An Empirical Analysis of the Effects of Joint Decisions on Food Stamp Program, Temporary Assistance for Needy Families, and Labor Force Participation

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Abstract

This study examines the interaction between Food Stamp Program (FSP) and Temporary Assistance for Needy Families (TANF) program participation, provides a model of joint decisions made by households on FSP, TANF, and labor force participation, and explains why households choose different alternatives.

We use the first Survey of Program Dynamics (SPD) longitudinal data and the 1998 SPD experimental data files. The modeling component consists of estimating equations to predict the probability of particular choices made by households. The households choose the alternative that gives the highest utility. The results show that the program parameters do matter. Variations across states in payment standards, benefit reduction rates, and income disregards help to identify household choices.

Keywords: labor force participation, Food Stamp Program, FSP, TANF, Temporary Assistance for Needy Families.

AN EMPIRICAL ANALYSIS OF JOINT DECISIONS ON FOOD STAMP PROGRAM, TEMPORARY ASSISTANCE FOR NEEDY FAMILIES, AND LABOR FORCE PARTICIPATION

Introduction

The Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) of 1996, better known as welfare reform, is set to expire in the fall of 2002. PRWORA ended the promise of unlimited cash assistance to the poor. Instead, it gave block grants to states, which could then offer poor families temporary subsidies while adults in the household prepared to enter the job force. At the center of the welfare reform debate is whether the current reforms have been sufficient to move poor families out of poverty, into jobs, and into more stable (married) family situations; and whether states, with substantial new powers to redesign welfare programs, can accomplish the overall program goals. Since 1996, Participation in the Temporary Assistance to Needy Families (TANF) program has fallen by 56 percent. The 5.4 million persons receiving TANF in fiscal year 2001 was the smallest percentage of the population receiving assistance since 1961 (Office of Planning, Research and Evaluation 2002).

In the era following welfare reform and the evolution of the TANF program, the Food Stamp Program (FSP) has become the largest federal food assistance program for low-income households. For many low-income households, food stamps represent an important share of household resources. As the unemployed poor become working poor, why are so many disappearing from food stamp rolls—even though many are still eligible for the federal benefit? From 1994 to 1999, the FSP experienced an unprecedented decline in participation. Participation fell from 27.5 million people in 1994 to 17.2 million people in 2000 (USDA 2002). The strong economy and changes in social welfare programs have accounted for a part of the decline. But while the declining caseloads mean fewer people are receiving assistance, they tell us nothing about the circumstances of the families that leave and whether they are making a successful transition off welfare. The new 2002 farm legislation reauthorizes the FSP for five years and reinstates food

stamp eligibility for legal immigrants residing in the United States for at least five years, and for all immigrant children and disabled individuals.

The changes in the linkages among social assistance programs under welfare reform are likely to have significant effects on the behavior of low-income individuals and families. The overall purpose of this study is to examine the economic and welfare program factors affecting the well-being of low-income families and the effects of welfare reform on labor supply decisions.

Most of the previous studies on FSP participation have examined the determinants of participation in the FSP among low-income or FSP-eligible households (see Gleason, Schochet, and Moffitt 1998 and Currie 2000 for a literature review). Currie (2000) focuses on evidence of how the FSP and other federal nutrition programs have met the goals of the federal food and nutrition programs. Because of common program eligibility rules for TANF and the FSP, joint participation parameters are of interest. Fraker and Moffitt (1988) model the effect of joint participation in the FSP and the Aid to Families with Dependent Children (AFDC) program on labor supply. As they show, the budget constraint for individuals on both the FSP and AFDC programs is complex and includes many kinks. Fraker and Moffitt estimate that in 1980, the FSP reduced labor supply of female heads of families by about 9 percent and the AFDC program had only a slightly greater effect on labor supply. Marginal changes in benefit levels and the benefit reduction rates had small effects on labor market participation. Hagstrom (1996) uses data from the 1984 Survey of Income and Program Participation (SIPP) to model the effect of food stamp participation on the family labor supply of married couples and finds that the FSP has a weak effect on the labor supply of married couples. Decreasing the FSP benefit by 25 percent would reduce the proportion of husbands and wives who choose not to work by less than 1 percent, while increasing the food stamp benefit by 25 percent would raise the FSP participation by 7 percent. Keane and Moffitt (1998) estimate that a reduction of the AFDC tax rate would have scarcely any effect on labor supply and would increase the participation rate in both AFDC and food stamps. Hoynes (1996) models the effects of cash transfers on labor supply and welfare participation in two-parent families. She shows that labor supply and welfare participation are highly responsive to changes in the benefit structure under the AFDC–Unemployed Parent

program. In sum, the effects of program parameters and labor market variables are likely to be complex, and evidence is still not clear-cut on their relative importance.

Among studies that have examined the effects of the 1996 reform on post-1996 caseloads are the Council of Economic Advisers (1999), and Schoeni and Blank (2000). Studies by Zedlewski and Braumer (1999) and Wilde et al. (2000) document that many families that left welfare also left the FSP even though they were still eligible for food stamps. Ohls (2001) suggests that families leaving TANF because of employment or other reasons might not be told that they are still eligible to receive food stamps, or families who enter the TANF program may not receive the information that they automatically are eligible for food stamp assistance. Moffitt (2002) gives an extensive review of the rules of the TANF program and the research that has been conducted on AFDC and TANF to date. He points out that while there is strong evidence that the TANF program has increased employment and earnings and decreased caseloads, the separate effects of work requirements, time limits, sanctions, and other features are unknown.

The fundamental motivation for this study is the question of interactions among FSP, TANF program, and labor force participation under different program designs and economic conditions. A goal of this study is to provide in-depth analyses of current circumstances of individuals and households that participate in the FSP and TANF and to make comparisons to those who left or who do not participate in welfare programs even though they are eligible. The study also examines the effects of key welfare program parameters such as benefit levels, welfare tax (the benefit reduction rate), income disregard, and sanctions for non-compliance with work requirements.

The objective of this study is to provide a model of the joint decisions by households to participate in the FSP, the TANF program, and/or to work. In this paper we show that the variations across states in payment standards, benefit reduction rates, and income disregards help to identify household choices. The results show that the program parameters do matter. Participation in TANF is positively related to the probability of FSP participation and negatively related to being in the work force. Working decreases the probability of receiving food stamps. Work, TANF, and FSP participation are significantly related. This paper includes seven sections: (1) FSP and TANF eligibility

criteria and benefits; (2) the theoretical model; (3) empirical model and estimation; (4) data and variables; (5) results; (6) policy simulations; and (7) conclusions.

Food Stamp and Temporary Assistance to Needy Families Programs: Eligibility and Benefits

The FSP established uniform national eligibility standards. Households who qualify for this program must be income and asset poor. That is, the gross income of a household must be at or below 130 percent of the poverty line and net income must be less than 100 percent of the poverty line. However, states have some discretion within federal rules. States may exclude certain types of income and resources not counted under other welfare programs and they are given new options on the use of standardized deductions. A household must also have assets worth less than $2,000 ($3,000 for households with someone 60 years of age or over). The maximum amount of food stamps a household can receive depends on the household size. Benefits also vary with income. For those who meet the eligibility criteria, the food stamp benefit is equal to the maximum benefit (G_h) given the household size minus 30 percent of the household's net income.

The PRWORA gives each state a fundamental role in assisting poor families, and, under TANF, each state has different eligibility rules and benefits. Eligible TANF families, however, must have sufficiently low income and asset levels. The income test requires that net family income not exceed a maximum benefit level that varies by family size and state of residence. Net income includes unearned income as well as countable earned income (earned income less an earned income disregard). A family having no income is eligible to receive the maximum permitted TANF grant in the state ($\bar{B}_{Tsh}$). For a family with income, the TANF benefits are calculated as the difference between the maximum potential benefit or "pay standard" ($\hat{B}_{Tsh}$), and net-family income:

$$B_{Tsh} = \min\{\bar{B}_{Tsh}, [\hat{B}_{Tsh} - N_h - t_s(w_h H_h - E_s)]\}, \quad (1)$$

where N_h is the household unearned income, E_s is a state earned income disregard (a dollar amount of earned income not counted when calculating the amount of welfare cash transfer), t_s is the benefit reduction rate, which is applied to earnings that exceed the

income disregard, and is between 0 and 1. The size of the welfare grant falls as earned income rises, but not dollar for dollar. This maintains incentives for eligible household members to work and not just rely on transfers.

Under PRWORA, welfare responsibility is left to state-run TANF programs. However, the act did include some strong rules. Recipients are now required to work, and most can collect aid for no more than five years over a lifetime. TANF recipients must secure a job after two continuous years on assistance. In 1997, at least 25 percent of single-parent-headed households and 75 percent of two-parent households were engaged in work activities in each state. Single parents receiving TANF benefits were required to work at least 20 hours per week by 1997 and at least 30 hours per week by 2000. Two-parent families must work 35 hours per week with the stipulation that parents can share the work hours. The required work activities include specified "priority" activities: employment, on-the-job training, job search and job readiness, community service, vocational educational training, or provision of childcare in community service. This requirement tends to force families into the workplace and off welfare. If adults who are required to participate in activities do not comply with requirements, the state has the option to sanction or reduce the unit's benefit. A sanction generally results in the removal of the non-complying individual from the unit for benefit computation purposes, a percentage reduction in the entire unit's benefit, or a full benefit sanction. States increase the severity of the sanction based on the amount of time or the number of times the individual is non-compliant. States may not use TANF funds to assist a family that includes an adult who has received assistance for more than five years, and the state may set a time limit of less than five years. The state is allowed to exempt up to 20 percent of its caseload for reasons such as no job availability or a high unemployment rate, age of parent, and disability or illness.[1] Families eligible for TANF are automatically eligible for Food Stamp and Medicaid programs.

Theoretical Model

A static model of household behavior is developed where work and program participation are chosen to maximize household utility function subject to a budget constraint reflecting transfers. The model is used to explain the joint decisions to

participate in TANF, the FSP, and labor markets of a population of households eligible for those programs. The household head chooses whether to work or not and simultaneously decides whether to participate in TANF or the FSP. The FSP and TANF participation and labor supply decisions are interdependent because labor supply decisions depend on the FSP and TANF benefits (through their effect on the budget constraint), the TANF participation decision depends on labor supply (through its effect on the TANF benefits), and the FSP participation decision depends on labor supply and TANF participation (through their effect on the food stamp benefits—each payment is reduced by an extra dollar of earnings and extra dollar of TANF benefit). Therefore, the combination of program participation choices must be treated jointly with the labor supply choice, and the labor supply equation must be estimated jointly with the TANF and FSP participation equations.

Following Moffitt (1983), consider the following family utility function:

$$U(L, X, P_t, P_f) = U(L, X) + d_t P_t + d_f P_f \quad (2)$$

where L is the household head leisure, X is purchased goods, P_t is an indicator equal to 1 if the family participates in TANF and 0 if not, P_f is equal to 1 if the family participates in the FSP and 0 if not, d_t is the marginal disutility of TANF participation, and d_f is the marginal disutility of FSP participation (d_t and d_f represent tastes for receiving cash transfers and food stamps respectively). The program participation indicators in equation (2) represent the costs of participating in the welfare program and are included to explain and account for non-participation among eligible families. If stigma is associated with program participation (and if P_t and P_f capture nothing besides stigma), $d_t < 0$ and $d_f < 0$. Hence, we would expect that $\partial U/\partial L > 0$, $\partial U/\partial X > 0$, $\partial U/\partial P_t < 0$, and $\partial U/\partial P_f < 0$. The budget constraint gives monthly disposable income:

$$I = wH + N + P_t(B_t(H)-C_t) + P_f(B_f(H)-C_f) = P_x X, \quad (3)$$

where w is the hourly wage rate per work hour, $B_t(H)$ and $B_f(H)$ are the benefit functions for TANF and the FSP respectively, C_t and C_f are the monetary costs associated with

TANF and FSP participation respectively, and H is the household head labor supply. Full income is

$$w(! - L) + N + P_t(B(H)-C) + P_f(B_f(H)-C_f) - P_xX = 0, \quad (4)$$

or

$$F = w! + N + P_t(B(H)-C) + P_f(B_f(H)-C_f) = P_xX + wL,$$

where !(=L+H) is the household head time endowment.

The household head is assumed to choose H (or L), P_t, and P_f simultaneously to maximize its utility U (L, X, P_t, P_f) subject to the budget constraint in equation (3). The household head chooses the (H, P_t, P_f) combination that provides the highest indirect utility.

The optimal choices are

$$X^* = d_X[w, P_x, N, B_t'(H), B_f'(H), C_t, C_f, Z], \quad (5)$$

$$L^* = d_L[w, P_x, N, B_t'(H), B_f'(H), C_t, C_f, Z], \quad (6)$$

$$H^* = ! - L^* = S_H[w, P_x, N, B_t'(H), B_f'(H), C_t, C_f, Z], \quad (7)$$

$$P_t^* = d_{Pt}[w, P_x, N, B_t'(H), B_f'(H), C_t, C_f, Z], \quad (8)$$

$$P_f^* = d_{Pf}[w, P_x, N, B_t'(H), B_f'(H), C_t, C_f, Z]. \quad (9)$$

where Z is a vector of other explanatory variables. Given these equations, we have also the following wage equation: $w^*=w[H, Z]$.

Participation in welfare programs is not costless. Costs are associated with a family filing an application, going for an interview, as well as with the opportunity cost from reduced expected future benefits due to a lifetime time limit imposed in TANF, and with opportunity costs of foregone labor earnings to become eligible. In addition, as Moffitt (1983) suggests, stigma is associated with AFDC participation and this helps explain the observed lower-than-expected participation rates. Families facing relatively low costs of current period participation are more likely to participate than are those facing higher costs. Ohls (2001) suggests that households might not participate in the FSP because of lack of transportation or potential embarrassment of receiving food stamps, or because

the application process is too burdensome. Zedlewski (2001) show that more families reported leaving the FSP because of administrative issues in 1999 than in 1997. Given states' freedom in designing TANF programs, important and hard-to-measure differences exist among states that may affect labor supply and TANF decisions. For example, the way in which a state TANF bureaucracy encourages or discourages participation in the TANF program is likely to affect stigma and transaction costs of participating and therefore account for some of the cross-state differences in participation. However, this is difficult to measure. While the costs and stigma associated with claiming benefits may be important, the empirical analysis cannot directly address these issues but they can be explicitly defined in a particular error term.

Empirical Specification and Estimation

The econometric model is a four-equation structural model that allows us to examine feedback among endogenous variables. The dependent variables in the model are labor force participation (P_l), TANF participation (P_t), FSP participation (P_f), and wage. The first three dependent variables are binary variables, and wage is continuous. The structural form of the three limited dependent variables is

$$P_l^{**} = \alpha_{lt}P_t^{*} + \alpha_{lf}P_f^{*} + \beta_l'Z_l + \mu_l \text{ with } P_l = 1 \text{ if } P_l^{**} > 0, \text{ and 0 otherwise;}$$

$$P_t^{**} = \alpha_{tl}P_l^{*} + \alpha_{tf}P_f^{*} + \beta_t'Z_t + \mu_t \text{ with } P_t = 1 \text{ if } P_t^{**} > 0 \text{ and 0 otherwise;}$$

$$P_f^{**} = \alpha_{fl}P_l^{*} + \alpha_{ft}P_t^{*} + \beta_f'Z_f + \mu_f \text{ with } P_f = 1 \text{ if } P_f^{**} > 0 \text{ and 0 otherwise.}$$

Although P_l^{**}, P_t^{**}, and P_f^{**} are unobservable, we do observe P_l, P_t, and P_f. Define Z as a vector of all observed exogenous variables, and $Z_l \in Z$, $Z_t \in Z$, $Z_f \in Z$, and $Z_l \neq Z_t \neq Z_f$, α_{lt}, α_{lf}, β_l', α_{tl}, α_{tf}, β_t', α_{fl}, α_{ft}, β_f' as parameter vectors, and define μ_l, μ_t, and μ_f as disturbance terms. Solving for the reduced form, we obtain

$$P_l^{*} = \pi_l'Z + \nu_l,\ P_l = 1 \text{ if } P_l^{*} > 0, \text{ and 0 otherwise;}$$

$$P_t^{*} = \pi_t'Z + \nu_t,\ P_t = 1 \text{ if } P_t^{*} > 0, \text{ and 0 otherwise;}$$

$$P_f^{*} = \pi_f'Z + \nu_f,\ P_f = 1 \text{ if } P_f^{*} > 0, \text{ and 0 otherwise.}$$

The potential simultaneity of employment and the decision to participate in TANF and the FSP is taken into account by using a simultaneous equation framework.

We use two-stage estimation procedure (Nelson and Olson 1978). First, we estimate the reduced form or estimate π_l, π_t, and π_f by maximum-likelihood applied to each equation. Second, we form the instruments $\hat{P}_l^* = \hat{p}_l' Z$, $\hat{P}_t^* = \hat{p}_t' Z$, and $\hat{P}_f^* = \hat{p}_f' Z$. Third, we replace P_l^*, P_t^*, and P_f^* on the right-hand side of the structural equations by the corresponding $\hat{p}_l' Z$, $\hat{p}_t' Z$, $\hat{p}_f' Z$ and treat these instruments as fixed regressors and the resulting equations as single-equation models. We then estimate the structural parameters by maximum likelihood applied to each equation separately. In the independent probit model, we also include variables we use for identification in the simultaneous equation models. At least one variable in the vector Z_l cannot be in Z_t and Z_f, and vice versa. For the vector Z_l, we use children under age 6, children under age 13, and children under age 18 as variables for identification; for vector Z_t we use the TANF program parameters (pay standard, benefit reduction rate, income disregard, and sanction), and for vector Z_f we use age and age squared, and the FSP benefit.

The empirical specification of the individual human-capital-based wage equation is

$$\ln(\text{wage}) = ß_0 + ß_1\text{age} + ß_2\text{agesq} + ß_3\text{edu} + ß_4\text{male} + ß_5 O' + \mu_w,$$

where O' is a vector of exogenous variables including race (white=1), marital status (married=1), and labor market variables (state unemployment rate); and whether the household head is male (male=1); variable μ_w is a normal random error term. The wage equation also includes a labor-market selection variable.

Data and Variables

We use the U.S. Census Bureau's first Survey of Program Dynamics (SPD) longitudinal data and the 1998 SPD experimental data files for the empirical analysis. The SPD contains detailed information about the characteristics of and the choices made by participant and non-participant households. The SPD survey is comprised of two SIPP files, the SPD Bridge file and the SPD file. The SIPP files are 1992 and 1993 SIPP Panel data and they are recoded to look and feel much like the Census Bureau's March Current Population Survey (CPS) files. The SPD Bridge file is a CPS instrument administered on the SPD population. The SPD file collects data on assets and many other important variables. Available longitudinal data are restricted to the variables on the March CPS.

As a result, the SPD longitudinal file has core employment, earnings, income, health insurance, and Medicaid information but lacks other data, such as assets that were left off the file. Therefore, the 1998 SPD experimental file is merged into the SPD longitudinal file. The 1998 Experimental Data were minimally edited, and imputations were not performed for missing data.

The longitudinal SPD file provides information on income, job participation, program participation, health insurance and utilization, and the well-being of adults and children during the reference period (1997).

The demographic variables for each member of the household include age, sex, education level, race, marital status, and household relationship. The economic characteristics include work experience, non-labor income, and an indicator (0, 1) of not receiving any cash benefits. The work experience information covers employment status, weeks worked, whether heads of household are looking for work or on layoff, average hours employed per week, and other job-specific characteristics. It also contains detailed information on variables that are necessary to determine the eligibility and the benefits for welfare programs, such as age, disability status of household members, and data on income, labor force status, and household's participation in government-sponsored programs such as TANF, Food Stamps, and Medicaid. The data about state TANF parameters is collected from the Green Book (U.S. House of Representatives 1998) and Gallagher et al. (1998). Information about unemployment rates is from the U.S. Census Bureau (1999).

Only non-elderly (between ages 18 and 65), non-disabled household heads are included in the sample (both the elderly and the disabled are eligible for other transfer programs). Households are also excluded from the sample if they are categorically ineligible for the TANF program, that is, if they do not have a child under age 18 in the family. Households with assets that exceed the state asset limit are excluded from the sample (Table 1). The resulting sample includes 4,545 households with low wealth, 66 percent of which are married-couple families, and 57 percent of which have a male as a household head (weighted data). The household head is the person (or one of the persons) in whose name the housing unit is owned or rented. If the house is owned or rented jointly by a married couple, the household head may be either the husband or the wife.

TABLE 1. State TANF parameters and unemployment rates

State	Asset Limit ($)	B ($)	E ($)	t (%)	Sanction (months)	UNRATE (%)
Alabama	2,000	137	0	80	6	5.1
Alaska	1,000	821	150	67	Until compliance	7.5
Arizona	2,000	275	90	70	6	4.6
Arkansas	3,000	162	0	100	3	5.3
California	2,000	493	225	50	6	6.3
Colorado	2,000	280	120	67	3	3.3
Connecticut	3,000	443	1157	100	3	5.1
Delaware	1,000	270	120	67	Lifetime	4.0
D.C.	1,000	298	100	50	6	7.9
Florida	2,000	241	200	50	3	4.8
Georgia	1,000	235	120	67	Lifetime	4.5
Hawaii	5,000	452	200	44	6	6.4
Idaho	2,000	276	0	100	Until compliance	5.0
Illinois	3,000	278	0	33	6	4.7
Indiana	1,500	229	120	67	36	3.5
Iowa	5,000	361	0	40	6	3.3
Kansas	2,000	352	90	60	2	3.8
Kentucky	2,000	225	120	67	Until compliance	5.4
Louisiana	2,000	138	1020	100	6	6.1
Maine	2,000	312	108	50	6	5.4
Maryland	2,000	313	0	65	1	5.1
Massachusetts	2,500	474	120	50	0.5	4.0
Michigan	3,000	371	200	80	1	4.2
Minnesota	5,000	437	0	64	6	3.3
Mississippi	1,000	96	90	100	Lifetime	5.7
Missouri	5,000	234	120	67	6	4.2
Montana	3,000	366	200	75	6	5.4
Nebraska	6,000	293	0	80	6	2.6
Nevada	2,000	289	0	50	1	4.1
New Hampshire	2,000	481	0	50	1	3.1
New Jersey	2,000	322	0	50	3	5.1
New Mexico	1,500	410	150	50	1	6.2
New York	2,000	467	90	55	6	6.4
North Carolina	3,000	236	120	67	6	3.6
North Dakota	5,000	340	0	62	Until compliance	2.7
Ohio	1,000	279	250	50	6	4.6
Oklahoma	1,000	225	120	50	Until compliance	4.1
Oregon	2,500	427	0	50	Until compliance	5.8
Pennsylvania	1,000	316	0	50	Lifetime	5.2
Rhode Island	1,000	449	170	50	0.5	5.3
South Carolina	2,500	160	0	50	1	4.5
South Dakota	2,000	380	90	80	6	2.7
Tennessee	2,000	142	150	100	3	5.4
Texas	2,000	163	120	67	6	5.4
Utah	2,000	362	100	50	Until compliance	3.1

TABLE 1. Continued

State	Asset Limit ($)	B ($)	E ($)	t (%)	Sanction (months)	UNRATE (%)
Vermont	1,000	554	150	75	Until compliance	4.5
Virginia	1,000	231	120	67	6	4.0
Washington	1,000	440	0	50	6	4.8
West Virginia	2,000	201	0	60	6	6.9
Wisconsin	2,500	440	120	67	Must reapply	3.7
Wyoming	2,500	320	200	100	1	4.6

Sources: TANF Parameters: *Green Book* (1998); Gallagher et al. (1998); Asset limits are for 1997 recipients; B (the maximum benefit) is for three-member family; Unemployment rates: U.S. Census Bureau (1999).

When modeling program participation choice, the issue of controlling for eligibility arises. This is not a simple matter because the eligibility criteria differ across states and the income is endogenous. We include all households who pass the TANF asset test rather than sampling on income, which is endogenous.

The variables we use in our analysis are a set of demographic variables, a set of household composition variables, and a set of structural variables designed to capture differences in labor market conditions and transfer programs. The demographic variables for the household head include his or her age, education level, a dichotomous variable indicating race (white=1), and non-labor income, which includes all non-wage family income excluding income from welfare transfers. The set of household composition variables includes the number of children under age 6, the number of children between ages 6 and 13, and the number of children between ages 13 and 18. The set of individual characteristics includes UNEMPLR, the state's annual unemployment rate. Also relevant are the observations of actual household earned and unearned income, program participation choices, and assets. As shown in equation (1) the benefit from participating in TANF is either the maximum permitted state benefit, $\overline{B}_{Tsh}$, or the pay standard, $\hat{B}_{Tsh}$, net of earned and unearned income according to state-specific reduction and disregard rates, whichever is lower. The food stamp benefits are equal to the maximum FSP grant net of the 30 percent countable income. Since earned income is endogenous to the choice to work, we instrument the payoffs of participating in TANF by the pay standard $\hat{B}_{Tsh}$ and the FSP by the maximum food stamps G_h for the specific household.

A household is recorded as a TANF participant household if a household member reports receiving TANF support during the reference year 1997. A household is recorded

as an FSP participant household if a household member reports receiving food stamps during the reference year. Household heads are classified as not working if they report working zero hours during the reference period, and they are classified as working if they report working one or more hours per week during the reference period. Table 2 presents the means and standard errors of the sample (weighted) percentage data. Table 3 shows the distribution of the sample by labor and welfare participation for all household heads and for single and married household heads. Over 30 percent of the single households participate in the FSP and TANF while only 6 percent of the married households participate in these programs. Married household heads work more (93 percent) than do the single ones (86 percent).

The household heads are classified into eight groups: (*i*) working, FSP and TANF participant; (*ii*) not working, FSP and TANF participant; (*iii*) working, not FSP participant, TANF participant; (*iv*) working, FSP participant, not TANF participant; (*v*) not working, not FSP participant, TANF participant; (*vi*) not working, FSP participant, not TANF participant; (*vii*) working, FSP participant, not TANF participant; and (*viii*) not working, not FSP participant, not TANF participant. Table 4 summarizes the main descriptive characteristics of these groups. The first row of the table gives the demographic characteristics of the whole sample. Those who work and are non-participants in the FSP and TANF (group 7) are more likely to be male, married, white, to have more education, and to have less children. The TANF and FSP participants who do not work (group 2) are less likely to be married and more likely to have more children. TANF-only participants (group 5) are most likely to be female and have the least education and the smallest amount of non-labor income.

Table 5 compares the main demographic characteristics of welfare participants with those of non-participants. The welfare participants are most likely to be single, younger, and have more children, have less non-labor income, and have less education. They are also less likely to work compared to the non-participants.

Table 6 presents the duration of participation in the FSP and TANF in 1997. The average number of months in TANF for TANF-only participants is 9.68, while for participants in both TANF and the FSP the number of months is slightly higher—10.15.

TABLE 2. Definitions of variables, means, and standard errors (n = 4,545; weighted data)

Variable	Mean (Standard Error)	Definition
Age	37.24 (0.15)	Age of household head
Agesq	1,462.9 (11.52)	Age squared
Schooling	12.24 (0.037)	Years of schooling of household head
Male	0.57 (0.008)	Dichotomous variable equal to 1 if the household head is a male, and 0 otherwise
Married	0.66 (0.008)	Dichotomous variable equal to 1 if the household head is married, and 0 otherwise
White	0.79 (0.008)	Dichotomous variable equal to 1 if household head is white, and 0 otherwise
Kids6	0.65 (0.013)	Number of children in household who are younger than 6 years old in household
Kids13	0.84 (0.015)	Number of children in household who are 6 and younger than 13 years old in household
Kids18	0.51 (0.012)	Number of children in household who are 13 and younger than 18 years old in household
Northeast	0.17 (0.006)	Dichotomous variable equal to 1 if household lives in the Northeast region, and 0 otherwise
Midwest	0.24 (0.007)	Dichotomous variable equal to 1 if household lives in the Midwest region, and 0 otherwise
South	0.39 (0.009)	Dichotomous variable equal to 1 if household lives in the South region, and 0 otherwise
UNRATE	4.93 (0.017)	Annual state unemployment rate
Non-labor income	1,508 (92.09)	Household non-labor income exclusive of welfare transfers per year in $
Pay standard	455.03 (3.34)	Maximum TANF grant per month in $, given participation
t_s	0.62 (0.003)	The benefit reduction rate is the rate at which additional dollars of earned income reduce the TANF benefit
E_s	140.55 (3.27)	The income disregard is a dollar amount of earned income not counted when calculating the household's transfer
G	403.42 (1.81)	Maximum FSP grant per month in $, given participation
Ln(wage)	2.37 (0.017)	Natural log of hourly wage
$\ln(\hat{wage})$	2.41 (0.005)	Predicted value of natural log of hourly wage
LF participation	0.90 (0.005)	Dichotomous variable equal to 1 if household head works, and 0 otherwise
TANF participation	0.09 (0.005)	Dichotomous variable equal to 1 if household participates in TANF, and 0 otherwise
FSP participation	0.13 (0.006)	Dichotomous variable equal to 1 if household participates in FSP, and 0 otherwise

TABLE 3. Distribution of the sample by labor force and welfare participation, and by family type

	Working		Not working		All	
All Household Heads						
Not participate in TANF and FSP	3,638	80 %	244	5.4 %	3,882	85 %
Participate in TANF but not in FSP	59	1.3 %	12	0.3 %	71	2 %
Participate in FSP but not in TANF	224	4.9 %	48	1.1 %	272	6 %
Participate in TANF and FSP	193	4.2 %	128	2.8 %	321	7 %
All	4,113	90.5 %	432	19.5 %	4,545	100%
Single Household Heads						
Not participate in TANF and FSP	966	64.0 %	71	4.7 %	1,037	68.7 %
Participate in TANF but not in FSP	38	2.5 %	8	0.5 %	46	3.0 %
Participate in FSP but not in TANF	139	9.2 %	33	2.2 %	172	11.4 %
Participate in TANF and FSP	150	9.9 %	104	6.9 %	254	16.8 %
All	1,293	85.7 %	216	14.3 %	1,509	100%
Married Household Heads						
Not participate in TANF and FSP	2,672	88.0 %	173	5.7 %	2,845	93.7 %
Participate in TANF but not in FSP	21	0.7 %	4	0.1 %	25	0.8 %
Participate in FSP but not in TANF	85	2.8 %	15	0.5 %	100	3.3 %
Participate in TANF and FSP	42	1.4 %	24	0.8 %	66	2.2 %
All	2,820	92.9 %	216	7.1 %	3,036	100%

Source: 1st longitudinal SPD data.

TABLE 4. Main demographic characteristics of different household groups (weighted data)

	No. of Households Unweighted	Male	Married	Educ	White	Kids	Age	Nonlab Income
Sample	4545	0.57	0.66	12.24	0.79	1.999	37.24	1,508
$P_t=P_f=P_l=1$	192	0.19	0.18	11.33	0.56	2.45	33.88	2,169
$P_t=0$, $P_f=P_l=1$	224	0.32	0.32	11.46	0.62	2.22	34.08	971
$P_t=P_f=1$, $P_l=0$	128	0.08	0.13	10.57	0.52	2.82	34.81	582
$P_t=P_l=1$, $P_f=0$	59	0.28	0.33	11.8	0.61	2.02	37.92	1,475
$P_t=1$, $P_f=P_l=0$	12	0.15	0.24	9.69	0.59	2.16	39.42	703
$P_t=P_l=0$, $P_f=1$	48	0.16	0.28	10.94	0.71	2.12	34.42	1,204
$P_t=P_f=P_l=0$	244	0.25	0.72	11.85	0.82	2.2	36.92	2,371
$P_t=P_f=0$, $P_l=1$	3638	0.65	0.73	12.46	0.83	1.91	37.76	1,494

TABLE 5. Main demographic characteristics of welfare participants and non-participants (weighted data)

	% of House-holds Un-weighted	Male	Married	Educ	White	Kids	Age	Nonlab Income	FSP partic	TANF partic	Labor partic
Welfare participants	0.15	0.21	0.24	11.2	0.59	2.39	34.6	1,283	0.9	0.6	0.71
Non-participants	0.85	0.63	0.73	12.4	0.83	1.93	37.7	1,547			0.94

TABLE 6. Participation in TANF and the FSP

	Only TANF participants	Only FSP participants	TANF and FSP participants
Number of months in TANF	9.68		10.15
Number of months in FSP		9.14	10.81
Number of households	71	272	320

The number of months in the FSP is 9.14 for FSP-only participants and it is 10.81 for participants in both TANF and the FSP.

Empirical Results

The dependent variables of the empirical model are TANF, FSP, labor force participation, and *ln* hourly wage. The simultaneous equation model is estimated using the instrumental variable estimator proposed by Nelson and Olson (1978).

At the first stage, each endogenous variable is regressed on a set of instrumental variables. The instruments consist of all exogenous variables in the model. The predicted values for the limited dependent variables are the predicted values $\hat{p}_l'Z$, $\hat{p}_t'Z$, $\hat{p}_f'Z$, rather than the predicted probability. The second stage is to substitute for the endogenous variables on the right-hand side of the system using the predicted values and then estimate the system by probit (TANF, FSP, labor force participation) and least squares (wage equation).

Wage Equation

Two sets of estimates for the wage equation are reported in Table 7, one with a selection term and one without a selection term. The wage equation is concave in age, and the age effect peaks at age 51. The findings on other coefficients are consistent with other studies. One additional year of schooling has the direct effect of increasing the wage by 7.6 percent. Added schooling increases wage income through increased labor productivity, holding other factors equal. Being male or white also increases an individual's wage. The hypothesis of the joint test of all the non-intercept coefficients, except for the coefficient of the selection term, is rejected. The sample value is 28.36 (the critical value is 2.01). The R^2 is 12 percent. We estimated a wage equation for the household heads who work and then used the predicted wage in the labor force participation equation in place of the actual wage, as an instrumental variable.

TANF Participation

The structural estimates of the TANF program participation are presented in Table 8. All coefficients have the hypothesized signs and many are highly significant. With respect to the state welfare policy instruments, the effects are as follows:

1. The higher are the benefits (pay standard), the higher is the TANF participation.
2. TANF participation is positively related to the earned income disregard and negatively related to the benefit reduction rate, and the effects are highly significant.
3. The higher is the sanction, the less likely is the household to participate in TANF, but the effect is not statistically different from zero.

Being male and married decreases the probability of being in TANF. Participation in TANF is positively related to the probability of FSP participation and negatively related to being in the work force. The higher non-labor income a household has, the smaller is the probability of that household's TANF participation.[2]

FSP Participation

The structural estimates of the TANF program participation are presented in Table 9. Being a TANF participant increases the probability of FSP participation. Working decreases the probability of receiving food stamps. Both effects are statistically

TABLE 7. Estimates of the individual log wage equation

Explanatory Variables	ln(wage)	ln(wage)
Intercept	-0.119 (0.288)	-0.529 (0.226)***
Age	0.062 (0.012)***	0.075(0.011)***
Agesq	-0.0006 (0.00002)***	-0.0008(0.00001)***
Schooling	0.076 (0.008)***	0.085(0.007)***
Married	0.107 (0.040)***	0.078(0.038)**
Male	0.214 (0.059)***	0.323(0.036)***
White	0.094 (0.038)***	0.106 (0.038)**
UNRATE	0.002 (0.016)	-0.014 (0.014)
Lambda	-0.417 (0.181)*	
R-square	0.123	0.122
F Statistics	65.17	73.63
Number of observations	3,710	3,710

Note: ** Statistically significant at the 5% level. *** Statistically significant at the 1% level. Standard errors are in parentheses.

TABLE 8. Structural estimates of the TANF program participation (probability of TANF participation)

Explanatory Variable	Dependent Variable
Intercept	-0.168 (0.243)
Predicted FSP participation[a]	0.616 (0.090)***
Predicted labor force participation[b]	-0.315 (0.116)**
Male	-0.277 (0.180)
Married	-0.527 (0.155)***
Pay standard	0.0008(0.00002)***
t_s	-0.582 (0.245)**
E_s	0.0005(0.0002)***
Sanction	-0.009 (0.035)
Nlabinc	-2.32E-6(6.55E-6)
Male*Married	0.478 (0.209)**
Log Likelihood	-968.03
Number of observations	4,545

Note: ** Statistically significant at the 5% level. *** Statistically significant at the 1% level. Standard errors are in parentheses.
[a]Predicted FSP participation is the predicted value of participating in the FSP.
[b]Predicted labor force participation is the predicted value of participating in the labor market.

TABLE 9. Structural Estimates of the FSP program participation (Probability of FSP participation)

Explanatory Variable	Dependent Variable
Intercept	0.329 (0.347)
Predicted TANF participation[a]	0.254 (0.098)**
Predicted labor force participation[b]	-0.735 (0.130)***
Male	0.098 (0.139)
Married	-1.062 (0.163)***
G	0.0007 (0.0003)**
Nlabinc	-0.00001(6E-6)**
Male*Married	0.631 (0.157)***
Log Likelihood	-1,335.19
Number of observations	4,545

Note: ** Statistically significant at the 5% level. *** Statistically significant at the 1% level. Standard errors are in parentheses.
[a]Predicted TANF participation is the predicted value of participating in TANF program.
[b]Predicted labor force participation is the predicted value of participating in the labor market.

significant. The higher is the food stamp benefit, the higher is the probability of a household being in the FSP. Being married decreases the probability of being in TANF. Having higher non-labor income makes the household less likely to participate in the FSP, and the effect is significant.

Labor Force Participation

The structural estimates of the TANF program participation are presented in Table 10. Variables that are excluded from the labor force participation equation are pay standard, benefit reduction rate, income disregard, sanction, and FSP benefit variables. The education, race, age, and age squared of the household head variables are excluded from the labor force participation equation in particular to identify the wage effect in labor force participation.

Working is positively related to a higher (predicted) wage and being male. The choice not to work is explained by having more children. Participation in the TANF program decreases the probability of working. Working decreases the probability of being a TANF and/or an FSP participant. Therefore, work, TANF, and FSP participation are correlated and highly significant. Higher unemployment rates decrease the probability of labor force participation.

TABLE 10. Structural estimates of the labor force participation (probability of labor force participation)

Explanatory Variable	Dependent Variable
Intercept	-0.487 (0.472)
Predicted TANF participation[a]	-0.309 (0.105)***
Predicted FSP participation[b]	0.315 (0.186)
Male	0.444 (0.188)**
Married	-0.344 (0.199)
Kids6	-0.191 (0.077)**
Kids13	-0.169 (0.060)***
Kids18	-0.087 (0.050)
$\ln(\hat{wage})$	1.140 (0.329)***
UNRATE	-0.147 (0.039)***
Nlabinc	-2.44E-6 (4.8E-6)**
Male*Married	0.369 (0.217)
Log Likelihood	-1,181.67
Number of observations	4,545

Note: ** Statistically significant at the 5% level. *** Statistically significant at the 1% level. Standard errors are in parentheses.
[a]Predicted TANF participation is the predicted value of participating in TANF program.
[b]Predicted FSP participation is the predicted value of participating in FSP.

Policy Simulations

In this section, we present the simulated effects of changes in policy parameters and wage on labor force and program participation. We evaluate an increase in payment standards, a decrease in the benefit reduction rate, and an increase in income disregard on the probability of TANF, FSP, and labor participation. We also examine the effect of an increase in the (predicted) wage on the probability of labor participation. The simulations are constructed by using the model estimates to predict the probabilities of TANF, FSP, and labor force participation given the household variables (demographic characteristics, non-labor income, welfare program parameters). Predicting the probabilities for each observation and then taking the mean over all observations creates average probabilities. Changing the program parameters and wage allows us to compare the probabilities of TANF, FSP, and labor force participation with those experienced under the current law.

The baseline estimates are displayed in the first column of Table 11. The predicted TANF participation rate is 8.6 percent, FSP, 13 percent, and labor force, 90.5 percent.

TABLE 11. Simulated changes in program parameters and wage (absolute and percentage changes in parentheses)

	Base	25% Increase in Pay Standard	$100 Increase in Income Disregard	10% Increase in BRR	10% Increase in (Predicted) Wage
Probability of TANF participation	0.0859	0.0932 (0.0073, 9%)	0.0884 (0.0025, 3%)	0.0819 (-0.0040, -5%)	
Probability of FSP participation	0.1302	0.1412 (0.0110, 8%)	0.1289 (-0.0012,-1%)	0.1284 (-0.0018, -1%)	
Probability of labor force participation	0.9050	0.8961 (-0.0089, -1%)	0.9022 (-0.0027, -0.30%)	0.9081 (0.0031, 0.34%)	0.9362 (0.0313, 3.46%)

The second column of Table 11 presents the estimated change related to a 25 percent increase in the pay standard. This change in the pay standard has a significant effect on TANF and FSP participation (it increases the probability of TANF and FSP participation by 9 and 8 percent respectively, as indicated in the parentheses) and a small effect on labor participation (it decreases the probability of labor force participation by 1 percent). The third column of Table 11 presents the results of a $100 increase in the income disregard. This change in the pay standard has a larger effect on TANF participation (it increases the probability of TANF participation by 3 percent) and smaller effects on FSP and labor participation (is decreases the probability of FSP and labor force participation by 1 and 0.30 percent respectively). As in the previous studies, we found that an increase in the TANF benefit reduction rate has a larger effect on TANF and FSP participation (it decreases the participation in both programs) and a very small effect on labor force participation.

The results of the simulations imply that participation in TANF and the FSP among households with low assets who are potentially eligible for TANF is sensitive to changes in program parameters. Although labor participation is affected by a change in program parameters to some degree, it is most affected (positively) by the (predicted) wage.

Conclusions

This study explores the effects of household- and state-specific characteristics on labor force, TANF, and FSP participation choices. The knowledge and information gained from this study may provide policy makers with insights on the effects of these interventions for individuals and families attempting to achieve financial independence and self-sufficiency. This study also provides information on economic, programmatic, and non-programmatic factors that affect the well-being of low-income individuals and families, which could lead to better program design. Participation in welfare programs differs across the eligible households. Our analysis of the data shows that 13 percent of the asset-eligible households participate in the FSP, and only 9 percent participate in the TANF program.

The factors that determine FSP and TANF participation are education, family structure, and benefits, as well as labor market conditions. The most important and significant characteristics for work effort are (predicted) wage (positive effect) and number and age of children (negative effect). The findings of the model of joint TANF, FSP, and labor force participation are consistent with the findings in the existing literature. If the family heads are male or married, then the probability that the household participates in TANF or the FSP is significantly lower, and the probability that the household head works is significantly higher. Households with children are less likely to be in the labor force.

We found lower program participation for married families; a negative relation between welfare participation and labor supply, and a positive relation between the cash transfer program and food stamps. Decreases in cash transfers reduce welfare participation and encourage labor efforts. Our results show that the welfare program parameters affect TANF participation. The results imply that, among households with low assets who are potentially eligible for TANF, participation in the TANF and FSP programs is sensitive to changes in program parameters. Although labor participation is affected by change in program parameters to some degree, it is most affected (positively) by the (predicted) wage.

Endnotes

1. For a detailed discussion of the exemptions from time limits, see Gallagher et al. 1998, p. IV-1.

2. We estimated the structural equation of the probability of TANF participation with children less than 6 years of age, but the coefficient was not statistically significant and we excluded it from the reported results.

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