Do Food Assistance Programs Improve Household Food Security? : Recent Evidence from the United States

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Abstract*

Food assistance programs play an important role in meeting the basic needs of low-income households. This paper examines the interaction among food stamps, labor force participation and food insecurity status of low-income households under different program design and economic conditions. A simultaneous equation model with three probit equations links the program, work force participation and outcome. Results based on the Survey of Program Dynamics data suggest that Food Stamp Program participation is more responsive to changes in the program benefits than to changes in unemployment rate or nonlabor income; food insecurity status is more responsive to changes in the food program benefit or unemployment rate, than to nonlabor income.

Key words: food assistance, food security, hunger, and welfare programs

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Introduction

Recent reforms in U.S. welfare policy have shifted significant funding and responsibility for welfare assistance from the federal to the state level, and include policies to encourage work and limit time on welfare. As a result of the reforms, the Food Stamp Program (FSP) originally designed to help people with low income to obtain a nutritionally adequate diet and to alleviate hunger, has become the major federal safety-net program for low-income households. For many low-income households, food stamp benefits represent an important share of household resources. Over 19 million people participated in the FSP in 2002. Total FSP costs were $20.7 billion in 2002, with an average monthly benefit of $79.60 per person per month (USDA, 2003).

Although most households in the United States are food secure, in 2001 there were 11.5 million U.S. households (or 10.7% of all households) that were food insecure (Nord, Andrews and Carlson, 2002). Food insecure households have "limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain availability to acquire acceptable foods in socially acceptable ways" (Anderson, 1990; Nord et al., 2002.) About one-third of food insecure households (or 3.3 % of all U.S. households) were food insecure with hunger. Our study evaluates the relationship among labor supply, food assistance (specifically, the FSP) and food insecurity. The study analyzes micro-level data from the Survey of Program Dynamics (SPD) to better understand the effect of socio-economic factors, program parameters and labor market participation on

food security at the household level. The results help to explain why some households that participate in the FSP find it difficult to sustain food security.

This study examines the question of whether there is a relationship among FSP, labor participation and food insecurity by considering a simultaneous model of program and labor market participation, and food insecurity, and makes use of newly available household data on social assistance program participation. We expect that program participation, labor force participation and household well-being are not independent. The ultimate objective of this study is to provide a model of the joint decisions by households to participate in food stamps and/or work, and the impacts of FSP and labor force participation on well being, as measured by food insecurity with hunger. We choose the more severe outcome measure, food insecurity with hunger, to better represent the status of households experiencing significant hardship (Anderson 1990; Nord et al. 2002). We exploit the simultaneous model structure to account for the endogeneity of the labor force participation, FSP participation decisions and food insecurity with hunger, in order to evaluate whether the households more likely to participate in the FSP are more likely to be food insecure with hunger. This study is similar to the studies by Gundersen and Oliveira (2001) and Jensen (2002) who each use a simultaneous equation model to account for endogeneity of FSP participation and food insufficiency (insecurity) of the households. However, we extend the model to include the labor force participation decisions of low-income families. We also present the simulated effects of changes in policy parameters (food stamps benefit), unemployment rate and nonlabor income on FSP participation and food insecurity with hunger in order to interpret the results in light of alternative social assistance policies.

Literature Review

A number of earlier studies have examined the determinants of participation in the FSP among low-income or FSP-eligible households (see Gleason et al., 1998 and Currie, 2002 for a literature review). Among other, important and related studies is one by Fraker and Moffitt (1988), who model the effect of participation in food stamps and welfare programs on labor supply. They estimate that in 1980 the FSP reduced labor supply of female heads of families by about 9%. A later study by Hagstrom (1996) on the effect of FSP participation on family labor supply finds that the FSP has a weak effect on the labor supply of married couples. One surprising finding is that many households do not participate in the FSP, or leave the FSP, even though they are eligible to participate (Zedlewski and Braumer, 1999; Wilde et al., 2000).

In the last decade, substantial work on the measurement of hunger and food insecurity has been done (e.g., Anderson, 1990; Radimer et al., 1990; Frongillo, 1999; Hamilton et al., 1997; Opsomer et al., 1999; Nord et al., 2002). Gundersen and Oliveira (2001) use a simultaneous equation model with two probits and show that food stamp participation has no effect on food insufficiency. Jensen (2002) finds a positive correlation between food stamp participation and food insecurity. Other, previous research shows that food insecurity is related to socio-demographic and economic conditions that limit the household resources available for food acquisition (Rose et al., 1998; Olson et al., 1996). Variables found to be significantly related to food insecurity were adverse health conditions, low income, minority status, low education, and food assistance program participation.

Theoretical model

We model a household's labor force, food stamps participation and food insecurity with hunger within a utility maximizing framework. A static model of household behavior is developed where work and program participation is chosen to maximize the household utility function subject to a budget constraint reflecting program transfers. The model is used to explain the decisions to participate in FSP and labor markets of a population of households potentially eligible for this program.

Assume that the household's utility is a function of leisure and disposable income,

$$U=U(H, Y, \delta_f, \delta_h), \quad (1)$$

where H is the household head's hours of work, Y is disposable income, δ_f represent tastes for receiving food stamps and δ_h is the disutility of being food insecure with hunger. If stigma is associated with FSP participation then $\delta_f<0$. The budget constraint gives disposable income:

$$Y = wH + N + P_f(B_f(H)-C_f) = P_xX, \quad (2)$$

where w is the hourly wage rate per work hour, N is unearned income, P_f is equal to 1 if the household participates in FSP and 0 if not, $B_f(H)$ is the benefit function for FSP, C_f are the monetary costs associated with FSP participation, X is purchased goods, and P_x is their price. Full income, F, is

$$F = w\bar{T} + N + P_f(B_f(H)-C_f) = P_xX + wL, \text{ or} \quad (3)$$

$$w(\bar{T} - L) + N + P_f(B_f(H)-C_f) - P_xX = 0,$$

where $\bar{T}(=L+H)$ is the household head time endowment and L is leisure.

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

The optimal choices are

$$X^* = d_X[w, P_x, N, B_f'(H), C_f, Z], \quad (4)$$

$$L^* = d_L[w, P_x, N, B_f'(H), C_f, Z], \quad (5)$$

$$H^* = \bar{T} - L^* = S_H[w, P_x, N, B_f'(H), C_f, Z], \quad (6)$$

$$P_f^* = d_{Pf}[w, P_x, N, B_f'(H), C_f, Z]. \quad (7)$$

where Z is a vector of other explanatory variables. Given these equations, we have also the following wage equation:

$$w^* = w[H, Z]. \quad (8)$$

Participation in the FSP is not costless. Costs are associated with a family filing an application, going for an interview. In addition, Moffitt (1983) suggested that a stigma is associated with program participation, and this helps explain the observed lower than expected participation rates in Aid to Families with Dependent Children (AFDC). For the FSP, higher participation costs or stigma include lack of transportation to program offices or potential embarrassment at receiving food stamps, an application process that is too burdensome (Ohls, 2001), or other significant administrative issues (Zedlewski with Gruber, 2001). While the costs and stigma associated with claiming benefits may be important, the empirical analysis cannot directly address this issue, however they can be explicitly defined as included in a particular error term.

Empirical specification and estimation

The econometric model is a four equation structural model, which allows us to examine feedback among endogenous variables. The dependent variables in the model are labor force participation (P_l), FSP participation (P_f), food insecurity with hunger (P_h), and wage. The first three dependent variables are binary variables and wage is continuous. The structural form of the three limited dependent variables is

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

$P_f^{**} = \alpha_{fl}P_l^{*} + \alpha_{fh}P_h^{*} + \beta_f'Z_f + \mu_f$ with $P_f = 1$ if $P_f^{**} > 0$ and 0 otherwise

$P_h^{**} = \alpha_{hl}P_l^{*} + \alpha_{hf}P_f^{*} + \beta_h'Z_h + \mu_h$ with $P_h = 1$ if $P_h^{**} > 0$ and 0 otherwise.

Although P_l^{**}, P_f^{**} and P_h^{**} are unobservable, we do observe P_l, P_f, and P_h. Define Z as a vector of all observed exogenous variables, and $Z_l \in Z$, $Z_f \in Z$, and $Z_h \in Z$, and $Z_l \neq Z_f \neq Z_h$; α_{lh}, α_{lf}, β_l', α_{fl}, α_{fh}, β_f', α_{hl}, α_{hf}, and β_h' as parameter vectors; and μ_l, μ_f and μ_h as disturbance terms. Solving for the reduced form we obtain: $P_l^{*} = \pi_l'Z + \nu_l$, $P_l = 1$ if $P_l^{*} > 0$, and 0 otherwise, $P_f^{*} = \pi_f'Z + \nu_f$, $P_f = 1$ if $P_f^{*} > 0$ and 0 otherwise, $P_h^{*} = \pi_h'Z + \nu_h$, $P_h = 1$ if $P_h^{*} > 0$ and 0 otherwise.

We use a two-stage estimation procedure similar to the procedure proposed by Mallar, 1977. First, we estimate the reduced form or estimate π_l, π_f, π_h by maximum-likelihood methods applied to each equation. Second, we form the instruments $\hat{P}_l^{*} = \hat{\pi}_l'Z$, $\hat{P}_f^{*} = \hat{\pi}_f'Z$ and $\hat{P}_h^{*} = \hat{\pi}_h'Z$. Third, we replace P_l^{*}, P_f^{*}, and P_h^{*} on the right hand side of the structural equations by the corresponding $\hat{\pi}_l'Z$, $\hat{\pi}_f'Z$, $\hat{\pi}_h'Z$ 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.

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

$$\ln(\text{wage}) = \beta_0 + \beta_1 \text{age} + \beta_2 \text{agesq} + \beta_3 \text{edu} + \beta_4 \text{male} + \beta_5 O' + \mu_w,$$

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

Data and variables

For the empirical analysis, the first Survey of Program Dynamics (SPD) longitudinal data and the 1998 SPD experimental data files are used. The SPD contains detailed information about the characteristics of and the choices made by participant and non-participant households. 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). Because the longitudinal SPD lacks data on assets, the asset information from the 1998 SPD experimental file is merged with the SPD longitudinal file. The 1998 SPD experimental data were minimally edited, and imputations were not performed for missing data. Table 1 shows the distribution of all households by asset level and income. The assets include the households' reported liquid assets. About 16 percent of the households in the1998 SPD experimental data file did not report their assets; most of these households had income larger than 300 percent of poverty. These households were deleted from our sample.

The SPD 1998 Food Security Status File contains summary food security status information for the households. The food security status variables, available in the file,

were calculated based on the 18 core items in the food security module. The food security status yields a categorical measure of food security status that identifies households as food secure, food insecure without hunger, or food insecure with hunger. In our analysis we categorize the households in two groups: first, food insecure with hunger; and second, food insecure without hunger and food secure. Information on the state's annual unemployment rate was also included.

Only non-elderly (ages 18 through 59) household heads are included in the sample used in our analysis. Households with income 300 percent of poverty and higher, and assets of $5,000 and higher are excluded (the asset limit for FSP is $2,000 and $3,000 for households with elderly members). The resulting sample includes 3,733 households with low-wealth and low income; 57% are married couple families and 51% have a male designated as a household head (weighted data). Table 2 presents the means and standard errors of the sample (weighted) percentage data. In the sample analyzed, 21% of the households participate in the FSP, 81% of the household heads are in the labor force and 7.7% of the households are food insecure with hunger. Thirteen percent of the households have a disabled member.

Participation in the labor force and FSP differ across the eligible households. Households are aggregated into categories according to characteristics that are exogenous to (determinants of) their responses to changing program and employment opportunities. They are classified in four groups: (1) working, food stamp participant; (2) not working, not food stamp participant; (3) not working, food stamp participant; and (4) working, not food stamp participant, as shown in Table 3.

Table 3 summarizes the main descriptive characteristics of the four groups. The first row of the table gives the demographic characteristics of the whole sample. Those who work and do not participate in the FSP (P_l=1, P_f=0) are more likely to be male, married, white, and have more years of education. Only 18% in this group are food insecure households and 5% are food insecure with hunger. The FSP participants who do not work (P_f=1,P_l=0) are less likely to be married or to be male, and more likely to have more children, have fewer years of education and the smallest amount of nonlabor income. They are the most vulnerable group with 55% being food insecure and 20% being food insecure with hunger. Food stamp participants (the sixth row) have higher food insecurity rates (including food insecure with hunger) than eligible nonparticipants. Seventeen percent of the FSP participating households are food insecure with hunger while only 5% of the potentially eligible but nonparticipating in food assistance program households are food insecure with hunger.

Empirical Results

The dependent variables of the empirical model are FSP participation, food insecurity with hunger and labor force participation, and *ln* hourly wage. The simultaneous equation model is estimated using an instrumental variable estimator. 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 $\hat{\pi}_l' Z$, $\hat{\pi}_f' Z$, $\hat{\pi}_h' Z$, rather than the predicted probability. In the second stage we substitute for the endogenous variables on the right hand side of the system using the predicted values and then estimate the system by probit

(FSP, food insecurity with hunger and labor force participation) and least squares (wage equation).

Two sets of estimates for the wage equation are reported in Table 4, 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 42. The findings on other coefficients are consistent with other studies. One additional year of schooling has the direct effect of increasing the wage by 3.7%. 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 nonintercept coefficients, except for the coefficient of the selection term, is rejected. The sample value of the F statistics is 8.14 (the critical value is 2.01). We estimated a wage equation for the household heads that work and then use the predicted wage in the labor force participation equation in place of the actual wage as an instrumental variable.

The structural estimates of the FSP participation, food insecurity with hunger and labor force participation are presented in Table 5. All coefficients have the hypothesized signs and many are highly significant. Being in the labor force decreases the probability of participating in the FSP and the effect is statistically significant. Food insecure with hunger households are less likely to participate in the FSP. The higher the food stamp benefit is, the higher is the probability of a household being in the FSP. Being married decreases the probability of being on food stamps. Having higher nonlabor income makes the household less likely to participate in the FSP, and the effect is significant. Being in the labor force decreases the probability of being food insecure with hunger and the effect is significant. FSP participation decreases food insecurity with hunger.[1] The effect of

food stamp participation on a household's probability of food insecurity with hunger is statistically insignificant. Having children increases the probability of being food insecure with hunger. Being married decreases the probability of being food insecure with hunger. Working is positively related to a higher (predicted) wage and having children age between 12 and 18. Being food insecure with hunger decreases the probability of working. The choice of working is explained by being married and having less nonlabor income. Married males are more likely to work.

Finally, we present the simulated effects of changes in policy parameters (food stamps benefit), unemployment rate and nonlabor income on FSP participation and food insecurity with hunger. The simulations are constructed by using the model estimates to predict the probabilities of FSP and food insecurity with hunger given the household variables (demographic characteristics, nonlabor income, food stamps benefit), predicting the probabilities for each observation, and then taking the mean over all observations to create average probabilities. Changing the FSP benefit and nonlabor income allows us to compare the probabilities of FSP participation and food insecurity under this types of transfer payments (food program or cash).

The baseline estimates are displayed in the first column of Table 6. The predicted FSP participation rate is 21% and the predicted households' food insecurity with hunger is 8%. The second column of Table 6 presents the estimated change related to a $100 increase in the food stamps benefit. This change in the food stamps benefit increases the probability of FSP participation by 16.59% and decreases the probability of being food insecure with hunger by about 6.67% compared to the baseline. In comparison, Hagstrom (1996) found that a 25% increase in the FSP benefit increases food stamp participation by

7%.[2] The third column of Table 6 presents the results from a $100 increase in the household's nonlabor income. This change has a small effect on the probability of FSP participation (decreases the FSP participation by 0.38%) and on food insecurity with hunger (decreases the food insecurity with hunger by 0.41%). The fourth column of Table 6 presents the results from a 0.5-percentage point decrease in the state unemployment rate. This change in the state unemployment rate decreases the probability of FSP participation by 3.5% and the probability of being food insecure with hunger by about 2.2% compared to the baseline.

Conclusions

This study explores the effects of household characteristics on labor force and FSP participation choices, and on food insecurity with hunger. The knowledge and information gained from the analysis can provide insights on the effects of these interventions for individuals and families attempting to achieve financial independence and self-sufficiency. The results also provide information on economic, programmatic and non-programmatic factors that affect the well being of low-income individuals and families, and for better program design. Participation in the FSP differs across the eligible households. Our analysis of the data shows that 21% of the potentially eligible households participate in FSP.

The factors that determine the FSP participation are family structure and the food stamp benefit level, as well as labor market conditions. An important finding is the positive effect of (predicted) wage on work effort. The findings of the model of joint FSP, labor force participation and food insecurity with hunger are consistent with our

expectations. If the family heads are male or married, then the probability that the household participates in the FSP is significantly lower, and the probability that the household head works is significantly higher. Household heads with older children are more likely to be in the labor force. We found lower FSP participation for married families; a negative relationship between food stamps participation and labor supply, and between food insecurity with hunger and labor force participation. Increases in food stamp benefits increase FSP participation and decrease the food insecurity with hunger. These findings imply that FSP participation and food insecurity with hunger among low income and low asset households that are potentially eligible for FSP are sensitive to changes in program parameters (e.g. food stamp benefit). Relatively greater reductions in food insecurity with hunger are achieved through increases in the food stamp benefits and improvements in macroeconomic conditions (e.g., lower unemployment rates) than to changes in nonlabor income.

The results show that the linkages among food program participation, labor force participation and well-being, measured as food insecurity with hunger, are complex. However, the results from the structural estimates and simulations suggest that the targeted benefits of the food stamp program reduce food insecurity and are more effective than pure cash transfers in doing so. In the face of the relatively strong effects of changes in unemployment on program participation and food insecurity, there is a clear need for research that helps to identify effective food program design.

Notes

1. We also estimated the food insecure with hunger equation with the FSP benefit, G, included but the effect was statistically insignificant.
2. A 25% increase in the mean FSP benefit in our data set would be approximately an increase of $96 per month. We also evaluate a 10% increase in the FSP benefit and in nonlabor income. The 10% change in FSP benefit led to 6.4% increase in FSP participation and 2.64% decrease in food insecurity with hunger; the 10 % change in nonlabor income led to 0.38% decrease in FSP participation and 0.41% decrease in food insecurity with hunger.

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Table1. Distribution of the SPD households by asset levels and income

Income	Missing assets	Assets <2000	Assets 2000-4999	Assets 5000-6999	Assets >7000	Total
<100%poverty	31(0.3)	985 (11)	15(0.2)	3(0.03)	14(0.1)	1048(11)
100-200% poverty	116(1.3)	1385(15)	54(0.6)	15(0.16)	65(0.7)	1635(18)
200-300% poverty	209(2.3)	1198(13)	96(1.0)	42(0.41)	149(2.0)	1694(18)
≥300% poverty	1104(12.0)	1950(21)	403(4.0)	179(1.90)	1222(13.0)	4858(53)
Total	1191(15.9)	5518(60)	568(5.8)	239(2.50)	1450(15.8)	7909(100)

Note: The numbers in the parentheses are the percentage households

Table 2. Definitions of variables, means and standard errors (n=3,084, weighted data)

Variable	Mean (Standard Error)	Definition
Age	37.67 (0.20)	Age of household head
Agesq	1513.4 (15.9)	Age squared
Schooling	11.70 (0.05)	Years of schooling of household head
Male	0.51 (0.01)	Dichotomous variable equal to 1 if the household head is a male, and 0 otherwise
Married	0.57 (0.01)	Dichotomous variable equal to 1 if the household head is married, and 0 otherwise
White	0.76 (0.01)	Dichotomous variable equal to 1 if household head is white, and 0 otherwise
Disabled	0.14 (0.007)	Dichotomous variable equal to 1 if household has a disabled member, and 0 otherwise
Citizen	0.91 (0.005)	Dichotomous variable equal to 1 if the household head is a US citizen, and 0 otherwise
Kids6	0.61 (0.02)	Number of children in household who are younger than 6 years old in household
Kids13	0.76 (0.02)	Number of children in household who are age 6 and 12
Kids18	0.42 (0.01)	Number of children in household who are 13 and younger than 18 years old in household
Northeast	0.17 (0.008)	Dichotomous variable equal to 1 if household lives in the Northeast region, and 0 otherwise
Midwest	0.21 (0.008)	Dichotomous variable equal to 1 if household lives in the Midwest region, and 0 otherwise
South	0.42 (0.01)	Dichotomous variable equal to 1 if household lives in the South region, and 0 otherwise
UNRATE	5.00 (0.02)	Annual state unemployment rate
Non labor income	956 (52.93)	Household non labor income exclusive of welfare transfers per year in $
G	382.94 (2.45)	Maximum FSP grant per month in $, given participation
Ln(wage)	2.06 (0.023)	Natural log of hourly wage
$\ln(\hat{wage})$	2.10 (0.004)	Predicted value of natural log of hourly wage
LF participation	0.815 (0.007)	Dichotomous variable equal to 1 if household head works, and 0 otherwise
FSP participation	0.207 (0.008)	Dichotomous variable equal to 1 if household participates in FSP, and 0 otherwise
Food insecure with hunger	0.077 (0.005)	Dichotomous variable equal to 1 if household is food insecure with hunger, and 0 otherwise
Food Security Status	0.74 (0.008)	Dichotomous variable equal to 1 if the household is food secure, and 0 otherwise

Table 3. Main demographic characteristics of different household groups (weighted data)

	#hhlds unweighted	Food Insecure	Food Insecure with Hunger	Male	Married	Educ	White	Children	Age	Nonlabo Income
Sample	3733	26%	8%	51%	57%	11.70	76%	1.79	37.67	956
P_f=P_l=1	453	45%	14%	31%	30%	11.18	62%	2.22	34.93	855
P_f=P_l=0	373	30%	10%	38%	63%	11.31	77%	1.51	41.161	1306
P_f=1,P_l=0	338	55%	20%	20%	27%	10.56	63%	2.29	38.09	743
P_l=1,P_f=0	2569	18%	5%	60%	64%	11.99	80%	1.69	37.61	953
P_f=1	791	49%	17%	26%	29%	10.91	62%	2.25	36.28	807
P_f=0	2942	20%	5%	57%	64%	11.91	80%	1.66	38.04	996

Note: P_f=1 if the household participate in FSP and P_f=0 otherwise; P_l=1 if the household head works and P_l=0 otherwise; Food insecure includes food insecure without hunger and food insecure with hunger households.

Table 4. Estimates of the Individual Log Wage Equation

Explanatory Variables	ln(wage)	ln(wage)
Intercept	-0.014 (0.408)	-0.171 (0.272)
Age	0.084 (0.016)***	0.089 (0.013)***
Agesq	-0.001 (0.0002)***	-0.001 (0.0002)***
Schooling	0.037 (0.013)***	0.042 (0.008)***
Married	-0.050 (0.049)	-0.058 (0.046)
Male	0.231 (0.094)**	0.274 (0.046)***
White	0.091 (0.045)**	0.096 (0.044)**
UNRATE	-0.008 (0.022)	-0.015 (0.018)
Lambda	-0.148 (0.287)	
R-square	0.05	0.049
F Statistics	17.68	20.17
Number of observations	2,698	2,698

Note: * Statistically significant at the 10 % level;
** Statistically significant at the 5 % level;
*** Statistically significant at the 1 % level. Standard errors are in parentheses.

Table 5. Structural Estimates of the FSP Participation (Probability of FSP participation), Food Insecure with Hunger (Probability of being food insecure with hunger) and Labor Force Participation (Probability of labor force participation)

Explanatory Variable	FSP participation	Food Insecure with Hunger	Labor force participation
Intercept	-0.859 (0.202)***	-1.023 (0.106)***	-5.519 (0.772)***
Food Insecure with Hunger	-0.299 (0.143)**		-1.650 (0.243)***
FSP participation		-0.167 (0.143)	0.197 (0.168)
Labor force participation	-0.646 (0.059)***	-0.428 (0.094)***	
Kids6		0.038 (0.053)	-0.069 (0.057)
Kids13		0.089 (0.047)*	-0.038 (0.053)
Kids18		0.138 (0.045)***	0.099 (0.049)**
Male	0.074 (0.070)	0.054 (0.133)	-0.584 (0.155)***
Married	-0.913 (0.089)***	-0.514 (0.143)***	-0.676 (0.138)***
White			-0.107 (0.070)
Nlabinc	-0.00005(9.4E-6)***	-0.00003(1.5E-5)***	-0.00005(0.00001)***
Male*Married		-0.045 (0.163)	0.747 (0.141)***
ln($\hat{wage}$)			2.336 (0.332)***
G	0.002 (0.0002)***		
Citizen	-0.029 (0.089)		
Disabled			-0.682 (0.163)***
Northeast		-0.020 (0.099)	
Midwest		0.005 (0.099)	
South		-0.009 (0.084)	
Log Likelihood	-1626.98	-974.38	-1,372.16
Number of observations	3,733	3,733	3,733

Note: * Statistically significant at the 10 % level;
** Statistically significant at the 5 % level;
*** Statistically significant at the 1 % level. Standard errors are in parentheses.

Table 6. Simulated Changes in FSP Benefit, Nonlabor Income and Unemployment Rate (absolute and percent changes in parentheses)

	Base	$100 increase in FSP benefit	$100 increase in Nonlabor income	Decrease in Unemployment Rate by 0.5 percentage point
Probability of FSP participation	0.2111	0.2462 (0.0350, 16.59%)	0.2104 (-0.0008, -0.38%)	0.2037 (-0.0074, -3.51%)
Probability of food insecurity with hunger	0.0809	0.0755 (-0.0054, -6.67%)	0.0805 (-0.0003, -0.41%)	0.0791 (-0.0018, -2.18%)