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Determinants of Food Stamp Program Exits

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This article examines factors that influence Food Stamp Program exits and finds that families who leave the Temporary Assistance to Needy Families (TANF) program are also more likely to leave the Food Stamp Program. However, the influence of TANF departure is smaller in states with large TANF caseload declines. The results also suggest that many families leaving the Food Stamp Program are still eligible for benefits. These families may have poor information on food stamps eligibility in the face of TANF departure or may view Food Stamp Program reauthorization procedures as too costly relative to program benefits.

The United States experienced impressive declines in public assistance program participation during the latter half of the 1990s. The number of individuals receiving federal cash public assistance, initially under the Aid to Families with Dependent Children (AFDC) program and then under Temporary Assistance to Needy Families (TANF) block grants, declined by 46 percent nationally between 1995 and 1999 (fig. 1). A smaller, but still substantial, decline of 32 percent occurred in Food Stamp Program participation for the same period. As the remain-

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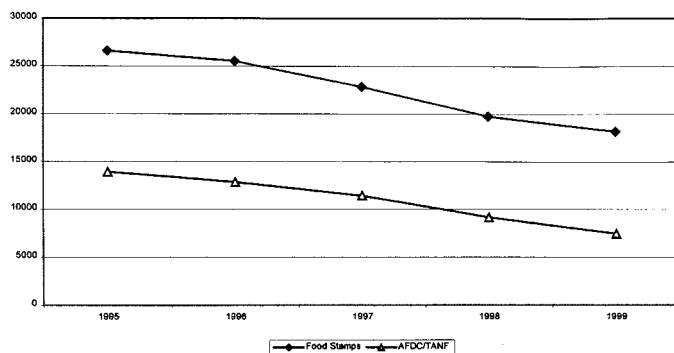


FIG. 1.—Individuals on TANF/AFDC and food stamps (thousands). Sources: Department of Health and Human Services (www.acf.dhhs.gov), 2000. U.S. Department of Agriculture (www.fns.usda.gov), 2000.

ing major entitlement program in the U.S. social safety net, Food Stamp Program caseload declines generate concerns for both social welfare and fiscal policy. Social welfare concerns center on whether Food Stamp Program caseload declines are due to changing eligibility restrictions, to economic gains among poor and near-poor families otherwise unaffected by new eligibility restrictions, or to declining program participation among still-eligible and needy families. Early evidence suggests that caseload declines can be linked to all three sources, but declines in participation among families remaining below the program eligibility criterion of 1.3 times the poverty line are of particular concern from the standpoint of food security (Dion and Pavetti 2000; Wilde et al. 2000).

Historically, fewer families have participated in the Food Stamp Program than are eligible. Low participation rates are commonly attributed to stigma and transaction costs associated with program participation (e.g., Moffitt 1989). The transaction costs mainly include the time and monetary costs of program authorization and reauthorization procedures. If welfare reform measures and the associated political climate have increased the stigma associated with Food Stamp Program participation, truly needy families might be leaving the Food Stamp Program. In addition, there may be a less than proportionate increase in stigma and transaction costs associated with participation in both the Food Stamp Program and TANF compared to each program individually. As a result, reform measures that induce a family to leave TANF may also induce the family to leave the Food Stamp Program.

Several studies suggest that families' decisions to participate in the Food Stamp Program and AFDC/TANF are jointly determined. Thomas Fraker and Robert Moffitt (1988) find that increasing benefits in one program increases participation in the other. Similarly, Michael Keane and Robert

Moffitt (1998) find that households already participating in one social welfare program experience little increase in stigma and other participation costs when they participate in an additional program. In an examination of families initially in the Food Stamp Program, Sheila Zedlewski and Sarah Brauner (1999) find that families leaving AFDC/TANF are more likely to leave the Food Stamp Program than other families. However, TANF exits and Food Stamp Program exits may be responses to changes in earnings not controlled for in the study.

The purpose of this article is to document influences on the decision of single female-headed families with children to terminate Food Stamp Program participation. These influences include changes in family earnings, area economic conditions, state TANF caseload declines, and families' exit from TANF. In contrast to previous studies of family transitions off of public assistance programs, this study employs nationally representative panel data on earnings, TANF assistance, and Food Stamp Program assistance in order to estimate the influence of these factors during the period immediately following the implementation of reform initiatives. This is the period when caseload declines in both programs were rapid. The article focuses on single female-headed families with children because they contain a majority of the nation's children living in poverty and are the largest single recipient group of TANF funds. Further, while they have been greatly affected by reforms in the public cash assistance program, they have been relatively unaffected by concurrent Food Stamp Program reforms.

Public Cash Assistance and Food Stamp Program Reforms

The 1996 Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) represents the most important change in U.S. social welfare policy in recent decades. The most notable reform under PRWORA is the replacement of federal matching funds for public cash-assistance payments under the AFDC program with state-specific cash assistance programs funded by federal TANF block grants. Temporary Assistance to Needy Families grant guidelines require able-bodied single heads of families to perform community service within 2 months of receiving TANF assistance and to work within 2 years of receiving TANF assistance, and they set 5-year cumulative limits on the receipt of TANF funds. A number of exemptions are attached to these requirements, the most notable of which is that states can exempt up to 20 percent of families from cumulative time limits and can exempt family heads with children under age 6 from work requirements if child care is unavailable. The replacement of federal matching funds with block grants provides states with clear fiscal incentives to move recipients off welfare and into the workforce. Similarly, states can be penalized with grant reductions for failing to meet specific roll reduction targets. States are also given

the autonomy to set more stringent eligibility requirements than those mandated under TANF (see Gallagher et al. [1998] for a review of state guidelines).

The contribution of recent reform legislation to observed caseload declines is a topic of considerable debate. Geoffrey Wallace and Rebecca Blank (1999) reviewed a number of state-level panel data studies and find that strong economic conditions, as manifest by low unemployment rates, explain a major portion of TANF caseload declines. Other factors, such as the dramatic rise in Earned Income Tax Credits in the 1990s, have increased workforce participation and undoubtedly contributed to declining welfare rolls (Meyer and Rosenbaum 1999). Bradford Mills, Jeffrey Alwang, and Gautam Hazarika (2001), using Current Population Survey data, suggest that changes in educational levels and other characteristics of single mothers may also account for significant reductions in program participation.

In addition to TANF measures, PRWORA also reauthorized the federally funded Food Stamp Program through 2002, but it imposed additional eligibility restrictions. Able-bodied adults ages 18–50 with no dependents are limited to 3 months of program participation in a 36-month period unless they are working or in a work-training program. Immigrants, unless naturalized U.S. citizens or refugees, are now ineligible for food stamp benefits. The primary recipient group of TANF benefits, single female-headed families with children, is not directly affected by these additional eligibility restrictions (unless they are not citizens).

An initial analysis of Food Stamp Program caseload declines by the U.S. Department of Agriculture, Food and Nutrition Service (1999) finds that between the summer of 1994 and the summer of 1997 nearly 6 million individuals left the program. While Food Stamp Program participation fell for the two groups most affected by new eligibility restrictions—legal permanent residents who are not citizens and unemployed adults with no children—61 percent of individuals who left the Food Stamp Program were also initially receiving TANF benefits. This finding suggests that declining TANF caseloads and declining Food Stamp Program caseloads may be linked. However, it is also worth noting that because TANF caseloads declined more rapidly than Food Stamp Program caseloads, the proportion of single-parent families receiving food stamps but not TANF assistance actually increased by 9 percent over the 1994–97 period. More formal analysis of the influence of TANF exits on Food Stamp Program participation must also address concurrent changes in family earnings and other factors. We conduct such an analysis below.

A Model of Food Stamp Program Exits

Framework

Family exit from the Food Stamp Program is determined by a number of factors.¹ This section develops a model of family transitions off the Food Stamp Program and outlines the expected influence of changes in earnings, TANF participation, and other factors on Food Stamp Program exits. Families initially on food stamps are assumed to engage in a sequential decision process. They first adjust their earnings through intensity of workforce participation and, at the same time, decide whether to participate in TANF under new work requirements and cumulative time limits.² They then decide whether to exit the Food Stamp Program based on their understanding of program eligibility and the benefits and costs of participating in the Food Stamp Program.

The indicator of Food Stamp Program exit is specified as $LVFSP_i = 1$ if the i th family leaves the Food Stamp Program during the second year in the sample and $LVFSP_i = 0$ otherwise. The vector X_i is taken to represent variables measuring change in TANF status, initial TANF status, change in earnings, initial earnings, family characteristics, and other variables influencing the probability of a family's Food Stamp Program departure. Then the probability of Food Stamp Program departure can be expressed using a probit model as

$$\text{Prob}(LVFSP = 1) = \int_{-\infty}^{B'X} \phi(t) dt = \Phi(B'X),$$

where $\phi(t)$ is a normally distributed probability density function and $\Phi(\bullet)$ is the associated cumulative density function.

Transition Data and Empirical Specification

The empirical model is estimated using a data set created from the rotating panel component of the 1997–99 Current Population Surveys (CPS). Specifically, half of the households in the March Annual Demographic files of the CPS are resurveyed the following year (with the other half initially surveyed in the previous year).

A population of 1,406 single mothers who were receiving Food Stamps entered the first year of the CPS in either 1997 or 1998. However, the sample used in the analysis is smaller for three reasons. First, single mothers tend to move relatively frequently. The CPS maintains the household, not the family, as the sampling unit even if the whole family moves. Therefore, single mothers who move are lost from the second year of the sample. Second, a family is dropped from the second-year sample if the mother marries or ceases to be designated the head of

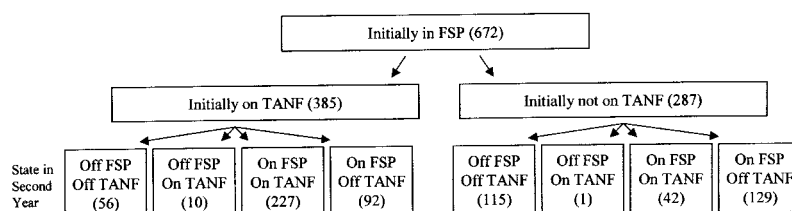


FIG. 2.—Transitions off of the Food Stamp Program (FSP)

family for another reason or if her children leave the household. Third, the CPS has no unique identifier for matching individuals across sample years. Therefore a cross-year comparison of the characteristics of single mothers was employed to ensure that the family head in the first and the second years of the survey was the same individual. Some likely valid matches were eliminated when responses to questions on age, race, and ethnicity were inconsistent across years. As a result, the sample is restricted to 672 single female-headed families who participated in the Food Stamp Program in their initial year in the panel and were successfully matched in the second survey year based on continuous residence in the same house or apartment and consistent personal characteristics in the two survey years.³

The relatively high rate of sample attrition generates concerns about possible sample bias. Comparisons of family earnings, number of children, and age of the family head reveal no statistically significant differences in the sample means between the initial sample of families entering the first year of the survey and the sample of families matched across both years of the survey. However, the sample could still yield biased probit equation parameter estimates if leaving the Food Stamp Program is behaviorally linked to family actions that result in exclusion from the sample for the three reasons discussed above.

Of these 672 families initially participating in the Food Stamp Program, 385 also received TANF benefits. These families faced a transition choice set consisting of the four possibilities shown in figure 2. The most common choice was to continue to receive Food Stamp Program and TANF benefits in the second year (227 families), the second most common transition was to continue to receive Food Stamp Program benefits but leave TANF (92 families), and the third most common choice was to leave both the Food Stamp Program and TANF (56 families). Only 10 families continued to receive TANF benefits in the second year but did not receive Food Stamp Program benefits.

The remaining 287 families that participated in the Food Stamp Program in the initial year of the panel did not receive TANF benefits. These families faced a slightly modified transition choice set. The most common choice was to continue to receive Food Stamp Program benefits

and not receive TANF program benefits in the second year (129 families). The second most common transition was to leave the Food Stamp Program and continue not to receive TANF program benefits (115 families). A distant third was the choice to enter the TANF program and also continue to receive Food Stamp Program benefits (42 families). Finally, only one family in the sample left the Food Stamp Program in the second year but entered the TANF program.

As noted, the independent variables in our model include measures of the change in TANF status, initial TANF status, changes in earnings, initial earnings, family characteristics, and other variables that potentially influence stigma and other transaction costs associated with Food Stamp Program participation. The change in earnings, *DIFFEARN*, is measured as the change in family earnings from wage and self-employment sources from the first to the second year in the survey. Positive changes in earnings should increase the probability of exiting the Food Stamp Program. A measure of initial earnings (*INTEARN*) is also included in the model. Initial earnings is expected to be positively related to Food Stamp Program exit because families with higher initial earnings, holding change in earnings constant, are more likely to exceed Food Stamp Program eligibility requirements and place a lower value on Food Stamp Program participation than families with lower initial earnings.

Personal Responsibility and Work Opportunity Reconciliation Act and state-level welfare reform measures influence TANF participation decisions but may also directly influence exits from the Food Stamp Program. As noted, transaction costs and stigma may represent important costs of Food Stamp Program participation (Moffitt 1989). These costs may increase less than proportionately if a family participates in both programs instead of only one (Keane and Moffitt 1998). Correspondingly, termination of TANF participation may place an additional set of stigma and transaction costs directly on Food Stamp Program participation. For example, TANF participants are automatically eligible for Food Stamp Program benefits. However, if a family leaves TANF it may need to be reauthorized every 3 months to participate in the Food Stamp Program. Often single mothers who are eligible for the Food Stamp Program but do not participate complain about the time and paperwork required for recertification, the business hours of the Food Stamp Program offices, and the first-come first-served policies in the offices (Dion and Pavetti 2000). Therefore, holding earnings and eligibility constant, departures from TANF are likely to increase costs associated with participation in the Food Stamp Program and make transitions out of the Food Stamp Program more likely. It should also be noted that the income loss associated with departure from TANF would have a countervailing influence on Food Stamp Program departure by increasing the marginal value of Food Stamp Program benefits to the family. Structural

models of Food Stamp Program participation have isolated the impact of stigma and other transaction costs from income effects by imposing a specific functional form on the family utility function (see Moffitt 1983). We focus on the net influence of departures from TANF on Food Stamp Program participation decisions both from shared transaction costs and income loss.

Imperfect information on Food Stamp Program eligibility may create a further link between TANF departures and Food Stamp Program exits. A recent survey shows that nearly three-quarters of Food Stamp Program-eligible heads of families leaving TANF thought they were no longer eligible for the Food Stamp Program (Zedlewski and Brauner 1999). The TANF leavers may also believe that earnings disqualify them from Food Stamp Program benefits.

The influence of the decision to exit TANF on the propensity to leave the Food Stamp Program is captured in the model by a discrete indicator for families that left TANF during their second year in the survey (LEFT-TANF). A discrete indicator for individuals receiving TANF benefits in the initial year is also included (INTTANF). After controlling for initial earnings, families initially receiving both TANF and Food Stamp Program benefits may be more dependent on public assistance, have lower stigma and other transaction costs to continued Food Stamp Program participation, and be less likely to depart from the Food Stamp Program than families initially receiving only Food Stamp Program benefits.

The impact of TANF departures on Food Stamp Program departures may also vary with the intensity of state welfare reform efforts. An interaction term (INTCASE) is specified as the product of the discrete indicator for the individual leaving TANF and the rate of change in state AFDC/TANF caseloads over the previous 3 years. The interaction term adjusts the magnitude of the effect of individual exits from TANF for differences in state rates of caseload decline. States that aggressively restrict TANF eligibility and have large negative caseload changes are more likely than other states to remove from the rolls families with a strong need for continued public assistance. Similarly, the long-term employment prospects of single mothers leaving TANF may, on average, be lower in states with high rates of caseload decline. The Food Stamp Program may then serve a more important role as insurance against future job loss. These families would be expected to have a lower probability of also exiting the Food Stamp Program on exit from TANF, and the sign of the interaction term coefficient would be positive.

States that aggressively remove families from the AFDC/TANF rolls may also make greater efforts to retain families in the Food Stamp Program than states that do not aggressively remove families from the rolls. Howard Chernick (1999), for example, finds that some states substitute Food Stamp Program benefits for AFDC benefits, since savings on the latter can be transferred to other state programs. Such strategic

behavior on the part of states would make families less likely to exit the Food Stamp Program after leaving TANF in states with large negative changes in caseloads and would contribute to a positive sign on the interaction term coefficient. On the other hand, states that aggressively remove families from TANF rolls may also create direct and indirect inducements to leave the Food Stamp Program. For example, in Mississippi (a state with a very high rate of caseload declines) Food Stamp Program benefits are sanctioned for noncompliance with TANF regulations (U.S. Department of Agriculture, Food and Nutrition Service 2001).

In interpreting the impact of state caseload changes it should also be noted that the caseload declines, as measured by 3-year rates in this study, began prior to TANF and that most of observed declines in caseloads cannot be directly attributed to state TANF policies. Further, since TANF program work requirements became binding 2 years after implementation of the TANF program in most states, reforms are likely to have created greater incentives to work for families initially observed in 1997 than for those whose behavior is initially observed in 1996. A discrete indicator for the later sample period (YEAR) is included in the model to capture any indirect effect that the more binding TANF work requirements in the later sample period may have on Food Stamp Program departures.

Finally, for a given change in earnings and TANF participation, the decision to exit the Food Stamp Program may depend on characteristics of the family and area economic conditions. Age of the family head (AGE) and being black (BLACK), of another nonwhite racial group (OTHNW), or of Hispanic origin (HISPANIC) are included in the model because they may influence the level of stigma associated with Food Stamp Program participation. The number of children in the family under age 6 (CHILDU6) and between ages 6 and 18 (CHILDU18) are included because Food Stamp Program benefit levels increase with the number of children, while stigma and other transaction costs of program participation remain relatively constant with additional children. An indicator of whether the family received Food Stamp Program benefits in all 12 months of the initial year (FS12) is included to account for the influence of previous intensity of Food Stamp Program participation. Continuous participation is likely to increase dependence on Food Stamp Program benefits and to reduce stigma, making transitions off the Food Stamp Program less likely. A discrete indicator for families whose head is a U.S. citizen (CITIZEN) is included to account for the influence of new eligibility restrictions on noncitizen participation in the Food Stamp Program.

Turning to area economic conditions, we include the unemployment rate for nonmetropolitan or metropolitan area of residence within the state (UNEMPL) in order to control for the influence of economic

Table 1

FOOD STAMP PROGRAM TRANSITION MODEL DESCRIPTIVE STATISTICS

Variable	Description	Mean	Standard Deviation
DIFFEARN	Change in earnings (\$)	2,235.07	10,518.72
INTEARN	Initial earnings (\$)	5,505.15	8,868.51
INTTANF	Initially on TANF	.710	.630
LEFTTANF	Left TANF in second year of panel	.191	.393
INTCASE	TANF caseload change past 3 years \times LEFTTANF	-.052	.124
YEAR	Initial year in panel (1997 = 0, 1998 = 1)	.488	.500
AGE	Age of family head	33.323	8.061
BLACK	Family head black = 1	.388	.487
OTHNW	Family head other nonwhite = 1	.051	.219
HISPANIC	Family head Hispanic = 1	.180	.385
FOWNU6	Number of children under age 6	.704	.814
FOWNU18	Number of children ages 6-17	1.487	1.211
FS12	On Food Stamp Program for 12 months in initial year = 1	.778	.416
CITIZEN	U.S. citizen = 1	.964	.186
URATE	State metro or nonmetro unemployment rate	.061	.017
NONMET	Family resident in nonmetropolitan area = 1	.201	.401
SOUTH	Family resident in South = 1	.223	.417
INTSNM	NONMET \times SOUTH	.073	.206

conditions on stigma associated with Food Stamp Program participation.⁴ Similarly, we include discrete indicators for residence in the South and in a nonmetropolitan area and an interaction term between South and nonmetropolitan to capture differences in TANF participation rates and benefit levels. March 1999 CPS data indicate that TANF program participation of single female-headed families with children below 125 percent of the poverty line was 31.1 percent nationally but only 23.7 percent in the metropolitan South and 16.4 percent in the nonmetropolitan South.⁵ Lower levels of TANF participation in the South are, in part, due to low benefit levels provided by states in the region (Nord 1998). By contrast, Food Stamp Program participation is only slightly lower in the South than in the nation as a whole, with 52.9 percent of single female-headed families with children below 125 percent of the poverty line participating nationally and 50.5 and 48.4 percent participating in the metropolitan and nonmetropolitan South, respectively.⁶ Thus the Food Stamp Program appears to play a greater role in the assistance strategies of low-income single mothers in the South, and the nonmetropolitan South in particular, than in other regions. Means and standard errors for all variables are presented in table 1.

Table 2

PROBIT ESTIMATOR RESULTS FOR LEAVING THE FOOD STAMP PROGRAM
(LVFSP = 1)

Variable	Coefficient	Asymptotic Standard Error
DIFFEARN (thousands)	.029***	.005
INTEARN (thousands)	.039***	.007
INTTANF	-.311***	.111
LEFTTANF	1.350***	.301
INTCASE	2.399**	.983
YEAR	-.014	.122
AGE	.007	.008
BLACK	-.071	.136
OTHNW	-.210	.307
HISPANIC	.106	.174
CHILDU6	-.243***	.093
CHILDU18	-.192***	.060
FS12	-.585***	.137
CITIZEN	-.555*	.320
UNEMPL	-4.764	4.457
NONMET	.964	.202
SOUTH	.240	.170
NONMET × SOUTH	-.440	.322
CONSTANT	.557	.539

NOTE.—Number of observations = 672. Log likelihood = -306.37. Likelihood ratio (df = 18) = 172.27.

* Indicates statistical significance at the $p = .1$ level in a two-tailed t -test.

** Indicates statistical significance at the $p = .05$ level in a two-tailed t -test.

*** Indicates statistical significance at the $p = .01$ level in a two-tailed t -test.

Results and Discussion

Parameter Estimates

The data are used to estimate the probit model of exits from the Food Stamp Program by the maximum likelihood method, and the results are reported in table 2. The coefficient estimates for the change in earnings between the 2 years in the panel (DIFFEARN) and for family earnings in the initial year in the survey (INTEARN) are both positively associated with exit from the Food Stamp Program during the second year of the survey at the $p = .01$ level of significance. The indicator for participation in TANF during the initial year of the survey (INTTANF) has a negative coefficient and is significant at the $p = .01$ level, while the indicator for leaving TANF in the second year of the survey (LEFTTANF) has a positive coefficient ($p = .01$). The parameter estimate for the interaction term composed as the product of the discrete indicator of individual exit of TANF and the state rate of TANF caseload change (INTCASE) is also positive ($p = .01$).

While earnings and TANF status measures have a strong statistical association with Food Stamp Program exit, age, race, and ethnicity of

Table 3

MARGINAL EFFECTS FOR SIGNIFICANT VARIABLES
(LVFSP = 1)

Variable	Marginal Effect
DIFFEARN (thousands)	.009
INTEARN (thousands)	.012
INTTANF	-.093
LEFTTANF	.476
INTCASE	.720
CHILDU6	-.073
CHILDU18	-.058
FS12	-.194
CITIZEN	-.194

NOTE.—For the discrete variables INTTANF, LEFTTANF, FS12, and CITIZEN the marginal effect is evaluated as a change from zero to one.

the family head show no significant association with exit from the Food Stamp Program. However, the numbers of children in the family under age 6 (CHILDU6) and between 6 and 18 years of age (CHILDU18) are negatively related to exit from the Food Stamp Program. Similarly, participation in the Food Stamp Program for all 12 months of the initial year in the survey shows a strong negative association with exit from the Food Stamp Program during the second year. Being a U.S. citizen also shows a weak ($p = .1$) negative association with exit from the Food Stamp Program. Finally, the variables area unemployment rate (UNEMPL), residence in a nonmetropolitan area (NONMET), and residence in the South (SOUTH), and the interaction term between South and nonmetropolitan residence, do not show statistically significant associations with exit from the Food Stamp Program.

The results suggest that Food Stamp Program departures are, in part, a response to the strengthening of family economic conditions. Specifically, changes in earnings are on average positive in the sample, and the positive earnings changes strongly influence families to exit the Food Stamp Program. High initial earnings also strongly influence exit of the Food Stamp Program. However, when the marginal effects of the significant variables are evaluated at sample means, the magnitude of these earnings effects on the probability of exit from the Food Stamp Program appears to be rather small (table 3). For example, a \$1,000 increase in family earnings between the first and second years in the sample results in a 0.9 percentage point increase in the probability of leaving the Food Stamp Program.

Families that initially received TANF benefits show a 9.3 percentage point lower probability of exiting the Food Stamp Program than those

not initially receiving TANF. However, leaving TANF in the second year of the survey results in a 47.6 percentage point increase in the probability of not receiving Food Stamp Program benefits in the second year of the survey. Thus, even after controlling for concurrent changes in earnings and other factors, TANF departure creates a strong inducement for families to exit the Food Stamp Program. Interestingly, strong state TANF caseload declines countervail the influence of an exit from TANF on the probability of Food Stamp Program departure. Rates of TANF caseload changes over the previous 3 years are negative in all states. The positive sign on the interaction between leaving TANF and the state rate of TANF caseload change implies that a 1 percentage point larger caseload decline (i.e., a larger negative change) decreases the probability of exiting the Food Stamp Program when leaving TANF (because the positive parameter estimate is multiplied by a negative value) by 0.7 percentage points. Thus, families in states that have aggressively pursued welfare reform efforts are more likely to remain in the Food Stamp Program on leaving TANF.

We also consider two alternative specifications of state rates of AFDC/TANF caseload changes. First, rates of caseload changes were incorporated directly rather than through an interaction with the dummy variable for individual exit of TANF. Second, we incorporated rates of caseload changes directly into the model and interacted the rate of caseload declines with the dummy variable for individual exit of TANF. In neither case was the parameter estimate on the rate of caseload change variable significant when incorporated directly. Further, the sign and significance level of the interaction term under the second alternative specification remained the same as those reported in the initial model. Thus, the results of the alternative specifications support the initial specification where large state AFDC/TANF caseload declines influence Food Stamp Program exit only by mitigating the effect of individual exit from TANF.

The lack of influence of family head characteristics is not surprising. While characteristics of family heads may be related to differences in stigma and other transaction costs, these characteristics do not manifest themselves in differential propensities to exit the Food Stamp Program. Area unemployment rates also do not have a significant effect on Food Stamp Program exits, but given CPS nondisclosure requirements making it impossible to identify the county of residence, statewide measures of metropolitan or nonmetropolitan unemployment rates are an admittedly blunt measure of local economic conditions. Finally, after controlling for earnings shocks and other factors we find that families in nonmetropolitan areas, in the South, and particularly in the nonmetropolitan South do not show significant differences in their propensity to exit the Food Stamp Program.

Other Specification Issues

The empirical model presented above is based on a sequential decision model. However, changes in family earnings and exits from the Food Stamp Program may be jointly determined if, for example, departure of the Food Stamp Program induces a family head to work more hours and earn more income. As a result, the difference in earnings variable may be correlated with the residual in the Food Stamp Program exit equation and lead to biased parameter estimates. To examine this concern, we treat the change in earnings as an endogenous variable and replace it with an instrumental variable. The instrumental variable is defined as the predicted value of the change in earnings generated from a set of regressors that are expected to be uncorrelated with the residual in the Food Stamp Program exit equation.⁷ The instrumental variable is, therefore, also not expected to be correlated with the residual in the Food Stamp Program exit equation, and the parameter estimate associated with the variable should be unbiased. Probit model estimates using the predicted change in earnings (PDIFFERN) are presented in the first column of table 4 and labeled "model 2." The standard errors for parameter estimates from the probit equation are adjusted for the use of a predicted variable using the method outlined in appendix 1. The coefficient estimate for PDIFFERN is positive but just fails the test for statistical significance at the conventional $p = .1$ level.⁸ However, the estimated earnings effect is not reduced, since the coefficient and calculated marginal effect estimates for PDIFFERN are larger than the corresponding estimates for DIFFEARN in the initial model specification. A \$1,000 increase in earnings is now associated with a 2.35 percentage point increase in the probability of exit from Food Stamp Program participation.

Parameter estimates for all other variables in the model show little change from those from the initial specification. Notably, departure from TANF is still positively related to departure from the Food Stamp Program and has approximately the same marginal effect as in the initial specification. Thus, controlling for the potential endogeneity of changes in earnings does not materially change the model results.

A second concern with the initial model specification is that families that did not receive TANF benefits in the first year of the survey cannot exit TANF in the second year. Since Food Stamp Program and TANF participation are often assumed to be jointly determined, the related specification concern is that families initially on TANF may show a different relationship between independent variables and exits from the Food Stamp Program than families not initially on TANF. The discrete indicator for participation in the TANF program in the initial year in the panel may not adequately capture this structural difference. Further, the marginal effect of leaving TANF, reported in table 3, is evaluated

Table 4

ALTERNATIVE SPECIFICATIONS OF PROBIT ESTIMATOR (LVFSP = 1)

Variable	Model 2		Model 3	
	Coefficient	Asymptotic Standard Error	Coefficient	Asymptotic Standard Error
PDIFFERN (thousands)	.077	.050		
DIFFEARN(thousands)			.059***	.013
INTEARN (thousands)	.059***	.021	-.004	.018
INTTANF	-.365***	.113		
LEFTTANF	1.443***	.300	1.996***	.360
INTCASE	2.448**	.977	2.152*	1.126
YEAR	-.077	.155	-.024	.215
AGE	.005	.009	-.000	.015
BLACK	-.112	.158	-.193	.220
OTHNW	-.223	.328	-.307	.471
HISPANIC	.141	.195	-.114	.292
CHILDU6	-.202**	.093	-.169	.145
CHILDU18	-.170***	.058	-.231**	.096
FS12	-.617***	.135	-.444*	.266
CITIZEN	-.555*	.318	-.891*	.528
UNEMPL	-2.786	4.623	6.309	7.424
NONMET	.020	.229	-.541	.405
SOUTH	.204	.189	.285	.285
NONMET × SOUTH	-.346	.361	.525	.585
CONSTANT	.348	.595	-.438	.865
Number of observations	672		385	
Log. likelihood	-319.35		-122.84	
Likelihood ratio	146.32		127.08	
	(df = 18)		(df = 17)	

NOTE.—Model 2 instruments for changes in earnings. Model 3 uses a subsample of households that were initially receiving TANF benefits.

* Indicates statistical significance at the $p = .1$ level in a two-tailed t -test.

** Indicates statistical significance at the $p = .05$ level in a two-tailed t -test.

*** Indicates statistical significance at the $p = .01$ level in a two-tailed t -test.

at the mean values of the other variables in the sample, not the mean values of the subset of families in the sample that were initially on TANF and, therefore, eligible to exit the program. To address this concern, we reestimate the initial model using only the subsample of families that initially received both TANF and Food Stamp Program benefits. The parameter estimates using the subsample are presented in the third column of table 4 and labeled “model 3.”

The model results using the subsample are, for the most part, consistent with results from the full sample. The discrete indicator for leaving TANF in the second year of the survey (LEFTTANF) and the change in earnings (DIFFEARN) are positive and significant ($p = .01$) in both models. In addition, the calculated marginal effects associated with each of these variables are very similar. In the full sample, leaving TANF increases the probability of leaving the Food Stamp Program by 47.6

percentage points, compared with 47.5 percentage points in the subsample. A \$1,000 increase in earnings increases the probability of leaving the Food Stamp Program by 0.86 percentage points in the full sample, compared with 0.96 percentage points in the subsample. The magnitude of state TANF caseload declines also has a strong influence on the exit of the Food Stamp Program for the subsample of families initially on TANF. The main difference in the parameter estimates between the full and subsamples is that in the subsample initial earnings (INTEARN) do not significantly affect the probability of leaving food stamps. Families who receive both Food Stamp Program and TANF benefits have consistently lower initial earnings than families who receive only Food Stamp Program benefits. The lack of significance of the initial earnings parameter may stem from relatively little variation in the initial earnings in the subsample of families that were initially on TANF.

Conclusions

Impressive declines in TANF caseloads appear to have contributed to concurrent declines in Food Stamp Program participation. The major empirical finding of this study, robust to several alternative model specifications, is that after we control for earnings shocks, area economic conditions, and other factors, a departure from TANF increases the likelihood of leaving the Food Stamp Program by more than 47 percentage points. The finding supports suspicions that TANF reform measures may have indirectly fostered Food Stamp Program exits among families that remain below 1.3 times the poverty line and are still eligible for food assistance.

During the 1996–98 period, 9.7 percent of U.S. households did not have access to enough food to meet basic needs (Nord, Jemison, and Bickel 1999). The incidence of food insecurity is undoubtedly higher for single female-headed families with children, given the high prevalence of poverty for this family type. Further, single female-headed families with children have become more vulnerable to negative income shocks from economic downturns because of increased workforce participation and decreased reliance on public assistance (Mills et al. 2001). At a minimum, the economic well-being of single female-headed families with children needs to be closely monitored as work requirements and lifetime eligibility requirements associated with welfare reform measures become binding and as general economic conditions become less favorable.

On a positive note, the results suggest that Food Stamp Program participation has not been disproportionately affected in states that aggressively cut TANF caseloads. High rates of state TANF caseload declines actually mitigate the influence that leaving TANF has on family Food Stamp Program exits. This mitigation might occur because states

that aggressively trim their TANF roles have removed families that have low levels of economic well-being and are still dependent on the Food Stamp Program. Alternatively, states with high caseload reductions may have provided clients with better information on their status with respect to continued eligibility for Food Stamp Program benefits. It is worth noting that state rates of caseload declines clearly do not control for all state variation in the climate and procedures for continued participation in the Food Stamp Program in the post-AFDC era. Further research is needed to disentangle restrictions to Food Stamp Program participation created by state-specific TANF regulations, particularly as cumulative time limits become binding.

Further research is also needed to identify the specific constraints to continued participation in the Food Stamp Program after leaving TANF. For example, if families do not receive complete information on Food Stamp Program eligibility in the face of TANF program benefit loss, additional resources to support local caseworker counseling may be warranted. If, on the other hand, Food Stamp Program exit is in response to cumbersome procedures to retain certification for Food Stamp Program benefits when TANF benefits are lost, efforts to further streamline procedures for continued program participation might be warranted. Finally, since 1996 families in the Food Stamp Program have become increasingly reliant on earned income and workforce participation. Given decreasing political support for public assistance programs, additional efforts may be warranted to educate political leaders and the general population that many Food Stamp Program recipients in the postreform era are working but remain below or near the poverty level. The Food Stamp Program continues to play an important role in safeguarding the well-being of working single mothers and their families.

Appendix

Table A1

INSTRUMENTAL VARIABLE ESTIMATOR FOR DIFFEARN

Variable	Coefficient	Standard Error
INTEARN	-.417***	.044
YEAR	1,549.343**	765.291
AGE	52.877	48.297
BLACK	1,097.393	884.586
OTHNWX	-436.057	1,799.269
HISPANIC	-120.244	1,116.102
UNEMPL	-29,218.41	26,966.77
NONMET	770.967	1,325.612
SOUTH	592.986	1,163.787
NONMET × SOUTH	-827.097	2,139.589
EDUCATION	696.007***	200.525

NOTE.— $R^2 = 0.133$. $F(11, 660) = 9.17$. Parameter estimates and standard errors for the probit equation in model 2 were obtained by two-step maximum likelihood estimation. The model is defined

$$\text{DIFFEARN} = \mathbf{Z}_1\beta_1 + \epsilon_1 \quad (\text{linear})$$

$$\text{LVFSP} = \Phi(\mathbf{X}\beta_2) + \epsilon_2 \quad (\text{probit}),$$

where $\mathbf{X} = (Z_2Z_1\hat{\beta}_1)$, $\beta_2 = (\delta'\gamma)$, and Φ is the normal cumulative density function. Estimates for β_1 and first-step standard errors were obtained by least squares. Estimates for β_2 and second-step standard errors were obtained by employing generalized linear models methodology (McCullagh and Nelder 1989). Adjustments to the second-stage standard errors were made using the asymptotic variance of β_2 that Murphy and Topel (1985) defined by

$$\Sigma = R_2^{-1} + R_2^{-1}(R_3'R_1^{-1}R_3 - R_4'R_1^{-1}R_3 - R_3'R_1^{-1}R_4)R_2^{-1},$$

where

$$R_1^{-1} = \text{asymptotic variance } (\beta_1)$$

$$R_2^{-1} = \text{asymptotic variance } (\beta_2|\beta_1)$$

$$R_3 = E \frac{\partial L_2}{\partial \beta_1} \left(\frac{\partial L_2}{\partial \beta_2} \right)'$$

$$R_4 = E \frac{\partial L_1}{\partial \beta_1} \left(\frac{\partial L_2}{\partial \beta_2} \right)'$$

and L_1 , L_2 are the log-likelihood equations from the step 1 and step 2 models. Estimates of the variance components were obtained using first-order Taylor series approximations to the log-likelihood equations.

** Indicates statistical significance at the $p = .05$ level in a two-tailed t -test.

*** Indicates statistical significance at the $p = .01$ level in a two-tailed t -test.

References

Chernick, Howard. 1999. "State Fiscal Substitution between Federal Food Stamp Program and AFDC, Medicaid, and SSI." Mimeograph. City University of New York, Department of Economics.

- Dion, M. Robin, and LaDonna Pavetti. 2000. "Access to and Participation in Medicaid and the Food Stamp Program: A Review of the Recent Literature." Washington, D.C.: Mathematica Policy Research Inc. (March).
- Fraker, Thomas, and Robert Moffitt. 1988. "The Effect of Food Stamps on Labor Supply: A Bivariate Selection Model." *Journal of Public Economics* 35:1–24.
- Gallagher, L. Jerome, Megan Gallagher, Kevin Perese, Susan Schreiber, and Keith Watson. 1998. "One Year after Federal Welfare Reform: A Description of State Temporary Assistance for Needy Families (TANF) Decisions as of October 1997." Mimeograph. Urban Institute, Washington, D.C.
- Keane, Michael, and Robert Moffitt. 1998. "A Structural Model of Multiple Welfare Program Participation and Labor Supply." *International Economic Review* 39 (August): 553–89.
- McCullagh, Peter, and John A. Nelder. 1989. *Generalized Linear Models*. 2d ed. New York: Chapman & Hall.
- Meyer, Bruce D., and Dan T. Rosenbaum. 1999. "Welfare, the Earned Income Tax Credit, and the Labor Supply of Single Mothers." Working Paper no. 7363. National Bureau of Economic Research, Cambridge, Mass.
- Mills, Bradford, Jeffrey Alwang, and Gautam Hazarika. 2001. "The Impact of Welfare Reform: A Semi-parametric Analysis." *Review of Income and Wealth* 47 (March 2001): 81–104.
- Moffitt, Robert. 1983. "An Economic Model of Welfare Stigma." *American Economic Review* 73:1023–35.
- . 1989. "Estimating the Value of an In-Kind transfer: The Case of Food Stamps." *Econometrica* 57 (March): 385–409.
- Murphy, Kevin M., and Robert H. Topel. 1985. "Estimation and Inference in Two-Step Econometric Models." *Journal of Business and Economic Statistics* 3:370–79.
- Nelson, Charles R., and Richard Startz. 1990. "The Distribution of the Instrumental Variable Estimator and Its *t*-Ratio When the Instrument Is a Poor One." *Journal of Business* 63 (January): S125–S140.
- Nord, Mark. 1998. "Racial and Spatial Equity in Welfare Programs: Interstate and Inter-county Differences in Welfare Spending." *Rural Development Perspectives* 13 (3): 11–18.
- Nord, Mark, Kyle Jemison, and Gary Bickel. 1999. "Prevalence of Food Insecurity and Hunger by State, 1996–1998." Food Assistance and Nutrition Research Report no. 2. Washington, D.C.: U.S. Department of Agriculture.
- Schirm, Allen. 2001. "Reaching Those in Need: Food Stamp Participation Rates in the States in 1998." U.S. Department of Agriculture, Food and Nutrition Service (January).
- U.S. Department of Agriculture, Food and Nutrition Service. 1999. "Who Is Leaving the Food Stamp Program? An Analysis of Caseload Changes from 1994 to 1997." Washington, D.C.: Office of Analysis, Nutrition, and Evaluation (March).
- . 2001. "Changes in Client Service in the Food Stamp Program after Welfare Reform: A Synthesis of Case Studies in Eight States." Report no. Food Stamp Program-01-CS Food Stamp Program. Washington, D.C.: Office of Analysis, Nutrition, and Evaluation (January).
- Wallace, Geoffrey, and Rebecca M. Blank. 2000. "Fighting Poverty: Lessons from Recent U.S. History." *Journal of Economic Perspectives* 14 (Spring): 3–19.
- Wilde, Parke, Peggy Cook, Craig Gunderson, Mark Nord, and Laura Tiehen. 2000. "The Decline in Food Stamp Program Participation in the 1990's." Economic Research Service, Food and Rural Economics Division, Food Assistance and Nutrition Research Report no. 7. Washington, D.C.: U.S. Department of Agriculture (June).
- Zedlewski, Sheila R., and Sarah Brauner. 1999. "Declines in Food Stamp and Welfare Participation: Is There a Connection?" Discussion Paper 99-13. Urban Institute, Washington D.C. (October).

Notes

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1. The term "decision" is used when modeling Food Stamp Program and TANF exits. However, we recognize that exits are often not based on the explicit choice of an individual but occur in response to program eligibility requirements and sometimes, in the case of TANF, sanctions.

2. Temporary Assistance to Needy Families exits may also be influenced by other policies, such as increased Earned Income Tax Credits and child-care subsidies that created incentives to increase hours worked.

3. Information on participation and earnings is recalled for the previous calendar year, but we refer to participation as being in the initial and second year of the panel for ease of exposition.

4. Unemployment rates are created by aggregating Bureau of Labor Statistics county-level employment and unemployment figures for all nonmetropolitan and all metropolitan areas of each state.

5. We chose 1.25 times the poverty line because it is slightly below the gross Food Stamp Program eligibility guideline of 1.3 times the poverty line. Temporary Assistance to Needy Families income eligibility guidelines vary by state and source of income.

6. Alternative estimates of Food Stamp Program participation with more detailed controls for eligibility indicate slightly higher rates of participation in the South, 61 percent, than in the nation as a whole, 59 percent (Schirm 2001).

7. The linear regression equation used to predict DIFFEARN is presented in appendix 1. Note that the identifying instrument, level of educational attainment (EDUC), is positively associated with changes in family per capita earnings.

8. This is not surprising, since a significant increase in the variance of the parameter estimate can be expected when the instrumental variable stems from an equation with low explanatory power (Nelson and Startz 1990).