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

Cityscape: A Journal of Policy Development and Research • Volume 8, Number 2 • 2005
U.S. Department of Housing and Urban Development • Office of Policy Development and Research

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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
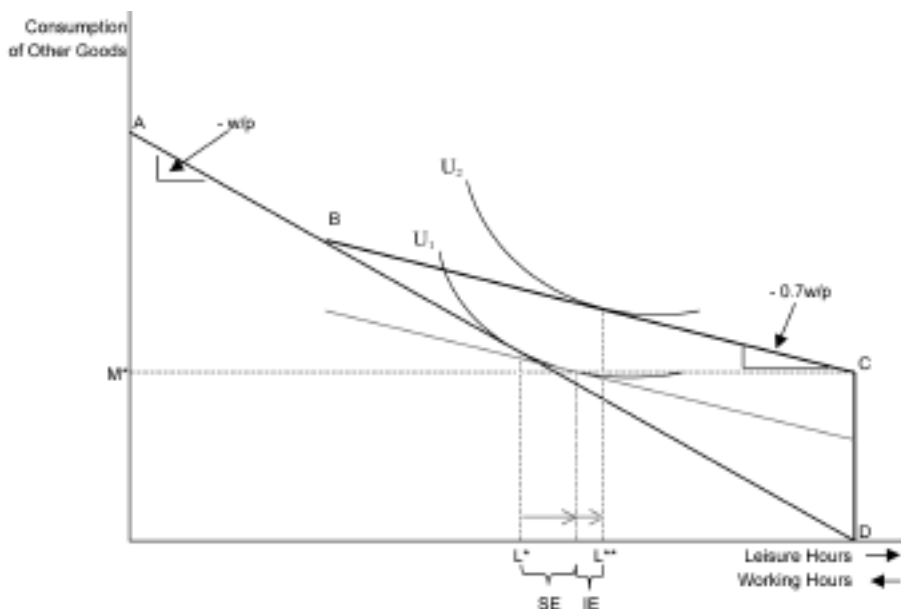
Adding important aspects of reality to this simple model eliminates its unambiguous implication concerning the effect of housing assistance on market labor supply. For example, Schone (1992) analyzes the effect of housing assistance on market work in a model with three goods: housing, other produced 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

$$MR_{ij} = (1 + \alpha_1 Z_{1ij} + ... + \alpha_m Z_{mij})(\beta_0 + \beta_1 X_{1ij} + ... + \beta_n X_{nij}) + v_{ij} \qquad (9)$$

and

$$\ln MR_{ij} = \beta_0 + \beta_1 X_{1ij} + ... + \beta_n X_{nij} + \alpha_1 Z_{1ij} + ... + \alpha_m Z_{mij} + v_{ij}. \qquad (10)$$

In these equations, MR_{ij} represents the gross rent of unit i in locality j, the Zs represent dummy variables for each locality (with one locality omitted), the Xs 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.

Acknowledgments

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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/assthsg/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.

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