Welfare and Labor Force Participation of Low-Wealth Families: Implications for Labor Supply

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Working Paper 01-WP 270
March 2001

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This research was supported in part by the U.S. Department of Agriculture, Economic Research Service. The author would like to thank Wallace Huffman, Maureen Kilkenny, Helen Jensen, and Peter Orazem from Iowa State University for helpful comments.

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Abstract

This paper examines the welfare and labor force participation of families potentially eligible for the new Temporary Assistance for Needy Families (TANF) program. Higher wage rates, lower unemployment rates, and lower TANF benefits decrease the probability of welfare participation. For these families, labor supply is moderately responsive to the wage rate.

WELFARE AND LABOR FORCE PARTICIPATION FOR LOW-WEALTH FAMILIES: IMPLICATIONS FOR LABOR SUPPLY

Introduction

The challenge of the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) enacted in 1996 is to reduce individuals' and families' dependence on federal government assistance by promoting labor force participation of adults. Since its passage, welfare recipiency has declined across the nation. Also, the United States' growing economy has provided greater opportunities for individuals to work. Studies indicate that some householders previously dependent on welfare have found employment (RUPRI). Other householders, however, with poor labor market skills, little work experience, or weak motivation are still not working and remain in poverty. Even some who find jobs are not necessarily lifted out of poverty. Furthermore, the outcomes differ across regions. Looking at recipiency on a region-by-region basis provides further evidence that economic growth has helped cut welfare rolls differentially (Saving and Cox).

The objective of this paper is to examine the effects of the reformed welfare program on labor force participation and supply decisions. This study tests the effects of cash transfers on welfare and labor force participation decisions and attempts to improve our general understanding of welfare and labor market activities of poor people.

Considerable literature exists on the effects of U.S. transfer programs on labor supply. Moffitt (1992) reviewed the research on the effects of the welfare system on work incentives, welfare dependency, family structure, and migration. He first proposed that many eligible individuals and households do not participate because of the welfare stigma or disutility of welfare participation (Moffitt 1983). Results of recent research show that eligibility and benefit structure have significant effects on labor and welfare participation. Keane and Moffitt used a structural model to examine work and multiple-welfare program participation decisions among single-adult female families. They used the estimated parameters to conduct policy simulations such as changing the benefits, wage subsidies,

and minimum wage and found that changes in wage rates have a larger effect on decisions than changes in welfare benefits. Hoynes (1996) modeled the effects of cash transfers on labor supply and welfare participation in two-parent families.

A number of recent studies have examined changes in welfare caseloads in the period before 1996 (Blank; Council of Economic Advisors [CEA] 1997; Wallace and Blank; Moffitt 1999) using aggregate state-level data. The research by Swann and Grogger and Michalopoulous focused on consumer choice under welfare time limits. Grogger and Michalopoulous found that lifetime maximum time limits do indeed reduce welfare use, with the greatest reduction found among families with the youngest children.

To date, relatively little evidence exists on how well the goals of the new welfare reform are being met. The studies reviewed above used pre-1996 data and analyzed changes that occurred before national welfare reform in 1996. Only a few recent studies have examined the effects of the 1996 reform on post-1996 caseloads. These include the 1999 CEA report and Schoeni and Blank (2000). Evaluations of the effectiveness of welfare reform on the number of people receiving welfare provide no information on what is happening to the well-being of families who leave welfare or who never enter the program.

Many researchers have analyzed the effects of government transfer programs on labor supply behavior among the low-income population. Most of the empirical studies have provided insights on how welfare transfers affect labor supply decisions of low-income families, especially of female household heads (Keane and Moffitt), or of married couples (Hoynes 1996). Although female-headed families represent most welfare recipients, the new welfare reform encourages participants to hold jobs and to maintain stable, married relationships and family structures.

A recent paper by Hoynes (2000) examined the impacts of changes in local labor market conditions on participation in the Aid to Families with Dependent Children (AFDC) program in California using the discrete duration models for exits and re-entry to welfare. The results showed that higher unemployment rates, lower employment growth, and lower wage growth are associated with longer welfare spells and higher recidivism rates.

This study uses observations from the Survey of Income and Program Participation (SIPP) to analyze labor market and welfare program participation decisions among all low-wealth families. A static model of family behavior is developed where work and program participation are jointly chosen to maximize family utility given a resource constraint. This model is used to explain the decision of the population of families eligible for the Temporary Assistance for Needy Families (TANF)[1] program to participate in the program and in the labor market. Estimates of both a reduced-form and structural bivariate-probit model of participation in the labor force and TANF program are reported, as are those of a labor supply equation for working family members that do not participate in welfare programs. The results show that higher wage rates and/or lower unemployment rates decrease the probability of welfare participation. For these low-wealth families who are potentially eligible for TANF, the wage elasticity of labor supply is positive and sizeable and the income elasticity is negative, implying that leisure is a normal good. These findings suggest that these "poor" families respond much the same as all families to labor market incentives.

TANF Program Eligibility

The PRWORA gives each state a fundamental role in assisting poor families, and under TANF each state has eligibility rules and benefits that are different. 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. Countable earned income includes earned income less an earned income disregard and a childcare deduction. The families eligible for TANF are eligible for Food Stamp and Medicaid programs.

With TANF participation comes benefits. A family with no income is eligible to receive the maximum TANF grant or pay standard. For a family with income, the TANF benefits are calculated as the difference between the maximum potential benefit and net family income. Net family income includes all unearned income plus countable earned income. Each state determines its own benefit level, which varies with family size.

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 each state, at least 25 percent of single-parent-headed households and 75 percent of two-parent households were required to be engaged in work activities in 1997. Single parents receiving TANF benefits were required to work at least 20 hours per week by 1997 and 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.

Theoretical Model

The model used here is one where the family chooses to participate in TANF and the labor force. The TANF participation and labor supply decisions are interdependent because labor supply decisions depend on TANF benefits (through their effect on the budget constraint), and the TANF participation decision depends on labor supply (through its effect on the TANF benefits). Therefore, welfare program and labor force participation must be treated jointly, and the labor participation equation must be estimated jointly with the TANF participation equation.

Participation in welfare programs is not costless. Costs are associated with a family filing an application, going for an interview, as well as the opportunity cost from reduced expected future benefits due to a lifetime time limit imposed in TANF. In addition, Moffitt (1983) suggested that a 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 those facing higher costs. How these costs affect the family decision to participate in TANF depends on when they want to receive the cash income support from TANF—now or in the future—and on the expected timing and duration of need for benefits.

Given states' freedom in designing TANF programs, important and hard-to-measure differences exist that might 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 may account for some of the cross-state differences in participation. But this is difficult to measure. While the costs and stigma associated with claiming benefits may be important, the empirical analysis cannot directly address this issue. It can, however, address indirectly the extent that individual characteristics are correlated with these factors.

Following Moffitt (1983), consider the following family utility function:[2]

$$U(L, X, P_t) = U(L, X) + \delta P_t \tag{1}$$

where L is adult family leisure, X is purchased goods, P_t is an indicator equal to 1 if the family participates in TANF and 0 otherwise, δ is the marginal disutility of TANF participation, $\overline{T}$ (= L+H) is the family adult time endowment, and H is family labor supply. See Barhan for a family labor supply model in a developing country context. To simplify, define time in "effective" terms so it can be aggregated across the family head and spouse for the married couple families:

$$\overline{T} = \overline{T}_f + \overline{T}_m e^{\gamma},$$

$$\overline{T} = Lf + Hf + (L_m + H_m)e^{\gamma},$$

where $\overline{T}_j$ is time endowment of j = f(female spouse) or m(male spouse), and γ is an efficiency factor. The adult family effective leisure L and the adult family effective labor supply H, measured in female units, are

$$L = L_f + L_m e^{\gamma},$$

$$H = H_f + H_m e^{\gamma}. \tag{2}$$

The presence of the program participation indicator in equation (1) represents the costs of participating in the welfare program and is included to explain and account for non-

participation among eligible families. If stigma is associated with program participation, $\delta<0$. Hence, one expects $\partial U/\partial L > 0$, $\partial U/\partial X > 0$, and $\partial U/\partial P_t < 0$.

The budget constraint gives monthly disposable income:

$$I = wH + N + P_t(B(H)-C) = P_xX, \tag{3}$$

where w is the hourly wage rate per effective work hour (in adult female units), N is unearned income, B(H) is the benefit function for TANF, and C is the monetary cost associated with TANF participation. Full income is

$$w(\bar{T} - L) + N + P_t(B(H)-C) - P_xX = 0, \text{ or}$$

$$F = w\bar{T} + N + P_t(B(H)-C) = P_xX + wL. \tag{4}$$

Assume the family will choose H (or L) and P_t simultaneously to maximize its utility U (L, X, P_t) subject to the budget constraint in (3).

The optimal choices are

$$X^* = d_X[w, P_x, N, B'(H), C], \tag{5}$$

$$L^* = d_L[w, P_x, N, B'(H), C], \tag{6}$$

$$H^* = \bar{T} - L^* = S_H[w, P_x, N, B'(H), C], \tag{7}$$

$$P_t^* = d_{Pt}[w, P_x, N, B'(H), C]. \tag{8}$$

Empirical Specification and Estimation

Substituting optimal choice functions (5)-(8) into (1), I obtain the family indirect utility function. The family chooses the (H, P_t) combination that provides the highest indirect utility. The resulting choice set has four alternatives, each of which is a combination of labor force (work/not work) and TANF (participate/not participate) outcomes. Each alternative provides a particular level of indirect utility V_{sm}. The subscripts *s* and *m* combined denote an alternative, which is a combination of labor force and TANF participation decision. The family chooses the alternative *sm* such that $V_{sm} \geq V_{s'm'}$ for all $s'\, m' \neq sm$.

Econometrically, I assume that the indirect utility function V_{sm} of family *i* is

$$V_{ism} = x_i' \theta_{sm} + z_{ism}' \gamma_{sm} + \varepsilon_{ism}, \quad (4)$$

where x_i is a vector of family characteristics, z_{ism} is a vector of alternative-specific attributes, and ε_{ism} is the alternative-specific disturbance from choice *sm*. Attributes of the family are used to proxy tastes for work and welfare participation and include age, education, marital status, number of children, etc. This set of variables includes a proxy for the unmeasured utility costs associated with welfare participation. Having children age 6 or less and the local (state) unemployment rate may proxy the family's expectation of need of benefits. I assume that a higher unemployment rate reduces the stigma of participation. The unemployment rate is positively correlated with the length of time over which the family discounts the monetary costs of participation. The choice-specific variables include benefit from TANF. The stochastic component captures the effect of unobserved heterogeneity of preferences.

Given the form of the utility function and the probability distribution of the stochastic component, the probability that the family chooses alternative *sm* is written as

$$Prob_{ism} = Prob[V_{ism} \geq V_{is'm'} \text{ for all } is'm' \neq ism].$$

Maddala presents an extensive discussion of limited-dependent and qualitative-variable models. The most widely used model in the discrete choice literature is the multinomial logit model that easily can be estimated for large choice sets. However, in the multinomial logit model, the stochastic errors are uncorrelated across alternatives. In my choice set, the unobserved error terms are not independent and they are likely to be correlated. The multinomial probit model is less restrictive. It permits the error terms to be correlated across all alternatives in the choice set. Hence, ε_{ism} are normally distributed with standard deviations SDV $[\varepsilon_{ism}]=\sigma(i)$ and unrestricted correlations COR $[\varepsilon_{ism}, \varepsilon_{is'm'}]=\rho(sm, s'm')$.

To accommodate the complex structure of family decision making, a switching-regression-model technique, corrected for selectivity bias is adapted to examine TANF participation and labor force participation. Decisions regarding membership in one or

another regime are the result of a family's optimizing behavior. The families can be divided into four regimes:

1. Those participating in labor market and TANF.
2. Those participating in labor market but not in TANF.
3. Those participating in TANF but not in labor market.
4. Those not participating in labor market or TANF.

Thus, four alternative regimes are identified based on outcomes of the discrete choices of participation in labor market and TANF. Endogenous switching among the four regimes can occur when the individuals are not randomly assigned to each regime (Maddala; Huffman). Jensen and Manrique used the endogenous switching technique to estimate demand for the low-income group, which had a large number of zeroes for some food groups.

Define P_l and P_t as participation in the labor force and TANF, respectively. All the families are then classified into four mutually exclusive regimes:

$$R_1: P_l = P_t = 1;$$

$$R_2: P_l = 1, P_t = 0;$$

$$R_3: P_l = 0, P_t = 1;$$

$$R_4: P_l = P_t = 0.$$

All families have a non-zero probability of being assigned to one of the four regimes, and this probability can be obtained by evaluating the following bivariate probability statements:

$$M_{11} \equiv P(R_1)=P(P_l,P_t = 1)=P[P_l^*=\theta_l'Z_l+\mu_l>0,\ P_t^*=\theta_t'Z_t+\mu_t > 0] \qquad (10)$$

$$M_{10} \equiv P(R_2)=P(P_l=1,\ P_t=0)=P[P_l^*=\theta_l'Z_l+\mu_l>0,\ P_t^*=\theta_t'Z_t+\mu_t \leq 0] \qquad (11)$$

$$M_{01} \equiv P(R_3)=P(P_l=0,\ P_t=1)=P[P_l^*=\theta_l'Z_l+\mu_l \leq 0,\ P_t^*=\theta_t'Z_t+\mu_t>0] \qquad (12)$$

$$M_{00} \equiv P(R_4)=P(P_l,P_t=0)=P[P_l^*=\theta_l'Z_l+\mu_l\leq 0,\ P_t^*=\theta_t'Z_t+\mu_t \leq 0]. \qquad (13)$$

Although P_l^* and P_t^* are unobservable, one can observe $P_l = 1$ if $P_l^* > 0$ and $P_l = 0$ otherwise; $P_t = 1$ if $P_t^* > 0$ and $P_t = 0$ otherwise. Define Z_l and Z_t as vectors of exogenous variables, θ_l and θ_t as parameter vectors, and μ_l and μ_t as disturbance terms. Given estimates of θ_l and θ_t, the probabilities in (10) through (13) can be evaluated, and they are used to construct sample-selection terms for inclusion in the labor supply equation. I use a two-step estimation to calculate the model. First, I jointly estimate the reduced-form labor force and welfare program participation equations using the maximum-likelihood method and then calculate the self-selection variables. Second, I estimate the labor supply, including two self-selection variables for families who work and do not participate in the welfare program.

The general specification for the bivariate-probit model is

$$P_l^* = \theta_l' Z_l + \mu_l,\ P_l = 1 \text{ if } P_l^* > 0, \text{ and 0 otherwise,}$$

$$P_t^* = \theta_t' Z_t + \mu_t,\ P_t = 1 \text{ if } P_t^* > 0 \text{ and 0 otherwise,}$$

$$E[\mu_l] = E[\mu_t] = 0,\ \text{var}[\mu_l] = \text{var}[\mu_t] = 1,\ \text{cov}[\mu_l, \mu_t] = \rho.$$

The bivariate normal cdf is

$$\text{Prob}(Z_l < z_l, Z_t < z_t) = \int_{-\infty}^{z_l} \int_{-\infty}^{z_t} \phi(Z_l, Z_t, \rho) dZ_l dZ_t = \Phi(Z_l, Z_t, \rho),$$

where $\phi(Z_l, Z_t, \rho)$ is the bivariate normal density function. The probabilities that enter the likelihood function are

$$M_1 = \Phi(\theta_l Z_l, \theta_t Z_t, \rho),$$

$$M_2 = \Phi(\theta_l Z_l, -\theta_t Z_t, -\rho),$$

$$M_3 = \Phi(-\theta_l Z_l, \theta_t Z_t, -\rho),$$

$$M_4 = \Phi(-\theta_l Z_l, -\theta_t Z_t, \rho).$$

Then, the log-likelihood function for the bivariate-probit model is $\ln L = \sum_{i=1}^{n} \sum_{j=1}^{4} \ln M_{ij}$.

The following labor supply equation is proposed for families in regime 2 who work but do not participate in welfare program:

$$\ln(\text{hours}) = \gamma_0+\gamma_1\text{age}+\gamma_2\text{agesq}+\gamma_3 \ln(\hat{wage}) +\gamma_4 M'+\gamma_5\text{otherinc}+\gamma_6\lambda_l++\gamma_7\lambda_t+\mu_h, \qquad (14)$$

where ln(hours) is the natural log of hours of work in female units as defined in (2);[3] age=$(\text{age}_f+\text{age}_m)/2$, age_f, or age_m, ln($\hat{wage}$) is the (predicted) female wage; M′ is a vector of exogenous variables including gender, number of children under age 6, number of children between ages 6 and 12, number of children between ages 13 and 18, marital status, and local unemployment rate; otherinc is family nonlabor income (exclusive of transfers); and μ_h is a normal random error term. The disturbance term in the labor supply equation, estimated without taking account of probability of selection, does not have a zero mean. Estimating the equation with standard estimation techniques would produce biased and inconsistent estimates. Adding two self-selectivity correction variables λ_l and λ_t (one for labor force participation and the other for TANF nonparticipation) for a family in regime 2 yields a new disturbance term that has a zero mean.

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

$$\ln(\text{wage}) = \beta_0 + \beta_1\text{age}+\beta_2\text{agesq}+\beta_3\text{edu}+\beta_4\text{male}+\beta_5 O'+\mu_w, \qquad (15)$$

where O′ is a vector of exogenous variables including race (white=1), marital status (married=1), whether there is an adult male in the family (male=1), metro/nonmetro location (metro=1), and labor market variables (state unemployment rate); 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 1996 SIPP Panel is used, which is a nationally representative data set. The advantage of using the SIPP is that the SIPP contains detailed information about the characteristics of, and actual choices made by, both participants and nonparticipants, whereas the administrative record data only contains information on participants. The SIPP provides information on the economic, demographic, and social

situations of family members. Because each family's state of residence is identified, the SIPP data can be supplemented with state economic data. SIPP's monthly data provide a significant advantage over annual data sets for the study of TANF and other welfare programs. The model is estimated using data from SIPP 1996, wave 3.

Only families with non-elderly (between ages 18 and 65), non-disabled household heads (and spouse where present) are included in the sample (both the elderly and the disabled are eligible for other transfer programs). Families are also excluded if they are categorically ineligible for the TANF program, that is, if they do not have a child under age 18 in the family. Families with assets that exceed $6,000, the highest asset limit of TANF, are excluded from the sample (Table 1).[4] The resulting sample includes 7,811 families with low wealth, 63 percent of which are married-couple families, and 78 percent of which live in metro areas.

All the dependent variables are defined for the month of November 1996. A family is recorded as a TANF participant if a member reports receiving TANF support within the month. Single family heads are classified as not working if they report working zero hours during the month, and they are classified as working if they report working one or more hours per week during the month. For married couple families, the family is classified as not working if the family head and spouse report working zero combined hours during the month, and they are classified as working if the family head and spouse report working a total of one or more hours per week during the month.

Variables used in this analysis include a set of demographic variables, a set of family-composition variables, and a set of structural variables designed to capture differences in labor market conditions and transfer programs. The demographic variables for the family head include gender, age, education level, and a dichotomous variable indicating race (white=1) for single family. For married couples, the demographic variables are the average age and average schooling of the spouses. The set of family-composition variables includes number of children under age 6, number of children between ages 6 and 12, and number of children between ages 13 and 18. The set of individual characteristics includes METRO, a 1-0 dichotomous variable that indicates that the family lives in a metro area versus a nonmetro area, and UNRATE, the state's

TABLE 1. TANF asset limits

State	Asset Limits ($)	State	Asset Limits ($)
Alabama	2,000	Mississippi	1,000
Alaska	1,000	Missouri	5,000
Arizona	2,000	Montana	3,000
Arkansas	3,000	Nebraska	6,000
California	2,000	Nevada	2,000
Colorado	2,000	New Hampshire	2,000
Connecticut	3,000	New Jersey	2,000
Delaware	1,000	New Mexico	1,500
District of Columbia	1,000	New York	2,000
		North Carolina	3,000
Florida	2,000	North Dakota	5,000
Georgia	1,000	Ohio	1,000
Hawaii	5,000	Oklahoma	1,000
Idaho	2,000	Oregon	2,500
Illinois	3,000	Pennsylvania	1,000
Indiana	1,500	Rhode Island	1,000
Iowa	5,000	South Carolina	2,500
Kansas	2,000	South Dakota	2,000
Kentucky	2,000	Tennessee	2,000
Louisiana	2,000	Texas	2,000
Maine	2,000	Washington	1,000
Maryland	2,000	West Virginia	2,000
Massachusetts	2,500	Wisconsin	2,500
Michigan	3,000	Wyoming	2,500
Minnesota	5,000		

Source: Gallagher et al.

monthly unemployment rate. Also relevant are the observations of actual family earned and unearned income, program participation choices, actual benefit levels, and assets.

Table 2 displays the means and standard deviations of variables and Table 3 shows the distribution of the dependent variables—labor force and welfare program participation for all families by family type. About 10 percent of the asset-eligible families receive TANF, and 87 percent participate in the labor market. Table 3 shows that the workers are concentrated in the TANF nonparticipation cell—83 percent of the sample fall in this

TABLE 2. Definitions, means, and standard deviations of variables (n=7,811)

Variable	Mean (Standard Deviation)	Definition
Age	36.34 (8.43)	Age of family head if single head family, and average of age of family head and spouse if married couple family
Agesq	1391.7 (645.5)	Age squared
Schooling	12.37 (2.7)	Years of schooling of family head if single family; average of years of schooling of family head and spouse if married couple
Male	0.69 (0.46)	Dichotomous variable equal to 1 if male adult is present in a family, and 0 otherwise
Married	0.63 (0.48)	Dichotomous variable equal to 1 if married couple family, and 0 otherwise
White	0.77 (0.42)	Dichotomous variable equal to 1 if family head is white, and 0 otherwise
Metro	0.78 (0.41)	Dichotomous variable equal to 1 if a family lives in metro area, and 0 otherwise
Kids6	0.70 (0.83)	Number of children in family who are younger than 6 years old
Kids13	0.80 (0.89)	Number of children in family who are 6 and younger than 13 years old
Kids18	0.51 (0.72)	Number of children in family who are 13 and younger than 18 years old
Northeast	0.17 (0.37)	Dichotomous variable equal to 1 if family lives in the Northeast region, and 0 otherwise
Midwest	0.19 (0.39)	Dichotomous variable equal to 1 if family lives in the Midwest region, and 0 otherwise
South	0.38 (0.49)	Dichotomous variable equal to 1 if family lives in the South region, and 0 otherwise
UNRATE	5.23 (1.04)	State unemployment rate
Nonlabor income	142.4 (489.3)	Family nonlabor income exclusive of welfare transfers per month in $
Pay standard	448.69(213.64)	Maximum TANF grant per month in $, given participation
ln(hours)	4.06 (0.53)	Natural log of hours worked last week by family head if single, or effective hours of work if married couple family (see text)
ln(wage)	2.21 (0.45)	Natural log of hourly wage
ln(*wâge*)	2.05 (0.19)	Predicted value of natural log of hourly wage
LF participation	0.87 (0.34)	Dichotomous variable equal to 1 if family head works if single, and family head and/or spouse work, and 0 otherwise
TANF participation	0.10 (0.30)	Dichotomous variable equal to 1 if a family participates in TANF, and 0 otherwise

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

	Working		Not Working		All	
All Family Types						
Do not participate in TANF	6,446	83%	579	7%	7,025	90%
Participate in TANF	339	4%	447	6%	786	10%
All	6,785	87%	1,026	13%	7,811	100%
Single Family						
Do not participate in TANF	1,947	68%	314	11%	2,261	79%
Participate in TANF	227	8%	389	14%	616	21%
All	2,174	76%	703	24%	2,877	100%
Married-Couple Family						
Do not participate in TANF	4,499	91%	265	6%	4,764	97%
Participate in TANF	112	2%	58	1%	170	3%
All	4,611	93%	323	7%	4,934	100%

Source: SIPP 1996, wave 3.

category; 7 percent do not work and participate in TANF; 6 percent of the sample do not work and do not participate in TANF; and 4 percent work and participate in TANF. The single-family subsample includes 2,877 families, 76 percent of which work and 21 percent of which participate in TANF. Sixty-eight percent of the subsample is concentrated in the working and not participating in TANF cell, while 13 percent participate in TANF but do not work. In the married couple family subsample, 93 percent of the families work and only 3 percent participate in TANF.

Empirical Results

Reduced-Form Bivariate-Probit Participation in the Labor Market and TANF Program

First, maximum likelihood estimates of the reduced form bivariate-probit model of labor force and welfare participation are presented in Table 4. Nonlabor income has a negative and statistically significant effect on both welfare and labor force participation.

A family head having more years of education, being male, or being white all decrease the probability that a family participates in TANF in a single family. All these coefficients are statistically significant. The effect of age on TANF is negative, but it gets smaller in

TABLE 4. Estimated parameters for the reduced-form bivariate-probit model of family labor force and welfare participation

Variables	LF Participation	TANF Participation
Intercept	-1.20 (0.33)**	1.06 (0.37)**
Age	0.099 (0.015)**	-0.108 (0.016)**
Agesq	-0.0014 (0.0002)**	0.001 (0.0002)**
Schooling	0.071 (0.007)**	-0.07 (0.009)**
Male	0.36 (0.08)**	-1.03 (0.111)**
Married	0.44 (0.08)**	-0.078 (0.112)
White	0.09 (0.07)**	-0.40 (0.05)**
Kids6	-0.18 (0.026)**	0.37 (0.027)**
Kids13	-0.11 (0.02)**	0.197 (0.024)**
Kids18	-0.087 (0.03)**	0.115 (0.03)**
Nonlabor income	-0.0001 (0.00002)**	-0.0004 (0.00006)**
UNRATE	-0.086 (0.024)**	0.156 (0.028)**
Metro	0.05 (0.049)	-0.05 (0.059)
Northeast	-0.12 (0.06)**	-0.077 (0.08)
Midwest	0.079 (0.07)	0.24 (0.086)**
South	0.024 (0.055)	-0.16 (0.067)**
Rho (correlation coefficient)	-0.610 (0.024)**	
Log likelihood function	-4216.78	

Note: **Denotes statistically significant at the 5 percent level. Standard errors are in parentheses.

absolute value when the individual becomes older. Families having more educated adults are more likely to participate in wage work and less likely to participate in TANF. This suggests that they are less dependant on welfare. A family having more children increases the probability of welfare participation and decreases the probability of wage work. Because of its relationship to monetary or utility costs, the unemployment rate is expected to have a positive effect on the probability of TANF participation and a negative effect on the probability of labor force participation. Increases in employment opportunities (lower unemployment rates) lead to lower participation in TANF. The coefficients of Midwest and South are statistically significant in the TANF participation equation and suggest that a family living in the Midwest has a high probability of TANF participation while a family living in the South region has a low probability of TANF

participation relative to families living in the West region. In the labor force participation equation, the coefficient of age, schooling, male, married, and white are positive and significantly different from zero.

The cross-equation correlation coefficient for the two participation equations is negative (–0.61) and highly significant. This implies (*a*) that the random disturbances in labor force participation and TANF participation decisions are affected in the opposite direction by random shocks (from unmeasured effects), and (*b*) that the labor force participation and TANF participation decisions are not statistically independent.

Wage and Labor Supply Equations

Two estimates of a wage equation are reported in Table 5, one with a selection term and one without a selection term. The wage equation is concave in age, and the age effect peaks at 49 years. One additional year of schooling has the direct effect of increasing the

TABLE 5. Estimates of the individual log wage equation

Explanatory Variables	**Dependent Variable ln(wage)**	
Intercept	4.93 (0.13)**	4.96 (0.09)**
Age	0.049 (0.005)**	0.05 (0.004)**
Agesq	-0.0005 (0.00007)**	-0.0005 (0.00005)**
Schooling	0.047 (0.003)**	0.046 (0.002)**
Married	-0.033 (0.03)	-0.028 (0.03)
Male	0.216 (0.03)**	0.210 (0.03)**
White	0.05 (0.01)**	0.05 (0.01)**
Metro	0.075 (0.01)**	0.075 (0.01)**
UNRATE	0.005 (0.007)	0.005 (0.006)
Northeast	0.02 (0.02)	0.02 (0.02)
Midwest	0.01 (0.02)	0.01 (0.02)
South	-0.08 (0.01)**	-0.08 (0.01)**
Lambda	-0.02 (0.07)	
R-square	0.17	0.17
F Statistics	111.35	121.48
Number of observations	6,415	6,415

Note: **Denotes statistically significant at the 5 percent level. Standard errors are in parentheses.

wage by 4.7 percent. Being male or white also increases an individual's wage. Individuals living in metro areas received higher wage rates (by 7.5 percent) than those living in nonmetro areas. Living in the South region decreases the wage (by 8 percent) relative to living in the West region. The joint test of all the nonintercept coefficients, except for the coefficient of the selection term, is rejected. The sample value is 69.01 (the critical value is 1.75). The R^2 is 17 percent.

I estimated a wage equation for the working family heads (single family) and for spouses when working (married-couple family) and then used the predicted wage in the labor supply equation in place of the actual wage, as an instrumental variable. Two estimates of labor supply equation are reported in Table 6, one with and one without selection variables. The results are quite similar. Having an adult male in the family or being a married-couple family increases (by 14 and 46 percent respectively) labor supply. Labor supply is moderately responsive to the wage (an elasticity of 0.11 which is significantly different from zero). The effect of nonlabor income on family labor supply is negative (significant with no selection variables) and relatively small. Families with

Table 6. Estimates of the family labor supply equation

Explanatory Variable	**Dependent Variable ln(hours)**	
Intercept	3.27 (0.29)***	3.29 (0.23)***
Age	-0.004 (0.006)	-0.0036 (0.006)
Agesq	-0.00004 (0.00008)	0.00004 (0.00007)
UNRATE	-0.019 (0.006)***	-0.018 (0.005)***
Kids6	-0.06 (0.012)***	-0.054 (0.008)***
Kids13	-0.037 (0.008)***	-0.035 (0.007)***
Kids18	0.0026 (0.0096)	0.0047 (0.009)
Male	0.141 (0.03)***	0.12 (0.025)***
Married	0.464 (0.026)***	0.472 (0.024)***
ln(*wâge*)	0.110 (0.044)***	0.106 (0.039)***
Nonlabor income	-0.00002 (0.00002)	-0.00003 (0.00002)**
Lambda1	-0.036 (0.039)	
Lambda2	0.072 (0.09)	
R-square	0.27	0.27
F Statistics	198.57	238.15
Number of observations	6,445	6,445

Note: *Denotes statistically significant at the 10 percent level. ** Denotes statistically significant at the 5 percent level. *** Denotes statistically significant at the 1 percent level. Standard errors are in parentheses.

young children work fewer hours. One additional child under age 6 or between ages 6 and 13 decreases hours of work by 6 and 3.7 percent respectively.

Structural Form of the Bivariate-Probit Model of Participation in the Labor Market and TANF Program

In the structural labor force and welfare participation equation, the predicted wage and TANF pay standard (the projected TANF benefit) are included as regressors, and the additional variables that are included as regressors from the labor supply equation are excluded. The new results for participation are included in Table 7. Nonlabor income, the welfare benefits, and the predicted wage are the variables that enter directly into the family budget constraint. Additional nonlabor income has a statistically significant and negative effect on both welfare program and labor force participation. The pay standard, which is a proxy for the TANF benefits, has a positive and significant effect on TANF participation and a negative (and significant) effect on probability of family wage work. The (predicted) wage has a positive effect on probability of wage work and a negative effect on the probability of TANF participation. The cross-equation correlation of distributions is negative (–0.605) and highly significant. Other results are somewhat similar to those for the reduced-form equations.

Marginal effects of the regressors on the probability of TANF and labor force participation are evaluated for the structural participation equations and reported in Table 8. A 10 percent increase in the (predicted) wage increases the probability of wage work for TANF participating families by 5.5 percent and only by 1.8 percent for non-TANF participating families, while a $100 increase in TANF benefit decreases labor force participation by 3 percent given TANF participation and by only 1 percent given TANF nonparticipation. A change (increase) by one percentage point in the unemployment rate decreases the labor force participation probability by 2.5 percent given TANF participation. An increase in family nonlabor income by $1,000 decreases family labor force participation probability by 10 percent. Being a married family or having an adult male in the family increases the probability of family wage work participation by 26 and 18

TABLE 7. Estimated parameters for the structural bivariate-probit model of family labor force and welfare participation

Variables	LF Participation	TANF Participation
Intercept	-6.76 (0.77)**	7.73 (0.95)**
Age	0.048 (0.017)**	-0.47 (0.02)**
Agesq	-0.0008 (0.0002)**	0.0008 (0.0002)**
Male	0.363 (0.08)**	-1.06 (0.11)**
Married	0.529 (0.08)**	-0.229 (0.112)**
Kids6	-0.143 (0.028)**	0.317 (0.028)**
Kids13	-0.078 (0.02)**	0.151 (0.025)**
Kids18	-0.058 (0.03)*	0.073 (0.03)**
Nonlabor income	-0.0001 (0.00002)**	-0.0005 (0.00006)**
UNRATE	-0.052 (0.02)**	0.066 (0.023)**
ln(*wâge*)	1.14 (0.13)**	-1.35 (0.16)**
Pay standard	-0.0005 (0.0001)*	0.0009 (0.0001)**
Rho (correlation coefficient)	-0.605 (0.02)**	
Log likelihood function	-4250.33	

Note: * Denotes statistically significant at the 10 percent level. ** Denotes statistically significant at the 5 percent level. Standard errors are in parentheses.

percent, respectively, for a TANF participating family and by 9 and 6 percent for a TANF nonparticipating family. For TANF participating families, having one additional child under age 6, between ages 6 and 12, or between ages 13 and 18 decreases the probability of working by 7, 4, and 3 percent, respectively. Given nonparticipation in TANF, the marginal impacts are markedly smaller.

However, a 10 percent increase in the wage decreases the probability of TANF participation by 1 percent for a family that works for wage and by 5 percent for a nonworking family, while a $100 increase in TANF benefit increases the probability of TANF participation by 3 percent for a nonworking family and by 0.7 percent for a working family. An increase by one percentage point in the unemployment rate increases the probability of TANF participation by 0.5 and 2.5 percent for a working family and nonworking family, respectively. The marginal effects on TANF in absolute value are larger for the nonworking family. Being a married family and having an adult male in the family decreases the welfare participation probability for working families by 2 and 8

TABLE 8. Marginal effects from the structural bivariate-probit model

	Probability of family labor force participation given:		Probability of family TANF participation given:	
Variable	**Participating in TANF**	**Not Participating in TANF**	**Family Working**	**Family Not Working**
Age	0.023	0.0078	-0.0037	-0.0179
Agesq	-0.0004	-0.0001	0.0001	0.0003
Married	0.2550	0.0857	-0.0178	-0.0866
Male	0.1752	0.0589	-0.0825	-0.4020
Kids6	-0.0687	-0.0231	0.0246	0.1200
Kids13	-0.0374	-0.0126	0.0117	0.0837
Kids18	-0.0278	-0.0094	0.0057	0.0571
Nonlabor income	-0.0001	-0.00002	-0.00004	-0.0002
UNRATE	-0.0253	-0.0085	0.0051	0.0249
ln(*wâge*)	0.5495	0.1847	-0.1048	-0.5104
Pay standard	-0.0003	-0.0001	0.00007	0.0003

percent, respectively. Being a married family and having an adult male in the family decreases the welfare participation probability for nonworking families by 9 and 40 percent, respectively. A thousand-dollar increase in the family nonlabor income decreases the probability of TANF participation by 20 percent for a nonworking family and only 4 percent for a working family. Having one additional child under age 6, between ages 6 and 12, and between ages 13 and 18 increases the probability of TANF participation by 3, 2, and 1 percent for a working family. Having one additional child under age 6, between ages 6 and 12, and between ages 13 and 18 would increase the probability of TANF participation by 12, 8, and 6 percent for a nonworking family.

Conclusions

This study analyzes the welfare program and labor force participation choices made by low-wealth families and the effects of the reformed welfare program on the labor force participation and supply decision. Employment plays an important role in reducing a family's reliance on public assistance. Employment reduces welfare dependency. This paper points to factors that contribute to a welfare recipient achieving independence. The factors that determine the welfare participation are education, family

structure, and benefits, as well as labor market conditions reflected in wage and employment opportunities.

Both a reduced-form and structural bivariate-probit model of participation in the labor force and TANF program were estimated. The findings demonstrate that families having preschool children and living in a metro area have a high probability of welfare participation, while more educated and married families have a low probability of TANF participation. A 10 percent increase in the (predicted) wage increases the probability of wage work for TANF participating families by 5.5 percent and by 1.8 percent for TANF nonparticipating families, while a $100 increase in TANF benefit decreases labor force participation by 3 percent for TANF participating families and by 1 percent given TANF nonparticipation. A 10 percent increase in the wage decreases the probability of TANF participation by 1 percent for a working family and by 5 percent for a nonworking family, while a $100 increase in TANF benefits increases the probability of TANF participation by 3 percent for a nonworking family and by 0.7 percent for a working family.

An endogenous switching-regression-model technique yielded unbiased and consistent labor supply parameters for the working low-wealth families who do not participate in the welfare program. The wage elasticity is larger than those individual elasticities reported in recent studies. These are positive results for welfare reform, which encourages participants to hold jobs and to remain in stable, married relationships. For these low-wealth families who are potentially eligible for TANF, the wage elasticity of labor supply is positive and the income elasticity is negative, implying that leisure is a normal good. These findings are similar to those obtained from an unrestricted sample. Hence, these “poor” nondisabled families with children respond to labor market incentives in a fashion similar to all families.

Endnotes

1. The PRWORA created the TANF program, which replaces AFDC.

2. Disutility from welfare is assumed to be separable.

3. The efficiency factor γ is equal to β_4 from the wage equation (10).

4. Families are not screened on income level, because hours of work and hence income are endogenous variables, and the family members' decision to earn an amount that causes family income to exceed the family break-even level is a matter of choice.

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