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Painter, Gary

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**WELFARE REFORM: WHAT CAN WE LEARN
FROM THE RATIONING OF HOUSING ASSISTANCE?**

By

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GARY PAINTER

WALTER A. HAAS SCHOOL OF BUSINESS

**FISHER CENTER FOR REAL ESTATE AND URBAN ECONOMICS
UNIVERSITY OF CALIFORNIA AT BERKELEY**

**Kenneth T. Rosen, Chair
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WELFARE REFORM: WHAT CAN WE LEARN FROM THE RATIONING OF HOUSING ASSISTANCE?

Gary Painter

University of California, Berkeley

WORKING PAPER NO. 96-246

Abstract

Many studies in the 1970s and 1980s have examined the effects of the welfare system on individual behavior. All of these studies fail to appropriately consider public housing assistance. Most studies have either ignored housing assistance or have implicitly assumed that there is no rationing in this program. This paper presents a model which measures the impact of rationing one public assistance program in the context of the entire benefit package offered to female-headed households. We find that the housing programs raise the disincentives of the welfare package an additional thirty-four percent when compared to the entitlement portion of the package.

JEL Classification: H0

Keywords: welfare, housing, labor supply

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** Author may be contacted at (510) 944-9092, painter@econ.Berkeley.EDU, or University of California, Department of Economics #3880, Berkeley, CA 94720-3880.

I. Introduction

Welfare reform is currently being debated at both the state and national level. Politicians debate the need for more or less public assistance while seeking to reform a system that the general public deems ineffective. Social scientists study the impact of the welfare package on the incentives of individuals in order to create a basis of knowledge from which to develop a better system. The welfare package for families with children consists of two types of benefits: cash assistance through Aid to Families with Dependent Children (AFDC), and in-kind subsidies through Food Stamps, Medicaid, and housing assistance.¹ In the past decade, numerous advances have been made in understanding the effect of public assistance programs on labor supply and other individual decisions. Most research has focused on entitlement programs such as AFDC and Food Stamps, and results from this literature have yielded a better understanding of the incentives of individuals both to participate in these programs and to supply labor.

The implications of this literature suggest that labor supply is negatively affected by increases in benefits in these welfare programs, but that this effect is quite small. One might expect that as individuals are made better off in a non-working state, more would not work or reduce hours substantially. This may be partially offset by unobservables in tastes for work and welfare stigma, but it is not likely that these account for the observed insensitivity of labor supply to changes in program rules. Part of the answer to this puzzle may lie in the fact that much of the research in this area has assumed participation in only one or two public assistance programs at a time. While research has taught us much about the AFDC and Food Stamp programs, less is understood about the impact of programs such as Medicaid and low-income public housing assistance. AFDC and Food Stamps simply add income to a household's budget constraint, because AFDC is a cash benefit and Food Stamps is essentially cash (Moffitt, 1989). On the other hand, Medicaid is an in-kind benefit which provides health insurance to the poor. Recently, researchers have begun to analyze Medicaid and its

¹ Supplemental Security Insurance is also available as a cash benefit for the elderly.

effect on labor supply and welfare participation, and some studies have found a strong impact of Medicaid on these decisions.²

At present, the vast majority of studies that analyze the impact of the public assistance programs on labor supply and program participation exclude housing. Studying housing is difficult for many reasons. Housing assistance is not only an in-kind benefit, but it is also unique from the previously mentioned programs because it is not an entitlement in which an applicant automatically receives the benefit when eligible. Therefore status on or off the waiting list for subsidies is important in an analysis of housing. Most data sets lack information on a household's status on a waiting list. Generally, we only observe whether or not a household is receiving a subsidy. In addition, very little information exists on the length of the waiting times which households face. Housing is also different from the other welfare programs because it is administered at the local level, and most data sets fail to identify the exact locale in which a household resides for confidentiality reasons.

Inclusion of the housing assistance programs in the choice problem is important in understanding the impact of the welfare package on labor supply and program participation. If the housing benefit is correlated with the other benefits in the welfare package, then past results which exclude housing have been biased. In addition, the total welfare effect has been underestimated. The housing benefit itself can be quite large, and great regional variation exists in the size of the housing benefits relative to the other benefit programs. A sample of one city from each of the nine Census regions is presented in Table 1 for illustrative purposes. We notice that the housing benefit is larger than the AFDC benefit in four of the nine cities, and in four of the cities, it is over half as large as the sum of AFDC, Food Stamps, and Medicaid.³ This provides further evidence that exclusion of the

² Blank (1989) proxies for the value of Medicaid with the average expenditure per recipient in each state and finds insignificant effects on welfare participation. On the other hand, Moffitt and Wolfe (1992) develop an insurance value for Medicaid, and find large labor supply disincentives, particularly in families with poor health. Yelowitz (1995) takes a different approach. He estimates the impact of Medicaid on AFDC participation and labor force participation based on evidence from Medicaid eligibility expansions. He finds that increasing eligibility of Medicaid by 25 percent of the Federal poverty level will reduce AFDC participation by 4.61 percent and increase the probability of working by 3.32 percent.

³ Medicaid is valued as the average expenditure per AFDC family (mother and two children) in the state.

housing programs in a model of labor supply and welfare programs participation could have a significant impact on the results.

Housing should also be studied in a proper context. Evidence from a subsample of female headed households in the Survey of Income and Program Participation (SIPP) demonstrates that individuals tend to participate in many public assistance programs at a time (Table 2). It may be the case that individuals make decisions in response to changes in the overall benefit package, and not just one or two pieces of the package. We currently observe marginal tax rates of one hundred percent in AFDC, thirty percent in Food Stamps, and about thirty percent in subsidized housing.⁴ In addition, Medicaid benefits are lost in their entirety in most states when AFDC eligibility ends.⁵ Therefore, looking at one program alone can lead to spurious results when the combined marginal tax rates for many households in this population is potentially well over one hundred percent.

Keane and Moffitt (1995) have included housing in a structural model of multi-program participation. They utilize simulation estimation to overcome the difficulties of estimating a structural model with a labor supply equation and participation equations for AFDC, Food Stamps, and subsidized housing.⁶ They find no significant effects of housing assistance, which they attribute to the absence of control in their model for the rationing of public housing assistance. There is another limitation of their study. They are unable to accurately describe the choice set of individuals by correctly matching individuals to the housing authority in which they reside and therefore do not use the actual housing subsidy which households would receive. It is the goal of this study to overcome both of these deficiencies in past work.

The results of this study indicate that proper assignment of the housing benefits is

⁴ The AFDC tax rate is sixty-six percent in the first three months of work.

⁵ To combat some of the potential disincentive effects, the government has four month transition periods for AFDC and Medicaid where benefits are not lost entirely upon reaching the income standard. Currently, Medicaid eligibility has been extended, particularly in the case of pregnant women and children in female headed households.

⁶ Deriving an analytic solution in this four equation system is computationally infeasible because of the interactions of the four error terms from the equations. It is not possible to identify the regions of the error space within which different program combinations are optimal.

critical in analyzing the impact of housing assistance on the decisions of households. Unlike past studies which found no effect of housing subsidies, we find significant effects. Rationing is also important, but better data would produce a more precise assessment of its impact. We also find that past studies of the effect of entitlements may not have yielded biased coefficients on the benefit variables, but that not including housing in the total package of benefits offered to households can severely underestimate the impact of the total welfare package. Simulations demonstrate that exclusion of the housing programs underestimates the effect of the welfare package by as much as thirty-four percent, and making housing an entitlement lowers the probability of labor force participation by a percentage point.

In upcoming years, housing may not be the only welfare program to be rationed. Because of the tremendous budget deficits which are projected to occur in the future, the federal government may be choose to ration current entitlement programs. Even if the federal government chooses not to ration the programs, but gives the money in block grants to the state, the state governments may choose to ration them. Thus we would like to be able to predict the effects of this type of policy change on individual behavior and on government expenditure. The example of housing provides a natural place to explore the impact of rationing a public assistance program in a package of benefits, thus providing a framework from which to judge the potential impact of rationing other programs such as AFDC.

The remainder of the paper is presented as follows. Section II describes the unique features of the housing programs in comparison to the entitlement programs such as AFDC, Food Stamps, Medicaid. Attention is also paid to past analysis of in-kind benefits like low-income housing assistance, and to the interaction of the various public assistance programs with the housing programs. Section III describes the various data sources employed in the analysis. A simple choice model is presented in section IV. The model illustrates the choice between working and receiving welfare benefits under different schemes by which the welfare package can be offered to the potential recipients. The econometric specification is discussed in section V. We present a reduced form analysis designed to assess the impact of the various components of the welfare package (entitlements,

rationed assistance, and waiting list information) on labor force and housing program participation probabilities after controlling for the various socioeconomic characteristics of the female-headed households. Section VI presents the results of the estimation. Section VII concludes.

II. The Uniqueness of the Housing Assistance Programs

While there are numerous housing programs administered by the Department of Housing and Urban Development (HUD), the program which has the greatest impact on the poor is subsidized rental housing. This type of housing assistance takes the form of either public housing or subsidized private rental housing (Section 8 vouchers or certificates). In both programs, families with sufficiently low income and assets are eligible, and in both programs the tenant is obligated to pay a rent set by a government formula. The Section 8 programs allow the tenant to find suitable private housing that meets government safe and sanitary living standards. The government pays the landlord a rent that will give the landlord, combined with the tenant payment, a "fair market rent" for the unit.⁷ The fair market rent level is established by the federal government.⁸ In public housing, the government acts as the landlord and simply collects the tenant portion of the fair market rent for the unit. Therefore the housing subsidy is the difference between the fair market rent and the tenant rental payment.

Housing subsidies are administered by a local public housing authority (PHA), which typically has jurisdiction over a county or city. The PHA is given a budget from the federal government based upon the quantity of low income households in the covered area, but this budget is insufficient to provide subsidies to all eligible applicants. It keeps a waiting list of those households which have applied for housing assistance, and give subsidies based on a queue. Individuals are only eligible if they are considered "low-income" or "very low-income", which is eighty percent or fifty percent of the

⁷ The differences between the certificate and voucher programs are small, and in fact, the certificate program is being abolished. The key difference is that in the voucher program, if the tenant wants to pay more or less than the fair market rent for a unit, he or she may pay the difference themselves or get to keep the difference. The certificate program requires the tenant to pay their calculated portion of the fair market rent, and any deviation over the fair market rent must be approved by the housing authority.

⁸ The fair market rent is calculated as the rent on a safe and sanitary unit which is in the forty-fifth percentile of rents on a comparable unit. The fair market rent varies by bedroom size, and is set at the metropolitan statistical area or county levels.

area's median income, respectively. The housing authority has the discretion of which measure to use, but most stick to the very-low income measure since the subsidies are in such short supply.⁹

There are two other interesting facets of the administration of housing subsidies. The first is the designation of federal preference and local preference for some tenants. If a family is displaced or homeless, living in substandard housing, or paying more than fifty percent of net income in rent, the family is given federal preference, and is placed at the top of a housing authority's waiting list. Designation of local preference varies by locale, but cannot supersede federal preference. A common example of a local preference is given when the applicant lives within the jurisdiction of a particular housing authority. This gives additional preference to residents at the expense of those applying remotely.

A second administrative point is that individuals in public housing can be on a waiting list for Section 8 housing vouchers. Public housing and private subsidized housing may be different goods, and should be treated differently in any analysis. If there is systematic variation in quality between the two housing programs, then we would expect people to view them as different benefits. There is some evidence that the quality difference may not be great. Steven Mayo (1983) finds in an analysis of the housing experiments in the 1970s that households receiving any type of housing assistance viewed their neighborhood as poorer than those who did not receive assistance. We posit that this is due to the fact that both end up in primarily low-income neighborhoods which would presumably have comparable neighborhood effects.¹⁰

The impact of housing assistance can be assessed in two ways. The first is to attempt to value the subsidy as an in-kind benefit and then to add its value into the budget constraint of the individual. Although Food Stamps is also an in-kind benefit, food purchases are usually found to be infra-

⁹ Eligibility must be maintained while a household is on the waiting list. Typically, a housing authority checks every six months from the time the applications is first submitted until the subsidy is granted.

¹⁰ In addition to the Mayo finding, we observe no individuals who are currently residing in public housing which are also on a waiting list for private housing vouchers in the data set (SIPP) which is used in this analysis.

marginal (Moffitt, 1989): i.e., no more food is purchased because of the existence of Food Stamps. Therefore one can value Food Stamps as cash inputs in an individual's utility function. One cannot do the same in the case of housing subsidies. Smeeding (1982) surveys the three main approaches to value in-kind benefits. These approaches attempt to develop some type of cash value for the subsidy which is then entered into the budget constraint. The conceptually correct method assumes a utility function and employs the concept of compensating variation to derive a cash-equivalent value for the housing subsidy (Murray, 1975).¹¹ This method is not without its problems. It requires detailed information on prices, elasticities of substitution among goods and income elasticities. It also requires the estimation of the parameters of a particular utility function, which is a difficult task (Moffitt and Wolfe, 1992). On the other hand, this method is conceptually correct if one can fully describe an individual's utility function and obtain a value of the subsidy for both participants and non-participants.

Because of the complexity involved, this paper does not attempt to explicitly derive a value for the housing benefit in this way. Instead, we attempt to assess the direct impact of the housing subsidy on the labor supply and housing program participation decisions of female-headed households. Studies have shown that public assistance programs can have adverse incentives for labor supply (Moffitt, 1992). Most studies use reduced form models, and include some combination of the entitlement programs, but exclude housing. Some of the studies use a structural model where the joint decision of working or receiving benefits is accounted for. These studies do find small disincentive effects of these transfer programs.¹² If being an in-kind benefit was the only unique feature of housing programs, then it would be straightforward to model housing subsidies. One could just add the

¹¹ The other methods are the government cost method, and the funds released approach. Government cost simply adds the cost of the subsidy to the government to an individual's budget constraint. The funds released approach can be thought of as similar to the government cost approach, except that the income effect is not taken into account (Smeeding, 1982).

¹² For example, Fraker and Moffitt (1988) incorporate this type of model in the case of AFDC and food stamps. They find that elimination of both the Food Stamp and AFDC programs will only increase weekly hours worked by 1.3 hours with a baseline mean of 20.7 in the presence of both programs.

housing program to the set of equations, and if the benefits are assigned correctly, one could proceed along the same line as Fraker and Moffitt (1988).

The additional complication involved in studying housing subsidies is that they are rationed. This necessitates changes in both the theoretical framework and the data requirements. The model should accurately describe the choice set of individuals which will include the wait that a household faces before it receives the housing benefit. This requires information on the waiting lists of the various housing authorities. We also need to observe a household's decision to apply for housing assistance. Most data sets simply record whether or not a household is receiving the subsidy. In order to properly model the decision to participate in the housing programs, we must also observe whether or not households which are not currently receiving benefits are on a waiting list for benefits. These households should be included as participants.

Because housing is an in-kind benefit, its impact on work incentives may also depend on whether housing is a complement or substitute of leisure. Leonesio (1988) shows in a theoretical framework that complements of leisure can deter work effort to a greater extent than do substitutes. For example, child care assistance as a substitute of leisure may have an overall effect of increasing work effort because of its interaction with leisure. On the other hand, a complement of leisure can have a greater impact on labor supply than a cash transfer of the same dollar value. It may be the case for those who currently reside in substandard housing or who are homeless that a guarantee of housing is a complement of leisure, but the impact on the potentially eligible population is uncertain.

Another issue in the study of housing is the interaction of housing assistance with the other public assistance programs (chiefly, AFDC and Food Stamps). Appendix 1 details the various rules of the programs. A first thing to observe in the eligibility and benefit formulas of these three public assistance programs is the interdependency of the programs in conducting the income tests and benefit calculations for each program. For example, the AFDC benefit figures into the Food Stamp and housing benefit formulas, but the reverse is not true. In addition, one can collect AFDC and Food Stamp benefits while waiting for the housing subsidy. During this waiting time, a non-working

household head will obtain federal preference under the rent burden provision and move into the group at the top of the waiting list. Therefore, the structure of the housing program may induce a household to choose lower labor income and substitute it with welfare income.¹³ This is another reason why it is important, when trying to calculate the impact of these benefits to individuals, to conduct these tests in the context of a multi-program model.

III. Data and Variable Construction

We utilize data from the Survey of Income and Program Participation (SIPP). The SIPP contains a nationally representative sample of approximately twenty thousand households, which provides good information on labor supply and income sources. Each panel of the SIPP contains 7 to 8 waves. Every wave contains a set of core questions, which is present in each wave, and a topical module which differs across waves. Responses for the past four months are given in each wave. We select a sample of female-headed households 16-50 with children under the age of 18 present because these households are potentially eligible for all the benefits discussed in the analysis. Families with non-labor incomes greater than the AFDC asset limits are excluded because their behavior may be structurally different from those with assets below this level. Sample statistics for variables used in the analysis are presented in Table 3. Three cross-sections of the SIPP, totalling 2538 observations, are used in the analysis.¹⁴ Housing participation is defined as whether participation took place in the month of the interview. Both current recipients and households on a waiting list are included. Labor force participation is equal to one if the mother worked that month. Benefit levels are divided by one hundred.

The SIPP is particularly attractive because it asks households if they are on public housing waiting lists. Unfortunately, the waiting list information is not asked of every respondent. The

¹³ While AFDC is entered into the formula in the same way as labor income, Food Stamps, and Medicaid is not. This differential treatment could influence a household's decision to take up welfare or work.

¹⁴ We pool the fourth wave in 1984 with the second wave in 1991, and the first wave in 1992. These waves are used because the topical module in these waves contain a question which asks if the household is on a waiting list. This question was dropped after 1984, but was asked again in later years. We chose to add the data from 1991 and 1992 based on the ability to access the data and to match housing benefits to the households.

question covers all respondents who receive any sort of government assistance, including AFDC, Food Stamps, Medicaid, Supplemental Security Income, and Social Security, but is not asked of the general population. Therefore, even with this data set we will miss those households which only wish to participate in the housing programs, but have not yet received their subsidy, as non-applicants. On the other hand, this population is small because most people who are waiting will choose to have federal preference to move to the top of the waiting list. Typically, households in this group supplement their meager labor income with government transfers of some kind. Therefore the misspecification bias may be negligible.¹⁵

Benefit information was collected from various sources. AFDC, Food Stamps, and Medicaid benefit levels are taken from the Green Book in the appropriate years. Fair market rents by county and bedroom size for 1984 are obtained from the July 5, 1984 issue of the Federal Register.¹⁶ Since public housing fair market rents are not published, we assume that they are the same as private housing. We also obtained some data on cost of living measures. McMahon (1991) provides a state level cost of living index (COL) for the total package of goods, and the American Chamber of Commerce Researchers Association (ACCRA) provides both housing and all items measures for 314 selected MSAs. These will be utilized to adjust the housing and the other entitlement benefits for differences in benefits which can be solely attributed to differences in the cost of living.

A final piece of data utilized in this study is information on the waiting lists of housing authorities. The Council of Large Public Housing Authorities has prepared information on the average length of time it takes households to get off of waiting lists to get either Section 8 vouchers or public housing residence. This is calculated by averaging the waiting time among current recipients in 1992. This sample includes both those who have been in public housing for many years as well as those who

¹⁵ Table 1 shows that forty-six percent of housing participants also receive AFDC, Food Stamps or Medicaid. In addition, the Green Book (1992) shows that forty-three percent of housing participants receive SSI, Social Security, Unemployment Insurance, or Medicare. With up to eighty-nine percent coverage, this question may not leave out many of the households on waiting lists.

¹⁶ Rents for 1991 and 1992 were obtained directly from HUD.

have just received the subsidy. Use of these data for the three cross-sections will only be correct if waiting times have been constant. Based on micro-data sample of Californians drawn from the same data set, the number of households in the two periods (1984 and 1991-1992) is quite different. Thirteen percent of the sample applied for housing assistance in the period 1991-1992, and two-thirds of the sample applied in the period from 1984-1991. Therefore, to the extent people are forward looking in making their decisions, the rationing information may yield a better description of the choice set of households in 1984.

Housing benefits are locally set at either the metropolitan level or county level, and waiting list information is available by local housing authority which typically have jurisdiction over a county or a city. There are over twenty-eight hundred housing authorities nationwide. However, the SIPP does not give accurate location identifiers below the state level. This makes it impossible to correctly assign housing benefits and waiting list information to each household's choice set. Access to private Census files which give exact place locations for each household enabled this project to overcome this final hurdle.¹⁷

The actual benefits received by participants of the transfer programs are not included in the tests of the model. Since the decision to work affects the amount of income one earns, and therefore affects the level of the benefits, actual benefits are endogenous. Thus, we use the state guarantee in the case of AFDC, and federal guarantee in the case of Food Stamps, and the fair market rent for the housing authority in the case of the housing programs.¹⁸ The fair market rent is used both for subsidized rental housing and public housing. With the diversity which exists in both quality and proximity to jobs and other services in both types of housing, using the fair market rent for public

¹⁷ These data remain classified, but we are able to do estimation at the Census. The Census retains all rights to these data, and it cannot be used outside of their jurisdiction.

¹⁸ We will assume that the Food Stamp benefit is cash, and therefore can be combined with the AFDC benefit. Medicaid is added in according to the formula mentioned by Smeeding (1982). The combined benefit will be $.7*G_A + G_F + .368*G_M$ (where G_i are the respective guarantee levels of the three entitlement programs) because the Food Stamp benefit formula taxes AFDC income. When housing assistance is also included, AFDC income is taxed by an additional thirty percent.

housing is preferred to attempting a mediocre, at best, hedonic type regression using the SIPP.

Understanding how these benefit levels are determined will influence the interpretation of their estimated impact on labor force participation. Estimates are obtained using inter-state variation in the case of the entitlements, and using intra- and inter-state variations in the case of the housing benefit. The goal for the federal government in establishing the fair market rent is to provide a certain quality of housing to households. Therefore the value to a household may be the same in two areas with vastly different benefit levels because of differences in cost of living. This is a similar goal of the state governments in setting the AFDC levels, but politicians also adjust the size of the benefit according to each state's objectives. With cash benefits, a cost of living index can adjust for the variation that is solely from cost of living differences. Without these indices, we are only able to estimate the average impact of an additional dollar of benefits, which can be quite different across states. The same should be true in the case of housing benefits, but there may be additional complications caused by its status as an in-kind benefit.

IV. The Model

A key in analyzing the impact of housing subsidies is how rationing affects individuals' incentives. While a literature exists on the impact of welfare payments, both cash and in-kind benefits, on various household decisions, there does not exist similar research on the impact of a rationed public assistance program. The literature describing the rationing of health care and consumption goods provides some guidance.

Lindsay and Feigenbaum (1984) have studied the impact of rationing on health services. They use a decay rate for the discount rate because the applicant's condition worsens with the wait. The medical service becomes less valuable as time progresses. This would not be the most logical specification for the discount rate in the case of housing. While it is apparent that housing assistance is not as valuable the longer the wait, it is most likely that the benefit only loses its value according to a standard discount rate model. The literature on the rationing of consumption goods either uses a standard discount rate model to parameterize the waiting time or allows the wait to have a direct cost

on utility because of the time wasted in a queue (Polterovich, 1993; Stahl and Alexeev, 1985).

Munro (1991) analyzes the welfare effect of multiple rationing of goods. The rationing of one good has an impact on its complements and substitutes. In fact, this can be the case in the welfare package offered to female-headed households. Housing assistance and AFDC may be complements to the extent that the existence of both programs greatly increases the attractiveness of the non-working state, whereas the existence of just one or the other does not provide sufficient benefits for subsistence. The other interesting point that Munro elucidates is that multiple rationing could actually offer a second best solution compared to the rationing of only one good. This theoretical observation may prove useful in accessing the policy implications of rationing other parts of the welfare package.

Housing assistance is best studied in a dynamic setting. In any given period, there are three groups of people facing a different set of choices. Those who have not applied for benefits in the rationed program have a common expected wait, but those who are already waiting or have received the subsidy all have different waiting times. Only in a dynamic model can one capture the different incentives faced by each group of individuals. The dynamic model presented below is greatly simplified because we assume that all information is known to the household at the time zero, and there will be no changes in any of the inputs to income such as potential wages and transfer payments. Therefore the model becomes deterministic. The model also leaves out a lot of the dynamics of the labor market such as experience and probability of receiving a job when looking for one, but it provides a basis to conduct a test of the model in a static framework.

i. One public assistance program, rationed

We first present a stylized model of one public assistance program, in this case housing, which is rationed. The same principle would apply, though, if there were many public assistance programs for which there was a single waiting time for the entire package of benefits. People have two choices. They can either work, and not receive public assistance, or they can receive public assistance and not work. While we do observe that some people both work and receive welfare, this simplification is motivated in part by the federal preference designation. As mentioned previously, households with

sufficiently small incomes will receive federal preference under the rent burden provision.¹⁹ The model assumes that this income is in fact zero. The model also assumes that people have infinite time horizons with period discount factor δ .²⁰ Let U_w be the utility received in the working state so that

$$U_w = (1/(1-\delta)) (I(H) - F(H))$$

where $F(H)$ is the disutility of labor and $I(H)$ is the income received from working, where H is the number of hours worked.

In the benefit state, income is received only from public assistance and there is no disutility of work so that

$$U_b = (1/(1-\delta)) (\delta^T G_H)$$

where T is the waiting time.²¹ G_H is the housing benefit. Utility in the benefit state is simply the sum of all transfer payments. The first payment is received at time T , and is discounted back to the present at discount rate δ .

In this simple case, the decision for the household is straightforward. Households will choose the state which yields the highest utility. Households with higher potential wages, lower disutilities of work, lower benefits, longer waiting times, and higher discount factors will be more likely to be in the working state. The interesting thing to note is that in the non-working state, no income is received until the waiting time has expired. Thus an individual will only choose the non-working state if the future stream of benefits is large enough to offset the loss of current income less disutility of work.²²

¹⁹ While it is the case that not all households which receive housing assistance have federal preference, most do. This is based in part on conversations with numerous housing authorities throughout California. Their experience was that wait time for those without a preference was 4 to 10 times as long. This is because those with federal preference will continue to move ahead of them on the waiting list.

²⁰ The yearly discount rate is equal to $1/(1+i)$ with $i = .12$. This is then converted into a monthly discount rate. Utility is simply a function of income and leisure. We assume that households maximize this utility function subject to a period budget constraint $I = W*H + G_A + G_H$. This is then substituted back into the utility function at the optimum.

²¹ There should also be a disutility term which comes from the stigma and transactions cost of welfare participation. It is added later in the participation equation.

²² We have implicitly assumed that no capital markets exist that would allow these parties to borrow money during the waiting time.

- ii. *one rationed public assistance program,
one entitlement program*

Next we add an entitlement program or groups of programs to the model. Now the non-working state is quite different. Utility in the benefit state is now

$$U_B = (1/(1-\delta)) (G_A + \delta^T G_H)$$

with G_A as the benefit from the entitlement program. The difference is that income (G_A) is received immediately. This greatly increases the attractiveness of the non-working state. Households receive the entitlement income for T periods, and then receive both types of income thereafter. A final scenario is the one which has already been studied by many researchers; namely, the case of one or more entitlement programs with no rationed components. Inherently in this model, there is no difference between the one-period and the multi-period choice problem in this scenario.

A few other issues exist in this simple choice model when we implement a test of the model. Use of the average waiting time is a valid simplification if all households on the waiting list have the same characteristics, e.g., they all have federal preference. However, the existence of uncertainty about the length of the wait will cause the average wait to be above the median. This results from a distribution which is not normal both because of the truncation of waiting times at zero and because of the existence of non-federal preference people that show up in the right tail of the distribution. Thus the average wait potential applicants face is overstated. We would like to have some measure of variation in individual waiting times to correct for some of these shortcomings, but unfortunately these data are not available.

Another feature of the programs is that the designation of federal preference is a choice of the household. Therefore, to some extent, the actual waiting time is endogenous in the model. The participation decision is complicated further because of the interaction of the rules of the entitlements and rationed assistance programs. Without AFDC, Food Stamps, and Medicaid, it would be less likely that an individual would participate in the housing programs. We would expect to see more people work during their wait yielding the possibility of not receiving federal and local preferences. This

interaction has an ambiguous effect on the estimated impact of program variable unless the sample is homogenous in its designation of federal preference.

V. Econometric specification

A reduced form approach is used to assess the impact of the housing programs in conjunction with the other components of the welfare package. A household is assumed to choose work if its utility from working is greater than its utility from receiving benefits and not working. Using the above model as a framework for the analysis, we write a labor force participation equation such that

$$LFP^* = U_w - U_b - \phi,$$

$$LFP = 1, \text{ if } LFP^* \geq 0; \quad LFP = 0, \text{ if } LFP^* < 0;$$

$$LFP^* = X'\gamma + \varepsilon.$$

ϕ captures heterogeneity of preferences with respect to work, and is a function of an individual's socioeconomic characteristics and other labor market characteristics. In the equation which will be estimated, X is a function of wage, socioeconomic characteristics, and the benefit characteristics of the welfare programs.²³ ε is the error term assumed here to iid.

A housing participation equation is estimated to observe the effect of these same variables on the participation probabilities. Let

$$P^* = U_b - U_w - \psi,$$

$$P = 1, \text{ if } P^* \geq 0; \quad P = 0, \text{ if } P^* < 0;$$

$$P^* = Z'\gamma + \mu,$$

where Z is a vector of socioeconomic and benefit characteristics, μ is an iid error term, and ψ captures both the stigma and transaction costs of participation in the housing programs.

One may note that in the simple model presented in the previous section, this test is redundant. The model assumes that a choice to participate in the labor market implies that the household will not

²³ Wage is estimated based on the sample of workers after controlling for sample selection. Predicted wages are used for both those who work and those who do not work. Results of the wage estimation are included in Appendix II. Gross wages are used because net wages are endogenous. We are not able to look at the effects of the marginal tax rate in this reduced form model.

participate in welfare programs; that is, $LFP = 1$ implies that $P = 0$. In fact, we observe that people do not participate in any or all of the welfare programs even when eligible, which is attributed to stigma or transaction costs among the different programs (Moffitt, 1983). In addition, individuals may work and still receive subsidies if their labor income is not sufficient. Therefore, the housing participation equation can give us insights into the effect of the socioeconomic and benefit variables on participation probabilities.²⁴

The next portion of the model that is investigated is proper utilization of the waiting list information in the housing and labor force participation equations. We know that households face different actual waiting times. In particular, people who are receiving benefits have no waiting time, and those who are on the waiting list have different waiting times than those who have not applied for benefits. The difficulty lies in what waiting time to include for the different groups. For example, if we set $T = 0$ for those who already receive benefits, we get a biased result. The housing guarantee for current participants will be high, and it will be low for non-participants; that is, the actual waiting time is endogenous. The bias occurs in much the same way as if we would include a dummy for a public housing resident in the model. In this regression, higher benefits would imply that households are housing participants, and the coefficient on the discounted benefit will be overstated. Instead, we use the average waiting time for all households whether or not they are currently receiving or have applied for housing assistance. The reason is that this is an exogenous measure which all households faced in their decision to apply, and therefore this specification captures their decision process. Again, since we are modeling a dynamic decision in a reduced form, deterministic framework, we must make the simplifications which will bias the results the least. The bias which may exist from this assumption would reduce the estimated impact of the coefficient on the discounted benefit.

There are two ways that the rationing in the form of waiting for benefits can have an impact on the labor force and housing participation probabilities. The first is that it captures the uncertainty

²⁴ We would prefer to have a three equation participation system for AFDC, Housing, and Food Stamps to more precisely model the interactions between these programs. Future research will reveal if there is a big difference in parameter values if one attempts a more structural approach, such as Keane and Moffitt (1995).

of when benefits will be received, which we use in the discount rate. The implicit assumption here is that the waiting times have not changed over time, since the people who are receiving subsidies now are not those who may be currently on the waiting list. The second possibility is that the waiting times should enter directly into the equation as another explanatory variable. The queue may have a direct cost to the utility of households which may result from the time spent applying and continually proving one's eligibility at the intervals determined by the housing authority.

Different specifications of the discount rate could also affect results. Researchers have found that individuals with different socioeconomic characteristics have different rates of time preferences (Lawrance, 1991). For example, the less educated may have much shorter time horizons than do the highly educated. To test the sensitivity of the parameter estimates to the discount rate specification, we conduct two tests. The first simply allows δ to vary. The second test parameterizes the discount rate as $\delta = \delta_0 + \delta_1 * V$, where V is a vector of socioeconomic characteristics. Here, we directly estimate the discount rate, and look at the effect of different δ on the coefficients of the model. Finally, we conduct a test of the model in a bivariate setting. The participation equations are jointly estimated and the correlation which results from the joint decision to participate in the labor force and in the housing programs is accounted for.

VI. Results

i. Labor Supply Equation

We present estimates of the various specifications of the labor force participation equation in Table 4 which differ in the inclusion of the various program variables. Because cost of living indices have not been used in previous studies of the effect of welfare components on labor force participation, the initial tests of the model are conducted without COL adjustments. Covariates are included to control for socioeconomic characteristics which vary across individuals.²⁵ The variables in these specifications have the expected signs. Higher potential wages, having fewer children, and

²⁵ The variables are age of youngest child, number of children under 18 years of age, predicted wage, three education dummies (some high school, high school graduate, and at least some college), two race dummies (Black and other non-white), and two time dummies (included to capture effects which may differ across time).

having a higher age for the youngest child raise the probability of labor force participation. It is interesting to note that the educational dummies which seem to have an effect beyond education's effect on wage are the high school diploma and college dummies. This may imply a lower distaste for work in this population.

In the first and second specifications the housing benefit and the entitlement benefit, respectively, are included as the key program variable.²⁶ Both are significant at conventional levels. Unlike the Keane and Moffitt (1995) study, we do find significant effects of the housing benefit alone which is most likely due to the correct matching of households to housing authorities and due to the presence of additional observations.²⁷ The coefficient on the housing benefit has a larger negative coefficient than the coefficient on the entitlement sum, although the confidence intervals of both estimates overlap. This may be because housing acts as a complement of leisure, or it may be an artifact of correlation between the housing benefit and the entitlements. The correlation coefficient is .579, implying that states with higher entitlement benefits also have higher housing benefits. We see that when both are included in the estimation together they end up with similar coefficients (-.048 for housing, -.039 for entitlements). It is interesting to note that the housing coefficient drops more than does the entitlement coefficient, but this may be a spurious observation as the standard error for the housing benefit is greater. In the final two specifications, the rationing information is added. The fourth specification tests whether the rationing has a direct cost. In this sample, there is none. The coefficient on the discounted housing benefit in the final specification is -.024 larger than the coefficient on the housing benefit in third specification, but they both lie in the confidence interval of the other.

The key result is that in the final specification, both coefficients on the program variables are statistically indistinguishable. This finding tells us that the housing benefit, once properly discounted,

²⁶ Results were robust to choice of the entitlement programs. We substituted the AFDC guarantee and the sum of the AFDC and Food Stamp guarantees for the entitlement sum, and the results do not change.

²⁷ Keane and Moffitt only use the 1984 SIPP cross-section, whereas here the 1991 and 1992 cross-sections are also used.

has the same impact as do the entitlement benefits. While the coefficients are the same, we are comparing a discounted dollar with an actual dollar, so the impact of the housing programs is not as great as the entitlement programs. Because a pooled sample is used in the estimation, the impact of rationing may be understated. We have assumed that waiting lists have remained constant over time in order to include one average time for each of the cross-sections. As stated in section III, the waiting list data more likely represent the actual waits for the 1984 sample, rather than the 1991-1992 samples. If waiting times have not remained constant, but there is no systematic change in waiting lists over time then the standard error on the estimate will increase, but there is no bias.

Table 5 presents estimates from a 1984, non-rural subsample. This sample is used for two reasons. We are able to fully utilize the cost of living measures in this sample, and use of the waiting list data may be more applicable to the 1984 group. The top panel of Table 5 presents the five specifications from Table 4 for the 1984 sample. The bottom panel of the table presents five additional tests which evaluate the impact of using the cost of living indices to adjust benefit levels. When included alone (specification 1), the estimate on the housing coefficient is not significant. The reason for the insignificance may be due to smaller sample. In the fourth and fifth specifications, we notice that inclusion of the rationing has an large effect. It both raises the coefficient on the housing benefit and makes it significant. It is a bit counterintuitive that the estimated impact of the discounted housing benefit (-.177) is larger than the coefficient on the entitlements (-.089). It is usually assumed that cash benefits have a larger effect. On the other hand, the confidence intervals of each of the estimates overlap, and therefore the "true" impact of each may not be different. The complementarity of the housing benefit to leisure may also be captured in these estimates, or the fact that households may have some type of money illusion, and do not fully discount the housing benefit.

In the bottom panel of Table 5, cost of living indices are used to adjust the wage and benefit levels. The first four columns replicate tests of the model using a state-level index. Proper use of an index in the model will more accurately reflect an individual's response to the portions of the benefit package. After adjustments for cost of living, we would expect less variation in the housing benefit,

and to the extent that AFDC and Medicaid are set by states to reflect differences in cost of living, we might expect less variation in the entitlement sum as well. If the cost of living measures have only small measurement error then this should yield more accurate estimates of the impact of an additional dollar on the probabilities. In the last column, the ACCRA index is used to adjust benefit levels.

The impact of the indices on the estimates is not large. The standard error of the estimates is greater, as one would expect. The estimates are a bit smaller as well, but not enough to state that the use of this index has changed the estimates. We have implicitly assumed here that housing purchases are infra-marginal, and therefore use a total goods index to adjust the dollar amount of the benefit. Use of the ACCRA index may be preferable because the housing benefit can be adjusted by a housing index, and the entitlements can be adjusted by an general index. This would be necessary if households distinguish their housing purchases from their overall purchases. These estimates do not prove statistically significant. This result may be derived from the fact that the sample is smaller or that these indices may be poor, as McMahon (1991) notes in his derivation of the state level indices.²⁸

ii. Housing Participation Equation

Table 6 presents the estimates for the housing participation equations. In these equations, the dependent variable is equal to one if the households are either currently receiving benefits or are on a waiting list. The same variables are included in these equations as are included in the labor force participation equations. Again, all of the statistically significant socioeconomic variables have the expected sign. One noted difference in the housing equation estimates in comparison to the labor force equation estimates is that the race variable capturing blacks has a large impact on participation probabilities. In the labor force participation equations, once wage was added as an explanatory variable, the dummy for blacks was only marginally significant, and has a much smaller coefficient. A possible explanation is that blacks, in particular, generally have less stigma associated with living in

²⁸ The impact of the cost of living indices was also explored in the housing participation equations. The same patterns emerge. Tables of these estimates are available from the author.

subsidized housing.

We first notice that the coefficient on the housing benefit in the first column is statistically significant. In the second specification, the coefficient on the entitlement sum is also significant and similar in size to the housing coefficient (.0905 to .0819). When the two program variables are included together, the coefficient on the housing benefit drops by two-thirds, but the coefficient on the entitlements remains relatively unchanged. The inclusion of the rationing information has little effect in these specifications.

It is curious that the entitlement programs have a larger estimated impact on housing participation than do the housing programs. One reason may be that the presence of the entitlement programs is almost essential for the time that the housing participants are on the waiting list. Receipt of the entitlements allows the household some income while maintaining federal preference. Households are not able to obtain this designation with the same level of labor income as with some welfare income, and therefore may have an incentive to take up welfare.²⁹

Since most data sets do not include any information on whether or not people are on waiting lists, we estimate some housing participation equations which code those on a waiting list as non-participants. This should produce a downward bias on participation probabilities. The effect of both the entitlements and the housing programs is lessened.³⁰ When the program variables are included alone the coefficient on the housing benefit drops to .055, and the coefficient on the entitlement benefit drops to .068. After they are included together, the coefficient on the housing benefit drops and becomes insignificant as before. Leaving out the waiting list population appears to drop the estimated impact of the programs about thirty percent.³¹

²⁹ We use the 1984 subsample in the housing participation equations as well. The coefficient on the discounted housing benefit increases from .01 to .04, but it is still insignificant. There is also little to gain from use of the cost of living indices.

³⁰ Tables which code those on the waiting list as non-participants are available upon request.

³¹ An AFDC participation equation was also estimated to explore the impact of the housing programs on AFDC participation probabilities. While the coefficient on the entitlement sum is .13, the coefficient on the housing programs is insignificant. Rationing of housing does seem to effect AFDC participation, especially in the 1984

iii. Other tests

Sensitivity of the specification of the discount rate is explored here, but a thorough investigation of proper use of the discount rate will be left to future research. Two different tests are conducted here using the labor force participation equation as the basis for comparison. The first test simply varies the discount rate used. The estimate on the discounted housing benefit varies from -.047 to -.060 with the yearly interest rate varying from thirty-six percent to six percent. This suggests that the estimates are fairly robust with respect to the choice of discount rate.

The second test is more interesting. The discount rate is parameterized as $\delta = \delta_0 + \delta_1 * V$, where V is a vector of socioeconomic characteristics. Table 7 contains the estimates, excluding the socioeconomic variables which change very little in these specifications. The discount rate is directly estimated in the first column. Its value translates into a yearly 4.3% interest rate, which is quite smaller than the one assumed in the paper. The estimate on the discounted benefit falls slightly. It may also be the case that individuals have quite different discount rates. Socioeconomic characteristics are used to proxy for the differences across persons. Because of the difficulty in obtaining estimates in which the discount rate is parameterized by more than one characteristic at a time, only those estimates which include one characteristic are presented. Looking at the second and third specifications, we see that those with higher levels of education and with higher ages are more willing to wait. In both of these cases, it seems that willingness to wait is associated with learning either through formal education or life experience.

The last sensitivity test conducted is a bivariate test of the model. As has been noted by many researchers (Moffitt, 1992, provides a review), the decision to participate in welfare programs and to supply labor may be simultaneous. If this is true, it would be important to capture the correlation between the error terms in the two participation equations in order to obtain unbiased estimates. In the past, these studies have used structural models. Here, no structure is imposed on the system of

subsample. Including the waiting list information directly increases the coefficient on the entitlement sum.

equations. The error terms from the equations are assumed to be drawn from a joint normal distribution. Estimation of this model is presented at the end of Table 7. The correlation coefficient (-.22) is significant, but the estimates are little changed after correcting for this correlation.

iv. Simulations

Finally, Table 8 and 9 illustrate the implications of the results. The simulations are calculated by using the variables for each household in the sample, and then calculating the probability of participation based on the parameter estimates. We then average the values over the sample. The full sample with no cost of living adjustments is chosen for the comparison (Table 4, specification 5 and Table 6, specification 5 in the labor force and housing participation equations, respectively).

Simulations based on the labor force participation equation are presented in Table 8. The baseline labor force participation rate is 67.76 percent which is very close to the 67.65 percent who actually participate. The first four rows of the table provide simulations based on changes in some of the socioeconomic variables. They serve as a basis for comparison for the policy simulations. In this reduced form model, it is the relative comparisons which prove most interesting. The policy simulations include increasing the benefit levels of the two sets of programs, making housing an entitlement, and eliminating both programs.

We first notice that although both the entitlement sum and the discounted housing benefit have almost the same point estimate, discounting lessens the impact of increasing the housing benefit. Elimination of the housing programs has about half as large an effect (.048) as the elimination of the entitlements (.075) does. Elimination of all programs raise participation probabilities by .117. Ignoring housing leads to an underestimate of impact of the welfare package on labor supply. When we simulate the effect of elimination of the entitlements in a model which ignores housing (Table 4, specification 2), the result is a .078 increase in labor force participation. Based on this comparison, labor force participation probabilities are raised an additional thirty-four percent over the simulated impact of the elimination of the entitlements alone. While raising the benefit levels of the welfare programs by \$100 each has a small effect on labor force participation (-.032), it has about the same

effect in this model as lowering the wage by a dollar (-.041). Making housing an entitlement has only a small adverse effect on labor force participation (-.010). It is difficult to interpret this result. One would expect that making housing available upon eligibility may have a larger disincentive. On the other hand, rationing may reduce the labor supply of current participants. Those who would choose to move off the program by earning additional income may be reluctant to leave the program, knowing that they would have to wait again for benefits if they experience a future job loss.

Table 9 present simulations from the housing participation equations. The baseline participation rate is 13.36 percent which compares to an actual participation rate in the sample of 13.36 percent. The program variable with the most impact is the entitlement program. Elimination of the entitlement program would lower participation by over half, but elimination of the housing programs has only one-tenth that effect. The simulations confirm the intuition that households would be less likely to participate in the housing programs if the entitlements did not exist to provide income during the waiting period.

VII. Conclusion

As many researchers have suspected, the housing programs do affect the labor force and housing program participation decisions of households. Proper assignment of benefits and accounting for rationing are both important in getting an accurate assessment of the impact of these rental assistance programs. While this study demonstrates that inclusion of housing does not change the independent impact of the entitlement programs, it is difficult to say if there was bias in previous estimates of the AFDC coefficient. Because the entitlement benefit is correlated with both the housing benefit and the waiting time, the fact that the coefficient on the entitlement sum does not change may be an artifact of the biases from exclusion of the two variables canceling each other out. The impact of the total welfare package has been underestimated by the exclusion of housing. Elimination of all these transfer programs increases labor force participation by as much as thirty-four percent in comparison with elimination of the entitlements alone. As better data become available on the waiting lists of public housing authorities, we will be able to better assess the impact of the rationing. We

must also explore whether the differences in waiting list sizes across geographical regions may cause the households to move to areas with the smallest waiting list. This may be especially true in metropolitan areas in which a household could keep the same job, but move to different locale within the MSA. This issue will be explored in future research.

There are a few implications of this study which may help policy makers in their welfare reform decisions. One implication of this study is that rationing further parts of the program will lead to a higher labor supply. If the amount of benefits that a household has available to it while waiting is too small, then many may never choose the welfare route. This would be especially true if the rationing was structured like the housing programs, where designation of federal preference is almost required for a person to receive benefits. While this may be effective in driving people off the welfare rolls, it may not help households rise above poverty status. This type of rationing scheme may also have the effect of encouraging long-term dependency rather than discouraging it. The fact that someone has to wait a good length of time (and in some cases up to 5 years) to obtain a subsidy implies a huge incentive to stay on the programs once one has received the subsidy.

The issue of long-term dependency is of chief concern in the current debate on welfare reform. As the architects of the welfare system had intended, current reformers are seeking to have AFDC be a program which lasts but a short time (e.g., two years). If the housing programs are not also reformed, it may be the case that the money spent on AFDC reform will not achieve the desired effect because of a household's concurrent participation in housing programs. One would expect this to be critical in those states with housing benefits which are relatively large. Only with consideration of these issues will policy makers be able to put together a good welfare reform package.

Table 1

Variation in Benefits Across the 9 Census Divisions

	AFDC	Food Stamps	Medicaid	Sum of Entitlements	Housing
Boston, MA	463	256	209	928	533
Pittsburgh, PA	401	256	195	852	390
New Orleans, LA	232	256	92	580	362
Birmingham, AL	147	256	130	533	338
Miami Beach, FL	273	256	132	661	515
Minneapolis, MN	611	256	293	1160	451
Cincinnati, OH	343	256	283	882	331
L.A. County, CA	660	256	198	1141	567
Denver, CO	420	256	200	876	487

Note: This example is taken from 1984, and the values are monthly. The monthly poverty level in 1984 was 690. The poverty level and benefit levels for the entitlements are taken from the Green Book (1984). Fair market rents are taken from the Federal Register (1984), and the waiting times were obtained from the Council of Large Public Housing Authorities (1992).

TABLE 2

Multiple Program Participation of Female Headed Households
Between the Ages of 16 and 50
Full Sample (N = 2358)

Program Participation	Current Housing Recipient	Waiting List	Housing Participant	Total
AFDC only	0	0	0	0
Food Stamps only	13	4	17	66
Medicaid only	16	8	24	56
AFDC & Food Stamps	0	0	0	0
AFDC & Medicaid	11	11	22	55
Food Stamps & Medicaid	29	14	43	95
AFDC, Food Stamps, & Medicaid	37	16	53	104
Number of Households Participating in Housing & at least one Entitlement	106	53	159	366

Note: This table is compiled from the total sample of the 1984, 1991, and 1992 SIPP cross-sections. In addition to the number of people that participate in housing represented in the table, there is also an additional 180 (14 on a waiting list) which do not participate in AFDC, Food Stamps, or Medicaid. There are a total of 546 which participate in at least one of these four programs.

Table 3
Summary Statistics

Variable	Mean	Std Dev
Labor Force Participation	0.6765	0.4679
Housing Participation	0.1336	0.3403
Same variable as above, without waiting list persons	0.1072	0.3094
Age of Youngest Child	7.4389	5.2105
Number of Children < 18	1.7203	0.9404
Age	34.1474	7.0714
Estimated Wage	7.1835	2.4616
Education in years	12.7427	2.5472
Education Dummy - Some High School	0.1281	0.3342
Education Dummy - High School Diploma	0.4019	0.4904
Education Dummy - College	0.4157	0.4929
Black Dummy	0.2336	0.4232
Other non-white Dummy	0.0323	0.1769
Year91 Dummy	0.2002	0.4002
Year92 Dummy	0.3944	0.4888
Housing Benefit / 100	4.9580	1.5584
Housing Benefit with AFDC taxed away	3.6192	1.3380
Waiting Time in months	18.6402	19.3680
Discounted Housing Benefit / 100	2.9958	1.0738
Entitlement Sum / 100	7.3972	1.7849

Table 4
Labor Force Participation Equation
Full Sample (N = 2538)

	(1)		(2)		(3)		(4)		(5)	
	Coef	Std Dev	Coef	Std Dev	Coef	Std Dev	Coef	Std Dev	Coef	Std Dev
Constant	-0.339	(0.217)	-0.298	(0.229)	-0.218	(0.236)	-0.207	(0.238)	-0.175	(0.244)
Age Yng Child	0.043	(0.008)	0.044	(0.007)	0.043	(0.008)	0.043	(0.008)	0.043	(0.008)
Number of Children	-0.149	(0.031)	-0.148	(0.031)	-0.148	(0.031)	-0.147	(0.031)	-0.147	(0.031)
Age	-0.011	(0.006)	-0.012	(0.006)	-0.011	(0.006)	-0.011	(0.006)	-0.012	(0.006)
Estimated Wage	0.129	(0.028)	0.130	(0.028)	0.133	(0.028)	0.133	(0.028)	0.132	(0.028)
Some High School	0.080	(0.134)	0.087	(0.134)	0.077	(0.134)	0.078	(0.134)	0.078	(0.134)
H.S. Diploma	0.533	(0.123)	0.546	(0.123)	0.530	(0.123)	0.531	(0.123)	0.532	(0.123)
College +	0.399	(0.141)	0.406	(0.141)	0.390	(0.142)	0.393	(0.142)	0.394	(0.141)
Black	0.116	(0.065)	0.092	(0.066)	0.105	(0.067)	0.101	(0.067)	0.099	(0.066)
Other Non-white	-0.005	(0.154)	-0.001	(0.154)	0.005	(0.155)	0.005	(0.155)	0.006	(0.155)
Year91	0.484	(0.076)	0.447	(0.076)	0.467	(0.078)	0.470	(0.078)	0.469	(0.078)
Year92	0.400	(0.061)	0.347	(0.063)	0.374	(0.066)	0.378	(0.066)	0.377	(0.066)
Housing Benefit	-0.064	(0.029)			-0.048	(0.034)	-0.054	(0.037)		
Entitlement Sum			-0.043	0.021	-0.039	(0.021)	-0.040	(0.021)	-0.041	(0.021)
Months							0.001	(0.002)		
Discounted Benefit									-0.066	(0.044)
<u>Log Likelihood</u>	-1443.68		-1443.94		-1442.98		-1442.88		-1442.83	

Table 5
Labor Force Participation Equation
1984 Urban Sample (N = 692)

	(1)		(2)		(3)		(4)		(5)	
	Coef	Std Dev	Coef	Std Dev	Coef	Std Dev	Coef	Std Dev	Coef	Std Dev
Constant	-0.365	(0.447)	-0.181	(0.424)	-0.228	(0.482)	-0.011	(0.493)	0.430	(0.547)
Age Yng Child	0.048	(0.014)	0.049	(0.014)	0.049	(0.014)	0.049	(0.014)	0.049	(0.014)
Number of Children	-0.072	(0.058)	-0.074	(0.059)	-0.074	(0.059)	-0.069	(0.059)	-0.071	(0.059)
Age	-0.020	(0.011)	-0.023	(0.011)	-0.023	(0.011)	-0.024	(0.011)	-0.023	(0.011)
Estimated Wage	0.167	(0.058)	0.187	(0.060)	0.187	(0.060)	0.190	(0.060)	0.184	(0.060)
Some High School	0.110	(0.237)	0.090	(0.237)	0.092	(0.237)	0.124	(0.239)	0.095	(0.237)
H.S. Diploma	0.633	(0.224)	0.615	(0.224)	0.618	(0.225)	0.635	(0.226)	0.612	(0.224)
College +	0.487	(0.275)	0.440	(0.277)	0.441	(0.277)	0.466	(0.278)	0.454	(0.277)
Black	0.200	(0.123)	0.180	(0.122)	0.176	(0.124)	0.143	(0.125)	0.178	(0.123)
Other Non-white	0.775	(0.377)	0.793	(0.378)	0.788	(0.379)	0.841	(0.382)	0.842	(0.379)
Housing Benefit	-0.047	(0.068)			0.017	(0.082)	-0.051	(0.087)		
Entitlement Sum			-0.058	(0.035)	-0.058	(0.035)	-0.079	(0.036)	-0.089	(0.039)
Months							0.007	(0.003)		
Discounted Benefit									-0.177	(0.100)
<u>Log Likelihood</u>	-395.91		-394.51		-394.48		-391.50		-393.37	

Labor Force Participation Equation
With State COL in Specifications 1-4 (N = 692)
With ACCRA COL in Specification 5 (N = 379)

	(1)		(2)		(3)		(4)		(5)	
	Coef	Std Dev	Coef	Std Dev	Coef	Std Dev	Coef	Std Dev	Coef	Std Dev
Constant	-0.501	(0.490)	-0.244	(0.457)	-0.270	(0.523)	0.253	(0.520)	0.886	(0.761)
Age Yng Child	0.046	(0.014)	0.047	(0.014)	0.047	(0.014)	0.048	(0.014)	0.023	(0.020)
Number of Children	-0.077	(0.058)	-0.078	(0.059)	-0.078	(0.059)	-0.074	(0.059)	-0.204	(0.082)
Age	-0.020	(0.011)	-0.021	(0.011)	-0.021	(0.011)	-0.022	(0.011)	-0.024	(0.015)
Estimated Wage	0.185	(0.061)	0.191	(0.061)	0.192	(0.061)	0.192	(0.061)	0.208	(0.079)
Some High School	0.101	(0.237)	0.094	(0.237)	0.094	(0.237)	0.103	(0.237)	-0.149	(0.301)
H.S. Diploma	0.620	(0.223)	0.620	(0.224)	0.620	(0.224)	0.618	(0.224)	0.254	(0.284)
College +	0.469	(0.272)	0.462	(0.272)	0.462	(0.272)	0.472	(0.272)	0.128	(0.343)
Black	0.148	(0.120)	0.124	(0.121)	0.123	(0.122)	0.114	(0.122)	0.210	(0.163)
Other Non-white	0.767	(0.376)	0.784	(0.377)	0.782	(0.378)	0.843	(0.378)	1.300	(0.653)
Housing Benefit	-0.026	(0.082)			0.009	(0.087)				
Entitlement Sum			-0.055	(0.041)	-0.056	(0.043)	-0.048	(0.041)	-0.067	(0.063)
Discounted Benefit							-0.164	(0.082)	-0.163	(0.145)
<u>Log Likelihood</u>	-395.69		-394.86		-394.85		-392.84		-221.60	

Table 6
Housing Participation Equation
Full Sample (N = 2538)

	(1)		(2)		(3)		(4)		(5)	
	Coef	Std Dev	Coef	Std Dev	Coef	Std Dev	Coef	Std Dev	Coef	Std Dev
Constant	-0.041	(0.261)	-0.283	(0.276)	-0.320	(0.284)	-0.310	(0.286)	-0.329	(0.294)
Age Yng Child	0.013	(0.009)	0.012	(0.009)	0.012	(0.009)	0.012	(0.009)	0.012	(0.009)
Number of Children	0.047	(0.037)	0.043	(0.037)	0.042	(0.037)	0.043	(0.037)	0.042	(0.037)
Age	-0.018	(0.007)	-0.016	(0.007)	-0.016	(0.007)	-0.016	(0.007)	-0.016	(0.007)
Estimated Wage	-0.160	(0.040)	-0.178	(0.041)	-0.180	(0.041)	-0.180	(0.041)	-0.179	(0.041)
Some High School	-0.106	(0.150)	-0.100	(0.150)	-0.095	(0.151)	-0.094	(0.151)	-0.096	(0.151)
H.S. Diploma	-0.258	(0.141)	-0.257	(0.141)	-0.249	(0.142)	-0.249	(0.142)	-0.251	(0.141)
College +	-0.311	(0.169)	-0.281	(0.169)	-0.273	(0.169)	-0.271	(0.170)	-0.276	(0.169)
Black	0.658	(0.072)	0.707	(0.073)	0.701	(0.074)	0.698	(0.074)	0.704	(0.073)
Other Non-white	-0.029	(0.201)	-0.065	(0.202)	-0.066	(0.202)	-0.067	(0.202)	-0.066	(0.202)
Year91	-0.189	(0.095)	-0.129	(0.095)	-0.140	(0.096)	-0.137	(0.097)	-0.138	(0.097)
Year92	-0.120	(0.036)	-0.025	(0.077)	-0.039	(0.081)	-0.036	(0.081)	-0.036	(0.081)
Housing Benefit	0.082	(0.036)			0.023	(0.043)	0.018	(0.047)		
Entitlement Sum			0.091	(0.025)	0.088	(0.026)	0.087	(0.026)	0.090	(0.025)
Months							0.001	(0.003)		
Discounted Benefit									0.025	(0.055)
<u>Log Likelihood</u>	-893.33		-889.57		-889.42		-889.38		-889.48	

Table 7
Sensitivity Tests
Full Sample (N = 2538)

	Discount Rate Tests						Bivariate tests			
	Labor Force Participation						Labor Force		Housing	
	(1)		(2)		(3)		Coef	Std Dev	Coef	Std Dev
Entitlement Sum	-0.040	(0.021)	-0.042	(0.021)	-0.045	(0.021)	-0.043	(0.020)	0.087	(0.025)
Discounted Benefit	-0.055	(0.039)	-0.064	(0.040)	-0.080	(0.048)	-0.057	(0.042)	0.026	(0.053)
Discount rate	0.996	(0.009)	0.955	(0.039)	0.619	(0.248)				
Education			0.003	(0.002)						
Age					0.008	(0.005)				
Rho							-0.222	(0.043)		
<u>Log Likelihood</u>	-1442.92		-1439.27		-1438.67		-2319.63			

Table 8
Simulation of Changes in Program Variables
upon Labor Force Participation

	Percent	Change from Baseline
Baseline	67.76	
Youngest child's age + 1	69.14	1.38
Mother's Age + 5	65.90	-1.87
Have two additional children	57.79	-9.97
Increase wage by a dollar / hour	71.89	4.12
Housing + \$100	65.97	-1.80
Housing + \$200	64.13	-3.63
Entitlement Sum + \$100	66.43	-1.34
Entitlement Sum + \$200	65.07	-2.70
Housing as an entitlement	66.72	-1.04
Add \$100 to the housing and Entitlement Sums	64.60	-3.16
Eliminate the entitlement programs	75.28	7.52
Eliminate the housing programs	72.56	4.80
Eliminate all programs	79.43	11.67

Table 9
Simulation of Changes in Program Variables
upon Housing Participation

	Percent	Change from Baseline
Baseline	13.36	
Youngest child's age + 1	13.60	0.24
Mother's Age + 5	11.89	-1.47
Have two additional children	15.06	1.70
Increase wage by a dollar / hour	10.22	-3.14
Housing + \$100	13.76	0.40
Housing + \$200	14.12	0.81
Entitlement Sum + \$100	15.16	1.81
Entitlement Sum + \$200	17.13	3.77
Housing as an entitlement	13.60	0.24
Add \$100 to the housing and Entitlement Sums	15.05	2.25
Eliminate the entitlement programs	5.64	-7.71
Eliminate the housing programs	12.27	-1.09
Eliminate all programs	5.08	-8.28

REFERENCES

- Aaron, H. (1977): "Comments on the Distribution of Benefits from Public Housing," in T. Juster, ed. *The Distribution of Economic Well-Being, Studies in Income and Wealth*, 41. National Bureau of Economic Research (Cambridge, Massachusetts. Ballinger), 65-69.
- and G. Von Furstenburg (1971): "The Inefficiency of Transfers In-Kind: The Case of Housing Assistance," *Western Economic Journal*, 9, 184-191.
- Blank, R. (1989): "The Effect of Medical Need and Medicaid on AFDC Participation." *Journal of Human Resources*, 24, 54-87.
- (1985): "The Impact of State Economic Differentials on Household Welfare and Labor Force Behavior," *Journal of Public Economics*, 28, 25-58.
- Clark, W. and W. Van Lierop (1986): "Residential Mobility and Household Location Modeling," in P. Nijkamp, *Handbook of Regional and Urban Economics*, Elsevier Science Publishers, 97-132.
- Cost of Living Index (1984): "Comparative Data for 314 Urban Areas," *American Chamber of Commerce Researchers Association*, Third Quarter 1984, 1-6.
- Cullis, J. and P. Jones (1986): "Rationing by Waiting Lists: An Implication," *American Economic Review*, 76, 250-256.
- Fraker, T. and R. Moffitt (1988): "The Effect of Food Stamps on Labor Supply: A Bivariate Selection Model," *Journal of Public Economics*, 35, 25-56.
- Hanushek, E. and J. Quigley (1985): "Consumption Aspects of Housing Allowances," in Katherine Bradbury and Anthony Downs, *Do Housing Allowances Work?* Washington, DC: Brookings Institution, 185-240.
- (1978): "An Explicit Model of Intra-Metropolitan Mobility," *Land Economics*, 54, 411-429.
- Haurin, D. et al (1991): "Local House Price Indexes: 1982-1991," *AREUEA Journal*, 19, 451-472.
- Henderson, J. and Y. Ioannides (1989): "Dynamic Aspects of Consumer Decisions in Housing Markets," *Journal of Urban Economics*, 26, 212-230.
- Keane, M. and R. Moffitt (1995): "A Structural Model of Multiple Welfare Program Participation and Labor Supply." Research Department Working Paper. Federal Reserve Bank of Minneapolis.
- Kraft, J. and E. Olsen (1977): "The Distribution of Benefits from Public Housing," in T. Juster, ed. *The Distribution of Economic Well-Being, Studies in Income and Wealth*, 41. National Bureau of Economic Research (Cambridge, Massachusetts. Ballinger), 51-65.
- Lawrance, E. (1991): "Poverty and the Rate of Time Preference: Evidence from Panel Data," *Journal of Political Economy*, 99, 54-77.
- Leonesio, M. (1988): "In-Kind Transfers and Work Incentives," *Journal of Labor Economics*, 6, 515-530.

- Levy, F. (1979): "The Labor Supply of Female Household Heads, or AFDC Work Incentives Don't Work Too Well," *The Journal of Human Resources*, 14, 76-97.
- Lindsay, C. and B. Feigenbaum (1984): "Rationing by Waiting Lists," *American Economic Review*, 74, 404-417.
- Mayo, S. (1983): "Benefits from Subsidized Housing," in J. Friedman and D. Weinberg, ed. *The Great Housing Experiment*, 24. Urban Affairs Annual Reviews, 235-257.
- McFadden, D. (1989): "A Method of Simulated Moments for Estimation of Discrete Response Models without Numerical Integration." *Econometrica*, 57, 995-1026.
- McMahon, W. (1991): "Geographical Cost of Living Differences: An Update," *AREUEA Journal*, 19, 426-450.
- Moffitt, R. (1983): "An Economic Model of Welfare Stigma," *American Economic Review*, 73, 1023-1035.
- (1989): "Estimating the Value of an In-Kind Transfer: The Case of Food Stamps," *Econometrica*, 57, 385-409.
- (1992): "Incentive Effect of the U.S. Welfare System: A Review," *Journal of Economic Literature*, 30, 1-61.
- and B. Wolfe (1992): "The Effect of the Medicaid Program on Welfare Participation and Labor Supply." *Review of Economics and Statistics*, 615-626.
- and B. Wolfe (1991): "A New Index To Value In-Kind Benefits," *Review of Income and Wealth*, Series 37, 387-408.
- Munro, A. (1991): "The Welfare Effects of Multiple Rationing," *Bulletin of Economic Research*, 43:4, 355-360.
- Murray, M. (1975): "The Distribution of Tenant Benefits in Public Housing," *Econometrica*, 43, 773-787.
- Pollakowski, H. et al (1991): "Rates of Return on Housing of Low- and Moderate Income Owners," *AREUEA Journal*, 19, 417-425.
- Polterovich, V. (1993); "Rationing, Queues, and Black Markets," *Econometrica*, 61, 1-28.
- Smeeding, T. (1982): *Alternative Methods for Valuing Selected In-Kind Transfer Benefits and Measuring Their Effect on Poverty*. Technical Paper 50. Washington: Bureau of the Census.
- Smolensky, E. et al (1977): "Adding In-Kind Transfers to the Personal Income and Outlay Account: Implications for the Size Distribution of Income," in T. Juster, ed. *The Distribution of Economic Well-Being, Studies in Income and Wealth*, 41. National Bureau of Economic Research (Cambridge, Massachusetts. Ballinger), 9-44.
- Stahl D. and M. Alexeev (1985); "The Influence of Black Markets on a Queue-Rationed Centrally Planned Economy," *Journal of Economic Theory*, 35, 234-250.

U.S. Bureau of the Census (1988): Current Population Report, *The Effect of Benefits and Taxes on Income and Poverty*: 1986, Series P-60. No. 164-RD-1, U.S. Government Printing Office, Washington. D. C.

Yelowitz, Aaron S. (1995): "The Medicaid Notch, Labor Supply and Welfare Participation: Evidence from Eligibility Expansions," *Quarterly Journal of Economics*, forthcoming.

Appendix 1: Description of the Programs

Transfer programs such as AFDC, Food Stamps, and housing assistance have many restrictions and the eligibility requirements can be somewhat confusing to the potential applicants. Indeed, this may be one of the reasons for non-participation of eligible populations. Keane and Moffitt (1995) provide a succinct description of the eligibility requirements and program characteristics from which the explanation follows.

For the most part, AFDC is restricted to very low income female-headed households with children. Eligible women receive a subsidy that is determined by family size, non-labor income (N), labor income (WH), and other allowable deductions for child care (C) and work-related expenses (E) for workers. In 1984, the formula for the monthly AFDC benefit for a given number of children was:

$$B_A = \text{Min} \{ P, r[G_1 - \text{Max}(0, WH + N - C - E)] \}$$

$$\text{if } WH + N < (1.85)G_2$$

$$= 0 \text{ if not}$$

where P is the maximum payment permitted in a state, r is the "ratable reduction" (a number between 0 and 1 by which the benefit may be reduced), G_1 is the maximum benefit paid, and G_2 is the needs standard.

The Food Stamp program is unique in this group of transfer programs in that it does not vary by state in the continental United States. Households are eligible if they pass the income screens. The formula for the monthly Food Stamp benefit in 1984 was:

$$B_F = \text{Max} \{ M, G - .3 Y_{n1} \} \quad \text{if } WH + N < M_1 \quad \text{and } Y_{n1} < M_2$$

$$= 0 \quad \text{if not}$$

where

$$Y_{n1} = \text{Max} (0, .82WH + N + B_A - 95 - S)$$

$$S = \text{Min} [134, \text{Max} (0, R - .5 Y_{n2})]$$

$$Y_{n2} = \text{Max} (0, .82WH + N + B_A - 95)$$

where G is the Food Stamp guarantee, M is a minimum benefit, Y_{n1} is a first type of net income, M_1

is the gross income screen, M_2 is the net income screen, S is a shelter deduction, R is rent paid, and Y_{n2} is a second type of net income.

Public Housing assistance varies by housing authority, but is set at the federal level according to the set of rules below. For participants not on AFDC or on AFDC in all but 10 states, the monthly rental payment (S) in 1984 for the tenant was determined by the following formula:

$$S = \text{Max} (.10Y_G, .30Y_N)$$

where

$$Y_G = WH + N + B_A$$

$$Y_N = Y_G - 40K - C$$

where Y_G and Y_N are gross and net income, K is the number of children, and C is a child care expense. The rental formula for families on AFDC in the remaining 10 states was

$$S = \text{Max} (.10Y_G, .30Y_N, rM)$$

where r is the ratable reduction in the state AFDC program and M is the maximum shelter deduction permitted in the state AFDC rules. Values for M can be taken from the U.S. Department of Health and Human Services (1985). The B_H can then be calculated as the difference between the fair market rent and the tenant rental payment.

Appendix 2: Estimation of the wage equation

Labor Force Participation 1984 Sample (N = 1029)		
	Coef	Std Dev
Intercept	-5.9260	1.0014
Age	0.2496	0.0505
Age Squared	-0.3437	0.0735
Education	0.1521	0.0759
Education Squared	-0.4054	0.3147
Unemployment Rate	0.0615	0.0279
Average Wage	-0.0132	0.0446
Black Dummy	0.0027	0.1026
Other Non-White Dummy	0.1825	0.2632
Number of Children	-0.1529	0.0475
MSA - Central City	0.7112	0.1025
MSA - Suburbs	0.8186	0.1038

Wage Estimation - Dependent Variable Ln(Wage) Sample if Wage > 0 (N = 603)		
	Coef	Std Dev
Intercept	-0.0528	1.3143
Age	0.0799	0.0428
Age Squared	-0.1021	0.0599
Education	-0.0671	0.0617
Education Squared	0.5023	0.2216
Unemployment Rate	-0.0422	0.0172
Average Wage	0.0914	0.0220
Black Dummy	0.0600	0.0520
Other Non-White Dummy	-0.0473	0.1313
MSA - Central City	-0.0913	0.1381
MSA - Suburbs	-0.0398	0.1465
Mills Ratio	-0.2993	0.2820

Note: Printout of Estimation for the wage equation in 1991 and 1992 are available upon request

