department of Housing and Urban Development as part of its Research Cadre program.
2. For more information on variations in local housing assistance policies, see Devine et al., 2000, and Devine, Rubin, and Gray, 1999.
3. The certificate program has been discontinued and these programs are now known as the Housing Choice Voucher program.
4. A much more limited set of observations (about 3 percent of all records) was also available for 1993 and 1994. Given the much lower rates of coverage, we did not rely on these earlier data in our analyses.
5. The file disaggregated income for the six largest sources for each household.
6. Creating measures of these policies requires combinations of several Welfare Rules Database variables.
7. Other hypothesized income replacements and coping mechanisms may also come into play, such as increased cohabitation with family or romantic partners.
8. Includes all households in the cohort, including those that had zero (0) earnings.

9. All dollar figures in this article are nominal and are not adjusted for inflation. We note that inflation during this period was historically very low.
10. Household race and ethnicity are based on the race and ethnicity of the household head.
11. The poverty rate was obtained from the 2000 Census and so is only a single-point-in-time measure.
12. We estimated the regression and logistic models using PROC REG and PROC LOGISTIC, respectively, in SAS, release 8.2.
13. Grant reduction sanctions varied widely. One state (Massachusetts) applied no sanctions at all.
14. Net trend for each program is the sum of the coefficients for the “years in program” term and the time interaction term for the particular program.
15. Odds are related to, but not the same as, probability. Mathematically, if the probability of an outcome is given by p , then the odds of that same outcome are equal to $p / (1 - p)$.
16. We are grateful to Barbara Haley of HUD for making us aware of these potential local policy differences.

References

- Bureau of Labor Statistics. n.d. *Local Area Unemployment Statistics program*. Washington, DC: U.S. Department of Labor. <http://www.bls.gov/lau/>.
- Devine, Deborah J., et al. 2000. *The Uses of Discretionary Authority in the Tenant-Based Section 8 Program*. Washington, DC: U.S. Department of Housing and Urban Development.
- Devine, Deborah J., Lester Rubin, and Robert W. Gray. 1999. *The Uses of Discretionary Authority in the Public Housing Program*. Washington, DC: U.S. Department of Housing and Urban Development.
- Fender, Lynne, et al. 2002. *Linking State TANF and Related Policies to Outcomes: Preliminary Typologies and Analysis*. Washington, DC: The Urban Institute.
- Rowe, Gretchen, and Tracy Roberts. 2004. *The Welfare Rules Databook: State Policies as of July 2000*. Washington, DC: The Urban Institute.
- Shroder, Mark. 2002. “Does Housing Assistance Perversely Affect Self-Sufficiency? A Review Essay,” *Journal of Housing Economics* 11 (4): 381–417.
- Tatian, Peter A. 2003. *CensusCD Neighborhood Changes Database (NCDB)*. Washington, DC: The Urban Institute.

Additional Readings

- Newman, Sandra J. 2001. *The Long Term Effects of Housing Assistance on Self-Sufficiency: Final Report*. Washington, DC: U.S. Department of Housing and Urban Development.
- Painter, Gary. 2001. “Low Income Housing Assistance: Its Impact on Labor Force and Housing Program Participation,” *Journal of Housing Research* 12 (1): 1–26.

The Effects of Different Types of Housing Assistance on Earnings and Employment

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Abstract

This article uses administrative data on nonelderly, nondisabled households that received U.S. Department of Housing and Urban Development rental assistance between 1995 and 2002 combined with data from other sources to estimate the effect of low-income housing programs on these households' labor earnings and employment. Using longitudinal data to explain the change in these measures of market labor supply makes it possible to account for immutable, unobservable household characteristics that are determinants of market labor supply and correlated with program participation. Employing a large random sample of households throughout the country makes it possible to produce estimates of the national average effect of each type of housing assistance. Using administrative data makes it possible to identify accurately the type of housing assistance received. The results indicate that each broad type of housing assistance has substantial negative effects on labor earnings that are somewhat smaller for tenant-based housing vouchers than for either type of project-based assistance. They also suggest that participation in the little-used Family Self-Sufficiency program, an initiative within the public housing and housing voucher programs to promote self-sufficiency, significantly increases labor earnings.

Introduction

Many programs that provide assistance to low-income households reduce the amount of assistance as labor earnings increase. Over the past four decades, many low-income households have participated in multiple programs of this sort. These programs collectively provide for sharp reductions in benefits as participants' incomes increase. Not surprisingly, the labor force participation rate of those served by these programs has traditionally been very low. Dissatisfaction with the low labor force participation of welfare recipients was an important factor that led to major reforms of cash assistance programs intended to increase the hours these people worked outside their homes. These reforms included greatly

increasing the generosity of the Earned Income Tax Credit (EITC) and replacing the Aid to Families with Dependent Children (AFDC) program with the Temporary Assistance to Needy Families (TANF) program, which contains strong incentives to promote market labor supply.

Calls for reforms to increase labor force participation have spread to in-kind transfer programs. Low-income housing assistance has not been immune from these forces. To promote participant self-sufficiency, Congress has authorized a number of initiatives within U.S. Department of Housing and Urban Development (HUD) housing programs such as Project Self-Sufficiency (1984), Operation Bootstrap (1989), the Family Self-Sufficiency (FSS) program (1991), and Welfare to Work vouchers (1999). HUD's Moving to Opportunity demonstration program, an important experiment within the Section 8 Housing Choice Voucher program, was also motivated in part by a desire to increase the labor earnings of public housing tenants living in high-poverty neighborhoods.¹ When the 1996 Continuing Budget Resolution suspended the federal preferences for admission into public housing that were based on hardship criteria, many local public housing agencies adopted preferences for employed households and households likely to become employed (Devine, Rubin, and Gray, 1999).

The purpose of this article is to estimate the effect of different types of low-income housing assistance and HUD's FSS program on the earnings and labor force participation of nonelderly, nondisabled households. Estimating these magnitudes is important for several reasons. First, many taxpayers are concerned about the low labor force participation of recipients of public assistance. Since housing assistance is an important type of public assistance, it is important to know its effect in this regard. Second, a major issue in low-income housing policy each year is how much to spend on each program. Therefore, it is desirable to know the differences between the effects on market work of different types of housing assistance. Finally, it is important to determine the effects of HUD's major initiatives to promote self-sufficiency. For this reason, we estimate the effect of the FSS program on earnings and labor force participation.

The effects on market work of cash assistance programs have been heavily studied for decades (Danziger, Haveman, and Plotnick, 1981; Hoynes, 1997; Moffitt, 2003, 1992). Research on the effects of in-kind transfers on earnings and employment has been much slower to develop (Currie, 2003; Gruber, 2003; Olsen, 2003). In recent years, however, research on these effects of low-income housing programs has expanded rapidly. Shroder (2002) cites 18 papers that have been completed during the past decade on the short-term effect of housing assistance on employment and earnings and a few papers on the longer term consequences in these regards. Several important studies have been completed since his survey (Patterson et al., 2004; Susin, 2004; Verma, Riccio, and Azurdia, 2003). The results of the studies of the short-term effects of housing assistance on labor earnings and employment are mixed (Shroder, 2002). Most studies find that housing assistance decreases earnings and employment. Some, however, indicate the opposite effect.² Most estimated effects are relatively small, and hypothesis tests often fail to reject the hypothesis of no effect at standard levels of significance.

Although most estimated short-term effects of low-income housing programs on earnings are modest, it is premature to conclude that housing assistance has little or no effect because many of the studies have potentially important methodological or data problems and many provide estimates for small, atypical subsets of assisted households.

The primary methodological problem in many studies is the failure to recognize and account for the difference between recipients and nonrecipients of housing assistance with respect to important determinants of market labor supply that are not included as

explanatory variables in the statistical analyses, most notably individual tastes for the things that money can buy versus other things.

An important data problem in some studies is the reliance on self-reported housing assistance status in national surveys such as the Survey of Income and Program Participation, the Panel Study of Income Dynamics (PSID), and the Current Population Survey in their estimation procedure. Evidence indicates substantial errors in answering the questions involved, especially with respect to the type of assistance (Shroder, 2002).³

Finally, it is important to realize that most studies tell us little about the national average effect of housing assistance on earnings and employment because they are based on samples from small, atypical subsets of the population of assisted households. For example, a number of studies are based on data on families that left AFDC/TANF during a particular period of time and lived in one or a few selected localities. The effect of housing assistance on earnings surely varies greatly across assisted households, and the average effect can be quite different for different subsets of these households. Verma, Riccio, and Azurdia (2003) report enormous differences in the effect of housing assistance on earnings between households in a control group that continued to participate in the standard AFDC/TANF program and an experimental group that received a substantially different welfare package. In assessing what the literature says about the effects of housing assistance on market work, less weight should be attached to studies of these effects for small, nonrandom subsets of the assisted population. There is no good reason to believe that the average effect for these subpopulations is the same as the overall average for the entire population.

This study overcomes some of the shortcomings of previous studies. First, it is based on an enormous random sample of housing assistance recipients throughout the country as well as data on a random sample of unsubsidized households. The administrative data from which the assisted sample is selected contains information on all renters who received HUD assistance between 1995 and 2002. Second, since the assisted sample comes from administrative data, the type of housing assistance received is correctly identified. Third, the study uses longitudinal data to account for immutable, unobserved household characteristics that are determinants of market labor supply and correlated with program participation. In addition, this study provides the first estimate of the effect of an important initiative within subsidized housing intended to promote self-sufficiency, namely, the FSS program.

The results indicate that all types of housing assistance have substantial disincentive effects on market work; that is, they lead to lower labor earnings than in the absence of housing assistance. Our most conservative estimates indicate that recipients in private subsidized projects earn \$4,011 less per year, public housing tenants earn \$3,894 less, and voucher recipients earn \$3,584 less.

Estimates of the difference between the disincentive effects of different types of housing assistance on market work based entirely on administrative data indicate that the work disincentive effects of housing assistance are somewhat smaller for tenant-based housing vouchers than for either type of project-based assistance. They indicate that, in the first year of program participation, households with tenant-based assistance have a \$419 smaller reduction in their annual earnings than similar households in private subsidized projects and a \$277 smaller reduction than public housing tenants. The difference in the change in annual earnings between different types of housing assistance is much smaller in later years. Recipients of tenant-based assistance experience increases that are \$177 a year greater than similar households in private projects and \$111 a year greater than public housing tenants.

Finally, the results suggest that participation in the little-used FSS program significantly increases labor earnings, although this effect is surely somewhat overstated due to selection bias.

This article is organized as follows. The second section discusses the guidance that economic theory provides regarding the determinants of earnings and employment for housing assistance recipients. The third section discusses the statistical method used to estimate the model and some potential biases in the resulting estimates. The fourth section describes the data to be analyzed for both participants and several subsets of unassisted households. The fifth section presents regression results that aim to measure the effects of different types of housing assistance on earnings and employment. The sixth section summarizes the main findings.

Guidance From Economic Theory

Although this article does not estimate a structural model, it does rely on economic theory for guidance concerning the determinants of earnings and employment for housing assistance recipients. In general, a household's earnings and employment depend upon what is possible for the household and its tastes.⁴ This section develops the theory focusing on determinants that are particularly important for the types of households that are eligible for housing assistance. It begins with the simplest economic model. This model implies that housing assistance will lead assisted households to reduce their earnings. It then shows that constraints associated with housing programs eliminate the model's unambiguous implication concerning disincentive effects on market work. Finally, it considers other aspects of reality that suggest additional determinants of earnings that are not involved in the simplest model.

In the simplest model of an individual's choice between leisure and spending time working for wage income, the individual chooses the number of hours of work and the resulting consumption of market goods that make him or her happiest subject to a feasibility constraint that depends on a wage rate and the prices of produced goods. In this model, leisure refers to time devoted to any activity that does not provide monetary compensation. Obviously, this definition does not correspond to the general use of the word. Many of these hours are devoted to activities that others are paid to undertake, such as housekeeping. Economists sometimes decompose "leisure" into these activities and pure leisure, and they describe the former as household production.⁵ To simplify the exposition in this section, we do not distinguish between the amounts of time devoted to different activities that do not provide monetary compensation. This article contains no evidence on the magnitudes of the separate effects of housing assistance on pure leisure and household production.

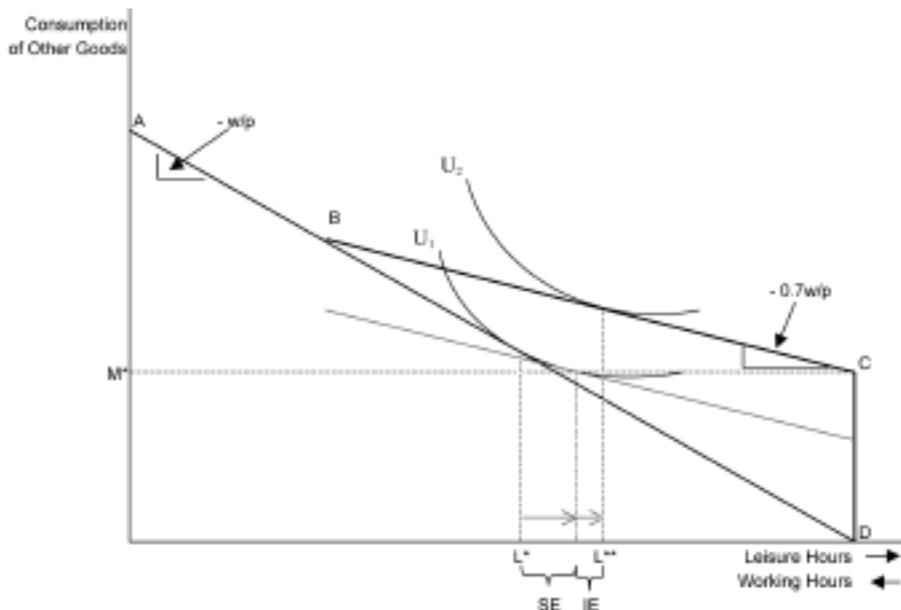
The simplest model assumes unrealistically that the individual is able to do only one job and can work as many hours as he or she chooses at a fixed wage rate. Although more realistic models will include other determinants of earnings, wage rates and the prices of produced goods are clearly relevant for market labor supply decisions. Therefore, the regressions include as an explanatory variable the ratio of the local wage rate for a particular low-skilled job to a cross-sectional index of the price of produced goods.

If housing assistance was the only government program altering an individual's labor/leisure choice and the constraints on housing consumption under government housing programs are ignored, this model predicts that housing assistance reduces a recipient's market labor supply. For most recipients of project-based HUD assistance, the subsidy has been the market rent of the recipient's unit minus 30 percent of the recipient's adjusted income. For recipients of tenant-based vouchers, the program's maximum subsidy has been the local payment standard minus 30 percent of adjusted income. In both cases the program provides a subsidy to households with no labor earnings, and the subsidy declines linearly with an increase in the recipient's earnings. Under the reasonable assumption that an individual will work less in response to a windfall gain, the individual will work less in response to housing assistance because its substitution and income effects induce more work.

Exhibit 1 depicts this simple analysis. This exhibit describes what is possible for a person during some time period in the absence of housing assistance and in the presence of housing assistance, and the choices made in these two situations. The number of hours of leisure (that is, hours not devoted to market work) is measured on the horizontal axis. An index of the quantities of goods purchased in markets is measured on the vertical axis. It is assumed that the person can work in the market as many hours as she wishes at a wage rate w and can buy as many goods in the market as she can pay for at price p per unit. In the absence of housing assistance, the person can choose any bundle of leisure and marketed goods on or below the line segment AD. In this situation, the person depicted chooses L^* hours of leisure and buys marketed goods equal to the height of AD at this quantity of leisure. The other bundles on the curve U_1 are as satisfactory to this person as the chosen bundle. The person prefers any bundle above U_1 to any bundle on this curve. Housing assistance expands what is possible for the person. The housing subsidy is greatest if the person has no income. In the exhibit, the person would consume M^* units of marketed goods if she did not work in the market. The subsidy declines linearly with increases in income. In the presence of housing assistance, this person can choose any bundle of leisure and marketed goods on or below the line segments AB and BC. In this situation, the person depicted chooses L^{**} hours of leisure and buys marketed goods equal to the height of BC at this quantity of leisure. The other bundles on the curve U_2 are as satisfactory to this person as this bundle. The person prefers any bundle above U_2 to any bundle on this curve. The increase in leisure denoted SE is called the substitution effect of housing assistance on the amount of leisure. The increase in leisure denoted IE is called the income effect of housing assistance on the amount of leisure. This simple model has led many economists to expect that housing assistance will reduce market labor supply.

Exhibit 1

Simple Model of Effect of Housing Assistance on Market Work



Adding important aspects of reality to this simple model eliminates its unambiguous implication concerning the effect of housing assistance on market labor supply. For example, Schone (1992) analyzes the effect of housing assistance on market work in a model with three goods: housing, other produced goods, and leisure. Unlike the preceding analysis, she accounts for the restrictions on housing consumption under low-income housing programs. Specifically, she analyzes project-based assistance that offers an eligible household an all-or-nothing choice of a particular unit.⁶ She shows that standard assumptions about tastes do not preclude the possibility that housing assistance will induce a person to work more. Therefore, simple economic models that account for the most basic constraints associated with housing programs do not imply that housing assistance has disincentive effects on market work.

In analyzing the effects of housing assistance on labor earnings, it is important to account for the effects of other government programs. All housing assistance recipients who have labor earnings must pay taxes; all must pay Social Security taxes, while some must pay federal and state income taxes. Almost all are eligible for other types of assistance such as Medicaid, TANF, food stamps, and the EITC. The effect of housing assistance on a family's earnings and employment depends in part on what is possible for the household with and without housing assistance; the aforementioned taxes and subsidies affect these possibilities. There are marked differences in the parameters of some of these taxes and subsidies across states during each time period. Furthermore, there have been major changes in these parameters over time, and research indicates that these changes have had a substantial effect on labor earnings of the least-skilled workers (Blank and Ellwood, 2002; Meyer and Rosenbaum, 2001). To account for the effect of taxes and other subsidies on what is possible for households, we include dummy variables for each combination of year and state as explanatory variables in the regression model explaining the level of labor earnings.

In the simplest economic models, individuals can affect their labor earnings only by choosing how many hours to work. More detailed models of market labor supply would account for other ways in which individuals affect their labor earnings such as working harder at the current job without working longer hours, searching for a similar job with a higher wage rate, and investing in upgrading skills. Even in these more detailed models, however, the aforementioned explanatory variables will affect what is possible for a family and hence its labor earnings.

Another complication in the work decision that the standard labor/leisure choice model does not take into account is the potential cost of changing labor earnings. For many individuals, earning more or less requires finding another job, which is a costly process. A consideration of these costs suggests at least one additional variable to explain labor earnings; namely, the local unemployment rate. This variable is included in our regression model.

Different types of housing programs should lead to differences in labor earnings. The most important distinction between rental housing programs is whether the subsidy is attached to the dwelling unit or the assisted household. If the subsidy is attached to the dwelling unit, the family living in the unit loses the subsidy when it moves. Recipients of tenant-based assistance retain their subsidies when they move. Taking a higher paying job that is farther from a recipient's current housing than his or her current job will be more attractive to a voucher recipient than to a recipient of project-based assistance. The net gain from this job depends in part on the extra commuting cost. Either type of recipient could reduce commuting cost by moving closer to the job. The voucher recipient, however, would retain his or her subsidy while the recipient of project-based assistance would usually lose it. For this reason, the regression model allows for tenant-based and project-based assistance to have different effects on earnings.

The two broad types of project-based rental assistance might also be expected to have different disincentive effects on market work. Public housing projects are owned and operated by local public housing authorities established by local governments. The federal government also contracts with private parties to provide housing for low-income households. One important difference between these two types of housing assistance is the location of the projects. Public housing is typically located in much poorer neighborhoods (Newman and Schnare, 1997). Therefore, accepting public housing often requires a family to move to a higher-poverty neighborhood where access to jobs and peer effects could alter work decisions. If jobs for low-skilled workers are concentrated in low-poverty areas, transportation costs from public housing residences to these jobs could significantly reduce the payoff of finding work. High-poverty neighborhoods have higher unemployment rates that might lead to a culture of unemployment and reduce knowledge of employment opportunities from peers. For the preceding reasons, we estimate the disincentive effects on market work separately for each broad type of project-based assistance.

The explanatory variables mentioned above account for differences in what is possible for households. Although economic theory does not suggest what accounts for differences in tastes, it does not rule out differences in average tastes for different types of families. To allow for this possibility, we include the age, race, and sex of the head of the household and family characteristics, such as family size, as explanatory variables in our regression model explaining the level of labor earnings. These same variables may also reflect differences in what is possible for different households. It is important to realize that the inclusion of these household characteristics as explanatory variables does not fully account for differences in tastes. Empirical research on household behavior shows that there are substantial differences in tastes among similar households with respect to these characteristics.

Statistical Methods

Economic theory suggests many determinants of labor earnings such as an individual's energy, ability, skills, and tastes that are not available in the data and are likely to be correlated with program participation. Ordinary least squares estimators of a linear regression model explaining labor earnings in terms of the variables mentioned in the preceding section will be biased on that account, including, most importantly, estimators of the coefficients of the dummy variables for receipt of housing assistance.

This bias can be largely overcome using the longitudinal nature of the data to explain changes in the variables of interest. Many important determinants of labor earnings that are not available in the data are different for different individuals and remain about the same over the time period considered. To account for these unobserved determinants of labor earnings and employment, our regressions explain the *change* in earnings and employment over time rather than their levels.

Although explaining changes in the variables of interest should eliminate much of the bias in estimation of the effect of housing assistance on market labor supply, some biases remain. One bias results from the effect of the existence of nonentitlement housing programs on the behavior of unassisted households that would like to receive assistance (Fischer, 2000). To get on the waiting list to receive housing assistance and remain on it, a household must have an income below the relevant upper income limit for eligibility. Some households that would earn more than the relevant limit in the absence of housing programs would reduce their earnings to get on the waiting list. Therefore, their earnings in the year before they enter the program are lower than they would have been in the absence of housing programs. Our measure of the change in earnings for households that enter a housing program is the excess of their earnings in their second year in the program over their earnings in the year before entering the program. This measure understates the decrease

in earnings resulting from housing assistance for some households and hence biases downward our estimates of the disincentive effects of housing assistance on market work.

Other biases are in the opposite direction. For example, it is plausible that households that do not receive housing assistance may report their earnings more fully to survey interviewers than recipients report their earnings to local housing authority staff members.⁷ Housing assistance recipients have an incentive to underreport their earnings to the entities administering HUD housing programs because a higher reported income typically results in paying a higher rent for the same housing. Even if the underreporting is the same in both years in percentage terms, this underreporting will lead to a smaller absolute increase in reported than actual earnings for recipients of housing assistance.

Another potential bias in the same direction is that the families that apply for housing assistance are likely to have flatter earnings trajectories in the absence of assistance than others with the same observed characteristics because they expect to receive larger future benefits from housing programs. Unless there is a compelling reason to expect a difference between the average increase in earnings in the absence of housing assistance of families that are selected to receive assistance and others that apply for it, we might reasonably expect that families that enter a housing program during a time period would have a smaller increase in earnings in the absence of housing assistance than families with the same observed characteristics that remained in unsubsidized housing. So if the control group of unassisted households used in the analysis is the set of all nonrecipients with the same observed characteristics as recipients, we should expect the results to overstate the increase in earnings that recipients would experience in the absence of housing assistance and hence overstate the disincentive effects on market work resulting from housing assistance on this account.

If the assumptions that lead to the conclusion in the preceding paragraph are valid, this bias can be reduced by a felicitous choice of a subset of unassisted households, namely, a group that contains a high fraction of nonrecipients that would accept housing assistance. Although no database identifies nonrecipients that would accept housing assistance if it were offered, all offer the opportunity to create groups with a high fraction of such households. The fraction of nonrecipients in any group that would accept housing assistance depends on the fraction in the group that is willing to accept assistance F_w and the fraction served F_s . Specifically, the fraction of nonrecipients in any group that would accept housing assistance is equal to $(F_w - F_s)/(1 - F_s)$. Therefore, from the viewpoint of overcoming the preceding bias, the best subsets of unassisted households are groups with a high fraction of its members that is willing to accept housing assistance and a low fraction served. An ideal subset consists of households that are all willing to participate.

One promising subset of unassisted households is nonrecipients with the lowest incomes, namely, families that are extremely low income in HUD's terminology. In HUD terminology, a four-person household has extremely low income if its income is less than 30 percent of the local median for all households. Multiplying 30 percent of the local median income by nationally uniform constants yields the income limit for other family sizes. These income limits are roughly similar to the poverty line in a typical locality. It is plausibly argued that these nonrecipients are eligible for such large subsidies that almost all want to participate. For example, an assisted family with one child and an adjusted annual income of \$8,000 living in an area with an average payment standard would have received an annual housing subsidy of \$6,000 from the Housing Choice Voucher program in 2002 if it occupied an apartment renting for at least the payment standard. Offsetting the advantage of this subset is the high rate at which they are served. According to the U.S. Department of Housing and Urban Development (2000), 38 percent of extremely low-income renter households received housing assistance in 1997 as opposed to 19 percent of households with incomes between limits based on 30 to 50 percent of the local median

for a family of four and 13 percent of households with incomes between limits based on 50 to 60 percent of the local median.

Another promising subset of unassisted households is nonrecipients with incomes somewhat greater than HUD's very low-income limits, say 50 to 60 percent of the area median with HUD's standard adjustment for family size. Due to HUD's income targeting requirements that have been in effect since 1984, we might reasonably expect the fraction of families receiving HUD assistance to drop sharply as income passes this threshold.⁸ If this drop is associated with a marked increase in the fraction of households willing to accept assistance, we can expect a sharp decrease in the bias in estimating the change in earnings of recipients compared with using nonrecipients with somewhat lower incomes.

We present results on the effects of the different types of housing assistance on labor earnings based on data for these two subsets of unassisted eligible households as well as all unassisted eligible households. It is important to realize, however, that the preceding bias exists only to the extent that families that receive housing assistance would have average earning trajectories in the absence of housing assistance that differ from the average trajectories of unassisted families with the same observed characteristics included as explanatory variables in exhibits 3 through 5. Since families are not assigned at random to the assisted and unassisted groups, there are differences in the observed characteristics of these two groups. This in itself does not result in bias in the estimates of the effect of housing assistance. The regressions account for these determinants of the change in labor earnings. The issue is the extent to which there are important unobserved determinants of the change in earnings that are correlated with receipt of housing assistance. Due to self- and administrative selection, there are likely to be some determinants of this sort and hence some bias in the estimates of the effects of different types of housing assistance on this account.⁹ Only studies based on random assignment completely avoid such biases.

Data

The Multifamily Tenant Characteristics System (MTCS) and Tenant Rental Assistance Certification System (TRACS) databases provide information on income, earnings, and welfare receipt along with household demographic characteristics for all HUD-assisted households. These databases also identify the primary program providing the housing assistance. They do not contain information on hours worked or wage rates.

This study is based on the recently created Longitudinal Occupancy, Demography, and Income file that contains MTCS/TRACS data from 1995 through 2002. We begin with about 30 million observations; each observation provides information on one household in 1 year. Since little concern has been expressed about the work disincentive effects of housing assistance for elderly or disabled individuals, we eliminate observations on households headed by such individuals. We also delete observations with missing, invalid, and implausible values of certain key variables, which reduces the number of observations to about 12 million. Our regressions are based on a large random sample from this population. The size of this sample and its longitudinal nature allow for more accurate measurement of the effects of the various types of housing assistance than previous studies.

Some records contain information about the household at the time of admission to the program. For earnings, the information pertains to the year before admission. Other records contain information at the time of each annual recertification. For earnings, the information pertains to the previous year. Each record contains a household's personal identification number, which enables us to follow recipients as long as they continue to receive housing assistance. Each record also contains the exact location of the household; this information enables the addition of Bureau of Labor Statistics data to control for local unemployment rates and wage rates for unskilled workers. For the analyses based only on administrative data on assisted households, these two variables are measured at the county level.

We use the PSID to provide information on unassisted households. The PSID provides similar demographic and income information to the MTCS/TRACS databases on a random sample of households. We use the PSID-derived sample to form control groups to study effects of the different types of housing assistance between 1999 and 2001 on households that began receiving assistance in 1999 and still received it in 2001.¹⁰ The PSID lacks the level of geographic detail contained in the MTCS/TRACS. For each household, it indicates only the state, the Beale Code that identifies the population size and urban/rural character of the county on a 10-point scale, and the size of the largest city in the metropolitan statistical area (MSA) or the largest city in the county for households outside an MSA. Our data on the unemployment rate and wage rate for unassisted households refer to the average for all counties with the same Beale Code in the same state as the household.

Since some of the changes in earnings over time reflect inflation and we are interested in real changes, we express all earnings in terms of the prices that prevailed in 1 year. Similarly, different families with the same nominal income living in localities with different prices will not enjoy the same standard of living. To account for geographical price differences, we have constructed a cross-sectional price index.

Since reliable indices of the prices of nonhousing goods across the geographical areas involved are not available and previous research has indicated that housing prices vary much more than the prices of other goods across areas (Citro and Michael, 1995), we assume that the prices of other goods are the same everywhere at any point in time and construct a cross-sectional housing price index for 1 year.¹¹ We then account for changes in the prices of housing and other goods over time using the relevant components of the national Consumer Price Index (CPI).

Specifically, our overall geographical CPI is scaled to be 1 in Washington, D.C., in 2002. For other localities in this year, it is a weighted average of our housing price index scaled to be 1 in DC in 2002 and an index of the prices of other goods set equal to 1 for all localities in this year. The shelter component of the national CPI is used to derive the housing price index for other years in each area. The nonshelter component of the national CPI is used to derive the nationally uniform price index for other goods in each year. The weights used to form the overall CPI in each area are .3 and .7, roughly reflecting the fraction of income devoted to housing and other goods by the families in the sample. Although this index is certainly improvable, it is surely better than no adjustment for temporal and geographical price differences.

Our geographical housing price index is based on data on the gross rent and numerous housing characteristics of tenant-based voucher units from HUD's 2000 Customer Satisfaction Survey (CSS) as well as information about the characteristics of the census tract of each unit from the 2000 decennial census.¹² The gross rent of a voucher unit is the rent received by the landlord plus any tenant-paid utilities. Previous research has indicated that the rents paid to landlords of voucher units are very close to the rents of units with identical characteristics occupied by unsubsidized households.

We used these data to estimate two general forms of a hedonic rent equation and used the one that best fit the data to create a cross-sectional housing price index. Both specifications assume that the percentage difference in rents between two areas is the same for any combination of housing and neighborhood characteristics. The two specifications are

$$MR_{ij} = (1 + \alpha_1 Z_{1ij} + \dots + \alpha_m Z_{mij})(\beta_0 + \beta_1 X_{1ij} + \dots + \beta_n X_{nij}) + v_{ij} \tag{9}$$

and

$$\ln MR_{ij} = \beta_0 + \beta_1 X_{1ij} + \dots + \beta_n X_{nij} + \alpha_1 Z_{1ij} + \dots + \alpha_m Z_{mij} + v_{ij} \tag{10}$$

In these equations, MR_{ij} represents the gross rent of unit i in locality j , the Z s represent dummy variables for each locality (with one locality omitted), the X s represent housing and neighborhood characteristics, and v_{ij} represents unobserved determinants of gross rent. To create the dummy variables for localities, observations were grouped into m localities by geographical area. Several levels of aggregation were explored. In the end, we produced a separate housing price index for each MSA and the nonmetropolitan part of each state. The hedonic equation (10) fit the data better; its fit was excellent ($R^2 = .80$), and the coefficients used to create the price indices were estimated with considerable precision. The estimated price index was usually consistent with popular views about differences in housing prices. Among the most expensive places to rent an apartment were San Francisco and San Jose, California; Stamford and Danbury, Connecticut; Boston, Massachusetts; and Nassau-Suffolk and New York City, New York. The least expensive places to rent tended to be nonmetropolitan parts of states and small metropolitan areas in the South.

Empirical Results

This section reports the results of two types of regressions. Some models are estimated with data on housing assistance recipients alone. These first models provide estimates of the difference in outcomes among the three different types of housing assistance. Other models are estimated with data on both assisted and unassisted households. These next models provide estimates of the effect of each type of housing assistance; that is, the difference between the outcome with housing assistance and in the absence of housing assistance.

The outcome measures in these regressions are changes in earnings and employment rather than levels of these outcomes. As mentioned earlier, the reason for this choice is that many important determinants of the earning level (such as a person's ability, energy, skills, and tastes) are not available in the MTCS/TRACS and PSID databases and some of these determinants are different for different individuals but are about the same over time for a particular individual. Explaining differences in the variables of interest is a method for accounting for the effect of unobserved variables of this sort. Since some of these unobserved variables are surely highly correlated with receipt of housing assistance, the failure to account for them will lead to highly biased estimates of the effect of housing assistance on earnings and employment.

The usual analysis explaining the change in a variable includes as explanatory variables only changes in other variables. This practice is based on an underlying model in which the variable of interest is a linear function of explanatory variables. That specification implies that the change in the variable of interest is a linear function of the changes in the explanatory variables. General theory, however, does not rule out the possibility that the change in the level of a variable depends on the level of another variable, and our specifications allow for this possibility as well.

To account for factors that differ across states and over time, especially welfare reform that proceeded at a different pace and in different ways in different states, all regressions include dummy variables for each combination of state and year except Washington, D.C., in 2002, where the year is the later year associated with each change in earnings. Therefore, the reported constant term in each regression applies to Washington, D.C., in 2002. To get the estimated constant term for other states and years, the estimated coefficient for the appropriate state-year dummy variable must be added to the reported constant term.

Differences in Outcomes for Different Types of Housing Assistance

Exhibits 2 and 3 contain regression results explaining differences in several outcomes among different types of housing assistance and accounting for many other factors that

influence these outcomes. These regressions are estimated with MTCS/TRACS data on assisted households only. Relying exclusively on this database allows for a lower level of geographic detail than the later regressions that include PSID data for control groups. As a result, we are able to account more precisely for the wage rate and unemployment rate in each household's local market and hence obtain somewhat more precise estimates of the differences in outcomes that are due to differences in the nature of the different types of housing assistance.

Exhibit 2

Differences in Effects of Different Types of Housing Assistance on Earnings
Dependent variable = increase in real annual household earnings over 1 year

| Variable | Parameter Estimate | Standard Error |
|-------------------------------------|--------------------|----------------|
| Intercept | 77.333 | 678.075 |
| Admission year | -436.876 | 65.534 * |
| Public housing | 66.197 | 58.076 |
| Public housing x Admission year | 76.240 | 109.456 |
| Tenant based | 176.579 | 50.634 * |
| Tenant based x Admission year | 242.568 | 89.870 * |
| Age of head | 39.674 | 14.609 * |
| Square of age of head | -0.648 | 0.194 * |
| Male | -264.317 | 68.002 * |
| African American | -133.499 | 110.977 |
| White | -58.729 | 109.573 |
| Hispanic | -71.564 | 60.374 |
| Family size | 57.022 | 16.757 * |
| With children | 42.278 | 63.655 |
| With infant(s) | 186.649 | 45.212 * |
| Co-head or spouse in household | 511.852 | 73.859 * |
| FSS program | 412.393 | 121.581 * |
| Average local weekly wage | -0.248 | 0.408 |
| Local unemployment rate | -9.089 | 9.471 |
| Change in family size | 797.953 | 47.499 * |
| Change in number of children | -538.899 | 41.616 * |
| Change in FSS program | 321.681 | 146.884 * |
| Change in co-head/spouse status | 4530.751 | 124.422 * |
| Change in local unemployment rate | -126.885 | 30.482 * |
| Change in average local weekly wage | 1.290 | 0.934 |
| R-squared | 0.02 | |
| Number of observations | 150,787 | |
| Mean change in real earnings | 931.11 | |
| F-statistic | 8.97 | |

Notes: The regression includes dummy variables for each combination of year and state except Washington, D.C., in 2002. Asterisk indicates statistical significance at the .05 level.

Underlying the interpretation of these regressions is the assumption that there would be no difference between the average change in earnings and employment in the absence of housing assistance among recipients of each type of assistance who are the same with respect to the other explanatory variables. Since recipients of the different types of housing assistance are not selected at random from a set of households willing to participate in any program, this assumption is surely violated to some extent. It is surely less objectionable, however, than the analogous assumption that recipients and nonrecipients are the same in this regard.

To the extent that families that are willing to accept one type of housing assistance are willing to accept other types, self-selection is a small source of bias in our estimates of differential program effects. Families that are eligible for one type of assistance are eligible

for all types, and families are allowed to be on the waiting lists for all types of assistance simultaneously. It is reasonable to believe that most families that put themselves on the waiting list for one program will try to get on the waiting lists for other programs.¹³ However, since some families that are willing to accept one type of housing assistance are not willing to accept other types and willingness to accept a particular type of housing assistance and not another type may be correlated with changes in household earnings in the absence of assistance, some self-selection bias is likely to be present in our estimates. For example, the more ambitious and energetic eligible households are likely to find housing vouchers more attractive than housing projects because vouchers enable them to pursue better jobs far from their current housing without losing their housing assistance. If so, this bias alone would lead us to understate the work disincentive effects of housing vouchers compared with project-based assistance.

Bias can also result from administrative selection. In any locality, public housing and housing vouchers are almost always administered by the same local housing agency, and the preference system for the two types of assistance have many common elements. There are some important differences; however, most notably, the different income-targeting rules enacted in the 1998 Housing Act that have required that at least 75 percent of new recipients of tenant-based vouchers and 40 percent of new recipients of HUD's project-based assistance have extremely low incomes. Each of the more than 20,000 HUD-subsidized, privately owned projects has its own preference system. This variation in preference systems has led to some marked differences in the characteristics of the households that receive different types of housing assistance.¹⁴ In itself, this difference does not imply that our estimates of the difference in the effect of the three types of housing assistance are biased. Administrative bias in our estimates results only if administrative selection is based on household characteristics that are not included as explanatory variables in the regressions and these characteristics are correlated with the change in household earnings.

Exhibit 2 reports the results of a regression explaining changes in real household earnings from one year to the next. The most important results for housing policy in exhibit 2 concern the type of housing assistance and participation in the Family Self-Sufficiency program. The FSS program is an initiative within the public housing program and the Housing Choice Voucher program to encourage work and savings. For families that do not participate in the FSS program, earning an extra dollar increases their contribution to rent by 30 cents without providing better housing. It is essentially a tax on labor earnings. For families that participate in the FSS program, this amount is put into an interest-earning escrow account. Families that complete the 5-year program receive the money in the escrow account and are free to use this money as they choose.

The specification of the regression model underlying exhibit 2 allows for a difference between the 1-year change in earnings for any type of housing assistance in the first year in the program and any later year. This specification allows for the possibility that housing assistance has an effect not only on the level of earnings but also on its long-run trajectory. In exhibit 2, *admission year* is a dummy variable that is equal to 1 if the change in earnings is the change from earnings in the year before admission to earnings during the first year in the program and 0 otherwise; *public housing* is a dummy variable that is equal to 1 if the household lives in a public housing project and 0 otherwise; and *tenant based* is a dummy variable that is equal to 1 if the household receives tenant-based assistance and 0 otherwise. The estimated coefficients of the five explanatory variables constructed from these variables yield estimates of the difference in the change in earnings for any two types of housing assistance in the first year in the program and for any 2 consecutive later years.

The theoretical analysis in the second section suggested that tenant-based assistance would have a smaller work disincentive effect than project-based assistance. The results in exhibit 2 support this hypothesis. During their first year of housing assistance, households

with tenant-based assistance have \$419 [=176.58+242.57] greater increase or smaller reduction in their earnings than do similar households in private subsidized projects and \$277 [=176.58+242.57-66.20-76.24] greater increase or smaller reduction than public housing tenants. The difference in the change in earnings between different types of housing assistance is much smaller in later years. Recipients of tenant-based assistance experience increases that are \$177 a year greater than similar households in private projects and \$111 a year greater than public housing tenants. The results do not support the hypothesis that public housing has a greater work disincentive effect than private projects.

In exhibit 2, *FSS program* is a dummy variable that is equal to 1 if the household participates in the FSS program at the beginning of the year and 0 otherwise. *Change in FSS program* is a variable equal to 1 if the household does not participate at the beginning of the year and does participate at the end of the year, -1 if the household participates at the beginning of the year and not at its end, and 0 if its participation status does not change over the year.

The FSS program is intended to promote work and its design should lead to this effect. Taken literally, the results in exhibit 2 indicate that the program is achieving its intended effect. They indicate that a household that is not in the FSS program at the beginning of a year but enters the program sometime during the year experiences an increase in earnings over the year that is about \$322 greater than the household would experience in the program's absence. A household in the program at the beginning and end of the year experiences a somewhat larger increase, namely \$412, than a household that was not participating at either time.

Although the estimated coefficients combined with the standard errors of the coefficients suggest that we can be quite confident that the FSS program does lead to greater earnings for its participants, it is likely that the preceding results overstate the effect of the FSS program on the increase in earnings. Participation in this program is voluntary, and the households that have the most to gain from participating are households that expect the greatest increase in earnings. So the results in exhibit 2 should be viewed as an upper bound on the effect of the FSS program unless all assisted households would like to participate in it.

The other explanatory variables are less relevant for housing policy. It lends credibility, however, to the key results to observe that their coefficients have the expected signs in almost all cases. To give a few examples, the results in exhibit 2 indicate that the greater the increase in the unemployment rate over a year, the smaller the increase in earnings will be, and the greater the increase in the local real wage rate for restaurant workers (a proxy for the wage rate of all low-skilled workers), the greater the increase in earnings will be, though this variable is not statistically significant at standard levels.¹⁵ When a household changes during a year from being one with a single head of the household to a married couple, the increase in household earnings is much greater, namely \$4,530. Households with a cohead of the household or spouse at the beginning and end of the year experience a larger increase in earnings over the year than households with a single head of the household over the same period. An increase in the number of adults (that is, an increase in the number of people in the household without any change in the number of children) also leads to a substantial increase in earnings.

Exhibit 3 reports results of a Probit analysis explaining the probability that a household with no labor earnings in one year will have labor earnings in the next year. Since the assumed functional form of the relationship between this probability and the explanatory variables is not linear, the estimated coefficients do not tell us the effect of a 1-unit change in an explanatory variable on the probability that a household with no labor earnings in one year will have labor earnings in the next year. To give some idea of the magnitude of the effect of a change in each explanatory variable on the probability, the first column of

exhibit 3 presents the effect of a 1-unit change in each explanatory variable starting from the mean values of all explanatory variables. In assessing the magnitude of the effects of various explanatory variables, it is useful to know that about 24 percent of households with no employed members in one year had employed members in the following year.

Exhibit 3

Differences in Effects of Different Types of Housing Assistance on Employment
 Probit Analysis for Unemployed Assisted Households
Dependent variable = 1 if became employed, 0 if no change

| Variable | dF/dx | Parameter Estimate | Standard Error |
|-------------------------------------|---------|--------------------|----------------|
| Intercept | -0.454 | -1.4802 | 0.211 * |
| Admission year | -0.028 | -0.0922 | 0.018 * |
| Public housing | -0.005 | -0.0176 | 0.017 |
| Public housing x Admission year | -0.002 | -0.0074 | 0.031 |
| Tenant based | 0.029 | 0.0949 | 0.015 * |
| Tenant based x Admission year | 0.002 | 0.0061 | 0.026 |
| Age of head | 0.013 | 0.0424 | 0.004 * |
| Square of age of head | 0.000 | -0.0006 | 0.000 * |
| Male | -0.023 | -0.0753 | 0.023 * |
| African American | 0.004 | 0.013 | 0.034 |
| White | 0.016 | 0.0532 | 0.034 |
| Hispanic | 0.003 | 0.0097 | 0.019 |
| Family size | -0.006 | -0.0195 | 0.005 * |
| With children | 0.038 | 0.1224 | 0.020 * |
| With infant(s) | -0.006 | -0.02 | 0.013 |
| Co-head or spouse in household | 0.133 | 0.4342 | 0.025 * |
| FSS program | 0.052 | 0.1703 | 0.038 * |
| Average local weekly wage | 0.000 | -0.0005 | 0.000 * |
| Local unemployment rate | -0.006 | -0.0193 | 0.003 * |
| Change in family size | 0.009 | 0.0285 | 0.014 * |
| Change in number of children | -0.009 | -0.0287 | 0.012 * |
| Change in FSS program | 0.057 | 0.1873 | 0.043 * |
| Change in co-head/spouse status | 0.222 | 0.7247 | 0.036 * |
| Change in local unemployment rate | -0.009 | -0.0279 | 0.009 * |
| Change in average local weekly wage | 0.000 | 0.0002 | 0.000 |
| Log likelihood | -39,711 | | |
| Number of observations | 73,780 | | |
| % gaining employment | 24.3% | | |
| Pseudo r-squared | 0.029 | | |

Notes: The analysis includes dummy variables for each combination of year and state except Washington, D.C., in 2002. The data are restricted to households with 0 earnings in the first of 2 years. Asterisk indicates statistical significance at the .05 level.

The results reported in exhibit 3 indicate that the percentage of previously unemployed voucher recipients who become employed during their first year in the program exceeds the percentage of occupants of private subsidized projects who become employed by 5.9 percentage points [=2.9+0.2-(-2.80)]. In later years, the difference is 2.9 percentage points. The results indicate little difference between public housing and private subsidized projects in their effect on employment. Taken literally, the estimated effect of the FSS program in promoting employment is substantial. The results suggest that FSS participation increases the probability of becoming employed by about 5.5 percentage points whether the person has been in the program for less than 1 year or longer. This result, however, is undoubtedly an upper bound on the true effect of the FSS program for the reason mentioned above unless all assisted households would like to participate. Participation in this program is voluntary, and the households that have the most to gain from participating are households that expect the greatest increase in earnings. These include households with members who expect to become employed.

In most cases, the estimated coefficients of the other explanatory variables have the same signs as in exhibit 2. *Family size* and *with infants* are the only two control variables that are statistically significant in explaining labor earnings and have the opposite sign in explaining exit from unemployment.

Effects of Housing Assistance on Earnings

The preceding section provides evidence on the differences in earnings and employment resulting from the different types of housing assistance. This section provides evidence on the effects of housing assistance on earnings. That is, it provides evidence on the difference between observed earnings for subsidized households and what they would have been in the absence of housing assistance.

The results in this section are expected to be somewhat less reliable than the preceding results for several reasons. First, the data on unsubsidized households do not identify the location of households at the same low level of geography as the data on assisted households and, hence, the values of several variables used in the analysis in this section, such as the local wage rate of unskilled workers and the local unemployment rate, apply to much larger areas than in the previous section. The MTCS/TRACS data on subsidized households identify the county of each household. The PSID data on unsubsidized households provide information on the household's state and the Beale Code that identifies the population size and urban/rural character of its county on a 10-point scale. In the preceding analyses, the wage and unemployment rates were measured at the county level. In the analyses in this section, the same rates are for all households living in counties with the same Beale Code in the same state. Furthermore, all variables involving our CPI are less accurately measured. Because the location of PSID households is not reported at the same level of geography as the MTCS/TRACS households, we could not use the CPI described in the previous section to express nominal magnitudes, namely earnings and the weekly wage, in terms of the prices that prevailed in Washington, D.C., in 2002. We could have used the CSS to create a new price index at the lowest level of geography available in the PSID. Instead, we adjusted all nominal variables for national changes in the CPI over time and accounted for geographical price differences indirectly via the inclusion of dummy variables for states and population size categories.

Second, our estimates of the work disincentive effect of each type of housing assistance are subject to the biases mentioned in the fourth section and perhaps others. Some biases will lead to overestimates of the disincentive effects on market work and others to underestimates. The net effect is theoretically ambiguous.

Results are presented for the three groups of unassisted households eligible for housing assistance mentioned earlier, namely all eligible nonrecipients, nonrecipients with incomes below 30 percent of the local median, and nonrecipients with incomes between 50 and 60 percent of the local median. The sample sizes of the three control groups are relatively small—1202, 293, and 202, respectively.

The regressions explaining changes in earnings refer to changes in annual earnings between 1999 and 2001, the 2 years over the period 1995 through 2002 for which PSID data provide some information on location. So, unlike the preceding regressions, these regressions explain differences over 2 years rather than 1 year. Furthermore, the sample of assisted households is limited to households that entered the program in 1999. So the results explain the effect of different types of housing assistance on outcomes for assisted households after 2 years in their program.

Exhibit 4 reports the results of a regression explaining the increase in annual earnings between 1999 and 2001 based on the control group of all eligible nonrecipients. The key results are the coefficients of the dummy variables representing the three types of housing

assistance and the two variables reflecting participation in the FSS program. The results suggest that all forms of housing assistance lead to a substantially lower increase in labor earnings for recipients of housing assistance. These effects range from \$6,281 for recipients in private subsidized projects to \$5,826 for voucher recipients. These coefficients are estimated with considerable precision.

The results in exhibit 4 lead to the same conclusion with respect to the FSS program as those in exhibit 2. Participation in the FSS program leads to greater earnings. It is estimated that a household that is not in the FSS program at the beginning of a year but enters the program sometime during the next 2 years earns about \$1,281 more per year than a similar household that does not participate in this program. A household that is in the program in 1 year and is still in it 2 years later experiences a smaller increase in annual earnings, namely, \$567, compared with similar nonparticipants. As previously explained, these estimates probably suffer from selection bias and hence overstate the effect of participating in the FSS program.

Exhibit 4

The Effect of Each Type of Housing Assistance on Annual Earnings

Control Group: All Eligible, Nonrecipient Households

Dependent variable = increase in real annual earnings over first 2 years

| Variable | Parameter Estimate | Standard Error |
|-------------------------------------|--------------------|----------------|
| Intercept | 7302.28946 | 740.65074 * |
| Public housing | -6145.59153 | 265.09467 * |
| Tenant based | -5826.37125 | 264.27842 * |
| Private project | -6281.14508 | 263.92237 * |
| Age of head | 21.04281 | 20.80447 |
| Square of age of head | -0.50526 | 0.28199 |
| Male | -155.17537 | 97.0888 |
| African American | -113.05172 | 164.11452 |
| White | -59.00237 | 161.28518 |
| Hispanic | -91.37835 | 89.15043 |
| Family size | 69.86095 | 25.31784 * |
| With children | 13.65741 | 96.08995 |
| With infant(s) | 353.81676 | 63.96562 * |
| Co-head or spouse in household | 823.01236 | 109.38699 * |
| FSS program | 566.90831 | 214.25508 * |
| Average local weekly wage | -0.03488 | 0.74985 |
| Local unemployment rate | 2.91329 | 14.83407 |
| Change in family size | 1344.66859 | 71.07822 * |
| Change in number of children | -1088.75772 | 71.85082 * |
| Change in FSS program | 1281.21309 | 166.87033 * |
| Change in co-head/spouse status | 4612.99811 | 156.65559 * |
| Change in local unemployment rate | -7.23745 | 33.04331 |
| Change in average local weekly wage | 0.48075 | 0.85595 |
| R-squared | 0.0288 | |
| Number of observations | 111,873 | |
| Mean increase in real earnings | 978.64 | |
| F-statistic | 40.99 | |

Notes: The regression includes dummy variables for each state excluding Washington, D.C. The regression also includes dummy variables for the size and urbanicity of county of residence excluding the smallest category. Asterisk indicates statistical significance at the .05 level.

Our discussion of potential biases in our estimation procedure suggested that one source of upward bias in our estimates of the disincentive effects on market work might be reduced by using several subsets of all eligible nonrecipients, namely nonrecipients with incomes below 30 percent of the local median and nonrecipients with incomes between 50 and 60 percent of the local median.¹⁶

Exhibit 5 presents the results using data on nonrecipients with incomes below 30 percent of the local median. Contrary to our expectations, the estimated effect of housing assistance on the earnings trajectories of assisted households is even larger than in exhibit 4. The reduction in the increase in annual earnings ranges from \$7,362 for recipients in private subsidized projects to \$6,934 for voucher recipients after the first 2 years in the program. One possible explanation for this result is that the high fraction of these households served more than offsets the high fraction willing to participate and hence a smaller-than-average fraction of the unassisted households in this group is willing to participate. Another possible explanation is that many unassisted households with very low reported incomes have experienced substantial changes in their earnings for reasons that are rare among recipients of housing assistance. For example, the individual involved may have recently graduated from college. The individual’s reported income may refer to the previous year when he/she was a full-time student. When he/she reports his/her income 2 years later, it is much higher. Similarly, the individual involved may have been a well-educated woman who did not work outside the home to any appreciable extent during the initial reporting period but entered the workforce due to separation or because her children now attend school full time. The results concerning the effects of the FSS program are almost identical to those in exhibit 4.

Exhibit 5

The Effect of Each Type of Housing Assistance on Annual Earnings
 Control Group: Nonrecipient With Extremely Low-income Households
Dependent variable = Increase in real annual earnings over first 2 years

| Variable | Parameter Estimate | Standard Error |
|-------------------------------------|--------------------|----------------|
| Intercept | 8564.55488 | 794.95307 * |
| Public housing | -7242.17831 | 465.61346 * |
| Tenant based | -6933.53701 | 465.35101 * |
| Private project | -7362.01877 | 465.3522 * |
| Age of head | 18.24229 | 19.38136 |
| Square of age of head | -0.36408 | 0.26315 |
| Male | -336.9567 | 90.3388 * |
| African American | -284.40282 | 154.59605 |
| White | -289.84757 | 152.02614 |
| Hispanic | -64.12391 | 82.62261 |
| Family size | 54.16445 | 23.50852 * |
| With children | 145.66487 | 89.5061 |
| With infant(s) | 387.1319 | 59.24458 * |
| Co-head or spouse in household | 846.78108 | 101.81838 * |
| FSS program | 577.52914 | 197.77824 * |
| Average local weekly wage | -0.2346 | 0.69325 |
| Local unemployment rate | 0.78713 | 13.72465 |
| Change in family size | 1149.77738 | 68.35787 * |
| Change in number of children | -932.05276 | 68.23833 * |
| Change in FSS program | 1290.99229 | 154.03555 * |
| Change in co-head/spouse status | 4608.55438 | 146.51524 * |
| Change in local unemployment rate | -21.38055 | 30.67151 |
| Change in average local weekly wage | 0.34574 | 0.79202 |
| R-squared | 0.03 | |
| Number of observations | 110,966 | |
| Mean increase in real earnings | 934.03 | |
| F-statistic | 38.63 | |

Notes: The regression includes dummy variables for each state excluding Washington, D.C. The regression also includes dummy variables for the size and urbanicity of county of residence excluding the smallest category. Asterisk indicates statistical significance at the .05 level.

Exhibit 6 presents the results based on nonrecipients with incomes between 50 and 60 percent of the local median. These results are in accordance with our expectations. They indicate that housing assistance does depress the earnings trajectories of assisted households but less than the results based on the control group of all eligible nonrecipients. The depressive effect ranges from \$4,011 for recipients in private subsidized projects to \$3,584 for voucher recipients over the first 2 years in the program. The effects of the FSS program are almost identical to the effects with the two other control groups.

Exhibit 6

The Effect of Each Type of Housing Assistance on Annual Earnings
 Control Group: Eligible Nonrecipients With Not Very Low Income
Dependent variable = increase in real annual earnings over first 2 years

| Variable | Parameter Estimate | Standard Error |
|-------------------------------------|--------------------|----------------|
| Intercept | 5163.33571 | 853.21765 * |
| Public housing | -3894.31471 | 554.17331 * |
| Tenant based | -3584.45854 | 553.79792 * |
| Private project | -4011.12046 | 553.57574 * |
| Age of head | 13.7656 | 19.37243 |
| Square of age of head | -0.29161 | 0.26313 |
| Male | -370.79388 | 90.16076 * |
| African American | -299.93785 | 154.04492 |
| White | -295.43498 | 151.44922 |
| Hispanic | -65.56012 | 82.40483 |
| Family size | 56.39873 | 23.48167 * |
| With children | 148.54672 | 89.2811 |
| With infant(s) | 392.5448 | 59.0959 * |
| Co-head or spouse in household | 863.37838 | 101.54464 * |
| FSS program | 584.16171 | 197.16026 * |
| Average local weekly wage | -0.19832 | 0.69117 |
| Local unemployment rate | 1.84322 | 13.68409 |
| Change in family size | 1194.18794 | 69.32071 * |
| Change in number of children | -976.2503 | 68.84517 * |
| Change in FSS program | 1294.7348 | 153.55403 * |
| Change in co-head/spouse status | 4554.59481 | 146.4609 * |
| Change in local unemployment rate | -18.30277 | 30.53868 |
| Change in average local weekly wage | 0.37046 | 0.78959 |
| R-squared | 0.03 | |
| Number of observations | 110,876 | |
| Mean increase in real earnings | 922.94 | |
| F-statistic | 36.78 | |

Notes: The regression includes dummy variables for each state excluding Washington, D.C. The regression also includes dummy variables for the size and urbanicity of county of residence excluding the smallest category. Asterisk indicates statistical significance at the .05 level.

The results reported in exhibits 4, 5, and 6 suggest that housing vouchers have the smallest work disincentive effect and private subsidized projects have the largest. The difference in earnings trajectories between different types of housing assistance is much smaller, however, than the difference between the earnings trajectory of households receiving any type of housing assistance and unassisted households with the same observed characteristics.

Summary

This article explores the effects of different types of housing assistance on economic self-sufficiency. The regression analysis suggests that all types of housing assistance have substantial disincentive effects on market work; that is, they lead to lower labor earnings than in the absence of housing assistance. Our most conservative results are based on a

control group of nonrecipients with incomes between 50 and 60 percent of the local median. They indicate that recipients in private subsidized projects earn \$4,011 less per year after their first 2 years in their programs, public housing tenants earn \$3,894 less, and voucher recipients earn \$3,584 less. These magnitudes represent large percentage reductions in labor earnings. MTCS/TRACS data indicate that the mean labor earnings of households that began receiving housing assistance in 1999 and continued to receive it in 2001 were \$9,123 for families in private subsidized projects, \$7,373 for public housing tenants, and \$8,446 for voucher recipients in the latter year. So our most conservative estimates of the percentage decrease in labor earnings range from 30 to 35 percent for the different types of housing assistance.

These results combined with other information suggest that housing assistance reduces economic self-sufficiency, at least in the short run. Since the average federal expenditure per recipient of HUD rental assistance was about \$6,200 in 2002 (Congressional Budget Office, 2003), our results suggest that housing assistance enables recipients to consume more goods produced outside the household. The housing subsidy exceeds the reduction in labor earnings. The reduction in market work necessarily results in more hours devoted to household production or pure leisure, although we have no evidence on the division between these two broad categories. Unless housing assistance leads to less pure leisure, it reduces economic self-sufficiency. Housing assistance increases recipient consumption without increasing the total hours devoted to work.

Estimates of the difference between the disincentive effects on market work of different types of housing assistance based entirely on administrative data also indicate that the work disincentive effects of housing assistance are somewhat smaller for tenant-based housing vouchers than for either type of project-based assistance. During their first year of housing assistance, households with tenant-based assistance have a \$419 smaller reduction in their earnings than similar households in private subsidized projects and a \$277 smaller reduction than public housing tenants. The difference in the change in earnings between different types of housing assistance is much smaller in later years. Recipients of tenant-based assistance experience increases that are \$177 a year greater than similar households in private projects and \$111 a year greater than public housing tenants.

Finally, all regressions indicate that participation in the little used Family Self-Sufficiency program increases labor earnings.

Although our methods and data enable us to overcome some of the shortcomings of almost all previous studies of the effects of housing assistance, they have not eliminated all biases in the estimates. This article identifies a number of likely sources of bias. Some would lead to overestimates of work disincentive effects, others to underestimates. Other sources of bias almost surely exist. Only random assignment of households to different types of assistance guarantees the absence of bias. Given the importance of the issue and the cost of experimental studies, however, additional nonexperiment research to reduce the biases is justified.

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Notes

1. Bogdon (1999) describes HUD's limited efforts to promote economic self-sufficiency before Welfare to Work vouchers. No attempt has been made to estimate the effects of these initiatives. Patterson et al. (2004) have produced reliable estimates of effects of Welfare to Work vouchers. Orr et al. (2003) describe the results to date from the Moving to Opportunity experiment.
2. This result is not inconsistent with the standard model of market labor supply in economics when it is modified to account for the housing constraints in low-income housing programs (Schone, 1992). Furthermore, housing programs might increase earnings for reasons not incorporated in these models (Newman, 1999; Patterson et al., 2004).
3. Some studies using these databases are not subject to this criticism. For example, Newman and Harkness (2002) rely on a version of the Panel Study of Income Dynamics with accurate information on the type of housing project occupied, and Yelowitz (2001) does not use information on whether a household receives housing assistance in his estimation procedure.
4. In economics, the word "tastes" refers to all factors other than what is possible that determine an individual's choices.
5. Taking care of children does not fit neatly into either category. Having children is a matter of choice in most cases, and people would not choose to have children unless they wanted to spend some time with them. That said, many people spend some time

with their children and hire others to take care of their children for the rest of the time. So taking care of children is a true leisure activity up to a point and is work beyond that point in most cases.

6. Her result is easily generalized to tenant-based housing vouchers that offer a much wider range of choices.
7. See Edin and Lein (1997) for an account of the extent to which welfare recipients underreport their income to administering agencies.
8. The details of these regulations have changed several times since 1984, but they have continued to require that most new recipients have very low incomes.
9. Olsen (2003: 378–382) provides a brief description of how households are selected to receive housing assistance. In short, each local public housing agency and each privately owned, subsidized project must have a preference system that determines priority for assistance. Federal law has long required these entities to give some preference to particular types of households but has not been specific concerning the details of the system. For example, between 1989 and 1996, federal law required that, for most new recipients of housing assistance, local housing authorities must give preference to families who were occupying substandard housing, involuntarily displaced, or paying more than 50 percent of their income for rent. Families in these categories must be served before others, but the priority given to households that met at least one of these criteria was not specified. Congress suspended these federal preferences on January 26, 1996, and repealed them in the Quality Housing and Work Responsibility Act of 1998. It replaced them with income targeting rules that required that at least 75 percent of new recipients of tenant-based vouchers and 40 percent of new recipients of U.S. Department of Housing and Urban Development project-based assistance have extremely low incomes, specifically incomes that were less than 30 percent of the local median for families of four and less than incomes based on these limits for other family sizes.
10. The sample we draw from the PSID is restricted to 1999 and 2001 for two reasons. First, the PSID became a biannual survey in 1997, eliminating 1998 and 2000 as possible sample years. Second, geographic identifiers are missing from the 1995–97 PSID files, making it impossible to generate the appropriate indicator variables to control for state and year fixed effects in those years.
11. An alternative was to limit the analysis to the urban areas covered by the Council for Community and Economic Research (ACCRA) Cost of Living Index and use its index of the prices of nonhousing goods. These areas account for about 70 percent of the U.S. urban population. It is important to realize, however, that the consumption bundle underlying the ACCRA index is intended to be typical of affluent professional and managerial households rather than the low-income families in our study. Our housing price index is unambiguously better than the ACCRA housing index because it accounts for many more housing and neighborhood characteristics. For the same reason, it is better than Malpezzi, Chun, and Green's (1998) housing price index. Their hedonic equation explaining rent has 19 regressors representing 11 underlying characteristics. Ours has 182 regressors representing many more characteristics. Our housing price index is also better than Thibodeau's (1995) because it has somewhat more detail about housing and neighborhood characteristics and it is available for all locations throughout the country. Carrillo and Olsen are happy to provide this housing price index along with the details of its specification and construction to interested researchers.

12. University of Illinois at Urbana-Champaign (1998) describes the pilot studies that led up to the survey. Olsen can provide the questionnaire used in the 2000 Customer Satisfaction Survey.
13. This is not always possible because waiting lists are often closed. This does not affect the argument, however, because the status of a program's waiting list when a family attempts to apply is surely uncorrelated with that family's earnings trajectory in the absence of housing assistance.
14. Most notably, private subsidized projects serve small and elderly households to a much greater extent than do housing vouchers or public housing. See 1997 Picture of Subsidized Households Quick Facts (<http://www.huduser.org/datasets/assths/picqwik.html>).
15. The lack of statistical significance may be due to a correlation between the increase in the wage rate and an increase in an omitted price that is positively correlated with it and negatively related to market work, namely the price of childcare. Most nonelderly, nondisabled housing assistance recipients are single mothers. Some of these mothers must arrange childcare for at least some of their children so they can work, and others place a high value on it when their children are not in school. To the extent that they cannot obtain this childcare for free from relatives and do not receive government subsidies to pay for it, a higher market price of childcare will discourage market work. Since the markets for different types of labor service are interconnected, a locality that experiences a large increase in the wage rate for restaurant workers is likely to experience a large increase in the wage rates of workers who provide childcare of the quality used by public assistance recipients. Our estimated coefficient captures the net effect of these two forces.
16. These are the income limits for a family of four. Income limits for other family sizes are based on these limits using standard HUD adjustments.

References

- Blank, Rebecca M., and David T. Ellwood. 2002. "The Clinton Legacy for America's Poor." In *American Economic Policy in the 1990s*, edited by Jeffrey A. Frankel and Peter R. Orszag. Cambridge, MA: MIT Press.
- Bogdon, Amy S. 1999. "What Can We Learn from Previous Housing-Based Self-Sufficiency Programs?" In *The Home Front: Implications of Welfare Reform for Housing Policy*, edited by Sandra J. Newman. Washington, DC: The Urban Institute Press.
- Citro, Constance F., and Robert T. Michael, eds. 1995. *Measuring Poverty: A New Approach*. Washington, DC: National Academy Press.
- Congressional Budget Office. 2003. *Budget Options*. Washington, DC: U.S. Government Printing Office.
- Currie, Janet. 2003. "U.S. Food and Nutrition Programs." In *Means-Tested Transfer Programs in the United States*, edited by Robert Moffitt. Chicago: University of Chicago Press.
- Danziger, Sheldon R., Robert Haveman, and Robert Plotnick. 1981. "How Income Transfers Affect Work, Savings, and the Income Distribution," *Journal of Economic Literature* 19 (3): 975–1028.

- Devine, Deborah J., Lester Rubin, and Robert W. Gray. 1999. *The Uses of Discretionary Authority in the Public Housing Program*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.
- Edin, Kathryn, and Laura Lein. 1997. *Making Ends Meet*. New York: Russell Sage Foundation.
- Fischer, Will. 2000. "Labor Supply Effects of Federal Rental Subsidies," *Journal of Housing Economics* 9 (3): 150–174.
- Gruber, Jonathan. 2003. "Medicaid." In *Means-Tested Transfer Programs in the United States*, edited by Robert Moffitt. Chicago: University of Chicago Press.
- Hoynes, Hilary. 1997. "Work, Welfare, and Family Structure: What Have We Learned?" In *Fiscal Policy: Lessons from Economic Research*, edited by Alan Auerbach. Cambridge, MA: MIT Press.
- Malpezzi, Stephen, Gregory H. Chun, and Richard K. Green. 1998. "New Place-to-Place Housing Price Indexes for U.S. Metropolitan Areas and Their Determinants," *Real Estate Economics* 26 (2): 235–274.
- Meyer, Bruce D., and Dan T. Rosenbaum. 2001. "Welfare, the Earned Income Tax Credit, and the Labor Supply of Single Mothers," *Quarterly Journal of Economics* 116 (3): 1063–1114.
- Moffitt, Robert. 2003. "The Temporary Assistance for Needy Families Program." In *Means-Tested Transfer Programs in the United States*, edited by Robert Moffitt. Chicago: University of Chicago Press.
- . 1992. "Incentive Effects of the U.S. Welfare System: A Review," *Journal of Economic Literature* 30 (1): 1–61.
- Newman, Sandra J., ed. 1999. *The Home Front: Implications of Welfare Reform for Housing Policy*. Washington, DC: The Urban Institute Press.
- Newman, Sandra J., and Joseph M. Harkness. 2002. "The Long-Term Effects of Public Housing on Self-Sufficiency," *Journal of Policy Analysis and Management* 21 (1): 21–44.
- Newman, Sandra J., and Ann B. Schnare. 1997. "'...And a Suitable Living Environment': The Failure of Housing Programs to Deliver on Neighborhood Quality," *Housing Policy Debate* 8 (4): 703–741.
- Olsen, Edgar O. 2003. "Housing Programs for Low-Income Households." In *Means-Tested Transfer Programs in the United States*, edited by Robert Moffitt. Chicago: University of Chicago Press.
- Orr, Larry, et al. 2003. *Moving to Opportunity for Fair Housing Demonstration Program: Interim Impacts Evaluation*. Abt Associates Inc. and National Bureau of Economic Research. Washington, DC: U.S. Department of Housing and Urban Development.
- Patterson, Rhiannon, et al. 2004. *Evaluation of the Welfare to Work Voucher Program: Report to Congress*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.

Schone, Barbara S. 1992. "Do Means Tested Transfers Reduce Labor Supply?" *Economics Letters* 40 (3): 353–357.

Shroder, Mark. 2002. "Does Housing Assistance Perversely Affect Self-Sufficiency? A Review Essay," *Journal of Housing Economics* 11 (4): 381–417.

Susin, Scott. 2004. Longitudinal Outcomes of Subsidized Housing Recipients in Matched Survey and Administrative Data. Unpublished manuscript.

Thibodeau, Thomas G. 1995. "Housing Price Indices From the 1984–1992 MSA American Housing Surveys," *Journal of Housing Research* 6 (3): 439–482.

University of Illinois at Urbana-Champaign. 1998. *Resident Assessment of Housing Quality: Lessons from Pilot Surveys*. Washington, DC: U.S. Department of Housing and Urban Development.

U.S. Department of Housing and Urban Development. 2000. *Rental Housing Assistance—The Worsening Crisis: A Report to Congress on Worst Case Housing Needs*. Washington, DC: U.S. Department of Housing and Urban Development.

Verma, Nandita, James Riccio, and Gilda Azurdia. 2003. *Housing Assistance and the Effects of Welfare Reform*. Manpower Demonstration Research Corporation. Washington, DC: U.S. Department of Housing and Urban Development.

Yelowitz, Aaron. 2001. Public Housing and Labor Supply. Unpublished manuscript.

Longitudinal Outcomes of Subsidized Housing Recipients in Matched Survey and Administrative Data

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Abstract

This study uses a new data set combining survey and administrative data to investigate the longitudinal effects of subsidized housing on a broad range of outcomes relating to dependency. Given a household's assistance status in 1996, it examines outcomes over the subsequent 3 years. The aim is to produce a credible comparison group by matching on the same variables (measured in an earlier period) as the outcomes to be examined.

Both subsidized and comparison households made strong gains from 1996 to 1999, showing sharp increases in income, employment, and earnings and reductions in poverty and transfer program participation. The earnings of people in the comparison group increased more rapidly, however, suggesting that housing subsidy programs reduce individual earnings by roughly 15 percent. In two of the three programs, similar results were found for family earnings, much of which can be explained by reductions in household size of 5 to 10 percent. Impacts of subsidy programs on program participation were small and inconsistent, suggesting little effect. Although these programs are found to affect neighborhood choice, neighborhood poverty rates explain little of the impact on individual earnings.

Introduction

This study uses a new data set to investigate the longitudinal effects of public housing, vouchers, and project-based subsidized housing on a broad range of outcomes relating to dependency. Given a household's assistance status in 1996, it examines outcomes over the subsequent 3 years. The outcomes include income and poverty status; employment and earnings; receipt of welfare benefits and housing subsidies; and living arrangements such as household size and marital status. The main focus is on the role played by housing subsidies, neighborhood, and household composition in determining earnings outcomes.

This research uses a new data set created by merging the Survey of Income and Program Participation (SIPP) with administrative data on the receipt of the three major types of

housing subsidies. Administrative data is important because self-reports of housing assistance contain considerable error (Shroder and Martin, 1996). Subsidized households are compared to a sample of unsubsidized households, matched using propensity score methods. Subsidized cases are matched to unsubsidized cases that, at the beginning of the panel, have similar background characteristics (such as race) and measures of dependency and poverty (such as the receipt of food stamps). Both groups of households are then followed, taking advantage of the SIPP's longitudinal nature. At the end of the panel, the study compares the two groups' outcomes, such as the receipt of food stamps and poverty status.

The aim is to produce a credible comparison group by matching on the same variables (measured in an earlier period) as the outcomes to be examined. For example, it seems reasonable to expect that two households with the same earnings in one year are likely to have similar earnings, on average, 3 years later. This identification strategy, as will be seen, requires careful attention to the dynamics of earnings and other outcomes.

Background

The various possible effects of subsidized housing can be loosely classified into economic, demographic, and sociological effects, albeit with some degree of caricature. According to standard neoclassical consumer theory (for example, Varian, 1992), subsidized housing should have substitution and income effects, both operating to reduce work. Substitution effects arise because the tenant's contribution to rent is set at 30 percent of income. Since rent increases by 30 cents for each additional dollar of earnings, subsidized housing reduces labor supply (that is, work effort) just as would a 30-percent tax.¹ In addition, subsidized housing residence amounts to an increase in income, which should also reduce labor supply (because the rent will be paid whether the recipients work or not). Other economic effects are possible as well. Housing assistance is likely to cause many recipients to change neighborhoods. Subsidized housing units might be located closer to or farther from employment sites than alternative unsubsidized residences. Finally, housing subsidies free up additional resources, which might be invested in employment-enhancing ways such as in education or a car, and lead to more employment in the long run.

Subsidized housing might also cause a change in demographic factors, specifically household composition. Gould Ellen and O'Flaherty (2002) note that housing subsidy programs require recipients to live in units deemed large enough to accommodate their families. To the extent that the supply of larger housing units is limited, smaller households applying for public housing or project-based assistance will be offered units more quickly and voucher recipients will have an easier time finding units in the private market. In addition, subsidized housing provides incentives to consume more housing; one way to do so is to reduce household size. For example, receiving housing subsidies may (and is intended to) allow recipients living "doubled up" to move out and form their own households. There is fairly consistent evidence of a subsidy-induced reduction in household size (Gould Ellen and O'Flaherty, 2002; Shroder, 2002a).

Subsidized housing can be expected to have a number of more sociological or psychological effects; these effects may be positive or negative. Housing assistance might enable a parent to move away from a gang-infested area and reduce the time spent monitoring her children, possibly leading to new employment (Katz, Kling, and Liebman, 2004; Reed, 2004). In other cases, subsidized housing might induce moves to a high-crime neighborhood (such as a crime-ridden public housing project), which might reduce employment. The neighborhoods of assisted developments may be stressful and depressing in other ways as well, affecting motivation to search for a job (Katz, Kling, and Liebman, 2001). For others, housing subsidies may permit a move to less crowded conditions, where the reduction in background chaos may make job search easier. Finally, the neighbors of subsidized housing recipients may be less (or more) connected to the labor market, serving as weaker (or stronger) sources of employment leads and role models.

This study will not aim to untangle all these possible effects; but it will decompose the effects of housing subsidies into the impact due to household size, the impact due to neighborhood (as measured by census tract poverty rates), and a residual impact presumably due to economic incentives.

Perhaps because of the many ways subsidized housing can affect labor supply, researchers have found little in the way of consistent impacts despite a number of studies. A recent review of the literature (Shroder, 2002a: 410) concludes, “The literature to date fails to confirm the neoclassical hypothesis [of reduced labor supply]; the more sophisticated tests do not show stronger negative effects than the less sophisticated. The distribution of results from these 18 empirical studies is consistent with a true housing assistance/short term employment effect of zero.”

Of the studies with multivariate controls, Shroder praises those based on special local data, which generally have particularly rich sets of control variables. At the same time, studies based in a particular local area are necessarily of limited generalizability. Similarly, four out of these five studies are limited to welfare recipients. While this population is important, most subsidized housing recipients do not receive welfare. Shroder is more critical of the six multivariate studies that rely on national survey data. He argues that misreporting of housing assistance status is a very serious problem in survey data. The best of these studies make use of instrumental variables techniques, but Shroder argues that the instruments used are implausible. Finally, all these studies are mostly cross-sectional.

An important recent experimental study of the voucher program, however, finds that the program reduces employment and increases welfare receipt (Patterson et al., 2004).² Another important recent study combines administrative data on subsidized households with survey data on a comparison group of households, finding large reductions in earnings for the subsidized group (Olsen, 2004). These studies will be discussed in more detail below, after the results are presented.

The present study aims to duplicate some of the merits of the local studies—precise measure of assistance status and a rich set of longitudinal controls—while avoiding their limits due to focusing on special populations and locations.

Description of Data

The data set used in the project is the 1996 panel of the SIPP merged with U.S. Department of Housing and Urban Development (HUD) administrative data on housing subsidy receipt. The SIPP is a national panel data set that follows approximately 40,000 households for 4 years, covering the period from December 1995 through February 2000. Households in the SIPP are interviewed every 4 months, for a total of 12 “waves” of interviews. Households from areas with high-poverty concentrations are oversampled.³

The HUD administrative data identifies enrollment in the various HUD-administered housing subsidy programs and the date of the most recent “transaction” as of December 1996. Programs covered by the data include public housing, Section 8 vouchers and certificates, and a number of project-based subsidy programs. The data do not include programs administered by the Rural Housing Service and units funded solely by low-income housing tax credits. The “transaction” date most commonly refers to the date of the most recent income certification, which occurs when a household moves into subsidized housing and annually thereafter.⁴ Most transactions occurred sometime during 1996, with the modal month being November 1996.⁵ For 195 cases (16 percent of the data), the transaction occurred before the start of the SIPP panel, usually sometime in the 6 months before the beginning of the panel. In general, the data identify households that were subsidized at some point during the first year of the panel, most commonly toward the end of the first year, but sometimes as much as 6 months before the beginning of the panel.

Merging the Survey and Administrative Data

We could not make a match between the SIPP and HUD data when the Social Security number (SSN) was missing or invalid in either data set or when a subsidized household was not listed in the HUD data. Match rates (the probability that a household listed in the HUD administrative data and also interviewed in the SIPP will be matched) are estimated to be between 75 to 80 percent, depending on the subsidy program. Because the HUD data itself fails to list perhaps 15 percent of households in subsidized housing due to underreporting by local authorities, the probability that a truly subsidized SIPP household will be identified is about two-thirds (that is, 85 percent of 75 to 80 percent).

Some nonrandom availability of SSNs occurs (and hence, nonrandom matching failures), but the magnitude is modest. Hispanics appear to be underrepresented in the matched sample by about 2 percentage points, compared to their true percentage in subsidized housing (13 percent). There is little evidence of any other important problems with nonrandom matching, although there may be a small tendency for social welfare program recipients to be overrepresented in the matched data compared to their true proportion in subsidized housing.

Since there was little evidence of substantial and systematic matching failures, the main implication of the undercoverage is that the comparison group is potentially contaminated with subsidized households that are not covered in the administrative data.⁶ To keep the comparison group as free of subsidized tenants as possible, households are excluded from the comparison group if they are reported as subsidized in either the survey or administrative data sets. Because of these two sources of information, and because the number of uncovered subsidized households is fairly small relative to the pool of potential comparison group members (that is, disadvantaged unsubsidized households), “contamination” of the comparison group is likely to be a minor concern.

Analysis Sample

After creation of the merged SIPP/HUD file, the cases receiving housing subsidies (according to the administrative data) were grouped into three categories: public housing, vouchers, and project-based subsidies.⁷ Public housing consists of developments built by the government and managed by local public housing authorities (PHAs). Vouchers are tenant-based subsidies that allow recipients to rent in the private market, with HUD covering a portion of the rent. Project-based subsidies consist of multiple programs managed by private entities that receive a continuing stream of subsidies; the government also subsidizes the development construction (or conversion) for these programs. Tenants in all programs generally pay 30 percent of their income in rent, with government subsidies covering the rest. In all three types of programs, eligibility is restricted to those with low incomes; other need-based restrictions exist as well (for example, the homeless have priority in some circumstances). Importantly, these programs are not entitlements but are generally rationed using some type of waiting list. Hence, a large pool of eligible but unsubsidized households are potentially available to serve as comparison group members.

The disabled are an important population in subsidized housing. To capture the effect of disabilities on outcomes, variables indicating the (self-reported) presence of a disability that limits or prevents work were included as matching and control variables. The disabled are included in the sample for three reasons. First, some of the outcomes studied are not directly related to disabilities; for example, family earnings (which could be due to other family members) and the number of adults in the household. Second, the disabilities measured in the SIPP are not necessarily permanent, and partial disabilities do not preclude work. In particular, residents of subsidized housing with partial disabilities at the beginning of the panel are employed at about the same rate (59 percent) as their nondisabled counterparts (although their earnings are lower). Of the subsidized housing residents who initially reported full disability, 13 percent are working by the end of the panel as are 19

percent of their counterparts in the comparison group. At the same time, the percentage reporting work-preventing disability drops to 79 percent (72 percent for the comparison group) by the end of the panel.

The analysis sample was restricted to those who met four criteria: (1) they were SIPP householders (meaning a household member whose name is on the lease or deed), (2) they were less than 55 years old in the first month of the SIPP panel (because policy interest in dependency focuses on younger people), (3) they had valid SSNs in the SIPP (because only this group can be merged with the HUD data), and (4) they were present in the first three waves of the SIPP (because the statistical match is based on data from these waves). In all, 670 subsidized households met these criteria.

Statistical Matching To Create Comparison Groups

To create comparison groups, these three groups of subsidized cases were statistically matched to unsubsidized households that had similar characteristics in the first year of the SIPP panel. The goal was to choose comparison groups similar to the subsidized groups at the beginning of the SIPP panel and then compare their outcomes at the end of the panel.

Propensity score matching was used to select the comparison groups (Rosenbaum and Rubin, 1983). That is, an indicator for the receipt of housing subsidies was regressed on a number of variables likely to predict subsidy receipt, such as income, education, and marital status. This logit regression was run in a sample consisting of those receiving one type of subsidy (for example, public housing) and those not listed in either the survey or administrative data as receiving subsidies. Next, the predicted probability of receiving a subsidy (the propensity score) was calculated for each case. Finally, three comparison group members—the three cases with the most similar propensity scores—were chosen as matches for each subsidized household.⁸

Exhibit 1 shows the means of the main variables used in the propensity score logit, which include measures of income, earnings, employment history, public assistance, household composition, other demographics, and disabilities.⁹ These variables are all measured during the first wave of the panel. A number of additional variables were also included in the matching logit but are not shown in the exhibit, including four measures of bank savings accounts; the square of age; and several measures of income, earnings, and public assistance measured at the end of the first year (wave three).¹⁰

In general, the logit results are not especially interesting because many variables are highly collinear (such as earnings in the first and third waves) and, therefore, many coefficients are individually statistically insignificant. The point here is not to estimate the coefficients precisely, however, but to predict the probability of living in the subsidized housing. Several of the variables related to savings (such as possession of a money market account) perfectly predict the nonreceipt of subsidized housing. Naturally, cases with these types of savings will not appear in the matched sample. The logit models predict subsidy receipt reasonably well, with pseudo-R²s between 0.30 and 0.34. The real test is whether the comparison group is similar to the subsidized group. As discussed below, the match does very well by this criterion.

Success of Statistical Matching

For all the comparisons in exhibit 1, there is no statistically significant difference between the subsidy and comparison groups. In addition, the differences are usually small as well. This lack of significant difference is not a mechanical function of the fact that these variables entered the matching function. For example, it is possible that there are no good matches for the subsidized cases and that even those cases closest in propensity scores

Exhibit 1**Subsidized Households vs. Comparison Groups: Average Income, Earnings, Employment, Program Participation, Household Composition, and Demographics in Wave One^a**

| | Public Housing | Comparison Group | Difference | Vouchers | Comparison Group | Difference | Project Based | Comparison Group | Difference |
|--|----------------|------------------|------------|----------|------------------|------------|---------------|------------------|------------|
| Family income | 919 | 907 | 12 | 1,100 | 1,093 | 7 | 945 | 900 | 45 |
| Individual income | 710 | 685 | 25 | 821 | 789 | 32 | 714 | 672 | 42 |
| Poverty | 0.718 | 0.741 | -0.023 | 0.631 | 0.627 | 0.004 | 0.668 | 0.671 | -0.004 |
| Family earnings | 537 | 498 | 40 | 665 | 625 | 39 | 662 | 632 | 30 |
| Family employment | 0.452 | 0.433 | 0.019 | 0.529 | 0.530 | -0.001 | 0.535 | 0.544 | -0.009 |
| Individual earnings | 384 | 345 | 39 | 444 | 401 | 42 | 469 | 451 | 18 |
| Employed wave one, job started 1995 or later | 0.275 | 0.257 | 0.017 | 0.261 | 0.276 | -0.015 | 0.294 | 0.288 | 0.006 |
| Employed wave one, job started before 1995 | 0.192 | 0.180 | 0.012 | 0.245 | 0.222 | 0.023 | 0.224 | 0.231 | -0.007 |
| New job in wave one or contingent worker | 0.021 | 0.028 | -0.007 | 0.012 | 0.009 | 0.003 | 0.018 | 0.016 | 0.001 |
| Not employed, worked 6+ months in 1995 | 0.073 | 0.066 | 0.007 | 0.124 | 0.139 | -0.015 | 0.101 | 0.115 | -0.015 |
| Not employed, worked 6+ months before 1995 | 0.352 | 0.373 | -0.021 | 0.293 | 0.286 | 0.007 | 0.281 | 0.249 | 0.032 |
| Never employed | 0.088 | 0.097 | -0.009 | 0.064 | 0.067 | -0.003 | 0.083 | 0.101 | -0.018 |
| Transfer income | 205 | 217 | -12 | 214 | 191 | 23 | 138 | 138 | 0 |
| Welfare | 0.325 | 0.325 | 0 | 0.283 | 0.313 | -0.030 | 0.255 | 0.239 | 0.016 |
| Food stamps | 0.615 | 0.623 | -0.008 | 0.563 | 0.551 | 0.012 | 0.573 | 0.537 | 0.037 |
| Persons in household | 3.10 | 3.21 | -0.11 | 3.31 | 3.31 | 0.00 | 2.85 | 2.86 | -0.01 |
| Adults in household | 1.40 | 1.43 | -0.03 | 1.42 | 1.46 | -0.04 | 1.37 | 1.39 | -0.02 |
| Children in household | 1.71 | 1.78 | -0.08 | 1.89 | 1.85 | 0.04 | 1.48 | 1.48 | 0.00 |
| Married | 0.187 | 0.195 | -0.009 | 0.221 | 0.220 | 0.001 | 0.171 | 0.183 | -0.012 |
| Single females | 0.705 | 0.699 | 0.005 | 0.699 | 0.701 | -0.003 | 0.719 | 0.721 | -0.001 |
| Age | 35.3 | 36.3 | -0.9 | 34.2 | 34.4 | -0.2 | 33.7 | 34.0 | -0.3 |
| Partial disability | 0.342 | 0.377 | -0.035 | 0.305 | 0.335 | -0.029 | 0.307 | 0.313 | -0.006 |
| Full disability | 0.244 | 0.285 | -0.041 | 0.205 | 0.245 | -0.040 | 0.202 | 0.222 | -0.020 |
| African American | 0.560 | 0.544 | 0.016 | 0.305 | 0.303 | 0.003 | 0.395 | 0.393 | 0.001 |
| Hispanic | 0.114 | 0.136 | -0.022 | 0.141 | 0.147 | -0.007 | 0.127 | 0.139 | -0.012 |
| Education (years) | 11.2 | 11.0 | 0.2 | 11.7 | 11.7 | 0.0 | 11.5 | 11.4 | 0.1 |
| N | 193 | 455 | | 249 | 607 | | 228 | 561 | |

Notes: None of the differences in the exhibit were statistically significant at the 10-percent level. Sample restricted to householders less than 55 years of age. All variables are measured as monthly averages with the exception of the employment history variables.

^a Interviews conducted April 1996 to July 1996.

Source: See exhibit 10

will still show significant differences.¹¹ Overall, the results in exhibit 1 strongly support the success of the statistical match. The propensity score procedure appears to have successfully produced comparison groups with characteristics similar to the subsidized groups at the beginning of the panel.

Because the matching is done with replacement, it was possible for a single comparison group member to be matched to multiple subsidy group members. This is an important criterion for evaluating the success of a statistical match, since a high rate of multiple matches can indicate that the data contain few (or no) good matches (Dehejia and Wahba, 1999). Fortunately, there appear to be many unsubsidized cases available as matches that are similar to the subsidized group. About 2.4 unique comparison cases were chosen per subsidy group member (compared to the 3.0 there would have been if no case had matched twice). More than 80 percent of cases were used only once as matches, and less than 5 percent were used three or more times.

Methodology and Potential Biases

The goal of this study is to follow two groups of households, one that was subsidized at the beginning of the panel and one that was unsubsidized, and examine their outcomes later in the panel. As mentioned above, the administrative data identifies households that were subsidized at some point during the first year of the panel or a few months before. Exhibits 2A–2C provide some empirical evidence regarding self-reported subsidy rates over the life of the panel for those listed in the HUD data as subsidized. In the first year of the panel, self-reported subsidy rates were about 80 percent for public housing residents. The rates fall below 100 percent mainly due to underreporting in the SIPP, an important reason for using administrative data instead.¹² As time goes on, some households leave subsidized housing. By the end of the panel, subsidy rates fell to 61 percent for public housing residents. There is a similar pattern for the other two programs, with voucher recipients leaving the fastest.

All of these households, including those that had moved out of subsidized housing, remain in the subsidized group. One reason for this approach was to avoid the obvious sample selection problems that would result if only continuously subsidized households were included in the subsidized group. That is, those who remained longer in subsidized housing may have been more likely to have preexisting disadvantages than the average subsidized or comparison group member. In addition, this procedure allows for the possibility that the effects of subsidized housing may linger, even after households leave. For example, if connections with the labor market deteriorated during time spent in subsidized housing, these connections presumably would not be rebuilt immediately upon exit.

One potential concern is the possibility that subsidized households are more likely to underreport their income to SIPP interviewers for fear that their answers will be reported to the PHA. Three factors mitigate this concern. First, subsidized households report 10 to 20 percent more income to the survey than they do to HUD; this difference provides some evidence that subsidized households believe the Census Bureau's confidentiality promises. Second, many comparison group members receive other means-tested subsidies (especially food stamps) and have similar incentives to misreport income. Third, many in the initially subsidized group (perhaps a quarter) have left for private-market housing by the end of the panel and no longer have this incentive to underreport their income.

Possible Biases

The major threat to the matching procedure validity is the possibility that those in subsidized housing might be more disadvantaged, in unobserved ways, than those in the comparison group. For example, they might have had lower motivation to find work or might have been

Exhibit 2

Proportion with Self-reported Housing Subsidy: Subsidized vs. Comparison Group

Exhibit 2A. Public Housing

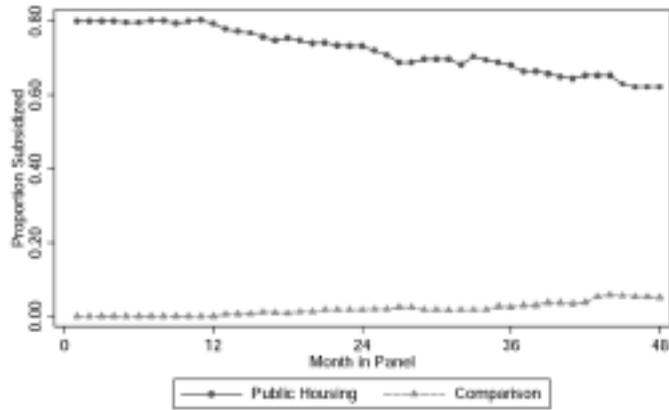


Exhibit 2B. Vouchers

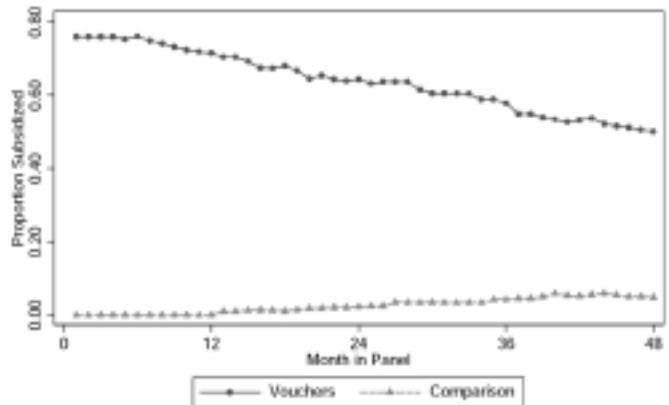
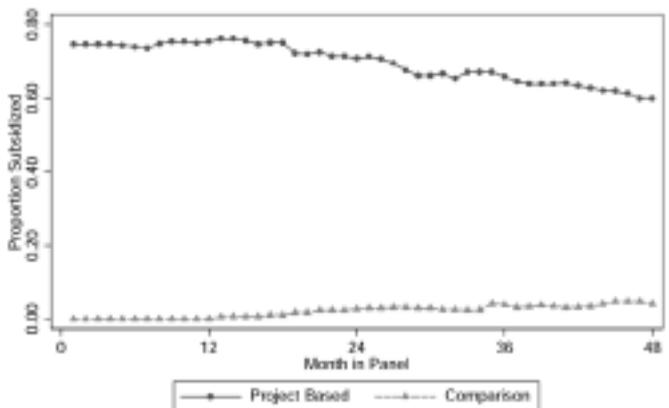


Exhibit 2C. Project Based



caring for sick relatives, neither of which is controlled for here. After all, disadvantages were presumably the reason they chose to move into subsidized housing in the first place. Indeed, during the period studied here, federal law required local PHAs to give preference to households that had high rent burdens, were displaced by federal action, were living in substandard housing, or were homeless.¹³

In general, selection for subsidized housing depends on PHA policies, applicants' actions, public and private landlords' actions, and the availability of suitable housing. In the end, this process probably selects for households with disadvantages not easily captured in survey data, but there are some factors that work to offset this selection. Public and private landlords have incentives to choose stable tenants; those likely to pay the rent and unlikely to cause property damage or other problems. For the voucher program in particular, approximately 20 to 30 percent of households offered rent vouchers failed to use them (Finkel and Buron, 2001). They were screened out by landlords or were otherwise unable to find qualifying housing. Shroder (2002b) finds some empirical evidence that voucher recipients with more disadvantages (those with disabilities or lacking cars) are less likely to find housing on which to spend their subsidies.

Minimizing Potential Biases

Concerns that housing subsidy programs systematically select those with unmeasured disadvantages can be interpreted econometrically as the possibility that we are matching those with permanently low incomes to those with only temporarily low incomes. Perhaps we are matching subsidized householders who were out of the labor force because of disabled children (or some other long-term factor) with comparison households that were suffering unemployment due to temporary layoffs. A similar potential problem is random measurement error. It could be that the comparison group simply had a negative error term in the beginning of the panel but rapidly reverted to the mean after the time of the match.¹⁴

This discussion suggests that a method for minimizing this problem is to match using variables measured over a longer period. For example, annual earnings will be closer to permanent earnings than monthly earnings will be. One way in which this idea is implemented is by matching on the employment history variables, which should provide some information about the more permanent components of earnings. In addition, the statistical match is based on variables from both wave one (months 1–4) and wave three (months 9–12). This choice of variables is likely to be superior to matching on 12 months of earnings for two reasons. First, using two separate measures allows the matching procedure to capture a trend. Second, those with temporary shocks to earnings will be screened out by this procedure, but might have spuriously matched if annual earnings had been used. For example, a high earner who is unemployed in wave one is likely to have found a job by wave three (because 9-month spells of unemployment are unusual). The higher earnings in wave three will then cause the match to be rejected. Annual earnings would not cause this bad match to be rejected; we would just see a year of low earnings and would not realize that this person's earnings rebounded later in the year. Using waves one and three means that an unemployment spell has to be at least 6 months long before it can affect both waves and, even then, it will do so only if it begins in month 4. Below, results with various combinations of waves are explored further.

Illustration of Matching on Temporary Dips

Exhibit 3A illustrates the potential problem caused by matching on temporary shocks. In this exhibit, the comparison group was matched using only wave one variables and no employment history data. In the exhibit, both the voucher recipients and their comparison group have falling poverty rates over time, but the comparison group's poverty rates fall faster. Much of the difference is due to a rapid fall in the comparison group's poverty

rates in month 5, between the first and second waves.¹⁵ This pattern casts doubt on the plausibility of interpreting the subsidy/comparison differences as causal and suggests that those with long-term troubles have been matched to comparison members experiencing a brief dip in income due to temporary problems. Exhibit 3B shows the same outcome but includes a comparison group matched using waves one and three and the employment history variables; the rest of this study uses this procedure. In this exhibit, there is less evidence of a jump in the beginning of the panel. The comparison group poverty rate falls faster than that of the public housing residents, but the fall is more gradual. This exhibit is more illustrative of what would be expected if the differences were truly causal, since we expect any effects of subsidized housing to build up slowly over time. In addition, there is nothing special about any particular month of the panel that should cause such a jump. Examining exhibits like these led to the decision to match on multiple waves of data.¹⁶

Exhibit 3

Illustration of Matching on Temporary Dips: Wave One Match With No Employment History Variables Compared With Matching on Waves One and Three and Employment History

Exhibit 3A. Wave One Only Match

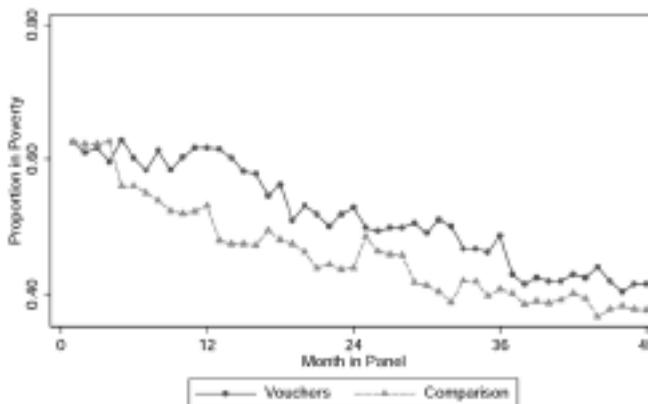
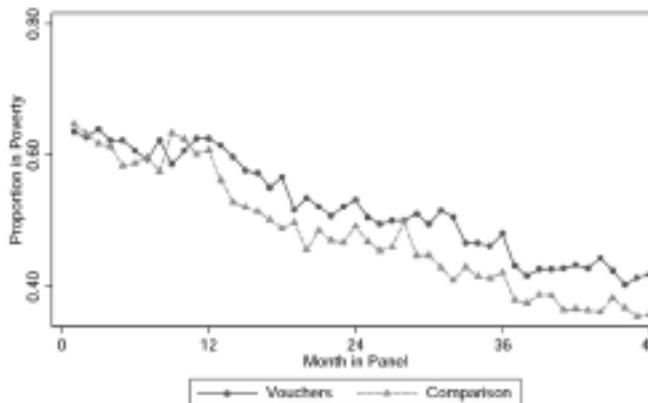


Exhibit 3B. Waves One and Three Match



Baseline Results

Levels

Exhibits 4A–9A, 4B–9B, and 4C–9C show selected outcomes over the panel’s life for the comparison group and for those with public housing, vouchers, or project-based subsidies, respectively. All the dependency-related outcomes (poverty, earnings, employment, food stamps, and Aid to Families with Dependent Children [AFDC]/Temporary Assistance for Needy Families [TANF]) show strong positive trends. Family earnings almost doubled by the end of the public housing group’s panel, while increasing by a factor of more than 2.5 for the comparison group. Employment rates rose by 11 percentage points for those in public housing and by 17 percentage points for the comparison group. Similarly, poverty and the receipt of food stamps and AFDC/TANF fell sharply for both groups. Those receiving vouchers or project-based subsidies experienced similar gains, with voucher recipients improving their situation most rapidly. Exhibits 9A–9C display an important demographic outcome, the number of adults per household, which rises fairly substantially over time.

From 1996 to 1999, the economy achieved a strong recovery, and the unemployment rate fell from 5.4 to 4.2 percent.¹⁷ Single mothers posted large employment gains (see, for example, Lerman, 2003) and welfare rolls fell sharply as states implemented welfare reform. Grogger, Karoly, and Klerman (2002) found that from 1993 to 1999 single mothers’ average earnings rose by 35 percent in real terms and employment rates rose from 69 to 83 percent. Hence, subsidized housing residents’ strong gains are not too surprising; they were able to take advantage of the 1990s’ economic boom.

Differences: Income

Exhibit 10 shows the wave twelve (final wave) results for the three subsidy groups and their comparison groups. The underlying data consist of monthly averages over the 4 months of the wave. Public housing residents had substantially lower family incomes than their comparison group, an average of \$1,502 per month compared to \$1,753, and 8 percent higher poverty rates. The differences were smaller for voucher and project-based subsidy recipients. None of the differences for vouchers or project-based subsidies were statistically significant, although the point estimates are all in the same direction as those for public housing.¹⁸

Differences: Employment and Earnings

The results for earnings were generally similar to those for income, pointing toward reductions in earnings. Public housing residents had family earnings \$235 lower than the comparison group, and those with project-based subsidies had family earnings \$277 lower. There were no statistically significant differences for voucher recipients, although the point estimates of reductions in earnings were similar to those for the other two programs.

There were no statistically significant effects on employment, implying that the earnings impacts are due to a reduction in work hours or wages among the employed. Regression-adjusted results not presented here find employment reductions in line with the earnings reductions for public housing residents but not for the other two programs.¹⁹ Decomposing the earnings impacts into the effects of employment, hours, and wages is not pursued further here; instead, the focus is on earnings.

Differences: Transfer Programs

Most of the differences between the subsidized and comparison groups are fairly small; only two of nine differences are statistically significant and point toward greater dependency.

Exhibit 4

Proportion in Poverty: Subsidized vs. Comparison Group

Exhibit 4A. Public Housing

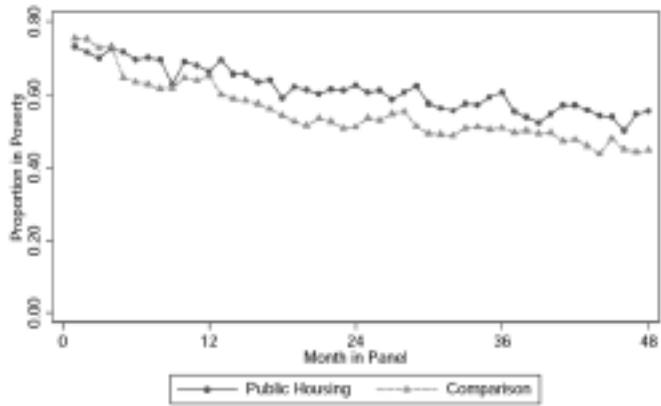


Exhibit 4B. Vouchers

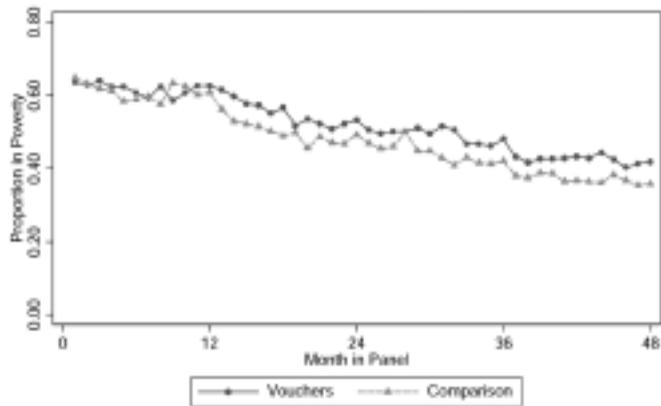


Exhibit 4C. Project Based

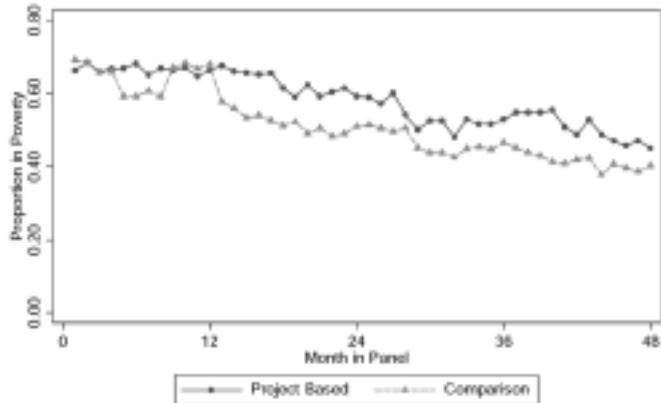


Exhibit 5

Monthly Family Earnings: Subsidized vs. Comparison Group

Exhibit 5A. Public Housing

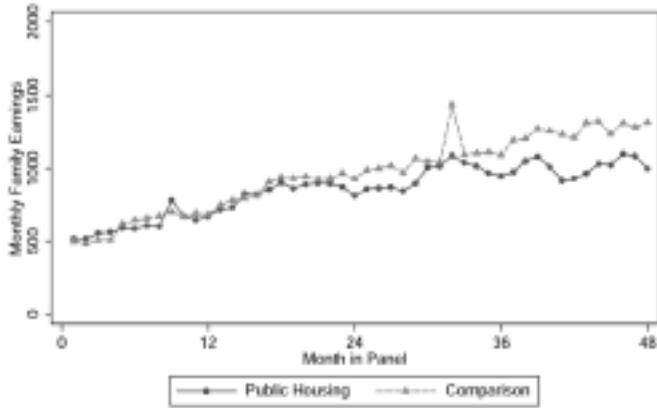


Exhibit 5B. Vouchers

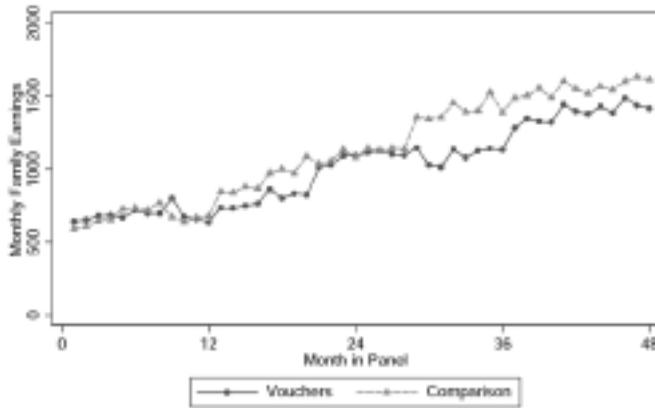


Exhibit 5C. Project Based

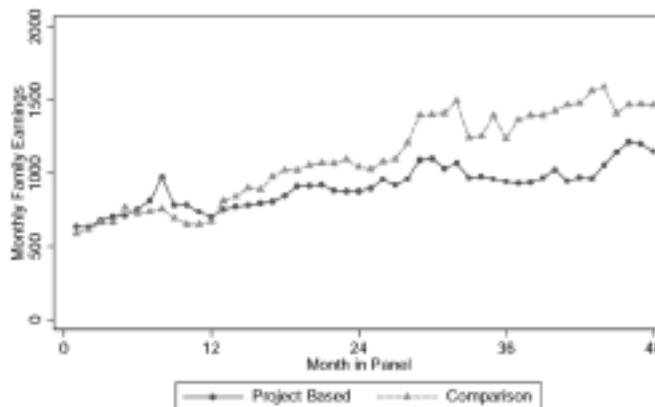


Exhibit 6

Proportion Employed: Subsidized vs. Comparison Group

Exhibit 6A. Public Housing

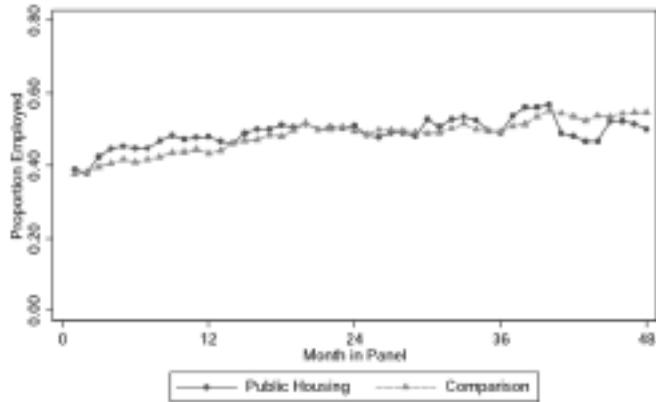


Exhibit 6B. Vouchers

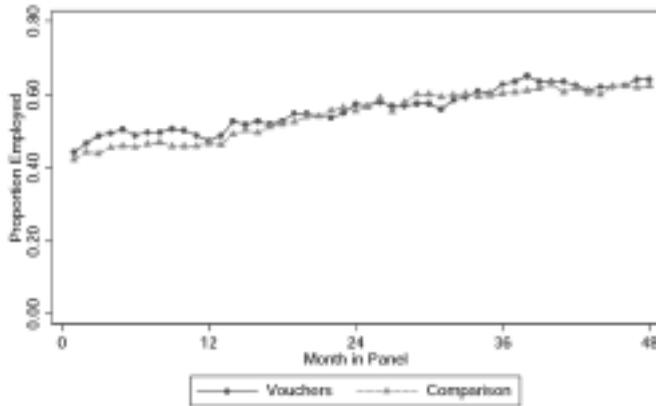


Exhibit 6C. Project Based

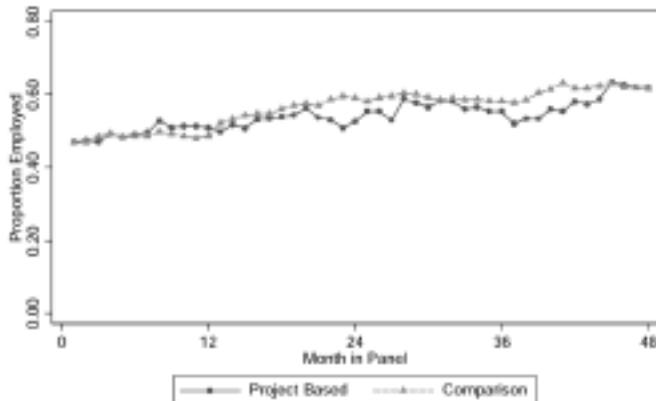


Exhibit 7

Proportion With Food Stamps: Subsidized vs. Comparison Group

Exhibit 7A. Public Housing

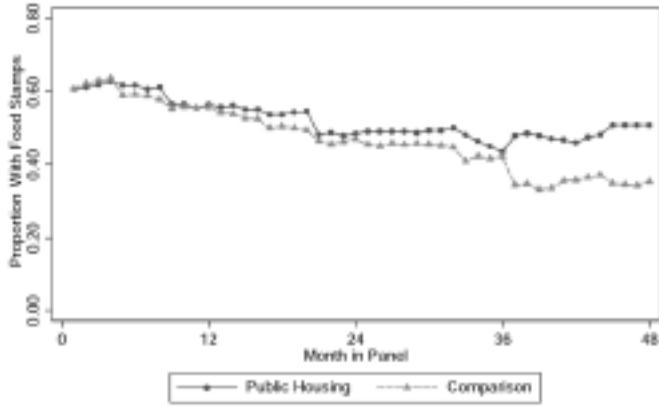


Exhibit 7B. Vouchers

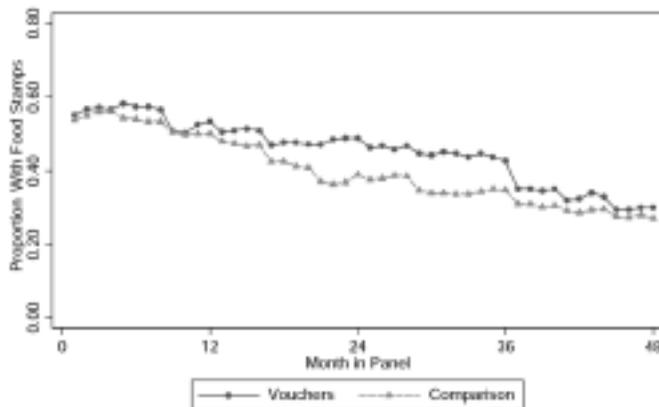


Exhibit 7C. Project Based

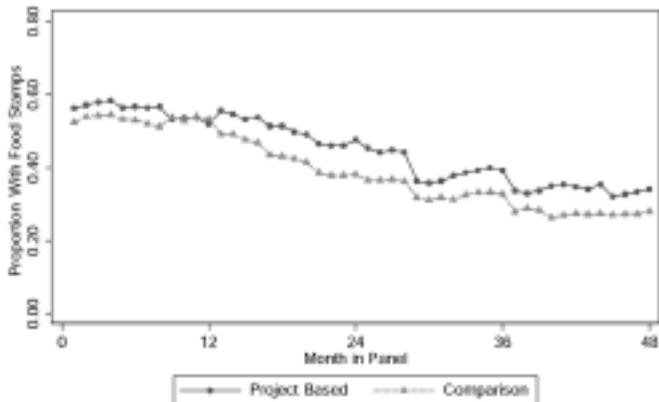


Exhibit 8

Proportion With AFDC/TANF: Subsidized vs. Comparison Group

Exhibit 8A. Public Housing

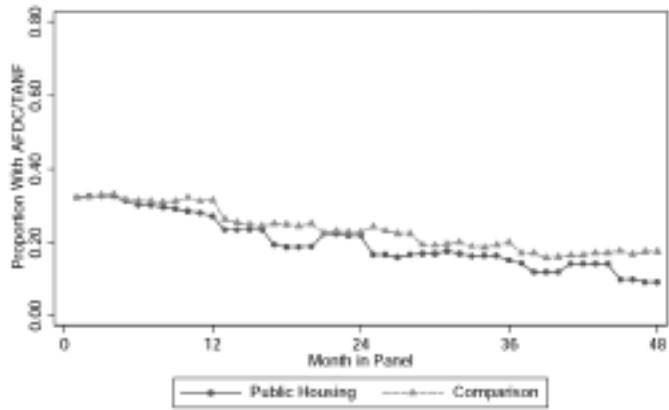


Exhibit 8B. Vouchers

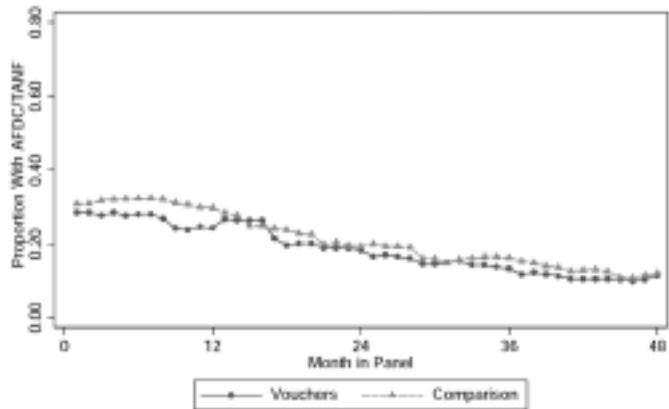


Exhibit 8C. Project Based

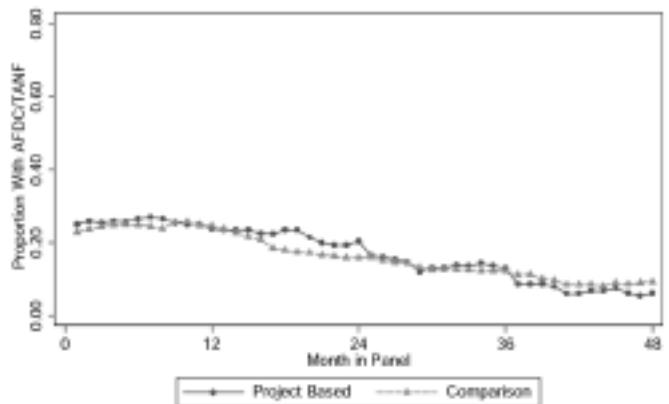


Exhibit 9

Adults per Household: Subsidized vs. Comparison Group

Exhibit 9A. Public Housing

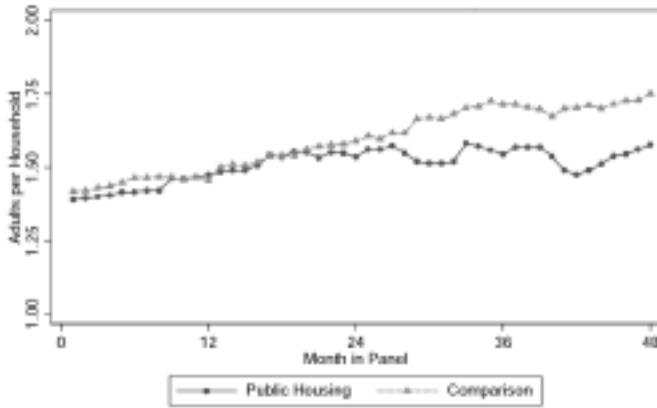


Exhibit 9B. Vouchers

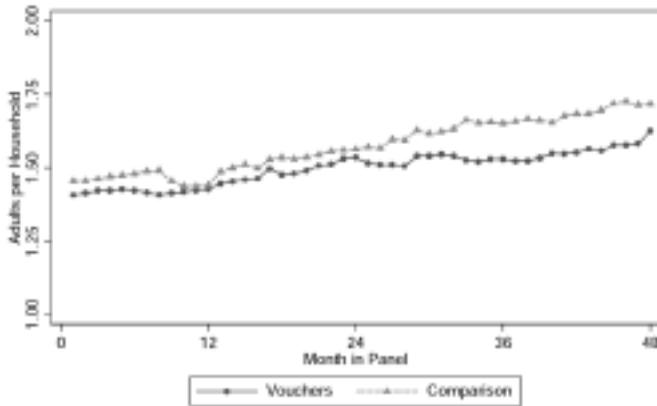


Exhibit 9C. Project Based

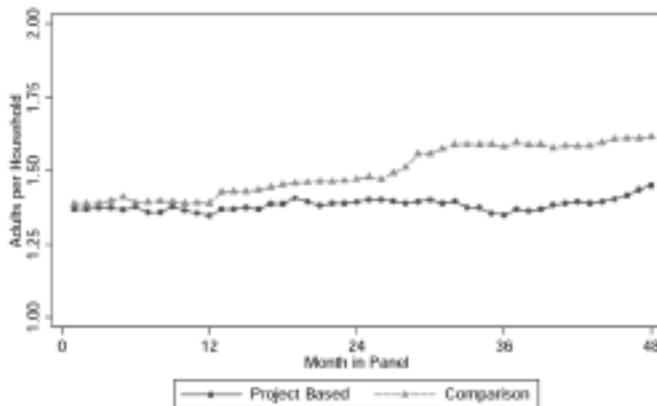


Exhibit 10

Subsidized Households vs. Comparison Groups: Average Income, Earnings, Program Participation, Household Composition, and Housing Subsidy Receipt in Wave Twelve^a

| | Public | | Comparison | | Difference | | Vouchers | | Comparison | | Difference | | Project | |
|-------------------------------------|-----------|-------|------------|-------|------------|-----------|-----------|-------|------------|-------|------------|-------|-----------|-----------|
| | Household | Group | Household | Group | Household | Group | Household | Group | Household | Group | Household | Group | Household | Group |
| Family income | 1,502 | 1,753 | 1,825 | 1,972 | -252 * | -147 | 1,825 | 1,972 | 1,567 | 1,763 | -195 | 1,567 | 1,763 | -195 |
| Individual income | 987 | 1,103 | 1,192 | 1,263 | -116 | -71 | 1,192 | 1,263 | 1,070 | 1,129 | -59 | 1,070 | 1,129 | -59 |
| Poverty | 0.534 | 0.454 | 0.414 | 0.365 | 0.08 * | 0.049 | 0.414 | 0.365 | 0.461 | 0.397 | 0.063 | 0.461 | 0.397 | 0.063 |
| Family earnings | 1,048 | 1,283 | 1,430 | 1,594 | -235 * | -164 | 1,430 | 1,594 | 1,175 | 1,452 | -277 ** | 1,175 | 1,452 | -277 ** |
| Family employment | 0.604 | 0.652 | 0.723 | 0.708 | -0.047 | 0.015 | 0.723 | 0.708 | 0.682 | 0.713 | -0.031 | 0.682 | 0.713 | -0.031 |
| Individual earnings | 659 | 759 | 880 | 995 | -99 | -115 | 880 | 995 | 778 | 903 | -126 | 778 | 903 | -126 |
| Employed (person) | 0.515 | 0.542 | 0.632 | 0.620 | -0.027 | 0.011 | 0.632 | 0.620 | 0.624 | 0.621 | 0.003 | 0.624 | 0.621 | 0.003 |
| Transfer income | 149 | 146 | 175 | 101 | 2 | 74 ** | 175 | 101 | 89 | 101 | -12 | 89 | 101 | -12 |
| Welfare | 0.095 | 0.173 | 0.105 | 0.113 | -0.078 ** | -0.008 | 0.105 | 0.113 | 0.063 | 0.089 | -0.026 | 0.063 | 0.089 | -0.026 |
| Food stamps | 0.508 | 0.347 | 0.296 | 0.275 | 0.160 *** | 0.022 | 0.296 | 0.275 | 0.330 | 0.274 | 0.055 | 0.330 | 0.274 | 0.055 |
| Adults in household | 1.56 | 1.73 | 1.59 | 1.72 | -0.18 ** | -0.13 * | 1.59 | 1.72 | 1.43 | 1.61 | -0.18 *** | 1.43 | 1.61 | -0.18 *** |
| Children in household | 1.77 | 1.72 | 1.73 | 1.63 | 0.04 | 0.10 | 1.73 | 1.63 | 1.37 | 1.38 | 0.00 | 1.37 | 1.38 | 0.00 |
| Married | 0.229 | 0.292 | 0.281 | 0.308 | -0.063 | -0.027 | 0.281 | 0.308 | 0.206 | 0.280 | -0.074 * | 0.206 | 0.280 | -0.074 * |
| Single female | 0.652 | 0.631 | 0.622 | 0.616 | 0.020 | 0.006 | 0.622 | 0.616 | 0.670 | 0.637 | 0.033 | 0.670 | 0.637 | 0.033 |
| Housing project (self-report) | 0.555 | 0.024 | 0.143 | 0.028 | 0.531 *** | 0.115 *** | 0.143 | 0.028 | 0.410 | 0.029 | 0.381 *** | 0.410 | 0.029 | 0.381 *** |
| Other housing subsidy (self-report) | 0.068 | 0.029 | 0.365 | 0.022 | 0.039 * | 0.343 *** | 0.365 | 0.022 | 0.197 | 0.016 | 0.181 *** | 0.197 | 0.016 | 0.181 *** |
| N | 132 | 321 | 184 | 443 | | | 184 | 443 | 147 | 405 | | 147 | 405 | |

Notes: *** = Statistically significant at the 1-percent level; ** = 5-percent level; * = 10-percent level. Sample restricted to householders less than 55 years of age. All variables are measured as monthly averages with the exception of the employment history variables.

^a Interviews conducted December 1999 to March 2000.

Sources: Merged Census Bureau survey data and Department of Housing and Urban Development administrative data from the 1996 Survey of Income and Program Participation, Multifamily Tenant Characteristics System, and Tenant Rental Assistance Certification System

Public housing is estimated to increase food stamp receipt by 16 percentage points, a substantial effect, and vouchers are estimated to increase total transfer payments by \$74 per month, which is also substantial relative to the comparison group's mean of \$101. None of the programs increased welfare (AFDC/TANF) participation, and public housing is actually estimated to have reduced participation by 7.8 percentage points. The other six effects are fairly small and statistically insignificant. Overall, these inconsistent and often statistically insignificant results weigh against the conclusion that housing subsidies substantially affect program receipt.

Differences: Household Composition

None of the programs have much effect on the number of children in the household. Point estimates of the effects on marriage are moderately large, although only the estimate for project-based subsidies is statistically significant. Residents of public housing and other subsidized projects did have smaller increases in the number of adults in the household than did the comparison group. Reductions of 0.13 to 0.18 adults for the three programs are somewhat sizeable and statistically significant. An important topic for future research is to decompose this effect into the change due to marriage, cohabitation, and other types of living arrangements. Below, we examine to what extent the reduction in household size is responsible for the observed differences in family earnings.

Comparisons Across Programs

F-tests of the null hypothesis that the three programs had identical impacts (subsidized/comparison differences) were estimated for all the outcomes in exhibit 10. In most cases, the tests could not reject the null hypothesis that the differences across programs were all equal.²⁰ Although public housing, for example, shows more statistically significant differences than do vouchers, as indicated by the asterisks in exhibit 10, the F-tests show that caution is warranted before concluding that the effects of the two programs are different. In other words, we should be wary of interpreting any of these results as suggesting that outcomes in one program are better or worse than in another.

Census Tract Poverty Rates

One goal of this study is to investigate the effects of neighborhoods on subsidized housing residents separately from the other possible effects discussed above. Exhibit 11 reports statistics on one measure of neighborhood quality—the census tract poverty rate—measured in 1990 for the tract households occupied in early 1996. Public housing residents live in census tracts with poverty rates that are 8.8 percentage points higher on average than those of the comparison group, a substantial difference. Voucher recipients actually live in tracts with poverty rates that are lower by 2.3 percentage points than the comparison group. Since housing subsidy recipients tend to be quite disadvantaged, the major concern was finding a comparison group that was as disadvantaged as the subsidized groups. Although the difference in tract poverty rates was statistically significant, the sign of the difference alleviates concerns that the comparison group was too advantaged. Finally, those receiving project-based subsidies were located in tracts with poverty rates 2.6 percentage points higher than their unsubsidized counterparts. Overall, the matching does not control for differences in the types of neighborhoods that subsidized households live in. Thus, any differences we observe between the subsidized and comparison groups may be due partly to neighborhood effects. We could control for this difference in tract poverty rates simply by including this measure in the matching equation. Instead, tract poverty rates are left out at this stage and the effect of neighborhood on subsidized households is investigated further below.

The differences in exhibit 11 are also estimates of the effect of subsidized housing on the neighborhoods where the disadvantaged population chooses to live. We are comparing

the neighborhoods of subsidized households to those of a matched sample chosen to be similar on the basis of individual characteristics. It turns out that public housing residents live in much poorer neighborhoods than do other households with similarly low incomes, low likelihood of marriage, and so on. This is not surprising, since the neighbors of many residents of public housing are also residents of the same large projects. Assuming that no important determinants of neighborhood choice are omitted from the matching equation, these differences can be interpreted as subsidized housing’s effect on residents’ neighborhood choices.

Overall, these results line up well with expectations. The tract poverty rates for the different subsidy programs are fairly similar (within a few percentage points) to those reported by HUD (Burke, 1998). In addition, many analysts have pointed to the tendency of public housing projects to spatially concentrate low-income people. An important goal of the project-based and voucher subsidy programs was to deconcentrate poverty in response to the perceived troubles of the older public housing program.²¹ This goal was to be achieved either by building smaller, “scattered site” subsidized developments in higher income neighborhoods or allowing voucher recipients to choose their neighborhoods. The results in exhibit 11 suggest that the project-based programs have succeeded in increasing concentrated poverty by less than the public housing program has, while the voucher program has been able to modestly reduce the concentration of low-income people. The current voucher program may do more to spatially disperse low-income people than these results suggest. In 1996, rent vouchers could be used only in the jurisdiction where they were issued (generally, a city or county); today, vouchers are “portable.”

Exhibit 11

Subsidized Households vs. Comparison Groups: Census Tract Poverty Rates (1990) in Wave One^a

| | Subsidized Group | Comparison Group | Difference |
|----------------|------------------|------------------|------------|
| Public housing | 32.8 | 23.9 | 8.8*** |
| Vouchers | 19.3 | 21.6 | -2.3** |
| Project based | 24.2 | 21.6 | 2.6** |

Notes: *** = Statistically significant at the 1-percent level; ** = 5-percent level; * = 10-percent level. Sample restricted to householders less than 55 years of age.

^a Interviews conducted April 1996 to July 1996.

Source: See exhibit 10

Explaining the Subsidy Effects

Exhibit 12 shows results that combine matching with regression. These results enable us to examine how much of the subsidy effect is due to tract poverty rates and the presence of “extra” adults. For example, results in the upper left derive from a regression of family earnings in wave twelve on all the matching variables, measured in waves one and three, and an indicator for residence in public housing during the panel’s first few waves. The regression was estimated in the matched sample of public housing residents and unsubsidized households. The first column in each pair reports the coefficient on subsidy status. The second column reports results from a model in which tract poverty rates (measured in wave one) and indicators for the number of adults in the household (measured in wave twelve) are included. The matching/regression approach allows us to control for some simple noneconomic factors (or at least some factors not included in a simple neoclassical model). In addition, this “belt and suspenders” approach of using regression to control for any remaining differences in the matched samples also has some technical advantages. For example, it reduces the standard errors of the estimates and can reduce bias as well.²²

Exhibit 12

**Regression-adjusted Matching Estimates
Effect of Housing Subsidy Receipt, Tract Poverty Rates, and Household Size on Family Earnings, Individual Earnings, and Number of Adults in Household in Wave Twelve^a**

| | Public Housing | | Vouchers | | Project Based | | Any Subsidy |
|--|---------------------|---------------------|-------------------|-------------------|----------------------|----------------------|-----------------------|
| Family Earnings | | | | | | | |
| Public housing | -240 ** (116) | -70 (112) | -158 (133) | -44 (123) | -195 * (106) | -49 (95) | -213 *** (75) |
| Wave one tract poverty rate (%) | | -6.08 (4.56) | | 1.67 (4.49) | | -10.02 *** (3.78) | -4.08 (2.71) |
| Two adults in household, wave twelve | | 806 *** (161) | | 938 *** (141) | | 946 *** (151) | 880 *** (99) |
| Three or more adults in household, wave twelve | | 1857 *** (348) | | 2132 *** (283) | | 2003 *** (318) | 1991 *** (225) |
| R-squared | 0.30 | 0.41 | 0.29 | 0.43 | 0.37 | 0.48 | 0.29 |
| Individual Earnings | | | | | | | |
| Public housing | -129 * (75) | -109 (83) | -141 * (83) | -128 (86) | -131 * (72) | -126 * (74) | -144 *** (48) |
| Wave one tract poverty rate (%) | | -1.40 (3.29) | | 1.89 (3.61) | | -3.76 (2.61) | -0.65 (1.96) |
| Two adults in household, wave twelve | | 26 (85) | | -107 (96) | | -48 (71) | -47 (55) |
| Three or more adults in household, wave twelve | | 178 (253) | | 113 (166) | | 176 (214) | 158 (146) |
| R-squared | 0.34 | 0.34 | 0.37 | 0.37 | 0.48 | 0.47 | 0.37 |
| Adults in Household | | | | | | | |
| Public housing | -0.119 * (0.070) | -0.064 (0.072) | -0.090 (0.065) | -0.087 (0.067) | -0.153 ** (0.062) | -0.148 ** (0.063) | -0.114 *** (0.041) |
| Wave one tract poverty rate (%) | | -0.004 * (0.002) | | -0.002 (0.002) | | 0.001 (0.002) | -0.002 (0.002) |
| R-squared | 0.40 | 0.41 | 0.29 | 0.31 | 0.30 | 0.30 | 0.31 |
| N | 453 | 447 | 627 | 606 | 552 | 538 | 1,393 |

Notes: *** = Statistically significant at the 1-percent level; ** = 5-percent level; * = 10-percent level. Sample restricted to householders less than 55 years of age. Other explanatory variables in the regression are the same wave one and three variables as are in the matching function. See text and exhibit 1. Table entries are OLS regression coefficients with heteroskedasticity-consistent standard errors in parentheses.
^a Interviews conducted December 1999 to March 2000.

Sources: Merged Census Bureau survey data and U.S. Department of Housing and Urban Development administrative data from the 1996 Survey of Income and Program Participation, Multifamily Tenant Characteristics System, and Tenant Rental Assistance Characteristics System

Estimates Without Additional Controls

The regression-adjusted results are broadly similar to the simple comparison of means for the matched sample in exhibit 10. There is little change for family earnings except that the reduction in earnings for project-based recipients falls from \$277 to \$195 a month, remaining statistically significant at the 10-percent level. The reduction in individuals' earnings increases slightly and becomes statistically significant at the 10-percent level for all three programs. The reduction in the number of adults in the household decreases somewhat, falling from -0.13 to -0.09 for the voucher recipients, and becomes statistically insignificant for this group. This exhibit also adds a fourth pair of columns for all three programs combined. The results for the pooled sample are always statistically significant at the 1-percent level.

Tract Poverty Rates

In general, tract poverty rates have only modest effects. The point estimates for public housing and project-based subsidies are moderate, and only the estimate for project-based assistance is statistically significant. A coefficient of -6 implies that a 10-point increase in tract poverty rates reduces family earnings by \$60, which would explain a quarter of the baseline \$240 reduction in family earnings. A 10-point increase is a fairly large change; it is more than the estimated difference in poverty rates between public housing residents and their unsubsidized comparison group. A similar increase could explain more than half of the baseline project-based effect of \$195, but this change is much larger than that induced by the program.²³ Tract poverty rates generally have very little effect on either individual earnings or the number of adults in the household. The one exception is for public housing, where a 10-point increase in tract poverty rates is estimated to reduce the average number of adults in the household by 0.04. Although this effect is small, it does explain about one-third of the baseline reduction of -0.12 . One reason why poverty rates may have little effect is that they are measured in wave one, and many households have moved during the panel's 4 years. Still, the results do suggest that the effect of tract poverty rates is not very long lasting.

The relative unimportance of tract poverty rates is consistent with the generally disappointing findings of the Moving to Opportunity (MTO) experiments, which successfully moved public housing residents to low-poverty neighborhoods by providing vouchers but were not particularly successful in boosting the recipients' employment rates (Orr et al., 2003). The modest effect of neighborhood poverty found here is, at least, not inconsistent with the extensive nonexperimental literature on the spatial mismatch hypothesis. In a recent survey, O'Regan and Quigley (1999: 460–461) concluded, "Job access does play a role in gaining employment, at least for youth, but none of the research suggests it is the primary determinant. Individual characteristics (education, job skills) and labor market conditions (unemployment, industry mix) clearly dominate." That is, the spatial mismatch literature has found that accessibility plays a relatively modest role despite the fact that this research focuses on youth, whose employment rates are likely to be especially responsive to job access.

Adults in Household

The number of adults in the household has a substantial effect on family earnings. This finding is not surprising, since more adults, if they are related and have any earnings, will mechanically increase total family earnings. The presence of additional adults in a household has no statistically significant effect on individual earnings. A priori, more adults could either provide childcare, facilitating the householder's opportunity to work, or provide extra income, reducing the need for the householder to work. The results, however, find no clear effect—positive or negative.

Explaining the Subsidy/Comparison Gap

Overall, adding tract poverty rates and the number of adults in the household to the model sharply reduces the estimated negative effects on family earnings. These two measures “explain” about three-quarters of the estimated reduction in family earnings for the three individual programs, or 56 percent when the three programs are pooled. The additional variables have very little effect on the householders’ earnings. Tract poverty rates explain about half of the reduction in the number of adults per household for the public housing sample but explain little for the other two programs. These differing results make sense, since public housing residents live in much poorer (by 9 percentage points) tracts than do others with similar individual characteristics.

Alternative Estimates

The methodological discussion above emphasizes the importance of matching over as long a time period as possible and using retrospective data on prepanel employment to avoid matching subsidized members with more permanent disadvantages to comparison group members who are experiencing only temporary difficulties. At the same time, matching over too long a time period reduces the period of followup available.

To explore this issue, the key results were reestimated using alternative matching periods.²⁴ In general, the earnings impacts were reduced as the length of the matching period increased. For example, the impact on family earnings for public housing is \$549 when the match includes only wave one and no employment history variables, \$427 with the employment history variables added to the matching equation, and \$293 when the match includes waves one and four. In general, adding wave two results in large reductions in the earnings impact, but replacing wave two with wave three or four has a relatively small effect and sometimes increases the impact. It appears, then, that adding the retrospective employment data and at least a second wave makes an important difference, presumably leading to fewer matches based on temporary earnings shortfalls. There is no strong reason, however, to choose wave two, three, or four as the second wave in the match.

The impacts for the number of adults in the household are affected much less by the length of the matching period, especially for public housing and project-based assistance, which is consistent with the fact that living arrangements last longer than jobs do.

Probably the most relevant changes in the economic environment facing low-income households during the period examined here were welfare reform and the associated sharp drop in welfare caseloads. To examine the impact of welfare reform, the models were reestimated with the addition of Ellwood’s (2000) measure of noneconomic caseload drops (caseload drops due to changes in welfare rules rather than economic factors). This proved to have little effect on the results, probably because the subsidized and control groups were well balanced with respect to the Ellwood caseload drop measure.

The results presented herein are not weighted and there is little reason to do so; matching and regression methods are alternatives to weighting. The strongest argument for weighting with the Census Bureau’s sampling weights is that the Survey of Income and Program Participation oversamples high-poverty areas, which may affect the levels (but not the treatment effects). When exhibit 10 was reestimated using weights (specifically, applying the subsidized group’s weights to both the subsidized households and their comparison households), there was very little change in the differences or the levels.

Comparison to Other Research

A recent study by Abt Associates Inc. (Patterson et al., 2004) is of great interest because it is the only experimental study of the effect of vouchers on earnings, welfare receipt, and neighborhood poverty rates. Patterson et al. examined a pilot program that gave vouchers to randomly chosen current and former TANF recipients in six cities; the researchers analyzed outcomes over a seven-quarter followup period.²⁵ Compared to the SIPP sample used here, Abt Associates' sample was somewhat more disadvantaged, but not extremely so.²⁶

The most comparable findings from the Patterson et al. study are for those living in their own unsubsidized households before receiving vouchers. As with the SIPP sample, which is limited to householders, these results from Patterson et al. exclude those living with friends or relatives and those living in homeless shelters, who may have experienced different impacts. In addition, results for this subgroup exclude those living in public or project-based subsidized housing before receiving vouchers, in line with the SIPP comparison group, which is limited to unsubsidized households.

For this subgroup, the Abt study found an earnings reduction of 11.0 percent, an increase in transfer payments of 10.0 percent, and an increase in tract poverty rates of 0.5 percentage points. Only the earnings impact was statistically significant. In comparison, this study estimated a reduction in individual earnings of 14.2 percent (an impact of \$141 from exhibit 12 divided by a control mean of \$995 in exhibit 10). An important caveat is that slightly different matching periods resulted in estimating smaller and statistically insignificant earnings reductions. For the other two programs, we found reductions in individual earnings of 17 percent (public housing) and 14 percent (project based). These estimates are not significantly different from each other or from the voucher impact. This study also found inconsistent impacts on welfare receipt and a reduction in tract poverty rates of 2.3 percentage points. The major finding from a comparison of the SIPP-based and Abt Associates studies is that the earnings reductions and, to a lesser extent, the fall in tract poverty rates are of approximately the same magnitude.

Olsen (2004), who performed a nonexperimental study based on panel data, found earnings reductions of the subsidy programs roughly twice the size of those found here: an increase in monthly earnings of \$300 to \$500 relative to the comparison group over 2 years. These findings may be biased because of the relatively limited set of available control variables and because of measurement issues; the subsidy group's earnings were measured with administrative data and the comparison group's earnings were measured with survey data.²⁷ Nonetheless, the Olsen study is of special interest since it is based on methods somewhat similar to those used here. In particular, it is one of the few other studies that makes use of longitudinal data.

Conclusion

This study has examined the effects of subsidized housing on various outcomes related to dependency using a new data set created by an exact match between the SIPP and HUD administrative data. The match to administrative data allows for much more accurate identification of subsidized housing residents and allows the three major classes of subsidized housing to be distinguished, which would not be possible with the SIPP alone. At the same time, the match creates a sample that somewhat underrepresents Hispanics and misses about one-third of truly subsidized residents, requiring the use of survey self-reports to screen out subsidized cases from the comparison group. The statistical matching procedure also worked quite well, at least insofar as it successfully balanced the characteristics of the subsidized and comparison groups.

For almost every outcome, subsidized households shared in the gains of the 1990s' economic boom, showing sharp income and earnings increases and reductions in poverty and transfer program participation. Welfare reform (the introduction of TANF in 1996 and 1997) may have been another factor driving these trends, although this study presents no direct evidence on the reasons for the gains.

Compared to the matched cases, residents of public housing and other types of subsidized projects had substantially less income and earnings growth (by various measures) over the 4 years of the SIPP panel than did unsubsidized households that were similar at the beginning of the panel. Family earnings of those in public housing grew more slowly than those of similar families, ending up 19 percent below the comparison group's level. Those with project-based subsidies received 13 percent less earnings and those with vouchers also had lower earnings at the end of the panel than the comparison group had, but the difference was not statistically significant. Caution is warranted before concluding that the voucher program is "better," however, because we are unable to statistically reject the hypothesis that all three programs have the same impact on family earnings. Indeed, equal impacts cannot be ruled out for almost any outcome examined here.

All three programs had similar effects on individual earnings. Subsidized households ended up with 17 percent (public housing), 14 percent (vouchers), and 15 percent (project-based) lower earnings than the comparison group had. It is possible, of course, that this reduction in earnings may have been offset by increased time spent on childcare or other nonmarket labor, an issue not addressed here.

In contrast to the reductions in earnings, none of the programs increased welfare (AFDC/TANF) receipt, and effects on food stamps or total transfer payments were each found for only one of the three programs.

Public housing and other project-based subsidy programs were found to lower the number of adults in the household by 6.9 and 9.5 percent, respectively. The effects for vouchers were smaller and not statistically significant. The desirability of this effect is less than clear; it may reflect reduced crowding and an increased ability to leave abusive situations or it may reflect a move to a thinner "marriage market" with fewer opportunities for marriage and cohabitation.

Public housing and project-based subsidies move recipients into neighborhoods with poverty rates that are 8.8 and 2.6 percentage points higher, respectively. Voucher recipients, by contrast, live in neighborhoods with poverty rates that are 2.3 percentage points lower than unsubsidized households with similar individual characteristics.

Of course, all these conclusions may potentially be driven by the selection into subsidized housing of those with greater preexisting (unmeasured) disadvantages. To address these issues, the matching models used characteristics that are as permanent as possible (such as several years of employment history) and used the same variables (measured in an earlier period) as the outcomes to be examined. The hope is that year one earnings will capture many of the unobserved characteristics driving earnings in year four. In addition, the use of poverty rates as controls in some models lessens concerns about sample selection bias, especially for the voucher and project-based subsidy groups. Neighborhood poverty rates are likely to be a powerful measure of long-term disadvantage (or advantage), since location decisions are typically based on long-term factors.

At the same time, neighborhood poverty rates did little to explain the impacts on either family or individual earnings, which is consistent with the MTO studies. Combined, the reduction in the number of adults in the household and the move to neighborhoods with higher poverty rates could explain half to three-quarters of the reduction in family earnings

for public housing and project-based subsidies, with household size accounting for the bulk of the decrease. In other words, subsidized housing recipients have lower family earnings because they have less family (that is, they have smaller households).

Tract poverty rates and household size accounted for little of the reduction of individual earnings, casting some doubt on theories of neighborhood effects such as those based on labor market networks, crime, or psychological factors. By process of elimination, we are left with mechanisms that operate directly on individuals (perhaps stigma) or neighborhood effects not closely tied to poverty (such as commuting time). Especially prominent among the remaining explanations are neoclassical income and substitution effects such as the implicit “tax” on work due to rent increasing with income.

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This article reports the results of research and analysis undertaken by U.S. Census Bureau staff. It has undergone a Census Bureau review more limited in scope than that given to official Census Bureau publications. This article is released to inform interested parties of research and to encourage discussion.

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Notes

1. The U.S. Department of Housing and Urban Development allows certain earnings deductions, but for most employed households the marginal “tax” is 30 percent.
2. Another recent experimental evaluation is the series of Moving to Opportunity (MTO) studies (for example, Katz, Kling, and Liebman, 2001). These studies are of less relevance here because they compare voucher recipients to housing project residents. The MTO studies generally found little difference in earnings or welfare receipt between the two housing programs.
3. The Survey of Income and Program Participation is described in detail at <http://www.sipp.census.gov/sipp/intro.html>.
4. Transactions also occur when a household leaves subsidized housing or moves from one subsidized unit to another and for some other administrative reasons.
5. Five transactions are listed as occurring after December 1996; income certifications can be done up to 3 months in advance.
6. Sample members who did not merge because they did not report Social Security numbers to the Survey of Income and Program Participation cannot contaminate the comparison group because they are excluded from both the subsidized and comparison samples.

7. Specifically, cases were coded as living in public housing if they were identified as “Public Housing,” “Indian Housing,” and “Others (Public Housing)” in the HUD Multifamily Tenant Characteristics System (MTCS) data. Cases were coded as receiving vouchers if they were listed as Section 8 Certificates or Section 8 Vouchers in the MTCS data. Cases were coded as project-based subsidies if they were listed as living in “Section 8” (meaning Section 8 new construction or substantial rehabilitation), “Rent Supplement,” “RAP,” “Section 236,” “BMIR,” “Section 202 PRAC” “Section 811 PRAC,” or “Section 202/162 PRAC,” in the HUD Tenant Rental Assistance Certification System data; or as “Mod Rehab” (meaning Section 8 moderate rehabilitation) in the MTCS data.
8. The statistical match was implemented using PSMATCH2 software for the Stata statistical package (Leuven and Sianesi, 2003; Sianesi, 2001). I modified this software to facilitate the creation of a matched file for analysis with procedures other than PSMATCH2.
9. Family income is shown in the exhibit but was not used in the logit because many of the many similar measures included in the logit were deemed sufficient.
10. Additional matching variables used in the propensity score logit but not shown in this exhibit are the presence of the following types of bank savings: savings account, interest-bearing checking account, money market account, and certificate of deposit; several variables measured at wave three, including individual income, transfer income, family employment, family earnings, poverty status, and receipt of food stamps; and the square of age in wave one.
11. In addition, the propensity score is a single index that attempts to summarize a long list of variables. It is possible that, say, a disabled person (raising the chance of subsidy) with a relatively high income (lowering the chance of subsidy) might be considered a good match for a nondisabled person with a low income, since only the propensity score matters.
12. The rates were below 100 percent for two reasons. First, in any given month, a household reported as subsidized by HUD at some time during 1996 may have moved out of subsidized housing or may not have moved in yet. Second, there was some underreporting of subsidy status in the Survey of Income and Program Participation (SIPP). About 10 percent of public housing residents and about 20 percent of those in the other two programs reported “not assisted” to the SIPP (Susin, 2004).
13. Federal preferences were eliminated in 1998 but were in effect during the time when sample members entered subsidized housing.
14. This setting is similar in some ways to Ashenfelter and Card (1985) except that those authors considered the case in which workers were selected into a training program because their earnings were temporarily low, while in the present case households are assumed to select into subsidized housing because the permanent component of the incomes is low.
15. Transitions in the Survey of Income and Program Participation occur more frequently between waves, a phenomenon known as “seam bias.”
16. Voucher recipients’ poverty rates were chosen as the case to graph because of their illustrative value. When matching with only one wave, poverty rates showed the most worrisome pattern of second-wave jumps. When matching over a longer period, the voucher group showed the “nicest” time pattern of the three programs (see exhibits 4A–4C).

17. Figures from the Bureau of Labor Statistics can be found at: <ftp://ftp.bls.gov/pub/special.requests/lf/aat1.txt>.
18. Standard errors in all exhibits are based on the usual formula, which assumes a simple random sample. The standard errors for exhibit 9 were also recalculated using replicate weights (a type of bootstrap procedure) that in principle can account for the stratification and clustering in the sample design. I resampled from the data, conditional on the statistical match, and used replicate weights corresponding to the unweighted data. The differences were typically quite small, as the replicate SEs were about 5 percent larger than the usual SEs, and no statistical test was affected. The replicate SEs may have problems of their own since they rely on a “large” sample for validity, while the sample here is relatively small. In particular, since the number of subsidized observations is fewer than the number of primary sampling units (PSUs are counties or groups of counties), it is questionable whether the replicate weight procedure can correctly account for any within-PSU correlation. Hence, the usual SEs, rather than the replicate SEs, are presented in the exhibits.
19. That is, regression-adjusted estimates analogous to those in exhibit 11.
20. The only substantive exceptions were food stamps (where equality can be rejected at the 10-percent level) and transfer payments (5 percent level). We can also reject that the impacts on the self-reported housing subsidy variables are equal, which is hardly surprising.
21. The goal of spatially deconcentrating poverty was cited in the 1974 law authorizing the voucher program and several of the project-based subsidy programs (Schill, 1993). Another useful history of U.S. subsidized housing programs is Quigley (2000).
22. Combining matching and regression was suggested by Rubin (1973). Recently, Abadie and Imbens (2002) have shown that matching estimators, even though consistent, can be biased in small samples. Abadie and Imbens have suggested combining matching and regression to reduce the bias.
23. In results not shown in the exhibit, when tract poverty rates are entered into the family earnings model without the indicators for number of adults, the poverty coefficients are -8.6 ($t=2.1$), 0.46 ($t=0.10$), and -8.3 ($t=2.15$) for public housing, vouchers, and project-based subsidies, respectively.
24. These results are available from the author upon request.
25. The cities were Atlanta, Georgia; Augusta, Georgia; Fresno, California; Houston, Texas; Los Angeles, California; and Spokane, Washington. Los Angeles had limited followup data and is not included in the figures cited here.
26. Recipients in the Abt Associates’ sample were 3 to 5 years younger on average, twice as likely to have never worked (19 percent), and much more likely to be receiving Temporary Assistance to Needy Families benefits (more than 50 percentage points more) or food stamps (roughly 25 percentage points more), but probably less likely to be disabled (11 percent received Supplemental Security Income).
27. In contrast to the Moving to Opportunity results, Olsen finds that voucher recipients experienced faster earnings increases than participants in the other two programs.

References

- Abadie, Alberto, and Guido Imbens. 2002. "Simple and Bias-Corrected Matching Estimators for Average Treatment Effects." Technical Working Paper # 283. Cambridge, MA: National Bureau of Economic Research.
- Ashenfelter, Orley, and David Card. 1985. "Using the Longitudinal Structure of Earnings to Estimate the Effect of Training Programs," *Review of Economics and Statistics* 67 (4): 648–660.
- Burke, Paul. 1998. *A Picture of Subsidized Households in 1998*. Washington, DC: U.S. Department of Housing and Urban Development.
- Dehejia, Rajeev H., and Sadek Wahba. 1999. "Causal Effects in Non-Experimental Studies: Re-Evaluating the Evaluation of Training Programmes," *Journal of the American Statistical Association* 94: 1053–1062.
- Ellwood, David T. 2000. "The Impact of the Earned Income Tax Credit and Social Policy Reforms on Work, Marriage and Living Arrangements," *National Tax Journal* 53 (4): 1063–1105.
- Finkel, Meryl, and Larry Buron. 2001. *Study on Section 8 Voucher Success Rates Volume I: Quantitative Study of Success Rates in Metropolitan Areas*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.
- Gould Ellen, Ingrid, and Brendan O’Flaherty. 2002. "Do Housing and Social Policies Make Households Too Small? Evidence from New York." Discussion Paper #0203–07. New York: Columbia University, Department of Economics.
- Grogger, Jeffrey, Lynn Karoly, and Jacob Klerman. 2002. *Consequences of Welfare Reform: A Research Synthesis*. Santa Monica, CA: RAND. http://www.acf.hhs.gov/programs/oprel/welfare_employ/res_synthesis/index.html.
- Katz, Lawrence F., Jeffrey R. Kling, and Jeffrey R. Liebman. 2005. Bullets Don’t Got No Name: Consequences of Fear in the Ghetto. In *Discovering Successful Pathways in Children’s Development: Mixed Methods in the Study of Childhood and Family Life*, edited by T.S. Weisner. Chicago: University of Chicago Press.
- . 2001. "Moving to Opportunity in Boston: Early Results of a Randomized Mobility Experiment," *Quarterly Journal of Economics* 116 (2): 607–654.
- Lerman, Robert. 2003. *Single Parents’ Earnings Monitor*. Washington, DC: The Urban Institute. www.urban.org.
- Leuven, Edwin, and Barbara Sianesi. 2003. "PSMATCH2: Stata Module To Perform Full Mahalanobis and Propensity Score Matching, Common Support Graphing, and Covariate Imbalance Testing." <http://repec.org/docs/ssc.php>.
- Olsen, Edgar O. 2004. The Effect of Housing Assistance on Earnings and Employment. Paper presented at the American Real Estate and Urban Economics Association Mid-Year Meeting, Washington, DC.
- O’Regan, Katherine M., and John M. Quigley. 1999. Accessibility and Economic Opportunity. In *Essays in Transportation Economics and Policy*, edited by J.A. Gomez-Ibanez, William B. Tye, and Clifford Winston. Washington, DC: The Brookings Institution, 437–466.

- Orr, Larry, et al. 2003. *Moving to Opportunity: Interim Impacts Evaluation*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.
- Patterson, Rhiannon, et al. 2004. *Evaluation of the Welfare to Work Voucher Program: Report to Congress*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.
- Quigley, John M. 2000. "A Decent Home: Housing Policy in Perspective." In *Brookings-Wharton Papers on Urban Affairs 2000*, edited by William G. Gale and Janet Rothenberg. Washington, DC: The Brookings Institution, 53–88.
- Reed, Joanna. 2004. Poor Women's Work: A Look at the Employment Opportunities and Experiences of Low-Income, Inner-City Women. Unpublished paper. Evanston, IL: Northwestern University.
- Rosenbaum, Paul R., and Donald B. Rubin. 1983. "The Central Role of the Propensity Score in Observational Studies for Causal Effects," *Biometrika* 70 (1): 41–55.
- Rubin, Donald B. 1973. "The Use of Matched Sampling and Regression Adjustments to Remove Bias in Observational Studies," *Biometrics* 29 (1): 184–203.
- Schill, Michael H. 1993. "Distressed Public Housing: Where Do We Go From Here?" *The University of Chicago Law Review* 60 (2): 497–554.
- Shroder, Mark. 2002a. "Does Housing Assistance Perversely Affect Self-Sufficiency? A Review Essay," *Journal of Housing Economics* 11 (4): 381–417.
- Shroder, Mark. 2002b. "Locational Constraint, Housing Counseling, and Successful Lease-up in a Randomized Housing Voucher Experiment," *Journal of Urban Economics* 51 (2): 315–338.
- Shroder, Mark, and Marge Martin. 1996. New Results from Administrative Data: Housing the Poor, or, What They Don't Know Might Hurt Somebody. Paper presented at the 1996 Mid-Year meeting of the American Real Estate and Urban Economics Association, Washington, DC.
- Sianesi, Barbara. 2001. Implementing Propensity Score Matching Estimators with STATA. Presentation at UK Stata Users Group VII Meeting, London. <http://fmwww.bc.edu/RePEc/usug2001/psmatch.pdf>.
- Susin, Scott. 2004. The Accuracy of Survey Self-Reports of Housing Assistance in the Survey of Income and Program Participation: Report to the Department of Housing and Urban Development. Unpublished paper.
- Varian, Hal R. 1992. *Microeconomic Analysis*. 3rd ed. New York: W.W. Norton.

Voucher Use, Labor Force Participation, and Life Priorities: Findings From the Gautreaux Two Housing Mobility Study

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Abstract

This article uses qualitative data from the Gautreaux Two Housing Mobility Study to assess how the use of vouchers to move low-income families out of segregated, high-poverty neighborhoods into more affluent ones affects female movers' labor force participation. We compare movers' and nonmovers' labor market experiences before they move, finding similar employment experiences and histories of holding low-wage service jobs interrupted by periods of welfare receipt. Primary obstacles to working are childcare responsibilities, illness and health issues (including pregnancy), transportation difficulties, and layoffs from temporary jobs. Respondents have positive attitudes toward employment. We find that moving had little or no impact on most study participants' employment situations. We explore this outcome by profiling four groups that describe the employment situations of most respondents after moving and discuss why moving seems to have little effect on employment. This article pays special attention to how gender influences voucher holders' labor market participation.

Introduction

The mid-1990s' welfare reform laws put new emphasis on jobs and work as the main way for individuals to lift themselves and their families out of poverty and dependency on the state. At the same time, public housing policy emphasized housing vouchers, rather than the construction of more publicly funded units, as a better way to help low-income families obtain affordable housing. A greater emphasis on voucher use was motivated by several factors; one was a growing consensus among researchers that living in the racially segregated, high-poverty neighborhoods, where most public housing developments are located, contributes to joblessness and other negative outcomes for inner-city residents (Massey and Denton, 1993; Wilson, 1999, 1997, 1986).

Results from the Gautreaux program, a 1980s-era housing mobility program that used vouchers, showed that families who moved from high- to low-poverty areas experienced better employment and other outcomes over time than those remaining in original units (Rubinowitz and Rosenbaum, 2000). These results and research about the effects of living in concentrated-poverty neighborhoods spawned interest in housing mobility programs that used vouchers, including the Moving to Opportunity (MTO) experiment. Policymakers hoped that by using housing vouchers to move public housing residents from concentrated-poverty neighborhoods or prevent concentration altogether, they could attend to some of the persistent problems associated with living in such neighborhoods, such as chronic unemployment.

Does the use of housing vouchers to move out of concentrated-poverty neighborhoods improve movers' labor force participation and prospects? Unfortunately, recent results from the MTO experiment (Orr et al., 2003) were less encouraging than the original Gautreaux program results. Although experiment participants who moved to low-poverty neighborhoods saw improvements in some of their well-being measures, participants' income or employment outcomes were not affected.

Neither the original Gautreaux program results nor those from the MTO experiment have completely explored why participants fared the way they did with respect to employment. The mechanisms at work in each study—how moving affects labor force participation—remain hidden. In this article, we use qualitative data from the first two rounds of the Gautreaux Two Housing Mobility Study to assess the relationship between using housing vouchers to move low-income families to more affluent neighborhoods and female movers' labor force participation. We first ask, what are voucher holders' baseline employment experiences? And then, how does the process of moving influence voucher holders' labor force participation? To answer these questions we first compare movers' and nonmovers' employment situations at baseline, before they move, and describe their employment experiences and the role of work in their lives. These comparisons and descriptions provide a background for discussing our finding that moving had little or no association with most respondents' employment situations. Second, we profile four groups that describe our respondents' employment situations, after they have made voucher moves, focusing on how employment influences the moving process and vice versa.

We will attempt to accomplish two goals with this article. Our first goal is to shed light on low-income women's labor market and employment experiences while participating in a housing mobility program. We want to give a sense of what voucher users' lives are like. We believe this will help tell the story behind the recent quantitative findings from MTO that show no association between moving to a more affluent neighborhood and employment outcomes.

Second, we want to focus on gender—an issue that has been largely ignored in previous studies but that has become increasingly important in the post-welfare reform political climate. Welfare reform marks a shift in government policy that emphasizes low-income women as workers rather than as mothers and pushes them into the labor market (Orloff, 2004). It is important to consider the role of gender in work, given the fact that most welfare recipients and public housing leaseholders are women. In addition, most theories about joblessness in central cities pertain to men's employment and do not tell us much about the employment situations of inner-city women. Our Gautreaux Two sample comprises low-income, African-American, mostly single mothers, which enables us to consider these issues.

Literature Review

Past research on voucher use provides a context for considering the employment experiences of Gautreaux Two respondents before and after they move. Nationally, 44 percent

of voucher holders receive wages as their primary form of income (Finkel and Buron, 2001). Movers tend to have greater work incomes than nonmovers do, especially if they move to the suburbs or live in low-poverty neighborhoods (Devine et al., 2003). In the 50 largest U.S. metropolitan statistical areas, nonmovers' employment rates exceed that of movers, but differences are not significant. Moreover, in most areas, movers' employment rates decrease as the neighborhood poverty rate increases (Devine et al., 2003).

Research about Chicago Housing Authority voucher holders, a group similar to our sample, shows that there is not much difference in employment or other characteristics between successful and unsuccessful voucher users (Popkin and Cunningham, 2000). Therefore, we expect little difference between movers' and nonmovers' employment rates at baseline. A recent paper analyzing Gautreaux Two program participants' voucher take-up reports that full-time employment or educational commitments prevent some participants from successfully searching for units and moving (Pashup et al., 2004); we expect to echo that finding.

Research from the original Gautreaux study found that voucher holders who moved to the suburbs were more likely to improve their long-term employment prospects (Rubinowitz and Rosenbaum, 2000). Some researchers have suggested that inner-city residents are victims of "spatial-mismatch"; as the economy and the city's geography have changed, inner-city residents have experienced declines in employment as more jobs have moved to the suburbs. A more recent study of the Detroit area from Allard and Danziger (2003) supports the spatial-mismatch hypothesis. Allard and Danziger report that welfare recipients living outside the central city had access to more jobs per person, and that living closer to jobs was associated with an increased probability of finding work and leaving welfare. The findings suggest that we might see increased employment prospects for our Gautreaux Two participants after they move as well. Recent findings from the MTO study, however, show no significant differences between movers and nonmovers in any of the measures of adult employment and earnings (Orr et al., 2003). The evidence, then, is mixed as to whether we should expect notable changes in employment among our participants.

Other issues affect our participants' employment prospects beyond their status as voucher holders and residents of racially segregated neighborhoods. The fact that our study participants are African American, female, and moving from public housing developments is likely to have negative or limiting effects on their job prospects. Waldinger and Lichter (2003) highlight the role of employer stereotypes about the suitability of different racial and ethnic groups for different types of jobs in channeling different groups into different occupations. Kirschenman and Neckerman (1991) more directly investigate the meaning of race for employers and find they often confound race and class and engage in statistical discrimination against African Americans and Hispanics. The researchers find that if an individual is African American, has a low income, and is from the inner city, or is perceived as such, these characteristics severely hinder the person's employment chances. Employers are loath to hire someone with these characteristics, which, for them, symbolize poor education, work ethic, and presentation skills. Since our sample participants are African American, have low incomes, and are primarily from the inner city, we might expect that although there may be more job opportunities in the suburbs, they may not be effectively open to our respondents.

In addition, Reskin (1991) argues that labor markets are composed as labor "queues" that reflect a ranking of workers by qualities that employers desire and by how workers rank jobs. Employers hire workers from as high up in the labor queue as possible, with the most desirable jobs going to the preferred workers. Reskin shows that women and African Americans are at the bottom of most labor queues, so we might expect that our sample participants will be viewed as suitable for, and will receive, some of the least desirable jobs when they do work. We also expect that our respondents will be channeled into stereotypically female jobs.

Moving may affect social networks, which many researchers consider important for finding employment. Contacts with working neighbors, acquaintances, family members, and friends are “social resources” that help individuals find jobs independently of their “personal resources” of skills and education (Lin, 1999). Since pervasive joblessness is a characteristic of inner-city, high-poverty areas, moving to a low-poverty neighborhood with higher rates of employment should result in new contacts that could help individuals in expanding their employment opportunities. Granovetter (1973) suggests that individuals find jobs through “weak” ties such as acquaintances, instead of through the “strong” ties of immediate family members or close friends, which suggests that movers may be able to find jobs through new neighborhood contacts. MTO experiment results suggest, however, that, although those who moved to low-poverty neighborhoods were about 20 percent more likely than individuals who remained in their original neighborhood to have a friend who is a college graduate or earns more than \$30,000, this increase in “social capital” did not transfer into employment gains (Kling et al., 2004).

It is important to consider how welfare receipt and welfare reform affect single mothers’ employment, since the Gautreaux Two sample consists of low-income, mostly single mothers with a history of welfare dependency. Edin and Lein (1996) show that neither welfare nor the low-wage work available to them enables single mothers to meet their expenses. Their resulting survival strategies involve a combination of welfare, work, and support from their private social networks. The decision to work or continue to receive welfare depends in part on the labor market of the city where they live and on individual cost/benefit calculations of the utility of working versus staying on welfare. Edin and Lein find that, while most women would prefer to work than receive welfare, working does not necessarily improve their financial situations.

Harris (1996) finds that many single mothers oscillate between welfare and work and that repeat welfare dependency is determined by social isolation, childcare responsibilities, and a lack of education and skills. Moving to an unfamiliar area may increase social isolation and childcare difficulties. An important caveat is that these studies are based on data collected before welfare reform began in 1996. Since a central focus of welfare reform is encouraging work and discouraging welfare use, we might expect that new disincentives to welfare use would push more women into employment and change the way single mothers assess the costs and benefits of working instead of receiving welfare. Indeed, recent research has suggested that employment rates and income levels of single, low-income women rose during the 1990s due to changes in welfare law, tax law (the earned income tax credit), and the economy (Grogger, 2003).

Data and Methods

The Gautreaux Two Program

As a result of ongoing litigation about alleged housing segregation policies on the part of the Chicago Housing Authority (CHA) and the U.S. Department of Housing and Urban Development, in 2001 the CHA implemented a new round of the Gautreaux residential mobility program. The Gautreaux Two Program enabled residents who were current CHA public housing leaseholders in good standing to sign up for vouchers they could use to move to “opportunity areas.” As defined by the program, these are census tracts where the African-American population does not exceed 30 percent and only 24 percent of residents are living in poverty.

For many, the Gautreaux Two voucher presented an opportunity to quickly move out of public housing instead of spending years on a waiting list for regular housing choice vouchers. An important context for the Gautreaux Two Program is that all of CHA is

currently undergoing a massive 10-year redevelopment plan involving the demolition of many existing units and the construction of new mixed-income developments. Therefore, residents in certain developments slated to undergo demolition or renovation were able to weigh the Gautreaux Two voucher against other mobility options that were offered to them under the CHA's "Plan for Transformation."

CHA residents went through several steps to secure Gautreaux Two vouchers. First, all tenants were sent letters inviting them to participate in a 1-day, phone-in registration. After they were deemed eligible for the program, tenants were invited to attend mandatory orientation sessions. Individuals who made it to an orientation session were required to attend an individual meeting with a housing counselor and return all program paperwork. Out of 1,120 people who called to register for the program, 450 completed all the steps and were granted vouchers to be used within 6 months. After they were granted vouchers, clients were responsible for conducting their own housing searches, determining (with help from their housing counselor) whether units were in "opportunity areas," and then arranging for inspections and lease negotiations.

According to the 2000 Census, 48 percent of all census tracts in the city of Chicago qualified as "opportunity areas." Qualifying tracts were primarily clustered on the city's north and southwest sides, but many city neighborhoods are a checkerboard of qualifying and nonqualifying tracts. Thus, clients who wished to move within the city had to use a trial-and-error approach, often locating multiple units before finding one at a qualifying address. Overall, clients received little specific information about which city neighborhoods were eligible for the program.

Data Collection

Using a two-pronged approach, we recruited a sample of mover and nonmover families. First, an initial pool of 82 families was randomly selected from 20 percent of all Gautreaux Two clients participating in orientation sessions. To compensate for the initial low rate of participants who actually moved with the program, in the late fall of 2002 we drew a second sample of 25 program enrollees who had located units and begun the inspection and moving process. Adding this second sample to the first sample ensured roughly equal numbers of movers and nonmovers. Thus, although only 36 percent of program participants overall have used Gautreaux Two vouchers to move, the rate is over 50 percent for Gautreaux Two study participants. Of these movers, 58 percent relocated to opportunity areas in the city, while the rest moved to the suburbs.

The bulk of the data from the Gautreaux Two study consists of four indepth qualitative interviews with 91 respondents. We completed baseline interviews before families used the program to move and maintained ongoing phone contact between interviews. We completed 86 of 91 interviews in the second round, with a retention rate of 95 percent. Movers' interviews were conducted 3 to 6 months after they moved (usually about 9 to 10 months after the baseline interviews), while nonmovers' second interviews occurred about 12 months after baseline interviews. The retention rate for the third round of interviews is 88 percent, and the fourth-round interviews are nearly complete. The fourth round of interviews began in the fall of 2004.

The baseline and second-wave interviews capture the process of searching for housing and moving and the initial adjustment to the new neighborhood. These interviews enable us to assess the early qualitative effects of respondents' employment on moving and the effects of moving on employment. When they are complete and ready for analysis, the third and fourth waves of the study will provide a longer range assessment of how moving impacts respondents' employment.

The sample we use for analysis in this article consists of 81 respondents.¹ We excluded one male respondent, four movers who did not use Gautreaux Two Program vouchers to move from their baseline units, and five participants whose second interviews are still being processed or are missing. We excluded these respondents so we could focus solely on women's employment and maintain the geographic uniformity of the mover and nonmover comparison groups, since respondents who moved via other means moved to neighborhoods similar to those of their original public housing developments.

The baseline interviews typically lasted between 2 and 4 hours and consisted of several open-ended questions that we used to probe in depth about many aspects of respondents' lives. Topics we focused on include experiences with all aspects of the Gautreaux Two Program implementation, narratives of respondents' motivations for moving, and their views on anticipated costs and benefits from their moves. We gathered a focused life history that gave us a sense of the racial and socioeconomic makeup of the various housing situations and communities in which respondents had lived and a detailed employment history. We also collected detailed narratives about respondents' current social and neighborhood contexts, including their family relationships, romantic involvements, family structures, social networks, schools, child-focused programs, or other social services families might have been using before they moved. We asked about families' daily and weekly routines and their neighborhood management strategies, such as strategies for avoiding street violence while participants were out and about in their neighborhoods.

After baseline, we modified interview questions to reflect movers' and nonmovers' different situations. Interviews with movers were designed to capture the process of searching for housing, moving, and adjusting to new neighborhoods; interviews with nonmovers were designed to gather obstacles to moving. Our approach to collecting qualitative data is highly systematic. All interviewers focus on gathering core content but have the flexibility to change question wording and the order of questions to make interviews as much like "conversations" as possible. Additional data come from field notes and interviewers' observations completed for every case after each interview. All interviews were audiotaped and transcribed verbatim.

Narrative analysis and comparative case studies are the primary qualitative methods we use in this article. Narrative analysis involves standard procedures for coding qualitative data and consists of analyzing data through close readings and comparisons of text as well as considering each case in context (Denzin and Lincoln, 2003; Strauss and Corbin, 1990). Case studies are especially effective for longitudinal data, as interviewers can track and assess changes as they occur. These methods enable us to discern common patterns and processes that can be used to formulate theories about causal forces behind a particular outcome. These methods also facilitate the identification of patterns in respondents' stated motivations toward courses of action as well as their beliefs and normative expectations.

Characteristics of Participants

Most participants in Gautreaux Two were from large or mid-sized CHA developments. Only one-third of program participants in our respondent pool came from developments slated for demolition in CHA's redevelopment plan. All respondents are female heads of household. Household size averaged four members; apart from the leaseholder, most household members are children. Respondents averaged 32 years of age at baseline and had lived in their current developments for an average of 8.5 years. More than half did not graduate from high school and household incomes averaged \$924 a month. Half of the families reported work income and slightly less than 40 percent received some sort of cash assistance, such as Temporary Assistance for Needy Families or Supplemental Security Income (SSI). Only about one-tenth received child support through the formal enforcement system. Virtually all respondents are African American, although a few are also of Caribbean or Puerto Rican descent.

Findings

We explore the relationship between moving and employment for Gautreaux Two voucher holders in two ways. First, we compare movers and nonmovers with respect to employment at baseline and describe their employment experiences and the role of work in their lives before they move. We define movers as program participants who used their vouchers to move into units in “opportunity areas” by round two. Nonmovers are program participants who have not used their vouchers to move and are still in their original public housing units. When we compare movers and nonmovers at baseline, before anyone has moved, we find little difference between the two groups and much in common in terms of their work experiences and opportunities. This snapshot of voucher holders’ lives helps explain how employment influences whether a voucher holder actually moves and provides a background for interpreting our finding that moving was not associated with most respondents’ employment situations, at least early on.

Second, we profile four groups that describe the employment situations of most of our respondents at round two, focusing on how employment influences the moving process and vice versa. The four groups are respondents for whom a job may prevent a move; those who keep a job when they move; nonworkers; and those whose employment status changed around the time of the move.

Employment Before the Move

We found no significant differences between movers’ and nonmovers’ employment rates at baseline or round two, as shown in exhibit 1. At baseline, 55 percent of movers worked, compared to 42 percent of nonmovers. A higher proportion of employed movers had full-time jobs (which we defined as working 30 or more hours per week) than did nonmovers. Percentages are almost identical at round two, with 55 percent of movers and 44 percent of nonmovers working. Both groups increased their numbers of full-time workers by round two. The average wage for movers was \$9.33 per hour at baseline and \$9.57 at round two. The average wage for nonmovers was \$9.43 per hour at baseline and \$10.22 at round two.

Exhibit 1

Employment Characteristics of Gautreaux Two Participants at Baseline and Round Two

| Employment | n | Baseline | | Round Two | |
|------------------------------|----|-----------------|-----------------|------------------|----------------|
| | | Nonmovers | Movers | Nonmovers | Movers |
| Percentage working | 81 | 42% (10) | 55% (7) | 44% (10) | 55% (7) |
| Percentage working full time | 67 | 24% (10) | 30% (7) | 26% (10) | 32% (7) |
| Wage (\$/hr.) | 81 | \$9.43 (\$8.25) | \$9.33 (\$6.45) | \$10.22 (\$8.59) | \$9.57(\$6.38) |

Notes: Values are means, with standard deviations in parentheses. N is number of women.

The difference in percent employment between movers and nonmovers between baseline and round two was not significant at the standard level of significance ($p < .05$).

Exhibit 2 summarizes census data on selected neighborhood characteristics for Gautreaux Two participants at baseline and rounds two and three. At baseline, when respondents are in their original neighborhoods, 38 percent of women aged 16 years and older were employed. Since half of our respondents report work income, they appear to work more than what is average for their neighborhoods. Exhibit 3 compares neighborhood characteristics and female employment rates for movers and nonmovers at round two. We find that movers’ new census tracts have significantly higher employment and lower unemployment rates for women than their original ones, where nonmovers still live. Therefore, a move to an

opportunity area significantly changes the neighborhood context for women's employment for movers.

Exhibit 2

Gautreaux Two Participants' Census Tract Characteristics at Baseline, Round Two, and Round Three

| Tract Characteristics | Baseline | Round Two | Round Three |
|---|---------------------|---------------------|---------------------|
| Percentage in poverty | 46% (19) | 25% (21) | 27% (20) |
| Median household income | \$21,133 (\$14,627) | \$35,999 (\$16,934) | \$33,685 (\$17,569) |
| Percentage of population age 16 and older who are working | 38% (12) | 53% (15) | 50% (15) |
| Percentage African American | 73% (36) | 35% (39) | 45% (41) |
| Percentage White | 11% (21) | 34% (28) | 28% (29) |
| Percentage Hispanic | 14% (22) | 24% (24) | 21% (24) |
| Percentage married | 31% (20) | 56% (23) | 52% (24) |

Notes: Data are from Census 2000 Summary File 3 (SF3). Except where noted, values are means, with standard deviations in parentheses.

Exhibit 3

Characteristics of Census Tracts at Round Two: Movers vs. Nonmovers

| Tract Characteristics | Nonmovers ^a | Movers ^b |
|--|------------------------|-----------------------|
| Percentage in poverty | 48% (20) | 13% (8)** |
| Median household income | \$18,973 (\$11,233) | \$44,164 (\$12,927)** |
| Percentage of adults working | 36% (12) | 61% (13)** |
| Percentage African American | 73% (37) | 14% (5)** |
| Percentage White | 11% (23) | 47% (20)** |
| Percentage Hispanic | 13% (23) | 30% (16)** |
| Percentage married | 32% (22) | 69% (15)** |
| Percentage of adult females not in labor force | 50% (8) | 40% (1)** |
| Percentage of adult females who are unemployed | 13% (8) | 4% (2)** |
| Percentage of adult females who are employed | 37% (8) | 56% (1)** |

^a N=27

^b N=60

Notes: Data are from Census 2000 Summary File 3 (SF 3). Except where indicated, values are means, with standard deviations in parentheses. **Movers differ from nonmovers at $P < .01$, statistically significant by T-test.

Virtually all respondents work in the service sector. There is little difference between the types of jobs movers and nonmovers hold. For working respondents at baseline, the most common jobs are formal and informal childcare, retail sales, and nursing home and senior care, followed by office clerking, temporary office or manual labor, food service, telemarketing, and hairstyling. A similar pattern emerges when considering all jobs respondents have held, regardless of whether or not they currently work.

Most respondents get their jobs through newspaper ads or walking into businesses and asking for work. Few report finding their jobs through social networks. Respondents consider certain jobs to be better than others. The worst job is as a fast food worker; respondents describe this job as low in pay and respect and cite poor working conditions—"too much work for no pay." Better jobs are what we term "helping" jobs, such as working in nursing homes with residents, in childcare, or at schools. One sample participant, Karla, currently works at a suburban assisted-living facility for seniors. She prefers this job to working in fast food. She says,

“I love the home health care... Basically, it’s a whole new change. It’s not, ‘I want this and you ain’t fixed my sandwich right,’ compared to, ‘Well, let me help you with this,’ and going about how to show [the residents] how to do it the right way.”

Respondents prefer to work at helping jobs over other jobs and consider them a step up even when they are not paid more. Helping jobs sometimes offer more of a vantage point for career development and continuing education than other jobs do. Respondents see opportunities that would be available to them if they had more training and many are encouraged to go back to school or complete degrees they started in the past. For example, some respondents who are certified nurse assistants have enrolled in phlebotomy courses. Still, most respondents are not very attached to their jobs.

Obstacles to Employment

A review of respondents’ work histories shows they typically change jobs frequently. Most respondents bounce from job to job, their work histories punctuated by periods of unemployment and receipt of public assistance. The most highly paid and most stable employees hold their jobs for at least a few years and are consistently employed, mostly full time. Respondents stop working for several reasons: layoffs, the end of a temporary job, childcare and transportation problems, pregnancy, and illness or disability (their own or their child’s). Some respondents are fired from their jobs, but this is the least common reason for not working.

Childcare is a constant concern for many respondents. Jalonda, a 25-year-old mother of one, lost her job because her childcare arrangements fell through. She explains,

“It’s just havin’ to take off my job, callin’ off, doin’ this, doin’ that. I have to go here in the mornin’, I’m gonna be a little late. Then they have to let me go, cause I was bein’ late too much.”

Some respondents stopped working when faced with an illness or disability in the family. Karen, a 42-year-old mother of six, says,

“I worked. I’d used to be a teacher’s aide, I did security, I worked in a hotel, in-house treatment, so I’m not a person to sit around going, ‘I want somebody to take care of me....’ What allowed me not to work when the kids were younger was Tyana had severe asthma. She had asthma so bad, when I did go to work I ended up having to quit because she just kept having asthma attacks.”

Most respondents work downtown, on the north side of Chicago, or in the suburbs and commute at least 30 minutes to work. They rely on family or friends for rides or take public transportation. Some have cars, which are often in a state of disrepair. Transportation is especially difficult for those who work the night shift in the suburbs because suburban transit systems often stop in the early evening. Liza, a 28-year-old mother of two, who currently works as a data entry clerk for the county court system, stopped working as a parking attendant at O’Hare airport, her highest paying job, because of transportation problems. She says,

“I had difficulties getting home, because after a certain time, the buses stopped running, and I get off late, and I miss the last bus. Walkin’ all the way down here.... And it was real late, and I stopped doin’ it. I just let it go.”

Pregnancy and childrearing are important issues in understanding respondents’ work histories and their off again/on again attitudes toward work and public assistance. Many stop working when they become pregnant. Their jobs do not offer maternity leave, or they have not worked long enough to accrue those benefits and lose their jobs when they can

no longer work. Then they are back on some sort of assistance or unemployment until they find another job after their child is born. Some respondents report being fired when bosses find out they are pregnant, due to getting sick on the job or liability issues.

Elise, a 29-year-old mother of three, thinks she was fired after only 4 days from “one of the highest paying jobs I had” doing customer service at a utility company because she told her supervisor she was pregnant. She says,

“I was pregnant with the twins when I first started working there. And I was so sick....I said, ‘Well I need to let [the supervisor] know, if she looks up and I’m not at my desk... I’m in the bathroom.’ [The supervisor] went and told her boss that I was pregnant...so I think that is why I was fired...They must have thought I was getting ready to take off for maternity leave and I just got there.”

Attitudes About Work and Public Assistance

Respondents are mostly positive about work. Their general attitude about working is that they want to be employed—not “sitting around at home.” Crystal, a 26-year-old mother of four, says,

“I do everything I can to do more for my kids. If I gotta work, I’m gonna work. I hate to be out of a job. I want me a good job where I can just stay there.”

For most respondents, working is preferable to public assistance, but since almost all of these women are single mothers, they must juggle work with family responsibilities and their desire to do what is best for their families.

Almost all respondents receive some form of public assistance—mostly food stamps and medical insurance. Most respondents are constantly reassessing the costs and benefits of working, comparing what they can earn from their jobs with various public benefits, private help, and child support. Christina describes how she limits her work hours to maximize her monthly earnings—her work income combined with her son’s SSI check and food stamps:

“I can’t earn over a certain amount of money...If I earn over, they take his check away. They will take his check, believe me.”

Virtually all respondents have bounced between work and public aid in the past and began receiving cash assistance after having children. Respondents who no longer receive cash aid are happy to be off public assistance. Misha, a 35-year-old single mother of two, says she started receiving aid when her first child turned 2. “And I got off public assistance in 1998,” she says, “and I’m glad. I don’t have to be bothered with them calling here.”

Courtney, a 39-year-old mother of two, describes how she went from working to receiving welfare with the birth of her last child, although she prefers to work. At baseline she was about to start a new job working in a factory making oven-cleaning pads for \$7 an hour; she has worked in retail in the past. Courtney says,

“Last time I had [cash assistance] was when I had my last son, because I had just started a new job, so I couldn’t get [maternity leave] so I had to go [to public aid]...I don’t like to really be bothered with public aid. I try my very best. I’d rather work a \$7-an-hour job than bother with them.”

Welfare reform seems to have impacted respondents’ attitudes toward working versus receiving cash benefits. Most feel that the new work requirements for cash assistance are too onerous to make the benefits they receive worthwhile. The assistance payments,

worked out to an hourly wage, are so low compared to the hours respondents are required to work and attend job training that they believe they would be better off with a job. Ada, a 23-year-old single mother of three, says, “If I get back on, they want me to go and work for them every month for \$248 in the aid office, and I’m not going to do that. I can find me a job where I get more than that.”

Moving and Employment

By the second interviews we find that little has changed in respondents’ employment situations regardless of whether they used their Gautreaux Two vouchers to move. More than 80 percent of workers (movers and nonmovers) remain in their baseline jobs and the overall percentage of movers who work at baseline and round two remains identical. In this section, we profile four groups that describe the round two employment situations of most respondents who were employed at baseline. The groups include movers and non-movers, and the descriptions shed light on how the physical and psychological process of moving relates to voucher holders’ employment.

My Job Is Important

The first group consists of respondents whose commitment to their baseline jobs became an obstacle to moving and describes about 34 percent of nonmovers at round two. Commitment to a job becomes an obstacle to moving in three ways. First, respondents with relatively well-paying, full-time jobs fear that moving might jeopardize their jobs by making childcare and transportation more difficult. Second, because they want to keep their baseline jobs, respondents restrict their housing search to areas near their jobs or with good public transportation. Third, full-time workers have limited time to successfully search for housing.

Sherry is an example of a respondent whose job and family commitments prevent her from moving. She is a 36-year-old divorced mother of four boys and currently cares for four of her sister’s children as well. She is involved in her church and her sons’ schools and works full time. About her family’s busy schedule, she says,

“I’m working full time. [The kids] are in different little summer activities and summer programs. I haven’t joined any programs or anything of that nature. We’re Jehovah’s Witnesses, so we’re always involved in spiritual activities. So, you know, we stay busy constantly.”

Sherry wants to move to escape the drug traffic and gangs prevalent in her neighborhood. At baseline she was working at temporary office jobs and going to school full time, working toward an associate’s degree in child development. Sherry would eventually like to become a teacher and wants to find a job in education. She restricted her housing search to neighborhoods with good public transportation but quickly grew frustrated with the search. At round two, she is still in the same public housing apartment. Her sister’s children are no longer in the household, and she has a new, better paying job as an assistant teacher at a Head Start center very close to her apartment. She says that her work schedule and transportation problems have made it difficult to search for housing. She also reports discrimination from landlords who are reluctant to rent to a single mother with four boys. She says,

“By me being a single parent, and having four boys, some people are very turned off by that. It’s their community, so it’s difficult, you know, and especially if you’re not married.”

Audrey is a 29-year-old mother of four who is engaged to the father of her youngest three children. She currently works full time at a popular coffee shop in an affluent neighborhood on Chicago's north side and commutes about 30 minutes to work by public transportation or taxi. She was recently promoted to "shift supervisor" and makes about \$9 an hour with benefits. She has limited her housing search to areas near her job, which is in an "opportunity area," because she doesn't have a car. Her full-time work schedule also leaves her "too busy" to spend much time looking for apartments. At round two, Audrey has received a raise and plans to work her way up to manager. She says,

"I really don't wanna look [for apartments] out [of] the city unless I have a car. Because it would be hard for me to come to work. An' I really don' wanna go to another [coffee shop] right now, cause I'm tryin' to become a manager. An' I really need to stay in it in order to do [that]."

Audrey is still searching for a new apartment but is frustrated by her lack of success and has not been looking at many units. She still wants to live near her job but is now considering moving somewhere on the south side of Chicago near her family who could provide assistance with transportation. Audrey would be far away from her job, but "I wouldn't have to worry about gettin' cabs to work," she says. "I would be gettin' taken to work."

Holding On to What They've Got

Another large group of respondents consists of movers who, despite moving to a new and often distant neighborhood, maintain the jobs, childcare arrangements, and social networks they had at baseline. About 36 percent of movers are in this group. Many keep their children in their old schools. These respondents view their moves to opportunity areas as trial moves—after a year, they will be free to use their vouchers to move elsewhere. Some want to make sure they like their new neighborhoods and housing arrangements before they make any major changes. Others are convinced from the start that they won't stay in their new neighborhoods for more than a year. All spend a lot of time and energy to maintain their own and their children's family and social ties in the old neighborhood, sometimes because they lack other options.

Amy is a 32-year-old mother of three who has held several steady jobs throughout her employment history. For the past three years, she has worked as a server in the restaurant of a well-known downtown department store. She also attends college in the far south side of Chicago. She is studying early childhood education and would like to work in daycare after finishing. Her children are enrolled in a Catholic school on the south side that is very close to her mother's house. She wanted to move to the south suburbs but could not find a unit that met opportunity area requirements. At round two, she has moved to a unit on the northwest side of the city. She expects that in another year she will use her voucher to move back to the south side where she will be close to her family. For her, she says, the program was a chance to "move to a neighborhood that I want to live in and not be forced to stay right there [in the original move unit]."

Amy admits that she doesn't know her new neighborhood because she is hardly there—she spends a lot of time driving her children to and from school on the south side and commuting to work downtown. She spends most weekends and days off with her family on the south side and does most of her shopping there. She says that nothing has really changed since she moved, except that she had to buy a newer car to keep up with the new commute:

"It's still the same, basically...I mean I might drive a little bit more now, you know, because of the distance but...the only thing is here we have to just get up

a little earlier... so there's nothing that's really changed. The only thing—is my car note...I got a new car. Car and insurance, about 500 bucks a month.”

Terri is a recently married mother of one. She is 28 years old and at baseline works part time for the Chicago Park District, often on evenings and weekends. She eventually would like to be a medical assistant but is putting classes on hold until after the move. She wants to move to escape shooting and violence but worries that moving will create transportation and childcare problems—she's afraid her car won't survive the long commute. She had a difficult search but finally located a unit in a south suburb. By round two, she has moved to her new unit and is commuting an hour each way to her job at the Chicago Park District. About her decision to move, she says,

“Because I was thinkin' [about] not moving. Not to move here, cause, like I said, I'd have a hard time, an' you know, it was hard for me to get back an' forth [to] the city. 'Cause I work in the city. I still work in the city. It's hard [to get] back an' forth. ..I wanted to move, but then...I don' know if I'm gonna make it out here...then I was like, 'You can't; you already signed your lease,' so I *had* to go. I wanted to move from the [project] environment.”

Terri's daughter remains in her old school because Terri didn't have childcare in the new neighborhood. Terri's daughter stays with an aunt in the city during the week and visits her mother on weekends. Terri says,

“[When] I first moved, you know, I was like I gotta – everything gonna change now. 'Cause okay, [my daughter] will be goin' to school out here, [but] who gonna watch her when I work? I don' know how I'm gonna do this, I gotta find a way to do somethin'. So my sister's like, 'Let's leave her out here.’”

Terri has begun attending classes at the local community college and hasn't had any luck finding a job at the local park district. She wants to reduce her course load because, as she puts it, “It was wearin' me down! I ain't have no time.” She is having marital problems due to her husband's inability to hold a job, and would like to move closer to the city when her year is up.

Sheila has four teenagers. For the past 2 years, she has worked as a cashier at a downtown hospital, where she earns \$7.55 an hour. By round two she has moved to a western suburb and kept her job at the hospital. She likes her new neighborhood, which she became familiar with through a friend who lives there. Since she moved, her commute is 90 minutes each way. She would like to find a job closer to her new unit and stay in the new neighborhood. She also would like to begin classes, which are offered free at her job in the city, to become a medical assistant. This is what Sheila says as she weighs her options:

“And then [I] realize [I] might as well find a job out there. You're coming too far and there's no way I would drive that far to work. And it's like, well, when I moved here I was undecided if I wanted to stay here. But now that the kids like it and everything, and my daughter, she's like, 'Well, mom, I want to finish school out here,'... and then the boys, they like it, too. So I said, 'Well, we gonna stay.' And then more than likely what I'm going to do is go on the Internet and look for something this way. [But with a new job] I probably wouldn't have the straight hours that I have no more. And, see, that's another reason why I was like that, 'Should I leave or should I stay?' And then right now I never know, with the way jobs laying off and then the way, if I come out here, I can't say if I have night schooling then I have to turn around and get a job out here, and they might want me to work nights. It'd be messed up. So that's another thing I am thinking before I really do something.”

Not Working

The second group consists of respondents who move but are unlikely to work because of personal or health problems. Virtually all of these respondents have worked in the past but were not working at baseline and have no immediate plans for employment. This group represents about 36 percent of movers.

LaTasha is a 26-year-old mother of three children. At baseline, she is pregnant with her fourth child. She thinks that moving would help her “better herself” and that her children would go to better schools. She recently learned that her oldest son has muscular dystrophy. She did not graduate from high school and has not worked recently. Her family has been helpful in identifying, calling, and taking her to visit units. By round two, she has moved to a small house in a rural northwestern suburb with her new baby and other children. She likes the new neighborhood and plans to stay, yet she is isolated there. She says, “I haven’t been outta this house” since she moved. Her car is not working and public transportation is slow and sporadic in her area. She relies on visits from her family and boyfriend to leave the house for shopping, doctors appointments, and other activities. LaTasha says she wants to find a job but has a hard time being able to “follow through” with things. She says,

“I work one time—no, two times an’ quit the same day. On both of ‘em! [But now] I’m gonna work. I’m gonna get me a job. I can’t sit in here, shoot. I want me an Impala SS. So I guess I’m a have to work for it. Or probably go to school ‘cause I was thinkin’ about goin’ up there to the college an’ see what classes they got. ‘Cause I was goin’ to school for architecture design...every time I decide I would go to school I wind up droppin’ the first semester like I can’t do it, because I don’t know if I really wanna do it! ...I have a fear of failin’ every-thing; I think that’s why I start somethin’ an’ I keep quittin’ it because I don’t think I will finish it.”

Tierra is a 31-year-old mother of one. She had to quit her last telemarketing job, which she had for 2 months, when she started dialysis. At baseline, she received disability payments and was unable to work. She was diagnosed with lupus at age 14 and has had serious health problems over the past 3 years. Despite her health problems, she was able to find a unit with help from her sister, who is also enrolled in the program. Although she successfully moved, at round two Tierra describes several problems with her new apartment and landlord and some incidents of racial bias at her daughter’s school. She is unhappy in her new unit and would like to move south to be near her family. She says,

“Actually, like I said, since I been here, I don’t feel I been happy, ‘cause this place depresses me, ‘cause there’s nothin’ to do, nothin’, you know, can’t get out much because the buses stop runnin’ early, I don’t have a car, I don’t know how to drive, so that’s another bad thing, you know, so I don’t get out.”

Tierra’s dream is to get a new kidney, return to school for a cooking program, and eventually open her own restaurant. For the time being, however, she is unable to work.

Alma has four adult children and is 59 years old. One of her sons was recently murdered by a girlfriend and the case will go to trial soon. His son and another grandchild currently live with her. In the past she held several steady jobs for long periods; she worked the longest as a cafeteria worker at a large auto manufacturing plant for 15 years. Two years before baseline, she had a mild stroke that left her with constant back pain and unable to stand for extended periods of time. She says,

“I can’t do no lot of walkin’ ...Because the lower part of my back gets to hurting an’ then all at once it gets in my knees. An’ then I just lose my balance. An’ I don’t do not lot of standin’ at one time. An’ I can’t do no liftin’, *period*.”

Alma currently receives disability payments and has no plans to work. She wants to move so her grandchildren can go to a better school; she has looked for units in the suburbs. At round two, she was living in a suburban unit found by her housing counselor. Her grandson is doing well in school and her health problems have improved. She has no plans to work but loves her new neighborhood and says, “Since I move out here, seem like I’m happy. For the first time in ...cause I was out there [in public housing] for almost 30 years. This is the first time I really felt *happy!*”

Movers With Job Changes

A small group of respondents experienced changes in their employment situations that coincided with their moves. A handful of respondents, about 7 percent of movers, lost their jobs after moving because of transportation problems. A few who were not working at baseline (again, about 7 percent of movers) started jobs in their new neighborhoods. Another small group of respondents (about 8 percent²) changed jobs for reasons unrelated to their moves.

Alisha is a 27-year-old mother of four. Before moving, she worked at the local phone company for \$5.25 an hour. She lost this job shortly after moving because it was too difficult for her to get to work from her new unit. By round two she has found a new part-time job driving a school bus but will not begin work until school starts.

Nancy moved to a far north suburb that is 2-1/2 hours away from her old neighborhood after her sister, who lives in the same town, found her a unit. Nancy has two children, but her oldest stays with her mother in her old neighborhood. She has held retail jobs in the past but, before the move, was not working due to feeling depressed about the deaths of some close family members. She says,

“I used to always try to keep me a job but, after my sister passed from the breast cancer, I had, like, gave up you know, I had went through like a depressed stage and I just stayed in the house.”

After the move, Nancy’s sister found her a third-shift job as a stocker at a large retail store, where she also works. Nancy depends on her sister to take her to work and pick her up. She is unhappy in her new neighborhood; “it’s too quiet,” she says. She wants to move back to south Chicago to be closer to her family and friends, although her son is adjusting well and likes his new school. She spends each weekend at her old public housing development, where her mother still lives.

Lisa is a 29-year-old mother of three. At baseline, she was working as a security guard and was worried about her drug-addicted mother, who was staying with the family. After moving to the north side of the city, her company transferred her job to a site close to her new apartment. From the start, she had many problems with her unit and landlord. After the unit failed an inspection, Lisa moved back to the south side. Just before moving, she got a better paying unionized job as a housekeeper at a large downtown hotel. She says that she wanted a new job whether or not she was moving.

Discussion

Here we return to the questions stated earlier: What are voucher holders’ baseline employment experiences? How does the process of moving affect and influence voucher holders’ labor force participation? We address each question in turn.

We have shown that there is little difference between movers’ and nonmovers’ employment situations at baseline. Overall, movers and nonmovers have very similar employment histories and experiences. Compared with census data for their original neighborhoods,

Gautreaux Two voucher holders as a group tend to work more than the norm for their areas. Most have worked a variety of low-wage service jobs in the past, regardless of whether they are working at baseline, and have shifted back and forth between work and public assistance as they bear children. Childcare, illness and pregnancy, layoffs from temporary jobs, and transportation problems are the main reasons why respondents stop working. It is important to note that of the obstacles to employment voucher holders describe, only one, transportation, is always affected by a move. Childcare may or may not be affected.

Respondents have positive attitudes about work and prefer to work rather than receive aid, yet they recognize that working may not always be the best thing for their families. Although the amount of aid available to respondents has declined since welfare reform, deciding whether to work involves a near-constant assessment of a job's costs and benefits compared to what a respondent could cobble together in various forms of public and private assistance. We want to emphasize that jobs, while increasingly important to respondents, are just one aspect of their lives. Respondents are all mothers who often have significant personal and health problems that affect their ability and desire to work.

In thinking about how moving influences labor force participation, we observe four early outcomes for voucher holders with respect to their employment situations as they attempt to move into more affluent neighborhoods. Again, we emphasize that our data covers the initial adjustment period after moving. The least common outcome is that movers experience a change in their employment situation. Only a handful of respondents begin new jobs in their new neighborhoods after moving, while a few lose their jobs because of transportation problems, and others change jobs for reasons unrelated to moving. The most common outcome is to keep a baseline job, which may or may not represent an obstacle to moving, or to remain out of the labor force.

Most movers who work at baseline hold on to their jobs and many aspects of their "old" lives after moving. They often view their moves as temporary and expend a lot of energy and time maintaining their and their children's school and social networks in the old neighborhood. For some workers, their commitment to their jobs becomes an obstacle to moving. If they view their jobs as good ones, holding on to their current positions may be more important than moving. A job can also be an obstacle to moving by limiting the amount of time available to respondents for housing searches and the areas they are willing to move to.

Moving out of a highly segregated, high-poverty neighborhood into a more affluent and racially mixed neighborhood seems to have little association with increased or reduced employment, at least initially. This tendency is despite the fact that census data show that movers' new tracts have significantly higher employment rates for women. Theoretically, we might expect that living in an area where more women are working means that more jobs are available, social norms about holding a job are more prevalent, and contact with employed neighbors might help voucher holders find jobs. Instead, we find that respondents who were working before they made voucher moves are likely to continue working at their original jobs, while respondents that are not employed continue to stay out of the labor force. Attitudes about work do not seem to be influenced by moving. Gautreaux Two voucher holders are positive about work before and after they move, and working, when possible, is greatly preferred to receiving public assistance.

These findings do not support ideas that simply moving low-income families out of segregated, high-poverty neighborhoods will encourage greater labor force participation. Beyond what we have already described, we have three suggestions about why location does not seem to affect voucher holders' employment. The first is to emphasize the type of moves Gautreaux Two voucher holders are making. The second is to highlight additional

problems and issues our respondents face in their daily lives that make it difficult for them to find and keep jobs. The third is to emphasize respondents' labor market patterns and the obstacles that keep them from working.

For Gautreaux Two participants, the chance to secure a voucher and move out of public housing is a rare opportunity. Participants' main reasons for moving are a desire to improve their housing conditions and escape the violence, drugs, and gangs that plague inner-city housing developments. While these are certainly good reasons for moving, in most cases Gautreaux Two voucher holders often have nothing to anchor them in the new neighborhoods they move to and a lot to bind them to their old neighborhoods. They do not move to take new jobs or start educational programs, which are common reasons why Americans move.

Most respondents have lived most of their lives in or around the south side neighborhoods where Chicago's public housing developments are concentrated and have an important support network of family and friends there. They also have fairly limited experiences in other parts of the city and do not feel comfortable there. If there were no restrictions on their Gautreaux vouchers, most respondents report wanting to move to working- and middle-class African-American neighborhoods that would not qualify as "opportunity areas." Moving is a major change for many of our respondents. While they may appreciate their new neighborhoods' relative safety and quiet, they are apprehensive about being outside of the city they know. Most take a "wait and see" attitude toward their new neighborhoods, putting off making major changes such as looking for new jobs or changing their children's schools until they have made up their minds about whether they will stay.

Many of our respondents have substantial personal and health problems that can make it difficult to find and keep jobs. In addition to the childcare woes that most working parents face, many of our respondents have witnessed brutal acts of violence and experienced the deaths and incarcerations of close family members, friends, and partners and have suffered material hardships. A study of Chicago Housing Authority voucher holders, a group similar to the Gautreaux Two sample, shows these individuals are more troubled than voucher holders nationwide (Popkin and Cunningham, 2000). Half of our respondents score in the clinical range on the CES-D (a depression scale) or report serious struggles with depression. Pre-existing depression or acute anxiety can sometimes make the inevitable disappointments and frustrations of the housing search overwhelming and can make jobs hard to find and keep. The physical health needs of participants and their children are a prohibitive barrier for many as well. We emphasize this only to highlight that, given the traumatic events our respondents face with depressing regularity, finding or holding onto low-wage jobs may seem relatively unimportant to them.

Another factor to emphasize is Gautreaux Two voucher holders' employment histories. Respondents tend to move in and out of jobs regularly, and they will likely continue to do so regardless of whether or not they move. Most of these employment changes will be influenced by whether respondents have more children, whether they or their children have health problems, and whether they are laid off from temporary jobs, rather than by residential moves. While transportation to and from a job can certainly be affected by a move, other common obstacles to working such as pregnancy, childcare problems, and illness are less likely to be.

We also want to emphasize that the employment obstacles faced by Gautreaux Two voucher holders are directly related to their gender and status as single mothers. The obstacles these voucher holders face are different from the employment obstacles reported for men in the literature about inner-city joblessness. Our respondents are often the only caregivers for their children, and sometimes grandchildren, and shoulder all aspects of their care and well-being with few material resources. These responsibilities, in turn, affect our respon-

dents' abilities and desires to work. Ironically, although the pressures of being a single mother may play out as an employment obstacle for respondents, children are a primary motivation for working. Respondents think working will improve their children's lives by alleviating material hardship and by setting a good example for them.

In conclusion, our findings do not offer much hope that using vouchers to move low-income families out of racially segregated, high-poverty neighborhoods will lead to greater labor force participation among these families. Moving alone simply cannot alleviate many of the obstacles that Gautreaux voucher holders, who are mostly low-income, single mothers, face when finding and keeping jobs. Moving to a more affluent neighborhood does not seem to translate into gains in labor force participation, although the new neighborhood offers a much different context for employment.

It is possible that later rounds of interviews with Gautreaux Two voucher holders will paint a different picture of their employment outcomes after moving, but we do not expect much change from what we present here. Voucher holders who held onto jobs when they moved and decide to remain in their new neighborhoods may eventually find jobs near their new homes, but we do not expect moving alone to encourage nonworkers to enter the labor force. We also expect that some current workers and nonworkers will switch places in future rounds of interviews. Voucher holders' propensity to hang on to their jobs when they move may mean that it is hard for voucher holders to find jobs even though most work at low-wage service jobs. It could also mean that moving in itself is such a big change that respondents want to hold on to familiar aspects of their routine.

After Gautreaux Two program participants move, voucher holders are in areas with much greater labor force participation for women, but it is unclear how or why this could translate into employment gains. Since respondents already want to work and have positive attitudes about it, being around more "role model" workers in the new neighborhood seems unlikely to have any effect unless they help voucher holders find jobs, something we have very little evidence of in the Gautreaux Two study. We know from past research on gender and work, however, that a desire to work is only one of many factors involved in finding and keeping a job. Additional issues of race, education, and employer stereotyping need to be considered as well, since they affect the types of jobs and opportunities available to African-American, female voucher holders who are from inner-city areas.

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Notes

1. The total N is higher than 81 in some of our exhibits because we have additional data for some respondents for whom we do not have interviews.
2. These percentages, combined with the others for movers, do not add up to 100 percent due to missing data and the fact that a few movers did not fit into any of these groups.

References

- Allard, Scott, and Sheldon Danziger. 2003. "Proximity and Opportunity: How Residence and Race Affect the Employment of Welfare Recipients," *Housing Policy Debate* (13) 4: 675–700.
- Denzin, Nelson, and Yvonna Lincoln, eds. 2003. *The Landscape of Qualitative Research*. Thousand Oaks, CA: Sage Publications.
- Devine, Deborah, et al. 2003. *Housing Choice Voucher Location Patterns: Implications for Participants and Neighborhood Welfare*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.
- Edin, Kathryn, and Laura Lein. 1996. "Work, Welfare and Single Mothers' Economic Survival Strategies," *American Sociological Review* 62 (2): 253–266.
- Finkel, Meryl, and Larry Buron. 2001. *Study on Section 8 Voucher Success Rates Volume 1: Quantitative Study of Success Rates in Metropolitan Areas*. Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.
- Granovetter, Mark. 1973. "The Strength of Weak Ties," *American Journal of Sociology* 78 (6): 1360–1366.
- Grogger, Jeffrey. 2003. "The Effects of Time Limits, the EITC, and Other Policy Changes on Welfare Use, Work, and Income Among Female-Headed Families," *The Review of Economics and Statistics* 85 (2): 394–408.
- Harris, Kathleen M. 1996. "Life After Welfare: Women, Work and Repeat Dependency," *American Sociological Review* 6 (3): 407–426.
- Jacobs, Jerry. 1989. *Revolving Doors: Sex Segregation and Women's Careers*. Stanford, CA: Stanford University Press.
- Kirschenman, Joleen, and Kathryn M. Neckerman. 1991. "We'd Love to Hire Them But...The Meaning of Race for Employers." In *The Urban Underclass*, edited by Christopher Jencks and Paul E. Peterson. Washington, DC: The Brookings Institution.
- Kling, Jeffrey R., et al. 2004. *Moving to Opportunity and Tranquility: Neighborhood Effects on Adult Economic Self-Sufficiency and Health From a Randomized Housing Voucher Experiment*. New York: National Bureau of Economic Research.
- Lin, Nan. 1999. "Social Networks and Status Attainment," *Annual Review of Sociology* 25: 467–470.
- Massey, Douglas, and Nancy Denton. 1993. *American Apartheid Segregation and the Making of the Underclass*. Cambridge, MA: Harvard University Press.

- Orloff, Ann S. 2004. The End of Maternalism. Paper presented at the Center for International and Comparative Studies, Northwestern University.
- Orr, Larry, et al. 2003. *Moving to Opportunity for Fair Housing Demonstration Program Interim Impacts Evaluation*. Prepared for the U.S. Department of Housing and Urban Development, Office of Policy Development and Research. Washington, DC: Abt Associates Inc., National Bureau of Economic Research, and The Urban Institute.
- Pashup, Jennifer, et al. 2004. *Residential Mobility Program Take-up From the Client's Perspective: Participation in the Gautreaux Two Housing Mobility Program*. Evanston, IL: Institute for Policy Research, Northwestern University.
- Popkin, Susan, and Mary K. Cunningham. 2000. *Searching for Rental Housing With Section 8 in the Chicago Region*. Washington, DC: The Urban Institute.
- Reskin, Barbara. 1991. "Labor Markets as Queues: A Structural Approach to Changing Occupational Sex Composition." In *Micro-macro Linkages in Sociology*, edited by Joan Huber. Thousand Oaks, CA: Sage Publications.
- Rubinowitz, Leonard S., and James E. Rosenbaum. 2000. *Crossing the Class and Color Lines: From Public Housing to White Suburbia*. Chicago: University of Chicago Press.
- Strauss, Anselm, and Juliet Corbin. 1990. *Basics of Qualitative Research*. 2nd ed. Thousand Oaks, CA: Sage Publications.
- Waldinger, Roger, and Michael Lichter. 2003. *How the Other Half Works*. Berkeley, CA: University of California Press.
- Wilson, William J. 1999. "Jobless Poverty: A New Form of Social Dislocation in the Inner City Ghetto." In *A Nation Divided: Diversity, Inequality and Community in American Society*, edited by Phyllis Moen, Donna Dempster-McClain, and Henry A. Walker. Ithaca, NY: Cornell University Press.
- . 1996 (1997 reprint). *When Work Disappears: The World of the New Urban Poor*. New York: Alfred A. Knopf.
- . 1986. *The Truly Disadvantaged: The Inner City, The Underclass and Public Policy*. Chicago: The University of Chicago Press.
- ### ***Additional Reading***
- Denzin, Nelson, and Yvonna Lincoln, eds. 2000. *Handbook of Qualitative Research*. 2nd ed. Thousand Oaks, CA: Sage Publications.
- . 2003. *Strategies of Qualitative Inquiry*. Thousand Oaks, CA: Sage Publications.
- Logan, John R., Richard D. Alba, and Shu-Yin Leung. 1996. "Minority Access to White Suburbs: A Multiregional Comparison," *Social Forces* 74 (3): 851–881.
- Orloff, Ann S. Forthcoming 2006. "Farewell to Maternalism? State Policies and Mothers' Employment." In *The State After Statism: New State Activities in the Age of Globalization and Liberalization*, edited by Jonah Levy. Cambridge, MA: Harvard University Press.
- Pendall, Rolf. 2000. "Why Voucher and Certificate Users Live in Distressed Neighborhoods," *Housing Policy Debate* 11 (4): 881–910.

Popkin, Susan, et al. 2000. "The Gautreaux Legacy: What Might Mixed-Income and Dispersal Strategies Mean for the Poorest Public Housing Tenants?" *Housing Policy Debate* 11 (4): 911–942.

Varady, David, and Carole Walker. 2003. "Housing Vouchers To Move to the Suburbs: How Do Families Fare?" *Housing Policy Debate* 14 (3): 347–382.

———. 2000. "Vouchering Out Distressed Subsidized Developments: Does Moving Lead to Improvements in Housing and Neighborhood Conditions?" *Housing Policy Debate* 11 (1): 115–162.

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