
ECONOMIC POLICY: SIMULATING EFFECTS OF WELFARE REFORM ON DEPENDENCY, WORK, AND POVERTY

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Abstract

We use a version of the Simulation of Trends in Employment, Welfare, and Related Dynamics (STEWARD) model to generate provisional estimates of possible responses to Temporary Assistance to Need Family (TANF) plans for single mothers over a four-year period. Varying assumptions about the anticipation of TANF time limits, we find that there is considerable variability in the simulated level of TANF caseloads, but that the employment-related characteristics of the caseload are more stable. We find that, regardless of whether the TANF plan is aggressive or moderate in its incentives and requirements, the percentage of single mothers on TANF in private jobs for at least 30 hours per week is consistently below 10 percent. We also find that levels of extreme poverty among single parents are higher under the aggressive plan than the moderate plan, and under the assumption of forward-looking behavior than the assumption of myopia.

With the shift in responsibility for welfare policy development from the federal government to the states, state officials have an urgent need for better information on how alternative reform policies will affect key outcomes such as program costs, caseloads, and their ability to meet the employment targets embodied in the recent legislation. Estimates of how the combination of time limits, work requirements, and enhanced work incentives will affect work behavior and welfare participation are particularly important. This paper reports on the continued development and application of a longitudinal microsimulation model, the Simulation of Trends in Employment, Welfare, and Related Dynamics (STEWARD), which was designed to produce such estimates. Unlike earlier models which had limited ability to examine behavioral responses, STEWARD explicitly models the time limits and changed work incentives. These policies are a central feature of the cash assistance programs states have been developing under the new welfare reform legislation.

The next sections briefly review the policy context and simulation methods. That is followed by a discussion of different approaches to designing TANF plans, how these plans are modeled in STEWARD, and how simulation estimates depend on some of the key assumptions regarding forward-looking behavior. The last section presents preliminary estimates of the effects of selected reform packages on welfare caseloads, employment-related outcomes, and poverty levels. Since the development of an improved version of the STEWARD model is an ongoing process, the reader should view the simulation estimates in this paper as provisional and illustrative only.

Policy Context

The Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA) made sweeping changes to the U.S. welfare system, including giving states great flexibility to design their own cash assistance programs for low-income families with children. States have begun to exercise this new authority in order to satisfy broad requirements of PRWORA and qualify for funding under the Temporary Assistance to Needy Families (TANF) block grant established by the act. However, even several months after the July 1, 1997 deadline for submitting TANF plans to the federal government, some states are operating essentially placeholder programs that they expect to change substantially during the next year. Nearly all states will continue to refine their programs for years to come. As state policymakers consider both large and small program reforms, they will need reliable estimates of the cost and distributional effects of alternative policies. The goal of STEWARD is to provide a policy analysis tool that combines the best information on how recipient work and welfare participation behavior varies depending on the personal characteristics and economic opportunities facing recipient families with information on the number and distribution of potential recipient families in each state.

What is Microsimulation: an Overview

A microsimulation model simulates how proposed changes to government assistance programs affect the programs and program participants. The model has two elements: (1) a micro database and (2) a computer program. The database is constructed from survey or administrative data with information on households in the population targeted by the government program. The model's computer program codes the rules of the government program under both the "baseline" policy, which is typically the current policy, and a "reform" policy, which is an alternative under consideration. The computer program also simulates what a caseworker does—that is, it determines whether a household is eligible for the government program and the benefits for which the household would qualify. In

addition, the computer program simulates a household's behavioral response, determining whether the household will participate in the program and how much the adult members will work. Processing all the households in the database as they make work and welfare decisions over 48 months, the model counts participants to estimate the caseload of the government program, adds up their benefits to estimate program costs, and tallies changes work behavior. By performing these operations under both baseline and reform policies and comparing the results, the model estimates the effects of the proposed reform on caseloads, costs, and employment levels. The model can also estimate the distributional effects of the reform on outcomes such as poverty rates.

Steward Conceptual Structure

Overview of the STEWARD Model

The STEWARD model was first developed by Mathematica Policy Research, Inc., between 1993 and 1995 with funding from the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services (DHHS). The purpose of the model was to simulate, on the national level, responses of female single parents over time to changes in AFDC and related policies. STEWARD generated estimates of changes in AFDC participation, food stamp participation, and labor supply response to changes in welfare, health, and tax policies, as discussed in Beebout et al (1994). The model also simulated the participation of AFDC recipients in the Job Opportunity and Basic Skills (JOBS) education/training program.

The original STEWARD model database consisted of longitudinal records from the National Longitudinal Survey of Youth (NLSY), 1979 to 1982 and 1986 to 1989, and the Panel Study of Income Dynamics (PSID), 1985 to 1988. These data were weighted to be representative of the national population of single mothers in the U.S. Current Population Survey (CPS) as of 1992. Each of the 3,194 single mothers in the sample was observed monthly for 48 months, and observed changes in marital status or fertility were used to account for demographic transitions over time.

The original STEWARD's model of labor supply and program participation was a structural model based on the work of Keane and Moffitt (1991, 1995). Each single mother's preferences for work are described by a utility function that is quadratic in hours worked per week and in disposable family income per month (Table 1, equation 1). The individual's preference for hours of work depends on personal characteristics (equation 2). Hours worked per week are assumed to be constant within a month and take one of four distinct values: zero, ten, twenty, thirty, or forty (equation 3). Disposable income equals the sum of

earnings, AFDC and food stamp benefits, other non-labor income, and a valuation of private health insurance or Medicaid, minus federal income and payroll taxes, child care costs, transportation costs, and employee health insurance premiums (equation 4). Earnings per hour were imputed using a wage equation for persons who did not report a wage in the database (equation 5), and analogous equations were used to impute child care costs (equation 6), and health coverage probabilities (equation 7). Also included in the utility function were “stigma” equations capturing the psychic costs of participating in the AFDC and food stamp programs; these depend on personal characteristics plus variables describing the duration of participation in AFDC, food stamps only, or neither program (equations 8 and 9). The approach for estimating the parameters of the utility function involved the use of logit maximum likelihood procedures and is described in detail in Beebout et al (1995); we have since re-estimated these equations using a slightly different specification.

Table 1. Key Equations in the Steward Model

Utility and Labor Supply Each Month

1. $U = \text{Utility} = (\text{from Keane and Moffitt 1991, 1995})$

$$\alpha H + \beta H^2 + \gamma Y + \delta Y^2 - P_A \Psi_A / \phi - P_F \Psi_F / \phi$$
2. $\alpha = X \theta_\alpha + \varepsilon$; X = matrix of personal characteristics
3. $H = \text{Hours} = \{ 0, 10, 20, 30, 40 \}$
4. $Y = \text{Income} = \text{Wages} * \text{Hours} + \text{AFDC Benefits} + \text{Food Stamp Benefits} + \text{Child Support} + \text{Other Income} + \text{Valuation of Any Private Health Insurance or Medicaid} - \text{Taxes} - \text{Child Care Costs} - \text{Transportation Costs} - \text{Employee Health Insurance Premiums}$
5. $\text{Child Care Costs} = (\text{Number of Children}) * \text{Hours} (X \pi_c + \omega_c)$
7. $\text{prob}(\text{have Private Health Insurance} | H) = \exp (X \pi_h) / (1 + \exp (X \pi_h))$
8. P_A, P_F = dummy variables for being on AFDC, Food Stamps only
9. $\Psi_k = \text{Stigma}_k = Z \theta_k + v_k$; $k = A, F$;
 $Z = X$ plus duration dependence terms

Welfare Transitions Each Month

10. Transition Matrix = matrix of probabilities of moving from state I to state j =

$$\begin{Bmatrix} \lambda_{11} & \lambda_{12} & \lambda_{13} \\ \lambda_{21} & \lambda_{22} & \lambda_{23} \\ \lambda_{31} & \lambda_{32} & \lambda_{33} \end{Bmatrix};$$

Welfare State 1 = AFDC/TANF (plus Food Stamps in most cases)

Welfare State 2 = Food Stamps only

Welfare State 3 = Neither Program

During 1996 and 1997, Mathematica received funding from the Smith Richardson Foundation, the Food and Consumer Service of the U.S. Department of Agriculture, and DHHS to develop a new version of STEWARD, called MATH-STEWARD (for Micro Analysis of Transfers to Households). Unlike the original STEWARD, MATH-STEWARD relies on data from the early 1990s through its use of three years of longitudinal data from the 1992 panel of the Survey of Income and Program Participation (SIPP). MATH-STEWARD will simulate program participation, labor supply, and child care outcomes for a broader population of households than the original STEWARD, and it will be able to generate simulation estimates for individual states. It will include a new set of behavioral equations estimated from SIPP data. Table 2 compares the major design features of the original STEWARD model and MATH-STEWARD.

While our original intention was to use the MATH-STEWARD model to generate estimates for this paper, the current schedule of model development has prevented us from achieving this goal. Instead, we have used the original STEWARD model to simulate the effects of illustrative TANF programs on the 1992 population of single mothers in the United States. These simulations incorporate two enhancements of the original model's simulation capabilities, the first related to the anticipation of TANF time limits, and the second related to the simulation of participation in the JOBS or other education/training programs.

Simulating the Anticipation of Time Limits

The original STEWARD model, while longitudinal in nature, was not fully dynamic since it did not allow single mothers to take future events (such as the expiration of a time limit) into account when making program participation or labor supply decisions. Given the adoption last year of a 60-month limit on federal TANF benefits to individuals, it is important to recognize that persons may choose to leave the TANF program rather than use up an additional month of benefits.

Short of modeling time limits in a fully dynamic manner, as described in Swann (1996), it is possible to account for the costs of participation in time-limited welfare programs (such as TANF) by subtracting from the current month's income the present value of future benefits lost from current participation. In particular,

when an individual has t months of TANF benefits left before reaching the limit, we assume that the financial cost of participating in TANF in the current month equals:

$$\frac{\text{maximum eligible benefit} * \text{probability of being non-exempt from time limit} * \text{probability of needing TANF } t \text{ months from now}}{\text{discount factor}} \quad (1)$$

Table 2. Comparison of the Original Steward Model and Math7 Steward

Characteristic	Original STEWARD model	MATH7 STEWARD model
Time of development	1993-1995	1996-
Sources of funding	ASPE/DHHS	Smith Richardson Foundation FCS/USDA ACF/DHHS
Responses simulated	AFDC participation FSP participation Labor supply Education/training participation	AFDC/TANF participation FSP participation Labor supply Education/training participation Child care program participation Child care choices
Policy options	National AFDC/TANF policies National health care policies National tax policies	National AFDC/TANF policies National health care policies National tax policies National FSP policies State welfare/FSP policies State child care policies
Sample definition	Female single parent families	All households
Database	NLSY, 1979-82 and 1986-89 PSID, 1985-88 CPS, 1992 (weights)	SIPP, 1992-94 FSP-IQCS, 1995 CPS, 1996 (weights)
Sample size	3,194	15,496
Length of simulation	Monthly for 48 months	Every 3 months for 36 months
State estimates possible	No	Yes

We assume that the probability of being subject to the time limit is 0.80, since 20 percent of a TANF caseload may be exempt from the limit. We assume that the probability of needing TANF t months from now is a function of the form $f(t) = \exp(a*t + b)$. Since Bane and Ellwood (1983) found that 50 percent of persons beginning AFDC spent 5 years or more on AFDC, we assume that $f(60) = 0.50$. We also assume that the probability of needing TANF approaches 1.0 as t approaches zero, that is, $f(0) = 1$. These assumptions imply $f(t) = \exp(-0.01155*t)$. Finally, we assume that the discount factor $d(t)$ is of the form $d(t) = \exp(r*t/12)$,

where r is the annual discount rate. Substituting these expressions into expression (1), we obtain the following cost of a current month's TANF participation:

$$\text{maximum eligible benefit} * 0.8 * \exp((-0.01155 B r / 12)*t) \quad (2)$$

Expression (2) implies that the present-value cost of participating in TANF increases as the number of months remaining decreases, or as the discount rate decreases. Setting $r = 0.10$, this equation implies that, when 60 months of TANF eligibility remain, the financial cost of participating in TANF equals 24 percent of the maximum eligible benefit. When 1 month of TANF eligibility remains, the financial cost of participating in TANF equals 78 percent of the maximum eligible benefit. Setting $r = 0.05$, when 60 months of TANF eligibility remain, the financial cost of participating in TANF increases from 24 percent to 31 percent of the maximum eligible benefit. Setting r equal to infinity (the myopic case), there is no financial cost of participating in TANF, regardless of how many months of benefits remain before the time limit is reached.

Simulating Participation in Education/Training Programs

The original STEWARD model assigned a random percentage of non-employed AFDC recipients to participation in the JOBS program; this percentage was set equal to 90 percent for teenage parents and 50 percent for other parents. These percentages were based on average levels of participation reported in the Teen Parent Demonstration and California GAIN experiments, respectively.

To simulate education/training participation in a more sophisticated manner, we estimated the probability of education/training program participation from administrative data collected through the Food Stamp Program's Integrated Quality Control System (FSP-IQCS). This sample enabled us to identify, for Fiscal Years 1995 and 1996, 51,590 female heads of household in food stamp units with children under age 18. Of these persons, 30 percent (15,322) reported that they were subject to the requirements for participation in the JOBS program or the Food Stamp Employment and Training (FSET) program (that is, they were not exempt for reasons such as age, disability, care giver status, or employment for 30 or more hours per week). We included non-AFDC recipients in the sample to obtain a broader population of single mothers. We used this sample of non-exempt persons to estimate, using a logit maximum likelihood procedure, an equation predicting education/training participation probabilities for the women in the sample.

The coefficients of the education/training participation equation imply that teenage mothers are more likely than older mothers to participate in education/training programs (Table 3). The relative odds of participation for older mothers are less than half the odds for teenage mothers, presumably because older mothers are more removed from the schooling process and are subject to less

pressure from welfare caseworkers. While odds of participation are about 15 percent lower for black women than white women, the odds of participation do not differ significantly between Hispanic women and white women.

As might be expected, women with higher levels of schooling are more likely to participate in mandatory education/training programs than women with lower levels of schooling. Compared with women who have not attended high school, women who have attended high school have 35 percent higher odds of education/training participation, women who have completed high school have 57 percent higher odds of education/training participation, and women who have attended college have nearly 4 times higher odds of education/training participation.

We included several other variables in the equation predicting education/training participation. The number of young children in a food stamp unit was associated with higher levels of education/training participation, perhaps because shorter-term welfare recipients are both more likely to participate and more likely to have young children. While the number of older children or a woman's disability status was not associated with significantly different odds of participation, participation was significantly higher in states that subjected a larger fraction of AFDC benefits to reduction for failure to comply with participation requirements.⁽¹⁾ The odds of education/training participation were 26 percent higher in Fiscal Year 1995 than in Fiscal Year 1996, despite the expansion of welfare reform programs during this period.

To capture state-specific policies affecting participation in education/training programs, we included separate effects in the participation equation for each of the 50 states and DC. The estimated state effects vary widely by state, the odds of participation relative to California's ranging from two-thirds less in the District of Columbia to 38 times as much in Nevada (see Appendix). Certainly some of these differences reflect differences in state policies, while others may reflect differences in state definitions of what constitutes education/training participation. Overall, the reported participation rate was about one-fifth (21 percent) for all non-exempt female heads of household in the sample.

Table 3. Logit Estimates of Probability of Participation of Nonexempt Female Household Heads in AFDC- or Food Stamp-Related Education/Training

Explanatory variable	Estimated coefficient	Standard error of coefficient	Significance level	Implied odds ratio
Ages 20 to 29	-0.788	0.175	***	0.455
Ages 30 to 39	-0.788	0.183	***	0.455
Ages 40 to 49	-0.813	0.194	***	0.442
Ages 50 to 59	-1.273	0.276	***	0.280
Black/non-Hispanic	-0.168	0.078	**	0.845
Hispanic	-0.042	0.120		0.959
Attended high school	0.300	0.141	**	1.350
High school graduate	0.450	0.135	***	1.568
Attended college	1.343	0.151	***	3.831
Education missing	-0.085	0.147		.919
# of children 0-4	0.140	0.057	**	1.150
# of children 0-17	-0.010	0.030		0.990
Disabled	-0.157	0.229		0.855
Limited benefit option	0.483	0.229	**	1.620
Fiscal Year >95	0.231	0.068	***	1.260
Constant term	-2.148	0.257	***	0.117

Note: Sample size = 15,316 female household heads in Food Stamp units containing children under age 18. *=statistically significant at the .10 level, **=statistically significant at the .05 level, ***=statistically significant at the .01 level.

Source: MPR estimates from Fiscal Year 1995-96 Food Stamp Program Integrated Quality Control System data. State effects shown in Appendix.

*Table 3 continued...***State Effects on Participation in Education/Training**

State	Estimated coefficient	Standard error of coefficient	Significance level	Implied odds ratio
AL	1.881	0.220	***	6.560
AK	1.251	0.265	***	3.494
AZ	1.806	0.212	***	6.086
AR	1.779	0.257	***	5.922
CO	0.932	0.217	***	2.540
CT	0.652	0.204	***	1.920
DE	1.442	0.264	***	4.229
DC	-1.076	0.493	**	0.341
FL	1.782	0.220	***	5.944
GA	-0.713	0.302	**	0.490
HI	0.693	0.235	***	1.999
ID	1.677	0.227	***	5.348
IL	1.282	0.178	***	3.605
IN	-0.893	0.339	***	0.409
IA	0.819	0.268	***	2.267
KS	1.633	0.207	***	5.117
KY	1.050	0.209	***	2.857
LA	-0.556	0.280	**	0.574
ME	1.086	0.232	***	2.963
MD	-0.440	0.339		0.644
MA	1.739	0.188	***	5.689
MI	-1.037	0.220	***	0.354
MN	0.596	0.244	**	1.815
MS	1.213	0.258	***	3.363
MO	0.210	0.243		1.234
MT	1.551	0.216	***	4.717
NE	3.536	0.268	***	34.316
NV	3.638	0.325	***	37.997
NH	3.396	0.237	***	29.839
NJ	-0.548	0.311	*	0.578
NM	1.988	0.217	***	7.303
NY	1.391	0.222	***	4.019
NC	2.701	0.291	***	14.889
ND	2.171	0.290	***	8.766
OH	2.016	0.196	***	7.507
OK	1.092	0.197	***	2.980
OR	1.755	0.209	***	5.784

PA	3.154	0.204	***	23.421
RI	0.361	0.211	*	1.434
SC	0.178	0.319		1.194
SD	1.950	0.302	***	7.026
TN	0.376	0.430		1.457
TX	-0.240	0.356		0.787
UT	2.930	0.225	***	18.727
VT	2.872	0.298	***	17.666
VA	3.215	0.261	***	24.912
WA	1.160	0.189	***	3.189
WV	0.986	0.201	***	2.682
WI	1.930	0.172	***	6.893
WY	1.516	0.268	***	4.554

Note: California is the omitted state (relative odds of participation = 1.000).

Modeling TANF Policy Options

Policy Choices Available in STEWARD

As mentioned earlier, STEWARD offers the user a variety of options for simulating changes in welfare and related policies. To simulate changes in welfare participation, employment, and poverty rates from welfare reform, we defined a set of baseline policies and two illustrative TANF welfare reform packages, one a “moderate” plan and another an “aggressive” plan (Table 4). In all instances, we set unemployment rates and state TANF/AFDC benefits at their 1992 levels, and federal tax provisions and non-transitional Medicaid rules at their 1996 levels. For simplicity, we assumed that state TANF programs are identical except for different benefit levels and probabilities of participation in the JOBS program. We modeled JOBS participation as affecting labor supply and welfare participation by increasing individuals’ schooling up to a high school equivalent level, and increasing work experience at half the rate of private sector employment. We treated women with fair or poor health, women caring for a disabled child, and women over age 59 as categorically exempt from JOBS participation requirements and from the cutoff of TANF benefits after reaching the time limit.

For the baseline simulations, consistent with the provisions of the PRWORA, we assumed the presence of a 60-month time limit on TANF benefits. We also assumed that the monthly TANF earned income disregard was a temporary \$30 plus one-third deduction in all states. We assumed that mothers of children no older than 36 months were exempt from JOBS participation

requirements, that half of non-exempt JOBS participants had open education/training slots. We allowed a very small number of nonexempt cases to have their TANF benefits reduced by 25 percent for failure to comply with JOBS participation requirements, and we assumed that the relative odds of JOBS participation were the same as in Fiscal Years 1995 and 1996. We also assumed the provision of transitional Medicaid assistance for 12 months to

Table 4. Comparisons of TANF Plans Simulated

Descriptions of characteristics of TANF policies	Type of Plan		
	Baseline plan	Moderate plan	Aggressive plan
Length of TANF time limit	60 months	60 months	24 months
Monthly TANF earned income disregard	temporary \$30 plus one-third	permanent \$150 plus one-half	permanent \$150 plus one-half
Maximum age of youngest child for JOBS exemption	36 months	12 months	3 months
Percentage of openings for eligible JOBS participants	50 percent	100 percent	100 percent
Reduction in benefits for non-compliance of nonexempt cases with JOBS requirements	25 percent for a very small number of nonexempt cases	25 percent for a moderate number of nonexempt cases	75 percent for all nonexempt cases
Relative odds of JOBS participation compared with Fiscal Years 1995-96	1.0	8.5	25.0
Length of transitional Medicaid assistance to workers and take up rates	12 months, with take up rates of 15-20 percent	24 months, with take up rates of 20-40 percent	60 months, with take up rates of 50 percent
Family cap provision	no	no	yes

workers leaving TANF, with 20 percent take up rates during the first six months and 15 percent take up rates thereafter.

The “moderate” TANF plan represents the sorts of measures states may adopt to meet the TANF work participation requirements enacted under PRWORA, which require that states involve an increasingly large percentage of TANF cases in work or related activities (up to 50 percent by 2002).⁽²⁾ We assumed that the moderate plan maintains a 60-month time limit on TANF benefits, but establishes a permanent \$150 plus one-half monthly earned income deduction to promote combining work with welfare. We assumed that, under this plan, mothers of children over 12 months are no longer exempt from JOBS participation requirements, and that all non-exempt JOBS participants have open slots. We allowed a moderate number of nonexempt cases to have their TANF benefits reduced by 25 percent for failure to comply with JOBS participation requirements, and we assumed that the relative odds of JOBS participation increased by a factor of 8.5 since Fiscal Years 1995 and 1996. We also assumed the extension of transitional Medicaid assistance to 24 months for workers leaving TANF, with 40 percent take up rates during the first six months and 30 percent take up rates thereafter.

The “aggressive” TANF plan represents the sorts of measures states may adopt to go beyond compliance with the provisions enacted under PRWORA and create even stronger incentives for work and self-sufficiency. We assumed that the aggressive plan reduces the TANF time limit from 60 to 24 months, and once again establishes a permanent \$150 plus one-half monthly earned income deduction. We assumed that, under this plan, mothers of children over 3 months are no longer exempt from JOBS participation requirements, and that all non-exempt JOBS participants have open slots. We allowed all nonexempt cases to have their TANF benefits reduced by 75 percent for failure to comply with JOBS participation requirements, and we assumed that the relative odds of JOBS participation increased by a factor of 25 since Fiscal Years 1995 and 1996. We also assumed the extension of transitional Medicaid assistance to 60 months for workers leaving TANF, with 50 percent take up rates. Finally, we assumed that the aggressive TANF plan includes the imposition of a “family cap” limiting TANF benefits to children conceived while on TANF.

Sensitivity of Baseline Outcomes to Behavioral Assumptions

We simulated the baseline plan under three different assumption about the anticipation of time limits: (1) the myopic case, in which individuals do not anticipate time limits and the discount rate is effectively infinity; (2) a forward-looking case, in which individuals anticipate time limits with a discount rate of 10 percent; and (3) a second forward-looking case, in which individuals anticipate time limits with a discount rate of 5 percent. Because STEWARD can only simulate outcomes for a maximum length of four years, we decided to simulate behavior during the first four years following the implementation of the five-year (60 month) TANF time limit. Consequently, in no instance did any TANF case

reach the end of a 60-month limit during the period of time covered by the baseline simulation.

The extent to which individuals are forward-looking has dramatic consequences on the simulated level of the TANF caseload (Table 5). Compared with the myopic case, anticipating the time limit with a discount rate of 10 percent leads to approximately 7 percent lower TANF caseloads during the second half of Year 1, 16 percent lower TANF caseloads during the second half of Years 2 and 3, and 19 percent lower TANF caseloads during the second half of Year 4. When we simulate behavior with a discount rate of 5 percent, the TANF caseloads reductions in Years 1, 2, 3, and 4 are even larger (8 percent, 18 percent, 19 percent, and 22 percent, respectively). These caseload reductions occur both because more cases leave TANF as the time limit draws closer, and because fewer families initiate the receipt of TANF benefits. Given the underlying model of program participation, the cases that leave are those most on the margins of participation, that is, cases with observed sources of cash income (such as employment or child support) or with higher levels of welfare stigma (perhaps because of the availability of extended family members and friends for material support).

Varying assumptions about the anticipation of time limits has less dramatic consequences on the employment-related characteristics of the TANF caseload and of single mothers in general (Table 6). While the percentage of single mothers on TANF who are employed during the second half of Year 4 is somewhat higher in the myopic case than when individuals are forward-looking, the differences are small. Rates of participation in JOBS, and the proportion of the TANF caseload exempt either for categorical reasons or because of private employment at 30 hours or more per week, are similar under all three sets of assumptions. Average earnings of TANF cases (counting zero earnings for cases without employment) are lower when in the forward-looking examples, consistent with the findings on employment rates. The employment and earnings of single mothers as a whole is largely unaffected by the discounting of future benefits lost through the TANF time limit.

Rates of extreme poverty among TANF recipients and single mothers as a whole are somewhat larger when individuals are forward-looking and forgo the receipt of TANF benefits. The proportion of single mothers on TANF below 25 percent of the poverty level is about 17 percent when individuals are forward-looking, compared with about 15 percent in the myopic case. The proportion of all single mothers below 25 percent of the poverty level is about 22 percent when individuals are forward-looking, compared with about 19 percent in the myopic case. The proportion of single mothers below 100 percent of the poverty level differs very little when TANF time limits are anticipated differently.⁽³⁾

Table 5. Simulated Effects of 60-Month TANF Time Limit on TANF Caseloads, by Discount Rates

Time period, average monthly TANF caseload, and percentage reduction from myopic case	Discount rate		
	r = +infinity	r = 10 percent	r = 5 percent
<i>Second half of Year 1</i>			
Level (millions of cases)	2.18	2.03	2.01
Percentage change from myopic case	0.0	-6.9	-7.9
<i>Second half of Year 2</i>			
Level (millions of cases)	2.15	1.81	1.76
Percentage change from myopic case	0.0	-15.8	-18.0
<i>Second half of Year 3</i>			
Level (millions of cases)	1.98	1.66	1.61
Percentage change from myopic case	0.0	-16.4	-18.8
<i>Second half of Year 4</i>			
Level (millions of cases)	2.05	1.66	1.60
Percentage change from myopic case	0.0	-19.0	-21.6

Source: Mathematica Policy Research, Inc. October 1997. STEWARD model.

Table 6. Simulated Baseline Characteristics of Single Mothers, Second Half of Year 4, by Discount Rate

Time period, group of single mothers, characteristic	Discount rate		
	r = +infinity	r = 10 percent	r = 5 percent
<i>Employment-related characteristics of single mothers on TANF</i>			
Percent working at 10+ hours/week	9.8	9.1	9.3
Percent working at 20+ hours/week	5.3	4.3	4.4
Percent working at 30+ hours/week	1.7	1.3	1.3
Percent in JOBS	3.4	4.0	4.1
Percent exempt from JOBS	53.0	54.7	54.3
Percent subject to limited benefits	0.1	0.1	0.1
Average earnings/month (1992 dollars)	32.5	27.3	27.8
<i>Employment-related characteristics of all single mothers</i>			
Percent working at 10+ hours/week	59.0	59.2	59.3
Percent working at 20+ hours/week	55.8	56.2	56.2
Percent working at 30+ hours/week	49.7	50.0	50.0
Percent working at 40+ hours/week	39.2	39.5	39.4

Time period, group of single mothers, characteristic	Discount rate		
	r = +infinity	r = 10 percent	r = 5 percent
Percent below 25 percent of poverty level	14.9	16.6	16.9
Percent below 100 percent of poverty level	98.0	98.4	98.4
<i>Poverty rates of all single mothers</i>			
Percent below 25 percent of poverty level	19.2	21.7	22.0
Percent below 100 percent of poverty level	45.6	45.4	45.3

Source: Mathematica Policy Research, Inc. October 1997. STEWARD model.

Estimated Effects of TANF on Caseloads, Work, and Poverty

Estimated Effects on TANF Caseloads

Under the moderate TANF plan, simulated TANF caseloads fall by similar percentages, regardless of the extent to which individuals anticipate time limits (Table 7). In the myopic case, the moderate plan results in reductions in TANF caseloads of about 1 percent during the second half of Year 1 and of about 5 percent during the second half of Year 4. When individuals are forward-looking, TANF caseloads increase slightly during the second half of Year 1 under the moderate plan, perhaps because expanded earned income disregards make exit from TANF less likely. By the second half of Year 4, TANF caseloads are 3 to 4 percent lower than under the baseline case when individuals are forward-looking. It is important to emphasize that, while the effects of the moderate plan on TANF caseloads are similar, regardless of the extent to which individuals are forward-looking, the baseline TANF caseload differs dramatically depending on how individuals anticipate the 60-month time limit present both at baseline and under the moderate plan.

Table 7. Simulated Effects of Welfare Reform on TANF Caseloads, by Discount Rate

Plan description, time period for percentage change in TANF caseload under reform	Discount rate		
	r = +infinity	r = 10 percent	r = 5 percent
<i>Moderate plan</i>			
Second half of Year 1	-0.8	1.0	1.5
Second half of Year 2	-2.6	-2.0	-1.8
Second half of Year 3	-3.2	-2.3	-2.7
Second half of Year 4	-4.6	-3.2	-4.0
<i>Aggressive plan</i>			
Second half of Year 1	-3.3	-6.8	-6.2
Second half of Year 2	-12.0	-14.2	-12.3
Second half of Year 3	-13.7	-19.1	-17.2
Second half of Year 4	-16.6	-27.8	-25.4

Source: Mathematica Policy Research, Inc. October 1997. STEWARD model.

The aggressive plan reduces the TANF time limit to 24 months, so it is not surprising that the effects of this plan compared with the baseline plan depend on the extent to which individuals are forward-looking. In the myopic case, the aggressive plan reduces TANF caseloads by 3 percent during the second half of Year 1, before anyone actually reaches the limit, but by 17 percent during the second half of Year 4. When individuals anticipate time limits with a discount rate of 10 percent, the aggressive plan reduces TANF caseloads by 7 percent during the second half of Year 1, and by 28 percent during the second half of Year 2. The corresponding reductions when the discount rate is 5 percent are smaller—6 percent and 25 percent, respectively—but the simulated TANF caseload is lower in all instances where the discount rate is lower.

Estimated Effects on Employment-Related Outcomes

The employment-related characteristics of active TANF participants are similar under each of the two TANF plans, regardless of assumptions regarding the

anticipation of time limits (Table 8). Under the moderate plan, regardless of the discount rate, the employment of single mothers on TANF during the second half of Year 4 ranges from 22 to 24 percent at 10 or more hours per week, from 14 to 15 percent at 20 or more hours per week, and from 5 to 6 percent at 30 or more hours per week. The percentage of the TANF caseload in JOBS is about 38 to 40 percent in each instance, with 38 to 41 percent of the caseload exempt from participation requirements (some because of high levels of employment), and another 4 to 6 percent of the caseload subject to limited benefits. Average monthly earnings of single mothers on TANF are about one hundred (1992) dollars, regardless of assumptions regarding the anticipation of time limits.

The aggressive plan is more effective than the moderate plan at promoting employment and JOBS participation by TANF recipients, but once again the simulated outcomes vary little according to assumptions regarding the anticipation of time limits. Regardless of the discount rate, the employment of single mothers on TANF during the second half of Year 4 ranges from 26 to 30 percent at 10 or more hours per week, from 17 to 19 percent at 20 or more hours per week, and from 8 to 9 percent at 30 or more hours per week. The percentage of the TANF caseload in JOBS is about 50 to 56 percent in each instance, with 35 to 39 percent of the caseload exempt from participation requirements (some because of high levels of employment), and another 9 to 11 percent of the caseload subject to limited benefits. Average monthly earnings of single mothers on TANF range between \$115 and \$129 under the simulations of the aggressive plan.

By the year 2002, 50 percent of each state's TANF caseload will be required to participate in work or related activities for at least 30 hours per week. The preceding simulations indicate that it is unlikely that employment of TANF recipients in private jobs will, by itself, enable states to reach this goal. Even under the aggressive TANF plan, the proportion of the single parent TANF caseload employed for 30 or more hours per week in private jobs never reaches 10 percent. This finding suggests that states will need to satisfy work participation requirements through means other than private employment of active TANF recipients, such as combining part-time employment with qualified JOBS-related activities (such as community work experience programs), or relying on the caseload reduction credit for reductions in the TANF caseload since Fiscal Year 1995 for reasons other than restrictions in TANF eligibility.⁽⁴⁾

The effects of each TANF plan on the employment of *all* single mothers are remarkably similar, regardless of the assumptions regarding the anticipation of time limits (Table 9). The moderate plan increases by about 9 percent the employment of single mothers at 10 or more hours per week, by about 8 percent the employment of single mothers at 20 or more hours per week, by about 4 percent the employment of

Table 8. Simulated Employment of Single Mothers on TANF under Welfare Reform, Second Half of Year 4, by Discount Rate

Plan description, characteristic of single mothers on TANF	Discount rate		
	r = +infinity	r = 10 percent	r = 5 percent
<i>Moderate plan</i>			
Percent working at 10+ hours/week	22.4	23.5	24.4
Percent working at 20+ hours/week	13.7	15.0	15.4
Percent working at 30+ hours/week	5.4	5.7	5.9
Percent in JOBS	40.4	37.8	37.8
Percent exempt from JOBS	38.2	40.4	40.7
Percent subject to limited benefits	5.6	4.8	4.1
Average earnings/month (1992 dollars)	94.4	98.8	102
<i>Aggressive plan</i>			
Percent working at 10+ hours/week	26.1	29.9	29.7
Percent working at 20+ hours/week	16.6	19.4	19.4
Percent working at 30+ hours/week	7.6	8.7	8.7
Percent in JOBS	56.0	50.1	50.2
Percent exempt from JOBS	35.1	39.4	39.3
Percent subject to limited benefits	8.7	10.6	10.6
Average earnings/month (1992 dollars)	115	129	128

Source: Mathematica Policy Research, Inc. October 1997. STEWARD model.

Table 9. Simulated Changes in Employment and Earnings of All Single Mothers under Welfare Reform, Second Half of Year 4, by Discount Rate

Plan description, percentage change in outcome versus baseline outcome for all single mothers	Discount rate		
	r = +infinity	r = 10 percent	r = 5 percent
<i>Moderate plan</i>			
Change in percent working at 10+ hours/week	8.6	8.7	8.8
Change in percent working at 20+ hours/week	7.5	8.0	8.0
Change in percent working at 30+ hours/week	3.6	3.5	3.5
Change in percent working at 40+ hours/week	-1.8	-1.8	-1.8
Change in average earnings/month (1992 dollars)	2.7	2.8	2.8
<i>Aggressive plan</i>			
Change in percent working at 10+ hours/week	10.1	10.3	10.3
Change in percent working at 20+ hours/week	9.2	9.6	9.5
Change in percent working at 30+ hours/week	4.2	4.6	4.5
Change in percent working at 40+ hours/week	-1.2	-1.3	-1.4
Change in average earnings/month (1992 dollars)	3.3	3.5	3.5

Source: Mathematica Policy Research, Inc. October 1997. STEWARD model.

single mothers at 30 or more hours per week, and by about 3 percent the earnings of single mothers. Somewhat surprisingly, the work incentives included in the moderate plan reduce full-time employment of single mothers by about 2 percent,

perhaps because some women reduce their labor supply in order to maintain eligibility for TANF with the expanded earned-income disregards.

As with single mothers on TANF, single mothers in general experience larger increases in employment and earnings from the aggressive TANF plan than the moderate TANF plan. The difference in the simulated effects of the two plans is usually on the order of one percentage point. In no instance do the effects of the aggressive plan on baseline employment levels differ substantially according to the manner in which individuals anticipate TANF time limits.

Estimated Effects on Poverty Rates

For both single mothers on TANF and single mothers as a whole, under both the moderate and aggressive plans, rates of extreme poverty (the proportion of single mothers with gross cash incomes below 25 percent of the poverty level for their family size) are larger under the aggressive plan than under the moderate plan, and under the forward-looking cases than under the myopic case (Table 10).

For the moderate plan, rates of extreme poverty for TANF recipients are 11 percent under the myopic case, but 12 percent under each of the forward-looking cases, and rates of extreme poverty for all single mothers are 17 percent under the myopic case, but 19 to 20 percent under the forward-looking examples. For the aggressive plan, rates of extreme poverty for TANF recipients are 16 percent under the myopic case, but 19 percent under each of the forward-looking cases, and rates of extreme poverty for all single mothers are 19 percent under the myopic case, but 22 percent under each of the forward-looking cases. Regardless of behavioral assumptions, the proportion of TANF recipients below 100 percent of the poverty level is about 90 to 92 percent under these plans; the corresponding proportion for all single mothers ranges between 42 and 43 percent.

The reasons why the aggressive plan is associated with higher rates of extreme poverty than the moderate plan are that the aggressive plan features substantially more sanctions (limited benefits) for failure to participate in JOBS, and a substantially lower TANF time limit (24 months). The reasons why rates of extreme poverty tend to be higher under each of the forward-looking cases than under the myopic case is that, under the former, many single mothers forgo months of TANF participation in order to conserve future TANF benefits, even though this decision results in a loss in family income. In some ways, these higher rates of extreme poverty represent the cost of obtaining the higher levels of employment and JOBS participation, and the lower levels of welfare dependency, that characterize the aggressive TANF plan.

Table 10. Simulated Poverty Levels of Single Mothers under Welfare Reform, Second Half of Year 4, by Discount Rate

Plan description, poverty rate of single mothers on TANF or all single mothers	Discount rate		
	r = +infinity	r = 10 percent	r = 5 percent
<i>Moderate plan</i>			
Single mothers on TANF			
percent below 25 percent of poverty level	10.9	12.1	12.4
percent below 100 percent of poverty level	91.5	92.2	91.9
All single mothers			
percent below 25 percent of poverty level	16.8	19.1	19.5
percent below 100 percent of poverty level	42.4	42.6	42.6
<i>Aggressive plan</i>			
Single mothers on TANF			
percent below 25 percent of poverty level	16.1	18.7	18.8
percent below 100 percent of poverty level	90.4	90.6	90.9
All single mothers			
percent below 25 percent of poverty level	18.8	21.8	21.8
percent below 100 percent of poverty level	42.0	42.3	42.3

Note: Poverty is measured using gross cash income plus the Earned Income Tax Credit and does not include income from food stamps.

Source: Mathematica Policy Research, Inc. October 1997. STEWARD model.

Conclusion

The preceding simulations are only illustrative of behavioral responses to possible state TANF packages. It is important to remember that the TANF plans we simulated do not correspond precisely with the TANF plan of any single state, nor does the underlying population match any single state's population of single mothers. In the near future, we hope to generate more appropriate simulation estimates for representative states using the state policy parameters, SIPP database, state weights, and behavioral equations of the MATH-STEWARD model. Nonetheless, we believe that several findings stand out from the provisional simulations we performed for this paper:

1. **Varying assumptions about the anticipation of TANF time limits, there is considerable variability in the simulated level of the TANF caseload.** After four years, a year before the first cases would reach a 60-month time limit, simulated TANF caseloads are approximately 20 percent lower under forward-looking behavior than under myopic behavior. At the same time, the employment- and income- related characteristics of the TANF caseload are more stable, regardless of the extent to which individuals discount the loss of future TANF benefits.
2. **Regardless of whether the TANF plan is aggressive or moderate in its work incentives and requirements, the percentage of single mothers on TANF employed in private jobs for 30 or more hours per week is consistently below 10 percent.** This finding suggests that states will need to meet TANF work participation requirements through the caseload reduction credit provision of the PRWORA, or through increases in participation in JOBS or similar programs combined with employment of TANF recipients in private jobs.
3. **The more aggressive plan, and a greater anticipation of TANF time limits, lead to higher levels of extreme poverty among single parents than would otherwise be the case.** The increase in these instances in the proportion of single parents with cash incomes below 25 percent of the poverty line suggests that there is a cost to some low-income families of aggressive policies designed to discourage welfare dependency and promote employment.

The MATH-STEWARD model will enable us to confirm these findings, as well as to see whether the simulated effects of TANF differ for single parent families and two-parent families. A future version of the model may also enable us to simulate forward-looking behavior in a more sophisticated manner.

Notes

1. The variable describing these “limited benefit plans” was set equal to the estimated fraction of AFDC benefits reduced for non-compliance with JOBS participation requirements. By Fiscal Year 1995, 6 states had already strengthened such measures, and 7 more did so during Fiscal Years 1995 and 1996.
2. A state can reduce its required level of work participation by the percentage by which TANF caseloads have declined from the state’s level of AFDC participation during Fiscal Year 1995. Because of this “caseload reduction credit,” states that are successful in reducing welfare dependency will not be penalized for failure to meet work participation requirements. The credit does not apply, however, to the extent that the reductions in caseloads are attributable to federal program requirements or changes in state eligibility criteria.
3. Note that our measure of poverty includes gross cash income plus the Earned Income Tax Credit, but does not include the cash value of food stamps or other in-kind transfers.
4. It is unclear how the caseload reduction credit will apply when states adopt shorter TANF time limits than the five-year federal limit, since this may be viewed as a restriction in TANF eligibility even when cases exit TANF voluntarily before available exhausting TANF benefits.

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Appendix

State Effects on Participation in Education/training

State	Estimated coefficient	Standard error of coefficient	Significance level	Implied odds ratio
AL	1.881	0.220	***	6.560
AK	1.251	0.265	***	3.494
AZ	1.806	0.212	***	6.086
AR	1.779	0.257	***	5.922
CO	0.932	0.217	***	2.540
CT	0.652	0.204	***	1.920
DE	1.442	0.264	***	4.229
DC	-1.076	0.493	**	0.341
FL	1.782	0.220	***	5.944
GA	-0.713	0.302	**	0.490
HI	0.693	0.235	***	1.999
ID	1.677	0.227	***	5.348
IL	1.282	0.178	***	3.605
IN	-0.893	0.339	***	0.409
IA	0.819	0.268	***	2.267
KS	1.633	0.207	***	5.117
KY	1.050	0.209	***	2.857
LA	-0.556	0.280	**	0.574
ME	1.086	0.232	***	2.963
MD	-0.440	0.339		0.644
MA	1.739	0.188	***	5.689
MI	-1.037	0.220	***	0.354
MN	0.596	0.244	**	1.815
MS	1.213	0.258	***	3.363
MO	0.210	0.243		1.234
MT	1.551	0.216	***	4.717
NE	3.536	0.268	***	34.316

NV	3.638	0.325	***	37.997
NH	3.396	0.237	***	29.839
NJ	-0.548	0.311	*	0.578
NM	1.988	0.217	***	7.303
NY	1.391	0.222	***	4.019
NC	2.701	0.291	***	14.889
ND	2.171	0.290	***	8.766
OH	2.016	0.196	***	7.507
OK	1.092	0.197	***	2.980
OR	1.755	0.209	***	5.784
PA	3.154	0.204	***	23.421
RI	0.361	0.211	*	1.434
SC	0.178	0.319		1.194
SD	1.950	0.302	***	7.026
TN	0.376	0.430		1.457
TX	-0.240	0.356		0.787
UT	2.930	0.225	***	18.727
VT	2.872	0.298	***	17.666
VA	3.215	0.261	***	24.912
WA	1.160	0.189	***	3.189
WV	0.986	0.201	***	2.682
WI	1.930	0.172	***	6.893
WY	1.516	0.268	***	4.554

Note: Sample size = 15,316 female household heads in Food Stamp units containing children under age 18. California is the omitted state (relative odds of participation = 1.000). * = statistically significant at the .10 level, ** = statistically significant at the .05 level, *** = statistically significant at the .01 level.

Source: MPR estimates from Fiscal Year 1995-96 Food Stamp Program Integrated Quality Control System data.