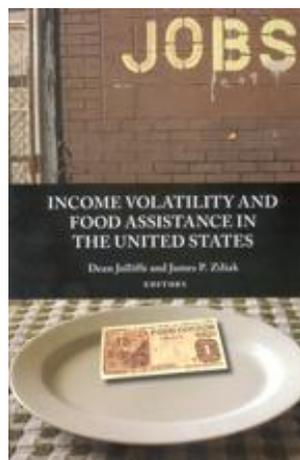**W.E. UPJOHN INSTITUTE**
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In the decade following passage of the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA, or welfare reform), numerous studies examined the correlates of leaving, returning to, and remaining on cash assistance. However, fewer have analyzed food stamp dynamics after welfare reform. Income limits for the Food Stamp Program are set higher than for the Temporary Assistance for Needy Families (TANF) program, under the assumption that low-income working families not eligible for cash assistance should continue to receive food assistance. Declines in the food stamp caseload after welfare reform, although smaller than TANF declines, were greater than some observers thought were warranted. These observers point out that many eligible families were not receiving benefits to which they were entitled (FRAC 2000). Since the recession of 2001, food stamp caseloads have increased substantially, whereas TANF caseloads have hardly changed.

In this paper, we analyze data from the Women's Employment Study (WES), a panel study conducted in one county in Michigan from 1997 to 2003. WES includes monthly data on benefit receipt that allow us to examine several questions related to food stamp dynamics

among current and former welfare recipients. The questions include the following:

- What characteristics are associated with a higher probability of exiting from food stamp receipt versus remaining on the rolls after the 1996 welfare reform?

- What characteristics are associated with a higher probability of returning to food stamps after a postwelfare reform exit from the rolls?

- What impact, if any, did two state policy changes—the switch to an Electronic Benefit Transfer (EBT) system and changes in eligibility rules concerning assets—have on food stamp receipt?

The paper is organized as follows. First, we briefly summarize previous relevant studies. Next, we describe welfare policy changes in Michigan, particularly as they relate to the Food Stamp Program. We then describe our panel data, our analytic strategy, and the measures we use. Then, we present empirical results and conclude with a discussion of policy implications.

PRIOR RESEARCH ON FOOD STAMP DYNAMICS

While a large literature has examined the correlates of entry and exit from the cash welfare roles, both before and after welfare reform (e.g., Blank and Ruggles 1996; Grogger and Michalopoulos 2003), fewer studies have focused on food stamp dynamics. While we do not review all studies here, we highlight several that examine the role that individual factors, public policies, and the macroeconomy play in food stamp dynamics.

Zedlewski and Gruber (2001) and Zedlewski (2004) analyze data from the National Survey of America's Families (NSAF) and find that poor households that recently received cash welfare are more likely to use food stamps than are poor households that have no prior welfare receipt. However, the two studies find few differences in the personal characteristics of food stamp users versus nonusers: those with less education and African Americans were more likely to remain on the rolls, but other characteristics, such as poor physical or mental health, were

not significantly different between food stamp participants and nonparticipants (Zedlewski 2004).

McKernan and Ratcliffe (2003) use data from the Survey of Income and Program Participation (SIPP) to examine the correlates of food stamp participation among low-income working households. They find that those working traditional daytime hours, holding multiple jobs, and working more hours are less likely to participate. However, this relationship between employment and participation was stronger in the early 1990s than in the late 1990s, suggesting that program efforts to decrease barriers to participation may have become more successful.

The study most closely related to ours is that of Heflin (2004), who examines food stamp exits and returns using the Women's Employment Study. She finds that women who move into work are more likely to leave both cash assistance and the Food Stamp Program. Those who are married, have other adults in the household, and meet the diagnostic screening criteria for drug dependence are more likely to exit, while those who are older, have less education, a shorter welfare history, more children, lack access to a car, and have less knowledge of eligibility rules are less likely to exit. Heflin uses the first four waves of WES data, whereas we use all five waves. Heflin limits her sample to women whose incomes were below 130 percent of the poverty line, roughly the eligibility limit for the Food Stamp Program. However, her method for calculating household income is not exactly the same as the one that the welfare agency uses to determine program eligibility. Also, WES collected detailed household income for the month of the survey, not for every month.

Our analyses build upon and extend Heflin's work by using all five survey waves and including all respondents. Most importantly, Heflin estimates the hazard of exiting from food stamps, whereas we distinguish between recipients who exit from food stamps while working and those who exit without a job, and, as discussed below, find that many individual characteristics have differential effects on these exit types.

Other studies examine how program policies and the economy affect food stamp usage. Danielson and Klerman (2006) find that welfare reform and an improving economy explain food stamp caseload declines during the late 1990s, while policies aimed at increasing program access and the weakening economy explain about half of the caseload increase in the early 2000s.

Ratcliffe, McKernan, and Finegold (2007) combine data from SIPP and state-level policy data to test the effects of various welfare, food stamp, minimum wage, and Earned Income Tax Credit (EITC) policies on food stamp receipt. They find that in states with more lenient vehicle exemption policies, longer periods between eligibility recertification, and expanded categorical eligibility (e.g., deeming families receiving services funded through TANF automatically eligible for food stamps), food stamp receipt increases. On the other hand, biometric technology (such as fingerprint imaging) reduces food stamp receipt. Simplified reporting and implementation of the EBT program, which moved food stamps from coupons to an electronic swipe card, increase food stamp receipt.

Ribar, Edelhoch, and Liu (2008) use state administrative data from South Carolina and find that exits from the Food Stamp Program are five to six times higher in months in which families have to recertify their eligibility than in other months. Once South Carolina increased the length of time between eligibility recertification, median spell lengths of food stamp receipt increased by nearly three months for households with earnings.

Our analyses build on these previous studies. Before describing our model, we review the policy context in Michigan.

THE POLICY CONTEXT IN MICHIGAN, 1997–2003

The Food Stamp and TANF programs have different eligibility limits, treatment of earnings, definition of the family unit, and so on, but the rules in one may affect use of the other. Michigan began adopting a work-first approach to welfare in 1994, requiring some recipients to participate in activities designed to move them into employment quickly (Seefeldt, Danziger, and Danziger 2003). Once PRWORA passed, all but a small number of recipients (for example, those with disabilities or those caring for children or other family members with disabilities) were required to participate in job search activities immediately after applying for cash assistance. Failure to comply with these or other requirements could result in loss of benefits, either immediately (for new applicants) or gradually (for those who were already recipients).

Michigan is one of 16 states that link receipt of food stamp benefits to compliance with TANF or other means-tested program rules (USDA 2004). A mother not complying with TANF rules could face reduction or loss of TANF cash benefits for her entire family along with elimination of her individual food stamp allotment. In other states, food stamp benefits may not increase when TANF benefits are reduced by sanctioning, but the noncompliant adult may not lose her food stamp benefits (Zedlewski, Holcomb, and Duke 1998).

As of April 1997, Michigan recipients on TANF for fewer than 60 days and not complying with work requirements could be terminated immediately from TANF and be hit with a reduction in food stamp benefits. Those receiving TANF for at least 60 days prior to noncompliance faced a 25 percent reduction in both TANF and food stamp benefits, and their TANF case would be closed if noncompliance continued for four months.[1]

Recipients who followed the new rules could combine work, cash welfare, and food stamps, or just work and food stamps, depending on their monthly earnings. Like most states, Michigan changed its earned income disregard to encourage work; it allowed TANF recipients to keep the first $200 of monthly earnings and 20 percent of the remainder. In 1997, a single mother with two children earning $6 an hour for 20 hours of work a week could receive about $200 a month in TANF and about $310 in food stamps. If she worked 35 hours a week, she would lose all TANF benefits but would still receive about $300 in food stamps.[2]

The PRWORA implemented a lifetime limit on receipt of cash assistance: adults could receive TANF for no more than 60 months cumulatively in their lifetime, or fewer months if the states where they lived chose a shorter time limit. All states must abide by the prohibition against using federal TANF funds for families exceeding this 60-month limit. However, Michigan is one of two states that did not put time limits on cash assistance.[3] Instead, the state uses its own funds to provide cash assistance to recipients who reach the federal limit and are in compliance with program rules.

Several analysts (Blank and Schmidt 2001; Pavetti and Bloom 2001; Zedlewski, Holcomb, and Duke 1998) developed post-PRWORA classifications of the stringency of state policy regimes. Most labeled Michigan's policies as "moderate" or "mixed." Policies such as the

requirement to engage immediately in work activities (the federal requirement at the time was, within 24 months, to start looking for work or to participate in activities geared toward finding a job) and the possibility of full-family sanctions were strict. Others, such as the lack of a time limit, were lenient. The state's cash benefit in the late 1990s was higher than average—$459 a month for a family of three with no other income, compared to $379 for the median state. However, the earned income disregard policy was not especially generous, and only part-time and low-wage workers could combine welfare and work. As noted above, a single mother with two children who worked 35 hours a week at a job paying $6 an hour was not eligible for cash assistance; in 24 other states, she would be eligible.

Even though Michigan's policies were moderate relative to those of other states, its TANF caseload declined at a rate similar to the national average. Between 1996 and 2003, cash assistance cases declined by about 56 percent nationwide and by about 58 percent in Michigan (authors' tabulations). Food stamp caseloads declined less. Over the same years, the average number of food stamp recipients declined by only 10 percent in Michigan and by only 17 percent nationwide. Food stamp caseloads in Michigan fell by 36 percent between 1996 and 2000 but then rose because of the 2001 recession. The average monthly caseload in Michigan climbed from 603,000 to 838,000 between 2000 and 2003 (HHS 2005). In Michigan, the food stamp participation rate among eligible families is estimated to be 65 percent, well above the 56 percent national average (Castner and Schirm 2005). It is unclear the extent to which this higher participation rate is related to particular state practices, to the state's distressed economy, or to some combination of the two.

As noted, Michigan families who are sanctioned for noncompliance with TANF rules can also lose their food stamps. Sanctioned families are more likely to be disadvantaged than nonsanctioned recipients on measures such as low education or poor health (Cherlin et al. 2002; Kalil, Seefeldt, and Wang 2002). If these disadvantages also make it less likely that sanctioned adults find jobs, then they might be more likely to reapply for TANF, food stamps, or both. On the other hand, if these disadvantages make it difficult for sanctioned adults to understand program rules about why they were sanctioned or how they might become eligible again, then they might be less likely to reapply.

Michigan's choice about how frequently to require food stamp recipients to recertify their eligibility affects participation, as shorter recertification periods are associated with lower program use (Kabbani and Wilde 2003). Federal policy requires that all cases with working adults be redetermined for eligibility at least once every 12 months. Before passage of the 2002 Farm Bill, states could choose periods as short as six months for working recipients in an effort to lower program error rates. In Michigan, TANF recipients are subject to the federal 12-month recertification period; those not on TANF must be recertified every six months if they have earnings (USDA 2003). Frequent recertifications might reduce participation, particularly among working TANF leavers, as more frequent updating of eligibility raises participation costs.

Michigan simplified reporting requirements for TANF and food stamp recipients, which may ease administrative burdens. Typically, families must report any changes in employment, earnings, or income, along with other changes that could affect eligibility. For adults whose earnings or employment status changes frequently, this reporting requirement might be burdensome. With simplified reporting for the Food Stamp Program, families must report changes in earned income only when they exceed 130 percent of usual monthly earnings (USDA 2003).

Other policy changes might have affected participation over our study period. First, between 1996 and 2000, Michigan faced federal penalties for having food stamp overpayment of benefits by rates of 11 to 16 percent, which was above the national 9 percent rate (Seefeldt, Danziger, and Danziger 2003). In an effort to achieve compliance, the state devoted extra resources during 2000 and 2001 to monitoring the Food Stamp Program. Increased monitoring might have deterred some working families from applying and caused others to be deemed ineligible.

Second, in 2001, because of federal program changes, Michigan adopted an Electronic Benefit Transfer program (EBT) to distribute both TANF and food stamp benefits. Instead of receiving food coupons, recipients are issued a "Bridge Card," which functions like a debit card. Proponents argue that this reduces the stigma associated with food stamps, as shoppers using the Bridge Card appear no different than debit-card users at checkout counters. If stigma kept some recipients from using food stamps, then EBT might encourage a return to the rolls.

Michigan also changed how it treated assets in eligibility determination over the study period. Prior to 1997, Michigan received a federal waiver to exempt one vehicle from a client's assets. Because it was thought that car ownership would facilitate the transition from welfare to work, the state allowed recipients who owned cars to maintain eligibility for food stamps. In September of 1999, the waiver expired, and for about one year vehicles were included in the asset test for eligibility determination. Through a creative categorical eligibility policy, the state eventually exempted all vehicles from consideration.

Finally, changes in Michigan's economic climate are likely to have affected participation over time. In the first few years following the 1996 reform, Michigan's economy was booming, and its unemployment rate was below the national average. However, the recession of 2001 and the continuing loss of manufacturing jobs led the unemployment rate to increase and remain above the national average. In 2003, the national unemployment rate was 6 percent, but in Michigan the rate was more than 7 percent.

DATA SOURCES

We analyze panel data from the Women's Employment Study (WES), conducted by the Program on Poverty and Social Welfare Policy at the University of Michigan. Respondents were chosen randomly from a list of white and African American women who received cash assistance as single-parent cases in February 1997 in one urban county in Michigan. Respondents were interviewed five times over a six-year period (Fall 1997, Fall 1998, Fall 1999, Fall 2001, Fall 2003). Response rates for the five waves were high: 86, 92, 91, 91, and 93 percent, respectively. There were 753 respondents in the first wave. Because there is little evidence that attrition from the sample was nonrandom, sample weights are not used (see Cadena and Pape [2006] for an analysis).

Information was gathered on factors known to affect welfare and food stamp usage, including employment, marriage and cohabitation, household size, race, and education. WES also gathered information on factors that are not usually available, including physical health and mental health status, experiences of domestic violence, child behavior,

and health problems. WES also contains monthly administrative data on food stamp and TANF participation provided by the Michigan Family Independence Agency.[4]

We combined survey and administrative data to create a panel data set with variables measured at the monthly level. We have measures of employment (self-reported) and TANF and food stamp receipt (administrative data) at this frequency. Most variables from the five interviews were not measured on a monthly basis. We used retrospective relationship questions asked at each wave to create a monthly marriage and cohabitation history for each woman.[5] Most other questions refer to the respondent's experiences during the interval between surveys. We apply the values of these variables backwards in time for all months between interviews. For example, suppose that in the wave 3 interview (1999) a woman reports having experienced severe domestic abuse since the last interview but that she did not report abuse at the wave 2 interview (1998). We code her as experiencing abuse in each month between the wave 2 and the wave 3 interview, but as not experiencing abuse in any month between waves 1 and 2. This methodology is imperfect and introduces some measurement error.

TRENDS IN RECEIPT OF BENEFITS

Figure 5.1 shows monthly patterns of employment, cash welfare usage, and food stamp receipt. All respondents received TANF in February 1997, as benefit receipt was the key study selection criterion. TANF receipt fell from February 1997 until early 2001, when it leveled off at about 20 percent and remained there until the study period ended. Almost all women received food stamps in February 1997. Receipt fell to about 45 percent by early 2000, stayed at this rate for about 18 months, and then increased to about 50 percent in spring 2002, where it remained for the duration of the study. The monthly employment rate increased from about 40 percent in February 1997 to about 75 percent in mid-2000; it then fell during and after the 2001 recession; so that it was just under 70 percent at the final WES survey (Fall 2003).

As employment fell after 2000, food stamp participation increased but TANF participation did not. These simple trends suggest that, after

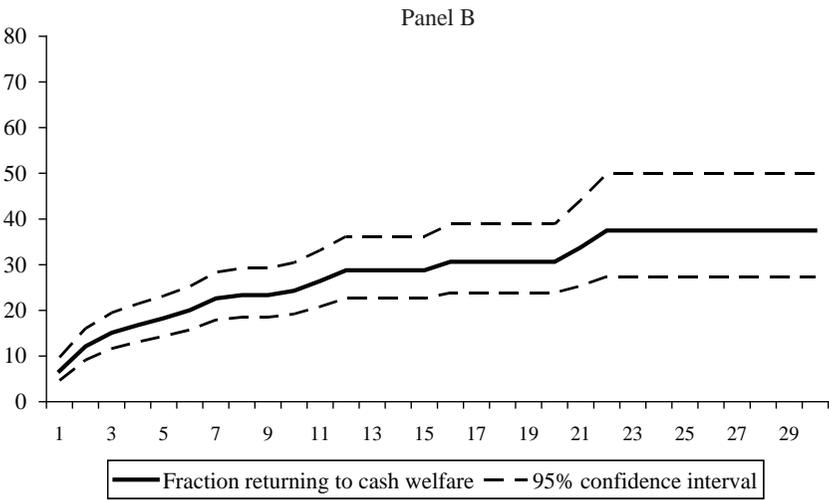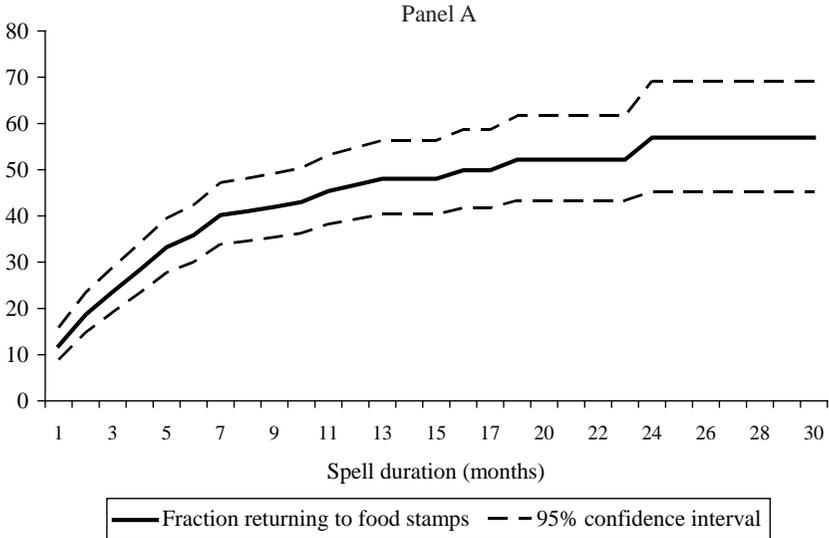**Figure 5.1 Employment, Cash Welfare Usage, and Food Stamp Receipt, February 1997 to August 2004 (%)**
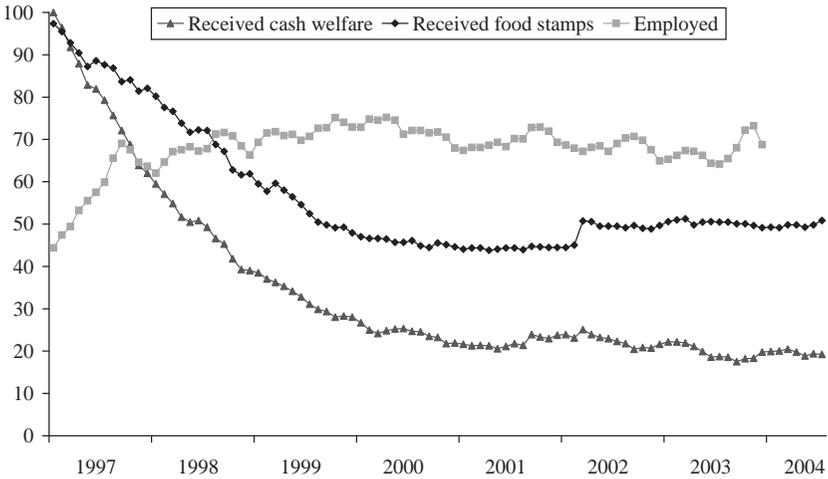
NOTE: Employment line ends January 2004.
SOURCE: Authors' calculations from the Women's Employment Study. The data in-
  clude all available observations.

welfare reform, women were more likely to use food stamps than TANF
in order to smooth temporary fluctuations in earnings. We document
this in Figure 5.2.

　　We select a sample of all spells of nonemployment preceded by
a month in which the woman was working and received neither food
stamps nor cash welfare. This sample includes women who have suc-
cessfully transitioned from welfare to work but who then experience at
least one month of nonemployment. The Kaplan-Meier failure func-
tions in Figure 5.2 show the unconditional probability (i.e., not adjusted
for covariates) that a woman will have returned to benefit receipt after
the number of months given on the x-axis. Women are more likely to re-
turn to food stamps than to cash assistance when work ends. After three
months of nonemployment, 24 percent of women have returned to food
stamps (Figure 5.2, Panel A) compared to 15 percent who have returned
to cash welfare (Figure 5.2, Panel B). By nine months of nonemploy-
ment, the return rates are 42 and 23 percent, respectively.

**Figure 5.2 Kaplan-Meier Estimates for Returning to Food Stamps
                within an Unemployment Spell (%)**

Panel A

Spell duration (months)

Fraction returning to food stamps — — 95% confidence interval

Panel B

Fraction returning to cash welfare — — 95% confidence interval

NOTE: The sample includes all spells of unemployment preceded by a month of em-
ployment with no food stamps or cash welfare.
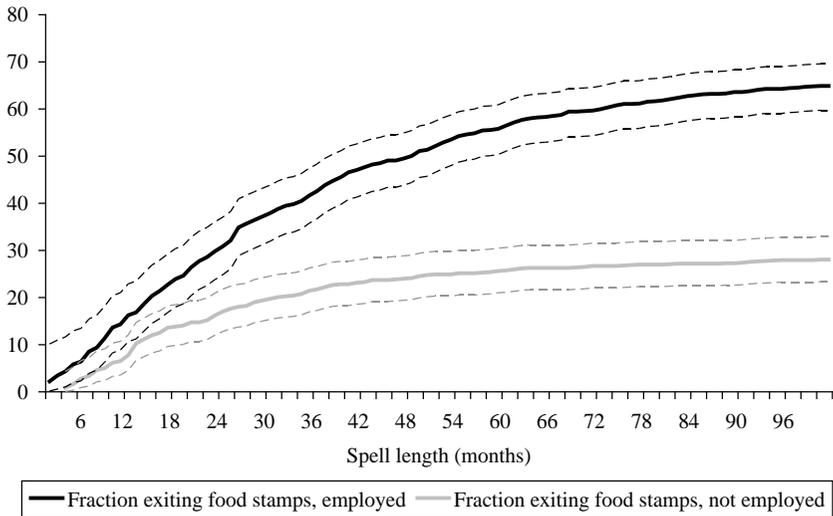SOURCE: Authors' calculations from the Women's Employment Study.

MULTIVARIATE ANALYSES—DEPENDENT VARIABLES

Our multivariate analyses examine three different aspects of food stamp dynamics. The first examines factors that are associated with a recipient's exit from the food stamp spell that was in progress when the sample was drawn. At that time, the typical respondent had received welfare and food stamps for about 7.5 years since she reached age 18 and was in the midst of a 33-month spell. We consider the initial spell (first exit) to be completed when she does not receive food stamps for two consecutive months. We treat spells that are ongoing at the date of the final interview or that are ongoing when respondents leave the sample because of attrition as right-censored. We classify the initial exits into two types: 1) spells ending in a month in which the woman was employed and 2) spells ending in a month in which she was not employed. Because we do not know monthly earnings, we cannot directly measure whether a spell ended because a woman's income exceeded program limits. We consider exits with work as proxies for exits due to higher income. Exits that occur without work are likely the result of sanctions, family status changes like marriage or a child's becoming an adult, or situations in which eligible recipients fail to comply with program rules.

Because the WES sampling frame selected women receiving cash welfare benefits in February 1997 (spells-in-progress), it oversamples longtime recipients. Fortunately, our administrative data contain the date the current cash welfare spell began. We assume that the food stamp spell also began on this date. Thus, there is measurement error to the extent that the food stamp spell began at another time. For February 1997 we assign to each respondent the duration of the spell-in-progress. Our analysis of returns to food stamps after an exit is not subject to the length-bias problem.

Figure 5.3 displays the percentage of food stamp spells that end by a given month following the beginning of the spell. The darker line shows the percentage of spells that end when a woman exits from her food stamp spell in a month in which she is employed. The bottom line shows spells that end without employment. For example, 24 months after the spell began, 32 percent of women had left the rolls in a month in which they were employed, and 13 percent had left in a month in which

**Figure 5.3 Cumulative Incidence Estimates of Exiting the Initial Food
Stamp Spell (%)**

Spell length (months)

Fraction exiting food stamps, employed   Fraction exiting food stamps, not employed

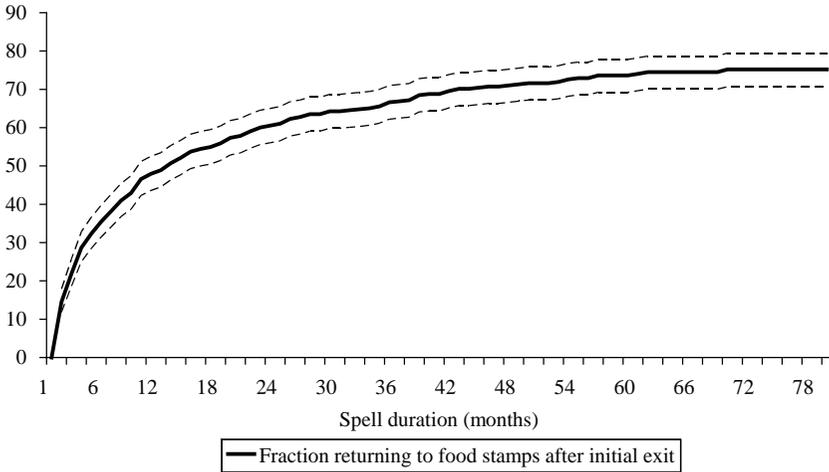NOTE: 95% confidence intervals shown as dashed lines.
SOURCE: Authors' calculations from Women's Employment Study.

they were without work. The remaining 55 percent of spells were still
in progress.[6]

The second analysis includes respondents who made a first exit af-
ter April 1997 (the third month of the panel) and analyzes factors as-
sociated with their first return to food stamp receipt. Each respondent
contributes only one spell to each of the first two samples. Figure 5.4
displays this probability of returning. For example, at 24 months after
their first exit from food stamps, 61 percent of women had returned to
the caseload. The third analysis focuses on returns to food stamps after
spells of nonemployment. This dependent variable was shown in Figure
5.2, Panel A.

Thus, food stamp participation is particularly dynamic. Most re-
spondents exit the program at least once during the study period, and
most women who exit their initial spell return.

**Figure 5.4 Kaplan-Meier Estimates for Ever Returning to Food Stamps
After Initial Exit (%)**

NOTE: 95% confidence intervals shown as dashed lines.
SOURCE: Authors' calculations from Women's Employment Study.

REGRESSION MODELS

We estimate regression models that address several questions about
food stamp dynamics. First, which characteristics are associated with a
higher probability of leaving the food stamp spell that was in progress
when the WES study began (first exit)? Do these covariates have dif-
ferent associations for work-based versus nonwork exits? Then, which
characteristics are associated with a higher probability of returning to
food stamps after exiting from the caseload (first return)? Finally, which
characteristics are associated with reentry to food stamps conditional on
experiencing a transition from work to nonemployment?

We estimate the semiparametric proportional hazards model out-
lined in Cox (1972).[7] The parameter of interest is the hazard rate $\lambda(t)$—
the probability that a spell ends in month t given that it has lasted until
t. Cox's model consists of two parts: 1) a baseline hazard that depends
only on t ($\lambda_0[t]$) and 2) a portion that depends on covariates. This speci-
fication does not require parametric assumptions about the baseline

hazard; the time pattern can take any form as long as it is common across spells. We model the portion that depends on covariates using an exponential functional form. The complete hazard rate, conditional on covariates x and coefficients β, is therefore

$$\lambda(t \mid x, \beta) = \lambda_0(t) \exp(x'\beta).$$

To estimate β, we assume that different covariate values lead to equal proportional changes in the likelihood that a spell ends in any month, regardless of the baseline probability. Our approach provides estimates that are robust to any form of time dependence in the baseline hazard. However, this approach does not allow us to test the nature of time dependence in the data.

As a robustness check, we include dummy variables for calendar years to control for unobserved differences in policies and state enforcement efforts over the study period. We report hazard ratios (exponentiated coefficients) and delta method–based standard errors. The coefficients can be interpreted as the proportional effect of a one-unit increase in the covariate on the probability of the spell ending in a given month. A hazard ratio equal to one means that women have an equal probability of exit for all values of the covariate. Ratios greater than one imply that an increase in the covariate increases the hazard rate; ratios less than one imply the opposite.

REGRESSION RESULTS

We first analyze exits from the initial food stamp spell, treating exits accompanied by employment and exits without employment as independent competing risks. The baseline hazard and the effect of each covariate can vary by type of exit. The hazard function we estimate is thus

$$\lambda(t \mid x, \beta) = \lambda_0(t) \exp(x'\beta_0) + \lambda_1(t) \exp(x'\beta_1) \ ,$$

with 0 representing employment-based exits and 1 representing non-employment-based exits. This specification is equivalent to estimating separate models for each exit type (treating observations that end with

the other exit type as censored). By estimating a model that allows for both types of exits simultaneously, we can test whether the covariates have the same proportional effect for both exit types.[8]

Table 5.1 defines the variables we use and presents their means and standard deviations, the number of observations, and the frequency with which the observations are measured. For example, age, education, and race are measured at the first wave in Fall 1997. On the other hand, as mentioned above, we have monthly information on employment and receipt of TANF and food stamps. The typical respondent was about 30 years old in 1997. About one-third of respondents had completed some education beyond high school, 37 percent had graduated from high school or completed a GED, and 31 percent had not finished high school. Over the course of the study period, a typical respondent worked for 67 percent of the months, received food stamps for 62 percent of the months, and received TANF for 40 percent of the months.

At a typical wave, many respondents reported physical and mental health problems; one advantage of WES over other welfare-reform data sets is the extent of this information. About one quarter of respondents reported physical limitations that placed them in the bottom quartile of functioning for their age and reported their overall health as fair or poor. About one-third met the diagnostic screening criteria for one of several psychiatric disorders measured in the WES instrument. Six percent had serious substance abuse problems, and 13 percent had experienced severe domestic abuse in the 12 months before the survey. These personal attributes, as documented elsewhere (Seefeldt and Orzol 2005; Turner, Danziger, and Seefeldt 2006), are associated with reduced work and increased TANF receipt among WES respondents.

Table 5.2 presents the results for the exit from the food stamp spell that was in progress in February 1997. In each of the three specifications, the first column reports hazard ratios for employment-based exits and the second column gives hazard ratios for exits without work; the final column (denoted as "Diff") reports whether the proportional effect of the covariate on the hazard rate is significantly different for the two exit types. The first specification includes only characteristics of women and their households that are fixed at their 1997 values. Women with at least a high school degree are more likely to leave food stamps with a job in any given month than those who have not finished high school (the omitted category). There are no significant effects of education on

the likelihood of exiting without work. With or without work, African Americans are less likely than whites to exit from food stamps.

The coefficients on the fixed attributes are attenuated in size and fall in significance when we include the rich set of time-varying variables in the second specification. This suggests that race and education are correlated with some of the variables included in the expanded model. Women living with a partner are more likely to exit with or without work than women not living with a partner: married women are 1.86 times as likely to exit with work—and cohabiting women 1.27 times as likely—as women who do not live with partners. A husband's financial resources are more likely to raise a woman's family income above the food stamp eligibility cutoff. Those who cohabit with an employed partner may have less financial need and hence be less likely to go through the recertification process.

For a given level of income, women with larger families are eligible for larger food stamp benefits, making them less likely to lose their eligibility when working. The analysis supports this hypothesis: each additional person in the household reduces the likelihood of exit with work by about 12 percent.

Women with significant problems with their physical or mental health or personal lives are less likely to find and keep a job and hence less likely to exit food stamps with work. The evidence supports this hypothesis. For example, a woman with health problems is about 33 percent less likely to exit with work, a woman with a mental health problem about 30 percent less likely, and one with a child with learning, mental health, or health problems about 36 percent less likely. Some women whose children have persistent problems may have been exempted from the TANF work requirement (Seefeldt and Orzol 2005).

Some critics of welfare reform expected that some recipients with many personal problems would fall through all the safety nets once reform was implemented (Edelman 1997). The fact that there is no significant relationship between personal problems and food stamp exits without work (hazard ratios near one in the second column of the second specification) suggests that the most disadvantaged are no more likely than others to exit food stamps without work. On the other hand, other work with the WES (Turner, Danziger, and Seefeldt 2006) has shown that a small but growing proportion of women lose jobs and do

Table 5.1 Variable Descriptions and Descriptive Statistics—Women's Employment Survey

Variable label	Variable definition	Mean	Std. Dev.	N	Frequency
Age in 1997	Respondent's age in years, measured at the time of first interview	29.75	7.40	753	Fixed
Age squared/100	Age in 1997 squared, divided by 100	9.40	4.82	753	Fixed
High school diploma or GED	1 if respondent has exactly a high school degree or equivalent; 0 otherwise	0.37	0.48	753	Fixed
More than high school	1 if respondent has more education than a high school degree; 0 otherwise	0.32	0.47	753	Fixed
Race dummy: 1 if African American	1 if African-American; 0 otherwise	0.56	0.50	753	Fixed
Worked during this month	1 if respondent reports working at least one hour this month; 0 otherwise	0.67	0.47	49,428	Month
Received food stamps during this month	1 if administrative data show food stamp receipt for this month; 0 otherwise	0.62	0.49	49,428	Month
Received TANF during this month	1 if administrative data show TANF receipt for this month; 0 otherwise	0.40	0.49	49,428	Month
Married	1 if married; 0 otherwise	0.17	0.38	49,381	Month[a]
Cohabiting, not married	1 if living with a male partner, but not married; 0 otherwise	0.28	0.45	49,417	Month[a]
Lagged unemployment rate in survey county	Monthly unemployment rate for the survey county, lagged one month	6.68	1.97	49,428	Month
Age-specific physical limitation & fair/poor health	1 if respondent has an age-specific physical limitation & reports fair or poor health; 0 otherwise	0.23	0.42	49,169	Wave

Any mental health barrier	1 if respondent has any mental health problem (PTSD, general anxiety disorder, social phobia, depression); 0 otherwise	0.34	0.47	49,428	Wave
Caregiven child has learning/ mental/physical health problem	1 if respondent is responsible for a child with special needs (learning disability, mental health or physical health problems); 0 otherwise	0.17	0.37	49,301	Wave
Any substance dependence or hard drug use	1 if respondent meets DSM-IV criteria for alcohol or drug dependence or uses "hard" drugs; 0 otherwise	0.06	0.23	49,305	Wave
Severe domestic abuse in past year	1 if respondent reports severe physical violence from an intimate partner; 0 otherwise	0.13	0.34	49,255	Wave
Owns a vehicle	1 if owns or has reliable access to a vehicle; 0 otherwise	0.79	0.41	49,418	Wave
Assets used to determine eligibility	1 if calendar date between 10/1999 and 9/2000; 0 otherwise	0.12	0.35	49,428	Month
Assets used × owns a car	Interaction between "Owns a car" and "Assets used to determine eligibility"	0.35	0.32	49,418	Month
After EBT rollout	1 if after March 2001; 0 otherwise	0.14	0.48	49,428	Month
Knows still eligible for food stamps if working	1 if respondent answers "no" to the question "Once anyone receiving cash assistance gets a job, do the rules say they will stop receiving food stamps?"; 0 otherwise	0.67	0.47	630	Wave 3 (Once)

NOTE: The number of observations for variables measured at the month or wave level is the number of valid person-months. Variables measured only at the wave level are assigned to individual months using the procedure described in the text.

[a]Although the marriage and cohabitation questions are only asked at each wave, they contain sufficient detail to create an accurate monthly history.

SOURCE: Authors' calculations from the Women's Employment Survey.

Table 5.2 Hazard Ratios from Competing-Risks Cox Proportional Hazard Models for First Exit from Food Stamps

	(1)			(2)			(3)		
	Working	Not working	Diff.	Working	Not working	Diff.	Working	Not working	Diff.
Age in 1997	0.947	1.088		0.994	1.068		1.000	1.110	
	(0.049)	(0.096)		(0.053)	(0.096)		(0.056)	(0.107)	
Age squared /100	1.073	0.884		1.016	0.909		1.002	0.863	
	(0.085)	(0.119)		(0.081)	(0.125)		(0.085)	(0.125)	
High school diploma or GED	1.548***	0.845	**	1.367**	0.906		1.465***	0.948	*
	(0.210)	(0.174)		(0.190)	(0.194)		(0.213)	(0.209)	
More than high school	1.723***	0.798	***	1.488***	0.870	**	1.566***	0.807	**
	(0.237)	(0.175)		(0.213)	(0.200)		(0.234)	(0.194)	
Race dummy: 1 if African American	0.756***	0.627***		0.832	0.671**		0.807*	0.657**	
	(0.082)	(0.110)		(0.095)	(0.125)		(0.096)	(0.129)	
Married				1.859***	2.078***		1.883***	1.943**	
				(0.310)	(0.528)		(0.324)	(0.516)	
Cohabiting, not married				1.273**	1.150		1.274*	1.123	
				(0.156)	(0.240)		(0.162)	(0.245)	
Number of people in household				0.876***	1.000	*	0.876***	1.014	**
				(0.034)	(0.056)		(0.035)	(0.058)	
Age-specific physical limitation & fair/poor health				0.673***	1.137	**	0.680**	1.149	**
				(0.102)	(0.241)		(0.106)	(0.251)	
Any mental health barrier				0.714***	1.199	**	0.711**	1.287	**
				(0.093)	(0.235)		(0.096)	(0.261)	
Caregiven child has learning/mental/ physical health problem				0.634***	0.845		0.584***	0.818	
				(0.107)	(0.195)		(0.104)	(0.194)	

Any substance dependence or hard drug use			0.790	1.001		0.808	1.102	
			(0.217)	(0.356)		(0.230)	(0.395)	
Severe abuse in past year			0.837	0.940		0.912	0.869	
			(0.148)	(0.237)		(0.167)	(0.235)	
Owns a vehicle			1.264	0.788	*	1.367*	0.745	*
			(0.190)	(0.171)		(0.222)	(0.167)	
Lagged unemployment rate in survey county			0.949	1.015		0.956	1.011	
			(0.042)	(0.061)		(0.043)	(0.065)	
After EBT rollout			1.271	1.532		1.255	1.501	
			(0.713)	(1.676)		(0.705)	(1.643)	
Assets used to determine eligibility			0.762	1.172		0.831	1.117	
			(0.379)	(0.663)		(0.417)	(0.634)	
Assets used × Owns a car			1.356	0.483		1.234	0.519	
			(0.682)	(0.297)		(0.627)	(0.320)	
Knows still eligible for food stamps if working						0.786**	0.715*	
						(0.092)	(0.138)	
N spells	679	679	679	679		570	570	
N exits	369	135	369	135		342	125	

NOTE: The models also include dummy variables for each calendar year. The first column in each specification gives the hazard ratio for exit from food stamps accompanied by employment. The second column gives the hazard ratio for exit from food stamps without employment. The third column reports the significance level on a test of equal proportionate effects on both types of exit. Exact partial likelihood method used for ties. $* = p < 0.10$; $** = p < 0.05$; $*** = p < 0.01$. Standard errors in parentheses. "Diff." stands for "difference."
SOURCE: Authors' calculations from the Women's Employment Survey.

not return to welfare; however, many of them continue to receive food stamps.

We also evaluate two policy changes implemented by Michigan. As noted, in 2001, the state adopted an Electronic Benefit Transfer system designed both to reduce fraud and to reduce the stigma of purchasing food by eliminating government coupons. Our analysis does not reveal any significant change in the probability of food stamp exit following EBT implementation, perhaps because these two effects tend to offset each other. Because we have only time series variation in the EBT variable, concurrent changes such as the rising unemployment rate might reduce our ability to identify an EBT effect.

We also examine how changes in the state's treatment of assets affected exit from the initial spell. For about one year in the middle of the study period, the state could not exclude the value of a car from the food stamp asset test. We include a dummy variable for the months in which an asset test was in place and an interaction with this variable and the vehicle ownership variable.[9] We find no evidence that asset testing affected the probability of exit, whether or not a woman owned a vehicle.

The third specification includes an indicator for knowledge about program rules. In Fall 1999, respondents were asked, "Once anyone receiving cash assistance gets a job, do the rules say they will stop receiving food stamps?" About a third did not know that "no" is the correct answer. Those answering correctly are about one quarter less likely to leave food stamps than women who answered incorrectly or were unsure. This suggests that some women who exited from TANF may have left food stamps by mistake, thinking that they were no longer eligible.

Table 5.3 presents our analysis of the probability of reentering the food stamp rolls following an exit of at least two months. Many of the same attributes associated with a lower exit probability in Table 5.2 are associated with a higher return probability here. For example, African Americans are more likely to return than whites, and those with more education than a high school degree are less likely to return (all columns, Table 5.3). Similarly, women who are married or cohabiting are much less likely to return to food stamps than women who do not live with partners (columns 2 and 3). Women who are not working are about 1.7 times as likely as working women to return to food stamps; this is not surprising since nonworkers will have lower monthly incomes than

workers. Additionally, when the county unemployment rate increases by one percentage point, women are 1.13 times as likely to return to food stamps. High unemployment rates likely translate into less job security and worse employment prospects for those looking for work and hence encourage women to return to food stamp receipt.

Women who own cars are about 30 percent less likely to return to food stamps than those who do not. Car ownership may be a proxy for greater economic stability, indicating that the woman has and expects to continue to have stable employment. Alternatively, women may be misinformed about the treatment of assets and, thinking that the car makes them ineligible, may not reapply. Any of these mechanisms could explain why car owners are less likely to return.

Women who experienced severe domestic violence in the year before the survey are about 50 percent more likely than others to return to food stamps. Some women may leave a violent relationship suddenly and unexpectedly and then seek public assistance. It represents a policy success when battered women return to food stamps as part of their coping strategy.

Knowledge of the food stamp eligibility rule concerning combining work and benefits does not predict with any statistical significance who returns to the rolls (Table 5.3, column 3). This conflicts with the data in Table 5.2 showing that program knowledge reduced the probability of an exit. The lack of relationship between knowledge and food stamp returns could be due to heterogeneity in the types of women who exited and are thus eligible to return. Some women may exit when they earn enough to make them ineligible for benefits. Their correct knowledge of the ability to combine work and food stamps cannot affect their likelihood of return since they are ineligible. Other women are eligible to combine employment and food stamp benefits but may be disproportionately likely to believe incorrectly that they are ineligible. The women who knew they were eligible may have never left the caseload. This differential selection can explain the insignificant results for the knowledge indicator in the return specification.

Women were much less likely to return to food stamps after coupons were replaced by the Bridge Card in 2001. This result does not support the hypothesis that EBT removed a stigma that was keeping women from participating. We do not consider this a definitive test of the effect of EBT on participation because the policy changes only once

Table 5.3 Hazard Ratios from Cox Proportional Hazard Models for First Return to Food Stamps

	(1)	(2)	(3)
Age in 1997	0.937	0.921	0.914
	(0.057)	(0.060)	(0.061)
Age squared /100	1.079	1.102	1.109
	(0.104)	(0.113)	(0.117)
High school diploma or GED	0.798	0.901	0.920
	(0.110)	(0.129)	(0.135)
More than high school	0.567***	0.704**	0.722**
	(0.084)	(0.110)	(0.116)
Race dummy: 1 if African American	1.802***	1.638***	1.637***
	(0.214)	(0.207)	(0.212)
Unemployed		1.738***	1.805***
		(0.221)	(0.234)
Married		0.577***	0.584***
		(0.102)	(0.106)
Cohabiting, not married		0.666***	0.696**
		(0.094)	(0.100)
Owns a vehicle		0.700**	0.711**
		(0.117)	(0.123)
Number of people in household		0.974	0.976
		(0.038)	(0.039)
Age-specific physical limitation & fair/poor health		1.182	1.201
		(0.178)	(0.183)
Any mental health barrier		1.053	1.039
		(0.148)	(0.149)
Caregiven child has learning/mental/ physical health prob		1.188	1.141
		(0.205)	(0.204)
Any substance dependence or hard drug use		1.117	1.170
		(0.308)	(0.325)
Severe abuse in past year		1.520**	1.521**
		(0.260)	(0.266)
Lagged unemployment rate in survey county		1.129***	1.125***
		(0.041)	(0.043)
After EBT rollout		0.313***	0.353**
		(0.132)	(0.153)

Table 5.3 (continued)

	(1)	(2)	(3)
Assets used to determine eligibility		1.172	1.179
		(0.386)	(0.390)
Assets used × owns a car		1.268	1.252
		(0.424)	(0.422)
Knows still eligible for food stamps			0.959
if working			(0.120)
N spells	527	527	490
N returns	341	341	324

NOTE: The models also include dummy variables for each calendar year. Exact partial
  likelihood method used for ties. * = $p < 0.10$; ** = $p < 0.05$; *** = $p < 0.01$. Standard
  errors in parentheses.
SOURCE: Authors' calculations from the Women's Employment Survey.

over the sample period and could easily be confounded with other fac-
tors changing at a similar time.

The specification in Table 5.4 is similar to that in Table 5.3, except
the sample is restricted only to those who have exited a food stamp
spell and who have experienced a transition from work to nonwork. The
results are quite similar to those in Table 5.3, with the exception that
women who have mental health problems are about 50 percent more
likely to return to food stamps during a spell of unemployment than
those who do not have mental health problems.

POLICY IMPLICATIONS

Our empirical results provide some good news from a policy perspec-
tive. First, food stamp participation among WES respondents was more
sensitive to employment variability than was TANF receipt. Second,
those with health and mental problems are less likely to exit food stamps
with work, but they are not more likely to exit without work. Women in
larger households are less likely than similar women in smaller house-
holds to exit, probably because their earnings are farther below the food
stamp eligibility cutoff, which increases with household size. Similarly,

**Table 5.4 Hazard Ratios from Cox Proportional Hazard Models for
Return to Food Stamps during an Unemployment Spell**

	(1)	(2)	(3)
Age in 1997	0.700***	0.649***	0.658***
	(0.068)	(0.071)	(0.075)
Age squared /100	1.727***	1.934***	1.904***
	(0.262)	(0.341)	(0.347)
High school diploma or GED	0.559**	0.623*	0.583**
	(0.128)	(0.154)	(0.150)
More than high school	0.437***	0.463**	0.427***
	(0.122)	(0.141)	(0.134)
Race dummy: 1 if African American	1.891***	1.671**	1.798**
	(0.393)	(0.398)	(0.438)
Married		0.413***	0.431***
		(0.122)	(0.129)
Cohabiting, not married		0.666	0.669
		(0.177)	(0.185)
Owns a vehicle		1.492	1.692
		(0.486)	(0.576)
Number of people in household		0.951	0.960
		(0.072)	(0.073)
Age-specific physical limitation & fair/poor health		1.009	0.979
		(0.251)	(0.246)
Any mental health barrier		1.506*	1.517*
		(0.348)	(0.363)
Caregiven child has learning/mental/ physical health problem		1.467	1.528
		(0.424)	(0.448)
Any substance dependence or hard drug use		0.779	0.718
		(0.358)	(0.334)
Severe abuse in past year		1.414	1.533
		(0.405)	(0.449)
Lagged unemployment rate in survey county		1.042	1.067
		(0.085)	(0.091)
After EBT rollout		0.464	0.459
		(0.287)	(0.284)
Assets used to determine eligibility		2.563	2.721
		(1.633)	(1.748)

Table 5.4 (continued)

	(1)	(2)	(3)
Assets used × owns a car		0.419	0.387
		(0.271)	(0.253)
Knows still eligible for food stamps			0.753
if working			(0.172)
N spells	344	336	330
N returns	112	109	106

NOTE: The models also include dummy variables for each calendar year. Exact partial
   likelihood method used for ties. * = $p < 0.10$; ** = $p < 0.05$; *** = $p < 0.01$. Standard
   errors in parentheses.
SOURCE: Authors' Calculations from the Women's Employment Survey.

when the county unemployment rate is higher and when women experi-
ence job loss, they are more likely to return to the Food Stamp Program.
We also find that women with recent experiences with severe abuse are
more likely than others to return to the food stamp rolls.

These findings tell us about the relative likelihood of staying on
or returning to food stamps, not about the participation rate of eligible
families. Increased outreach efforts might be warranted, given the con-
fusion respondents express about food stamp rules and given their em-
ployment instability. Women who understand that they are allowed to
combine food stamp receipt with low-wage work are significantly more
likely to continue to receive food stamps. On the other hand, women
who own vehicles are less likely to return to food stamps, perhaps in-
dicating misunderstanding about car ownership rules. An outreach pro-
gram that provided information about eligibility might increase partici-
pation rates.

Although the typical respondent in our Michigan sample worked
in almost 70 percent of the months over the six-and-one-half-year pan-
el, more than half experienced at least one spell of "unstable employ-
ment," defined as having been fired, laid off, or otherwise not having
worked for more than four weeks (Johnson 2006). Food stamp receipt
helps cushion earnings losses, but many who lost jobs did not return
to the program. While some women find new jobs relatively quickly,
many experience long spells of nonemployment without receiving food
assistance.[10]

A study of local agency practices indicates that it may not be the particular type of outreach activity that matters but the number of activities in which an office engages (Bartlett, Burstein, and Hamilton 2004). Outreach is usually low-cost and includes activities such as preparing informational pamphlets and posters for distribution in community centers and other public places, operating a toll-free information hotline, and coordinating outreach activities with the local Medicaid and State Child Health Insurance Program (SCHIP) offices. Such activities better provide information about eligibility to eligible nonparticipants.

Although economic conditions in the nation have improved since the 2001 recession, many low-income families have not yet benefited from the recovery: poverty rates remain above 2000 levels, and the number of individuals who are food-insecure increased by six million between 1999 and 2004 (Rosenbaum 2006). The Food Stamp Program provides economic support for millions of working poor families, and our results suggest that more should be done to encourage eligible nonparticipants to apply for the benefits to which they are entitled.

Notes

1. In the WES data, described below, a woman receiving TANF in April 1997 had received aid for at least 60 days since the sample was drawn from the February 1997 caseload.
2. Amounts were computed using the "marriage calculator" available from the Administration for Children and Families, U.S. Department of Health and Human Services. We assume that the woman has no assets, no vehicle, receives no child support, and has been on TANF for at least six months. The calculator is available at http://marriagecalculator.acf.hhs.gov/marriage/calculator.php (accessed April 28, 2008).
3. Michigan has since adopted a 48-month time limit that went into effect in late 2007.
4. The agency's name has since been changed to the Michigan Department of Human Services.

5. Respondents were asked if they were married or cohabiting and, if so, for how many months. Single women were asked to specify the month in which a previous marriage or cohabiting relationship ended.
6. These estimates use the cumulative incidence approach, so the probabilities add to one.
7. We use the exact partial likelihood method to handle ties (exits occurring in the same month) because our exits are measured in discrete time intervals.
8. To estimate these models, we augment our data using the methodology outlined in Lunn and McNeil (1995).
9. The WES survey asks a respondent if she owns a vehicle or has consistent, reliable access to one. We label all positive responses as vehicle ownership, even though some women do not own a vehicle. There is measurement error for these women, since their use of someone else's car would not affect their food stamp eligibility.
10. A limitation of our study is that our sample is drawn from a particular county in a single state. Both TANF and food stamp policies vary by state, and our findings may not be generalizable to states with different policy regimes. However, it seems reasonable to assume that lack of knowledge of program rules is a common problem that might be addressed by outreach efforts.

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