

Events that Trigger Poverty Entries and Exits*

Signe-Mary McKernan, *The Urban Institute*

Caroline Ratcliffe, *The Urban Institute*

Objective. This article examines how events—such as changes in household composition, employment status, disability status, and economic conditions—affect poverty entries and exits. We also examine whether the role these events play in poverty transitions differs in the pre- and post-welfare-reform periods. *Methods.* The analysis uses discrete-time multivariate hazard models along with monthly, longitudinal data from the 1988, 1990, and 1996 panels of the Survey of Income and Program Participation (SIPP). *Results.* Analyses show that many events are related to the likelihood of entering and exiting poverty. Of the trigger events examined, individuals living in households that experience a loss or gain of employment are the most likely to enter and exit poverty. We also find that changes in employment are more important in the 1996 to 1999 time period—after welfare reform—than in the 1988 to 1992 time period—prior to welfare reform. Finally, changes in household composition, disability status, and educational attainment are found to play a role in throwing people into poverty and helping them exit from poverty in both time periods. *Conclusions.* There is no single path into or out of poverty, suggesting that multiple policies can be considered to help alleviate poverty.

The U.S. poverty rate fell from over 15 percent in 1993—one of its highest levels in three decades, to 11.3 percent in 2000—its lowest level in two decades.¹ But even at this low, one in 10 people were in poverty,

*Direct correspondence to Dr. Caroline Ratcliffe, Senior Research Associate, The Urban Institute, 2100 M St. NW, Washington, DC 20037 (cratclif@ui.urban.org). Upon request, the corresponding author will share all data and coding information with those wishing to replicate the study. This research was supported by a Census-funded grant from the Joint Center for Poverty Research Development Grants Program and is based on work funded by the U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation under Contract HHS-100-99-0003. The authors thank the anonymous referees and the editor for helpful comments. They also thank Stephanie Riegg, Emily Rosenberg, Yasmeen A. Salahuddin, and Kristen Erwin for their excellent research assistance. Laura Chadwick, Susan Hauan, Don Oellerich, Julia Isaacs, Robert Lerman, and Douglas Wissoker provided excellent comments and advice. This article also benefited from comments received from Steven Haidar and participants at the 2002 Econometric Society Meetings, from participants of the George Washington University Labor Studies Workshop, and from participants at the JCPR/Census Bureau Research Development Grants Conference. The views expressed are solely those of the authors and should not be attributed to the JCPR, U.S. Department of Health and Human Services, the Urban Institute, its trustees, or its funders. All errors are the responsibility of the authors.

¹Individual poverty rates from the U.S. Census Bureau (2000).

including one in six children. These statistics, and the more recent increase in poverty, show that poverty remains a problem in the United States. What events triggered entries into and exits from poverty in the United States during the last decade? What role do events such as changes in household composition, employment status, and disability status play in entries into and exits from poverty? Understanding why individuals enter and exit poverty may be useful for effective policy, yet little is known about the events associated with poverty transitions.

Researchers have examined the relationship between events and poverty transitions in the United States, though most studies use only descriptive analyses. Although informative, descriptive analyses provide limited information because individuals can experience more than one event at a time, making it impossible to disentangle the relationship between one event and a poverty transition from that of other events or demographic characteristics. This study adds to our understanding of the role events play in entries into and exits from poverty by using a multivariate framework, which disentangles the relationship between different events and poverty transitions.

This study examines poverty in the United States and sheds light on two questions that remain largely unanswered in the literature.

1. What events increase the likelihood of entering and exiting poverty? Do changes in household composition, employment status, disability status, or economic conditions play a role?
2. Have these events changed over time—from the late 1980s to the late 1990s?

We answer these questions using discrete-time multivariate hazard models along with monthly, longitudinal U.S. data from the 1988, 1990, and 1996 panels of the Survey of Income and Program Participation (SIPP). The 1988 and 1990 panels provide monthly data for 1988 through mid-1992 and the 1996 panel from 1996 through early 2000. The monthly data bring the benefit of close timing in measures between events and changes in poverty status. The three panels allow us to examine poverty events before and after the major U.S. 1996 federal welfare reform.

The next section of this article discusses the prior research and our contributions to the literature. Then we present the conceptual framework and empirical model, respectively, followed by a description of the data. Finally, the results are discussed and a conclusion provided.

Prior Research and Contributions

A review of the poverty transitions literature finds two broad questions that have been examined. (1) What is the effect of poverty-spell duration on entries into, exits from, and reentries into poverty? and (2) What *events* are associated with entries into and exits from poverty? The first question has

been addressed by numerous studies—Stevens (1999) in the United States, Devicienti (2001) in Britain, and Hansen and Wahlberg (2004) in Sweden. The second question has not been fully addressed in the literature and is the focus of this study. Below, we review the methods and findings from the poverty events literature.

Methods Used to Examine Events Associated with Entries into and Exits from Poverty

Descriptive analyses that count the proportion of individuals who experience a poverty-related event and whether or not they enter or exit poverty are used by Ruggles and Williams (1987), Duncan and Rodgers (1988), and Blank (1997). Duncan and Rodgers also measure the net change in poverty rates for individuals who experience an event. Bane and Ellwood (1986), Blank (1997), and Jenkins (2000) identify the *primary* event most likely associated with poverty transitions. As Jenkins explains, “this social arithmetic is not modeling” (2000:552). This approach allows for only one (primary) reason for a change in the family’s poverty situation, when in fact there may be several reasons, one of several limitations of this approach.

Extending this research with multivariate analysis will relate multiple factors to changes in the family’s poverty situation and will help identify the relative importance of each factor in beginning or ending the poverty spell. Picot, Zyblock, and Pyper (1999) and Finnie and Sweetman (2003) begin to extend this research by using a multivariate logit model framework with annual, longitudinal data from Canada. Iceland (1997b) uses a multivariate hazard rate model and annual longitudinal data from the United States, although his analysis does not examine individual- and family-level events, but rather changes in labor market conditions, welfare payments, and residential segregation.

Results for Events Associated with Poverty Transitions

Descriptive analyses by Bane and Ellwood (1986), Ruggles and Williams (1987), Duncan and Rodgers (1988), and Blank (1997) for the United States, Jenkins (2000) for Britain, and the OECD (2001) for 12 EU member states, Canada, and the United States find similar results concerning events associated with poverty transitions. These analyses find that changes in employment and earnings are more commonly associated with poverty transitions than changes in household structure and composition. For example, using annual data from the PSID, Bane and Ellwood find that nearly three-quarters of poverty spells end with a rise in earnings, while only one-tenth of poverty spells end with a transition from a female-headed household to a male-headed household (1986:19).

The multivariate logit analysis by Picot, Zyblock, and Pyper (1999) for *children* in Canada finds that family composition changes (such as divorce or marriage), when they occur, are more important than changes in jobs held by parents in annual poverty transitions. Finnie and Sweetman (2003) focus on adults and find dramatic associations between family composition events (such as becoming a single parent) and annual poverty transitions but cannot compare them with employment changes due to data limitations.

Contributions to Literature

The U.S. literature has examined the relationship between individual- and household-level events and poverty transitions using only descriptive analyses. We add to the literature by using a multivariate hazard model and monthly U.S. data to examine how events such as changes in household structure, disability status, and employment status affect poverty entries and exits. The multivariate approach allows us to disentangle the relationship between one event and a poverty transition from that of other events or demographic characteristics. Monthly data (as opposed to annual data), along with concurrent and lagged-event variables included in the model, allow events and poverty status changes to be more closely timed. Associating an annual change in poverty status with an event that occurs at some point during the year is more difficult than associating a monthly change in poverty status with an event that occurred in the same or prior month(s) (Ruggles and Williams, 1987). We further add to the literature by examining whether the events that trigger poverty entries and exits have changed over time, from the late 1980s to the late 1990s, periods before and after the U.S. federal welfare reform.

Conceptual Framework

A change in poverty status can result from a change in household earned income, household unearned income, or household size—the three components that directly feed into the official U.S. poverty definition. Our hypotheses of the events likely to affect poverty entries and exits are based on the human capital theory (Becker, 1975) and Becker's (1991) theory of the demand for children.² These two theories identify major determinants of household earnings and household size. Human capital theory explains both individuals' decisions to invest in human capital (education and training)

²Sawhill's survey of the poverty persistence literature concludes that the literature lacks "a widely accepted theory of income distribution that might help one choose between competing model specifications and their varying results" (1988:1112). A review of the literature indicates this is still the case. The literature provides many statistics and some empirical results, but little theory to explain them.

and the pattern of individuals' lifetime earnings.³ Becker's (1991) theory of the demand for children predicts that the number of children in a family will depend on family income and the costs of children.

Other theories relevant to poverty analysis are the permanent income and lifecycle hypotheses. Empirical models based on these theories, however, do not reproduce observed patterns of poverty persistence as well as other methods (Stevens, 1999). In addition, the permanent income hypothesis does not allow for an individual's income stream to change if, for example, he or she becomes disabled. This is a serious drawback for analyzing poverty transitions.

Below, we discuss the three components of poverty—earned income, unearned income, and household size. Our discussion considers structural factors that affect poverty, such as economic conditions, public policies, and discrimination, although we focus on the proximate individual- and family-level factors that affect poverty.

Determinants of Household Earned Income

Household earned income is directly determined by the total number of hours household members work in the wage labor market and the wage rate. We discuss these in turn.

Determinants of Hours Worked in Wage Labor Market. Total household hours worked in the wage labor market are determined by wages, unearned income, number of adults in the household, number of children in the household, ages of children and adults in the household, household members' health or disability status, household preferences, and economic/labor market conditions. Note that economic conditions affect hours worked through many of the determinants mentioned, including wages, unearned income, and household composition.

Higher wages have two offsetting effects on hours worked. On the one hand, higher wages increase hours because the cost of leisure and home production increases (a substitution effect). On the other hand, higher wages decrease hours worked because individuals do not need to work as many hours to reach a particular level of income (an income effect). Higher unearned income has only one effect and is expected to lower household hours spent in the wage labor market (an income effect). Additional unearned income means household members can spend less time in the wage labor market and consume the same amount of goods.

Additional adults in the household should increase household hours spent in the wage labor market by providing another potential wage earner and

³Empirical work tends to support the human capital theory (Willis, 1986:598; Duncan, 1984:124).

additional help with home production. The number of children in the household is expected to reduce hours spent in the wage labor market, due to the need for additional time spent caring for the child. This is particularly true for households with young children.

Human capital theory suggests that household labor supply should also vary with age. Young adults are more likely to invest in human capital and so spend less time in the wage labor market, working-age adults will spend more hours as they reap the benefits of their investments, and adults nearing retirement age will spend fewer hours. To the extent that poverty follows earnings, we predict a similar relationship between age and poverty, with poverty more likely for the young and elderly. Health status will affect hours worked if a household member misses work due to illness or is unable to work due to a disability.

Determinants of Wages. The wage rate is another important determinant of household earned income. The wage available to individuals in a household will depend primarily on their human capital, age, gender, race, the state of the economy, and government policies. Human capital theory predicts that individuals with higher levels of education and training will have higher wages. It also predicts that wages will be affected by age, where young and older individuals are expected to have lower wage rates. Gender may affect wage rates to the extent that women have taken time out of the labor market to rear children and there is discrimination in the labor market. Similarly, we may see differences in wage rates by race to the extent that discrimination exists in the labor market or to the extent that our measure of educational attainment does not capture the level of human capital. The economy will affect wage rates—a strong economy and high demand for workers will result in higher wages.

Determinants of Household Unearned Income

Household unearned income is the sum of government transfers, private transfers, and asset income. The amount of government and private transfers a household receives is in part a function of preferences. All else equal, families with little taste for receiving transfers will have less unearned income from either government or private transfers than their counterparts who have more of a taste for transfers. The economy may also play a role in altering household unearned income as returns on investments will affect asset income.

Determinants of Household Size

Household size is an important determinant of whether a household or individual is in poverty because the official poverty measure incorporates household size. Based on Becker's theory of the demand for children,

household size depends on household income, the cost of children, wages, government transfers, and preferences. Income plays a role in determining family size because families with higher incomes are more able to afford additional children. In addition to the direct costs of having children (e.g., food, clothing, and health-care expenses), there are also *relative* costs. Relative costs of children are affected by the opportunity cost of child rearing as measured by the female wage rate, to a lesser extent the male wage rate, and government transfers. Government transfers may affect the number of children and adults in a family by altering the relative cost of having a child and creating incentives or disincentives to marry.

The Underlying Determinants of Poverty and Events Hypothesized to Affect Poverty

Combining the determinants of household earned income, unearned income, and size, we arrive at the determinants of poverty. The likelihood that a household is in poverty is determined by: age, race/ethnicity, human capital, gender, health/disability status, number of adults, number and age of children, cost of children, government policies, economy, and household preferences. This conceptual model also identifies events associated with poverty entries and exits.

- Changes in household composition: the birth of a child (through its effect on wage labor hours and its effect on household size) and change in marital status (through its effect on wage labor hours).
- Change in employment status (through its effect on earnings).
- Changes in disability or health status (through their effect on wages or wage labor hours).
- Changes in educational attainment (through their effect on wages).
- Changes in economic conditions (through their effect on wages or wage labor hours).

These variables form the basis for the empirical model that examines the relationship between household poverty status, household characteristics, and the events households experience.

Empirical Model

Discrete-time multivariate hazard models are used to analyze events that trigger entries into and exits from poverty. The hazard model provides information about the probability of experiencing an event at time t (e.g., exiting poverty) *given* that the event has not occurred prior to time t . Separate poverty entry and exit equations are estimated.

Our hazard model assumes that the probability of entering (or exiting) poverty in a month is represented by a logit specification.⁴ The logit specification is very tractable and restricts the transition probabilities to lie between 0 and 1 (Allison, 1984). Several studies of poverty dynamics have used the logit specification (Stevens, 1994, 1999; Iceland, 1997b). With this specification, the probability of entering (or exiting) poverty for person i at time t is:

$$P_{it} = \frac{1}{1 + e^{-y_{it}}} \text{ where } y_{it} = \alpha_t - \delta'T_{it} - \beta'X_{it}.$$

In this model, the intercept α_t varies with time, allowing the rate of a poverty entry (or exit) to change with the number of months an individual is observed out of (or in) poverty. The vector T represents the transition events and the vector X represents the control variables.

Both the poverty entry and exit equations have a binary dependent variable, where a 0 indicates that the transition has not occurred and a 1 indicates that the transition has occurred. Once an individual enters (or exits) poverty, that individual is no longer at risk of entering (or exiting) poverty, so is no longer in the equation.

We use the official U.S. poverty measure to define whether an individual is in poverty. This absolute poverty measure compares a household's annual income with an absolute annual poverty threshold (meant to reflect minimum family needs) to determine whether individuals in the household are in poverty. We convert this official annual measure to a monthly measure by comparing total household monthly income with the annual poverty threshold divided by 12, similar to Ruggles (1990).

Our model of *poverty entries* includes the following transition events: (1) child under age six enters household, (2) two-adult household becomes female-headed household, (3) loss of employment (of head, spouse, and other household members)—measured as a change from with job to no job, (4) nondisabled household head becomes disabled, and (5) weakening economy (change in state unemployment rate and change in GDP). Our model of *poverty exits* includes similar, although slightly different, transition events: (1) female-headed household becomes two-adult household, (2) gain in employment (of head, spouse, and other household members)—measured as a change from no job to with job, (3) disabled household head becomes nondisabled, (4) household head receives high school degree, (5) household head receives advanced degree, and (6) strengthening economy (change in state unemployment rate and change in GDP). Because some of these events are potentially endogenous, the models do not necessarily identify causal relationships. Instead, they measure conditional relationships—the relationship after controlling for other events and characteristics.

⁴We use a discrete-time, not a continuous-time, multivariate hazard model because poverty transitions are observed in a discrete time period, a month.

An important issue is the extent to which events that occur in earlier periods are allowed to affect transitions in the current period, that is, to what extent lags enter the model. An immediate fall in income, say due to the loss of a job, may not cause a household to instantly fall below the poverty threshold if it is eligible for unemployment insurance. A household may fall below the poverty threshold only when unemployment insurance benefits run out. Based on this theory of the timing between events and a poverty transition, we allow lags to enter the model for up to one year. We include the event at time (month) t and four quarterly lags.

Control variables include characteristics of the household head (age, race, and educational attainment), household (female-headed household, number of adults 18–61, number of children), geographic characteristics (region and MSA), economic indicators (state unemployment rate and GDP), poverty-spell information (observed duration of current spell at time t , observed number of prior spells, left-censored spell identifier), and year identifiers.⁵

Left and Right Censoring

Our hazard model approach takes account of right-censored spells, but left-censored spells are more problematic. Iceland (1997a) recommends that “when studying poverty transitions, using discrete-time logistic regression,” as we do in this article, “all observations from left-censored spells should be included in [the] model to avoid selection bias.” Iceland finds that omitting left-censored cases potentially introduces greater bias in poverty transitions than including them because it would systematically exclude individuals in the midst of long spells.⁶ As our analysis focuses on poverty transitions, we incorporate left-censored spells. We do, however, identify left-censored spells in the model using a dummy variable. With this design, the model of poverty entries that includes left-censored spells, for example, examines “first observed poverty entry” not “first entry.” To test the sensitivity of the results, we also estimate the poverty entry and exit equations excluding left-censored spells.

Interpreting Coefficients from the Model

The values of the estimated coefficients from the discrete-time multivariate hazard models do not have a straightforward interpretation. We can, however,

⁵Control variables that are related to event variables are defined such that the event variable captures the full effect of the event. We do this by defining the control variables as of more than one year ago (recall we include events at time t and four quarterly lags). Using female-headed household as an example, the control (i.e., nonevent) variable in the entry equation is “been a female-headed household for more than one year.” In this example, two-adult and single-male-headed household at time t is the omitted group.

⁶Stevens is also concerned about bias from omitting left-censored spells from her examination of poverty exit and reentry. She estimates models with and without left-censored spells and finds the bias from omitting left-censored spells is extremely small (1999:572).

use the estimated coefficients and individuals' characteristics to calculate the change in the probability of entering poverty (or exiting poverty) when an event occurs. We calculate how the likelihood of entering/exiting poverty changes when the event occurs by calculating (1) the average of each individual's likelihood of entering poverty *when the event is assumed to occur*, (2) the average of each individual's likelihood of entering poverty when the event *does not* occur, and (3) the difference between these two average likelihoods.⁷ This difference provides an estimate of how the probability of entering/exiting poverty changes when an event occurs and is referred to as the "simulated effect."

Data

Our analysis uses SIPP data supplemented with monthly state unemployment rates from the U.S. Department of Labor (2001) and quarterly real gross domestic product (GDP) from the U.S. Department of Commerce (2001). Each panel of the SIPP is a nationally representative (noninstitutional) sample of U.S. households whose members are interviewed at four-month intervals over approximately a two- to four-year period. The sample size for each panel ranges from 14,000 to 36,700 households. At each interview, data are collected for each of the preceding four months.

We analyze the 1988, 1990, and 1996 SIPP panels. The 1988 and 1990 panels interview households from February 1988 through September 1992, enabling us to analyze poverty prior to welfare reform and during a strong economy (the economy was expanding from November 1982 to July 1990; NBER, 2001) and during a weak economy (including the July 1990 to March 1991 recession; NBER, 2001). The 1996 SIPP panel interviews households from April 1996 through March 2000, allowing us to capture poverty after welfare reform and during a strong economy. A primary strength of the SIPP lies in its monthly data on income and household composition.

The unit of analysis for defining poverty status is the SIPP household. A SIPP household consists of all persons who occupy a housing unit (including all unrelated persons).⁸

Results

The SIPP data are split into two samples: (1) persons at risk of entering poverty in the current period t (i.e., persons not in poverty in the prior

⁷In the poverty entry models, for example, the probability individual i enters poverty at time t is expressed as $P_{it} = 1/(1 + e^{-y_{it}})$. When calculating the estimated probability of entering poverty when an event is assumed to occur, individuals' own characteristics are used except for the one transition event that is assumed to occur (i.e., the event indicator variable is set to 1). Similarly, when calculating the estimated probability of entering poverty when an event is assumed to not occur, individuals' own characteristics are used except the transition event being examined is set to 0.

⁸Additional details about the data are provided in an appendix available from the authors.

period) and (2) persons at risk of exiting poverty in the current period t (i.e., persons in poverty in the prior period). This section first provides basic descriptive statistics and then presents results from the multivariate analysis.

Descriptive Analysis

Events Associated with Poverty Entries. Examining the key trigger events, we find that the events are experienced by a small portion of the sample in any month (0.1 to 1.2 percent). At first glance, this incidence rate may appear low, but it is a monthly rate (i.e., based on person-month observations), not an annual or lifetime rate. A loss of employment by a household member other than the head or wife is the most common event experienced by individuals (1.2 percent in a given month). Shifting from a two-adult to a female-headed household is a relatively rare event, experienced by 0.1 percent of the sample in a given month.⁹

Persons who experience these key trigger events are significantly more likely to enter poverty than the overall sample. Those who shift to a female-headed household are the most likely to enter poverty, but this event does not explain why most people are poor, because only a small fraction of the population experiences this event. Employment is the most common event associated with poverty entry. Twenty percent of those entering poverty had a household member lose a job. A change in disability status plays the next largest role (3.1 percent of those entering poverty), followed by a shift to a female-headed household (2.8 percent), and a young child entering the household (2.5 percent).

Events Associated with Poverty Exits. Of the person-month observations at risk of exiting poverty each month, 10.9 percent exit poverty in the 1988/90 SIPP panel and 9.1 percent exit poverty in the 1996 SIPP panel. Changes in employment occur most often (1.1 to 2.9 percent), followed by a change in disability status (0.4 to 0.8 percent), and a shift from a female-headed to a two-adult household and education gains (0.1 to 0.2 percent). Persons experiencing each of the key exit trigger events in a given month are significantly more likely to exit poverty that month than the overall sample. Similar to the findings for poverty entry, persons who shift from living in a female-headed to a two-adult household in a given month are the most likely to experience a poverty transition—51.9 to 65.2 percent exit poverty. However, because relatively few people experience this event, it is less associated with poverty exits. Changes in employment are often associated with poverty exits in the total population.

⁹For a thorough discussion of the descriptive results, see McKernan and Ratcliffe (2002, 2003).

Multivariate Analysis

The general findings from the multivariate analyses are similar for the poverty entry and exit models. The analyses confirm that many events are related to the likelihood of entering and exiting poverty. Of the trigger events examined, individuals living in households that experience an employment change are the most likely to enter and exit poverty. This differs from our descriptive findings, as the descriptive results suggest that shifts in household structure are more important than changes in employment. Controlling for characteristics of households reduces the observed relationship between household structure shifts and poverty, and employment changes emerge as most strongly related to poverty transitions. Below, we discuss findings from the poverty entry analysis, the poverty exit analysis, and additional specification tests.

Poverty Entries

Trigger Events: The 1996 SIPP results (which cover the 1996–1999 time period) identify employment losses as the event most often associated with poverty entries (Table 1, Columns 4–6). The next most important event is the entry of a child under age six into the household, followed by a shift to a female-headed household and then the onset of a disability of the household head. The relationship between events and poverty entries is substantially stronger in the current month than in prior months, so the discussion below focuses more heavily on the effect in the current month.¹⁰

Loss of employment by the household head has the largest impact on poverty entry. Persons in households where the head stops working this month (at time t) or in the prior two quarters (at time $t - 1$ or $t - 2$) are more likely to enter poverty this month. Our finding that the loss of employment in earlier months is related to poverty entries in the current month suggests that some households are able to keep themselves out of poverty in the short term, perhaps because of government transfers such as unemployment insurance benefits. If the household head stops working this month, the probability of entering poverty this month is higher by 11.0 percentage points, and if the household head stopped working at time $t - 1$ or $t - 2$, the probability of entering poverty is higher by 1.1 and 0.3 percentage points, respectively. Employment losses by either the spouse or other family members this month have smaller, yet significant, effects on the probability of entering poverty this month (the probability rises by almost 5 percentage points).

Having a child under age six enter the household this month increases the likelihood of entering poverty (this month) by 2.7 percentage points. Shifting from a two-adult to a female-headed household has a smaller relationship with poverty entries—the likelihood of entering poverty increases by

¹⁰The tables only show the current period and two lags (i.e., t , $t-1$, and $t-2$). The full set of results (which also includes $t-3$ and $t-4$) is available from the authors.

TABLE 1
 Determinants of Individuals' Poverty Entry: Coefficient Estimates and Simulated Effects from Poverty Duration Hazard Model

Explanatory Variables	1988 & 1990 SIPP		1996 SIPP		Simulated Effect
	Coeff.	s.e.	Coeff.	s.e.	
<i>Entry Trigger Events (at t and Lagged)^a</i>					
Change in Household Composition					
Child under age 6 enters household, t	1.349**	0.140	1.310**	0.091	0.027
Child under age 6 enters household, $t - 1$	0.342**	0.116	0.268**	0.086	0.004
Child under age 6 enters household, $t - 2$	0.395**	0.116	0.316**	0.084	0.004
Two-adult becomes female-headed household, t	2.520**	0.159	0.984**	0.124	0.018
Two-adult becomes female-headed household, $t - 1$	0.456*	0.209	0.144	0.166	0.002
Two-adult becomes female-headed household, $t - 2$	0.141	0.216	0.172	0.169	0.002
Change in Employment					
Loss of employment, head, t	2.639**	0.085	2.741**	0.042	0.110
Loss of employment, head, $t - 1$	0.747**	0.114	0.705**	0.055	0.011
Loss of employment, head, $t - 2$	0.008	0.128	0.247**	0.058	0.003
Loss of employment, spouse, t	0.797**	0.118	1.829**	0.061	0.048
Loss of employment, spouse, $t - 1$	0.100	0.091	0.526**	0.066	0.008
Loss of employment, spouse, $t - 2$	-0.002	0.108	0.184**	0.070	0.002
Loss of employment, others in household, t	1.329**	0.103	1.847**	0.042	0.049
Loss of employment, others in household, $t - 1$	0.093	0.084	0.364**	0.052	0.005
Loss of employment, others in household, $t - 2$	0.056	0.085	0.123*	0.057	0.002
Change in Disability Status					
Head becomes disabled, t	0.124	0.132	0.856**	0.080	0.015
Head becomes disabled, $t - 1$	0.049	0.100	-0.442**	0.087	-0.004
Head becomes disabled, $t - 2$	0.044	0.102	0.321**	0.071	0.004
Change in Economic Status					
Change in state unemployment rate, t	0.089**	0.033	0.004	0.026	0.000
Change in state unemployment rate, $t - 1$	-0.054	0.042	-0.005	0.027	0.000
Change in state unemployment rate, $t - 2$	-0.062	0.049	-0.049	0.026	0.000
Change in GDP, t (in billions)	0.000	0.000	-0.000**	0.000	-0.001
Change in GDP, $t - 1$ (in billions)	0.004**	0.001	0.001**	0.000	0.002

continued

TABLE 1—continued

Explanatory Variables	1988 & 1990 SIPP		1996 SIPP	
	Coeff.	s.e.	Coeff.	s.e.
Change in GDP, $t - 2$ (in billions)	-0.001	0.001	-0.001**	0.000
Nontrigger Events				
Demographic Characteristics of Household Head				
Age				
Less than 25	0.544**	0.054	0.338**	0.038
Greater than or equal to 55	-0.410**	0.046	-0.233**	0.029
Race				
Hispanic	0.474**	0.051	0.295**	0.036
African American	0.464**	0.050	0.341**	0.031
Educational Attainment				
Equal to high school	-0.444**	0.042	-0.370**	0.030
More than high school	-0.755**	0.044	-0.649**	0.031
Household Composition				
Female-headed household for more than one year	0.276**	0.059	0.520**	0.028
Number of adults (less head and wife)	-0.242**	0.025	-0.224**	0.019
Number of children (less children that enter from t to $t - 4$)	0.144**	0.016	0.139**	0.009
Economic Characteristics				
State unemployment rate, t	0.038**	0.012	0.040**	0.012
GDP t (in 10 billions)	-0.022	0.025	-0.014	0.012
Sample size	2,034,658			3,242,561

^aThe models also include: the event variables lagged at time $t - 3$ and $t - 4$; region (northeast, midwest, and west); MSA; observed duration of current spell (0, 4-6, 7-9, 10-12, 13-15, 16-18, 19-21, 22-24, 25-27, and 28 or more months); number of previous observed spells; indicator of left-censored spell; and indicators of calendar year.

*Denotes statistical significance at the 5 percent level; **denotes statistical significance at the 1 percent level.

NOTE: Simulated effects are the estimated percentage point change in the likelihood of entering poverty when the explanatory variable changes. For most variables the simulated effects are calculated going from 0 to 1 (e.g., no employment loss in month t to having an employment loss in month t). The exceptions are the unemployment rate (which is simulated to go from 0 to 0.5) and GDP (which is simulated to go from 0 to 25).

1.8 percentage points. Since the model controls for employment changes, these effects are net of any change in the employment status of household members.

The results suggest that changes in economic conditions, as measured by state unemployment rates and GDP, have only a slight influence on poverty entries (Table 1). We examine whether the estimated relationship between poverty entries and changes in economic conditions are mitigated by the inclusion of employment changes in the model, but our analysis suggests that this is not the case. The effect of economic conditions on poverty could be working through other variables included in the model, such as changes in household composition. Also, state unemployment rates and GDP do not fully capture economic conditions, particularly local labor market conditions, so there may be other measures of economic conditions that are important determinants of poverty entries. The results do suggest, however, that the *level* of a state's unemployment rate is significantly related to poverty entries—individuals living in a state with a high unemployment rate are more likely to enter poverty.

Changes Over Time: The period from the late 1980s to the late 1990s saw changes along several dimensions—the economy strengthened (NBER, 2001), poverty rates fell (U.S. Census Bureau, 2000), female employment rates increased (U.S. Department of Labor, 2005), and welfare reform legislation was enacted. Along with these changes may have come changes in the relationship between events and poverty transitions, so we compare results over time.

The SIPP results suggest that shifts from two-adult to female-headed households—measured while controlling for shifts in employment—became less important in poverty entries over the 1988–1992 to 1996–1999 time period (Table 1, Columns 3 and 6). Shifting from a two-adult to a female-headed household this month is important in both periods, but is found to increase the likelihood of entering poverty by 8.3 percentage points in the 1988–1992 period and by only 1.8 percentage points in the 1996–1999 period.

Household structure changes are often associated with employment changes, so we also estimate models that exclude employment changes (not shown). Models excluding employment changes show a similar relationship between poverty entries and household structure across the 1988–1992 and 1996–1999 periods. One explanation for this pattern is that household structure changes operate through employment to a greater extent in the later period than the earlier period. In the earlier period, females were more likely to move from not employed to employed when the spouse/partner left the household, so these households were less likely to experience a net change in employment (since her employment replaced his employment). In the later period, women were more likely to be employed both before and after the household shift, so the departure of employed males from the household resulted in a greater net loss

of employment. As a result, the effect of shifting from a two-adult to a female-headed household is more concentrated in the household-structure variable in the earlier period than the later period.

Consistent with these employment patterns, our analysis suggests that the loss of employment is more important in poverty entries in the later period, particularly the employment of the spouse and other household members.

The relationship between disability onset and poverty entry is smaller in magnitude in the 1988–1992 versus 1996–1999 period. The onset of a disability this month increases the likelihood of entering poverty by 1.5 percentage points in the 1996–1999 period, but for the earlier 1988–1992 period, we find no relationship between onset and poverty entry.¹¹ Finally, the increase in the likelihood of entering poverty if a child under age six enters the household this month is similar in the 1988–1992 and 1996–1999 periods—2.5 and 2.7 percentage points, respectively.

Nontrigger Events/Control Variables: Many of the control variables also help to explain poverty entry. Characteristics of the household head, including age, race, and educational attainment, are related to poverty entry. Persons in households headed by older adults (age 55 or older) are less likely to enter poverty, which is consistent with Naifeh, who also uses SIPP data (1998:6). Consistent with analyses by Eller (1996) and Naifeh (1998), persons who live in households headed by African-American individuals are more likely to enter poverty than persons who live in households headed by white individuals, as are persons in households headed by Hispanics. We also find that higher educational attainment is associated with a lower probability of entering poverty.

Finally, household structure also plays a role. Persons in households that have been female-headed for more than one year are more likely to enter poverty than persons in two-adult and single-male-headed households. The presence of children is also related to poverty entries—the likelihood of entering poverty is higher for persons in households with more children.

Trigger Events: Individuals experiencing many of the trigger events are significantly more likely to exit poverty (Table 2). Like our examination of poverty entries, the 1996 SIPP results suggest that employment changes are most often associated with poverty transitions. We also find that increases in educational attainment—completing a high school or higher-level degree—are important events, as well as shifts in household structure and changes in disability status.

Employment gains by the head, spouse, and other household members are of roughly equal importance in helping individuals exit poverty. The likelihood of exiting poverty this month is higher by between 21 and 24

¹¹The relationship between disability onset and poverty entry is larger in magnitude in models that exclude changes in employment status.

TABLE 2
Determinants of Individuals' Poverty Exit: Coefficient Estimates and Simulated Effects from Poverty Duration Hazard Model

Explanatory Variables	1988 & 1990 SIPP		1996 SIPP		Simulated Effect
	Coeff.	s.e.	Coeff.	s.e.	
<i>Exit Trigger Events (at t and Lagged)^a</i>					
Change in Household Composition					
Female-headed becomes two-adult household, <i>t</i>	2.295**	0.259	0.833**	0.173	0.077
Female-headed becomes two-adult household, <i>t</i> - 1	-0.652*	0.256	-0.126	0.196	-0.009
Female-headed becomes two-adult household, <i>t</i> - 2	-0.868**	0.312	-0.053	0.218	-0.004
Change in Employment					
Gain of employment, head, <i>t</i>	1.120**	0.090	1.818**	0.043	0.214
Gain of employment, head, <i>t</i> - 1	0.470**	0.082	0.732**	0.047	0.064
Gain of employment, head, <i>t</i> - 2	0.195	0.103	0.227**	0.055	0.017
Gain of employment, spouse, <i>t</i>	1.231**	0.112	1.934**	0.072	0.236
Gain of employment, spouse, <i>t</i> - 1	0.367**	0.095	0.584**	0.079	0.049
Gain of employment, spouse, <i>t</i> - 2	0.133	0.110	-0.095	0.088	-0.007
Gain of employment, others in household, <i>t</i>	1.531**	0.090	1.967**	0.061	0.241
Gain of employment, others in household, <i>t</i> - 1	0.212*	0.086	0.656**	0.062	0.056
Gain of employment, others in household, <i>t</i> - 2	-0.032	0.090	0.083	0.066	0.006
Change in Disability Status					
Head ceases to be disabled, <i>t</i>	0.281	0.168	0.785**	0.094	0.071
Head ceases to be disabled, <i>t</i> - 1	-0.632**	0.137	-0.625**	0.087	-0.036
Head ceases to be disabled, <i>t</i> - 2	-0.343*	0.157	-0.043	0.072	-0.003
Change in Education					
Head graduated high school, <i>t</i>	0.872**	0.237	0.813**	0.195	0.074
Head graduated high school, <i>t</i> - 1	-0.444	0.238	-0.160	0.202	-0.011
Head graduated high school, <i>t</i> - 2	0.229	0.202	0.279	0.185	0.022
Head received advanced degree or certificate, ^b <i>t</i>	1.069**	0.281	0.830**	0.251	0.076
Head received advanced degree or certificate, <i>t</i> - 1	0.273	0.256	0.251	0.197	0.019
Head received advanced degree or certificate, <i>t</i> - 2	0.672*	0.310	0.510**	0.188	0.042
Change in Economic Status					
Change in state unemployment rate, <i>t</i>	0.077*	0.030	0.038	0.027	0.001
Change in state unemployment rate, <i>t</i> - 1	-0.047	0.038	0.008	0.029	0.000

continued

TABLE 2—continued

Explanatory Variables	1988 & 1990 SIPP		1996 SIPP	
	Coeff.	s.e.	Coeff.	s.e.
Change in state unemployment rate, $t - 2$	-0.109*	0.046	0.022	0.029
Change in GDP, t (in billions)	0.001*	0.000	-0.000**	0.000
Change in GDP, $t - 1$ (in billions)	0.005**	0.001	0.001**	0.000
Change in GDP, $t - 2$ (in billions)	-0.000	0.001	-0.001**	0.000
Demographic Characteristics of Household Head				
Age				
Less than 25	-0.197**	0.056	-0.262**	0.039
Greater than or equal to 55	-0.142**	0.046	-0.106**	0.028
Race				
Hispanic	-0.214**	0.051	-0.101**	0.035
African American	-0.463**	0.053	-0.195**	0.031
Educational Attainment				
Graduated high school more than one year ago	0.384**	0.067	0.212**	0.029
Received an advanced degree/certificate more than one year ago	0.485**	0.070	0.369**	0.029
Household Composition				
Female-headed household for more than one year	-0.393**	0.062	-0.274**	0.028
Number of adults (less head and wife)	0.304**	0.026	0.152**	0.018
Number of children (less children that enter from t to $t - 4$)	-0.052**	0.017	-0.069**	0.009
Economic Characteristics				
State unemployment rate, t	-0.085**	0.013	-0.060**	0.013
GDP, t (in 10 billions)	-0.117**	0.024	-0.015	0.012
Sample size	272,639		517,902	

^aThe models also include: the event variables lagged at time $t - 3$ and $t - 4$; region; MSA; observed duration of current spell; number of previous observed spells; indicator of left-censored spell; indicators of calendar year; and a variable indicating if the head's educational attainment increased, but the increase was due to a household shift.

^bAdvanced degree or certificate is defined as having a technical, associate, or higher-level degree/certificate. This variable differs across the 1988/1990 and 1996 SIPP analysis files because of differences in the survey questionnaire across the panels. The 1996 SIPP questionnaire provides information on degree attainment (e.g., received technical degree/certificate, associate degree, or college or higher-level degree), while the 1988 and 1990 panels only provide years of education. To approximate this event in the 1988 and 1990 panels, we code an individual as having received an advanced degree or certificate if he or she completes at least two years of education beyond a high school degree.

*Denotes statistical significance at the 5 percent level; **denotes statistical significance at the 1 percent level.

NOTE: Simulated effects are calculated as described at the bottom of Table 1.

percentage points if the head, spouse, or another household member gains employment this month (Table 2, Column 6). Educational gains in the current month, and in prior months, increase the likelihood of exiting poverty. If the household head receives an advanced degree or certificate (technical, associate, or higher-level) this month, the probability of exiting poverty this month is higher by 7.6 percentage points, and if the household head received the degree at time $t - 2$, $t - 3$, or $t - 4$ the probability of exiting poverty is higher by 4 to 6 percentage points. If the household head receives a high school degree this month, the likelihood of exiting poverty this month is higher by 7.4 percentage points, although the estimated coefficients on the lagged variables are not statistically significant. This increased likelihood of exiting poverty on completing a schooling degree/certificate may be due to the higher wages individuals generally command with higher levels of education, as well as increased hours of work that may coincide with the completion of school.

A shift in household structure—from a female-headed to a two-adult-headed household—is also related to poverty exits. An individual's likelihood of exiting poverty this month is higher by 7.7 percentage points if the household shifted from a female-headed to a two-adult-headed household. Individuals in households whose head ceases to be disabled this month are also more likely to exit poverty (by 7.1 percentage points). The results do not show that changes in state unemployment rates affect poverty exits, although higher unemployment rates (i.e., the level variable) lower the likelihood of exiting poverty. Contrary to our expectation, we find that an increase in GDP reduces the likelihood of exiting poverty (in periods t , $t - 2$, and $t - 3$). As with the poverty entry models, we examine whether the estimated relationship between poverty exits and changes in economic conditions are mitigated by the inclusion of employment changes in the model, but our analysis suggests this is not the case. It is possible, however, that measures of economic conditions not included in the model are important determinants of poverty exits.

Changes Over Time: Comparing the 1988/1990 and 1996 SIPP panel results show differences and similarities. In models that include employment, shifts from female-headed to two-adult-headed households were less important in poverty exits in the later period (1996–1999) than in the earlier period (1988–1992). However, when employment is excluded from the model, we find a similar relationship between poverty exits and household structure shifts across the two periods. As with our entry analysis, this pattern is consistent with the more stable employment of women across household structures in the later period than in the earlier period.

With higher employment rates among women in the late 1990s, one might expect shifts from female-headed to two-adult households to lead to more poverty exits in the later period than in the earlier period (since the male's earnings more likely add to, rather than replace, the female's earnings in the

later period). The decline in the earnings of less-educated men (those with a high school education or less) from the early to the late 1990s (Waldfoegel and Mayer, 1998–1999:12–13), however, may have mitigated this.

Employment gains are more important in poverty exits in the later period (1996–1999) than in the earlier period (1988–1992).¹² This is consistent with increases in women's earnings during the 1990s, although these increases were concentrated among women with a high school degree or more (Waldfoegel and Mayer, 1998–1999:12–13). An employment gain by someone in the household this month increases the likelihood of exiting poverty this month by 13 to 20 percentage points in the 1988–1992 period, while the same employment gain increased the likelihood of exiting poverty by 21 to 24 percentage points in the 1996–1999 period. Finally, we find that the relationship between economic conditions and poverty exits differs somewhat between the two time periods.

Nontrigger Events/Control Variables: Individuals in households headed by young adults (under age 25) and older adults (age 55 and older) are less likely to exit poverty. Consistent with the literature, persons in households headed by African-American and Hispanic individuals are less likely to exit poverty than persons in households headed by white individuals (Eller, 1996; Naifeh, 1998; Stevens, 1999). Like Stevens (1999), we find that higher educational attainment is associated with a higher probability of exiting poverty.

Household composition also plays a role. Persons in households that have been female headed for more than one year are less likely to exit poverty than persons in two-adult and single-male-headed households. The presence of children in the household is also related to poverty exits—the likelihood a poverty exit is lower for individuals in households with more children.

Specification Tests. To check the robustness of our results, we conduct specification tests for left-censored spells and unobserved heterogeneity. We include left-censored spells in our primary models because omitting left-censored spells can lead to selection bias. We estimate the poverty entry and exit equations excluding left-censored spells to assess the extent of potential bias.

In the poverty entry analysis, eliminating left-censored spells restricts our sample to a select group of individuals who previously (and relatively recently) experienced a spell of poverty. Among this disadvantaged subpopulation, we analyze individuals' probability of *reentering* poverty. In the poverty exit analysis, eliminating left-censored spells restricts our sample to individuals with relatively short poverty spells (the maximum length is between two and four years) because individuals in the midst of long poverty spells are removed from the estimation sample.

¹²This time pattern also exists in models that exclude the household-composition-event variables.

By and large, our general reported findings for both the entry and exit analyses are not sensitive to the inclusion or exclusion of left-censored spells. We do, however, find that the effects of the trigger events are larger in magnitude in models that exclude left-censored spells. The results tell us that the increase in the probability of *entering* poverty when a trigger event occurs is greater for the subpopulation previously observed living below the poverty line than for the full population at risk of entering poverty. Similarly, in the poverty exit model, the larger effects tells us that the increase in the probability of exiting poverty when a trigger event occurs is greater for the subpopulation that is in the midst of a relatively short poverty spell than for the population that is in the midst of a poverty spell of any length.

We estimate additional specifications to examine the potential effects of unobserved heterogeneity. Much of the literature is concerned that unobserved heterogeneity could bias the estimated effect of duration on the hazard rate (in our case the likelihood of transitioning into and out of poverty). This is not our primary concern because this article focuses on the effect of events on poverty transitions (controlling for duration), rather than the effect of duration itself on these transitions. We have the narrower concern that potential correlation between the duration terms and events could lead to biased measures of the events. We assess this bias by estimating models with a more flexible form of the duration term. Rather than grouping the duration terms into roughly three-month intervals, we allowed each month to enter separately. To the extent that longer duration picks up differential propensities to switch states, a model including very detailed duration terms should provide insight into the effects of including greater controls for unobserved heterogeneity. Results from models with more detailed duration controls are similar to those presented above. This suggests that parameterizing unobserved heterogeneity would have little effect on our event variable coefficients. We also attempted to estimate our model using the Heckman and Singer (1984) approach to correct for unobserved heterogeneity but, as is common in this literature, the models did not converge (Finnie and Sweetman, 2003).

Conclusion

This study examines events that trigger entries into and exits from poverty using discrete-time multivariate hazard models. The events examined are motivated by the conceptual model and include changes in household composition, employment status, disability status, educational attainment, and economic conditions. Our multivariate approach disentangles the relationship between one event and poverty transitions from that of other events and demographic characteristics, thereby providing information about the relationship between specific events and individuals' entries into and exits from poverty. Several studies have examined the relation-

ship between events and poverty transitions, but most use only descriptive analyses.

We examine poverty transitions using monthly data from the 1988, 1990, and 1996 panels of the SIPP. Using these data, we examine whether the trigger events differ in the 1988–1992 period—prior to welfare reform—and the 1996–1999 period—after welfare reform.

Descriptive statistics suggest that those who shift from a two-adult household to a female-headed household and vice versa are the most likely to transition into and out of poverty, although individuals experiencing any of the examined trigger events are more likely to enter and exit poverty than those not experiencing the events. Although the multivariate results confirm that many events affect the likelihood of entering and exiting poverty, a different event is identified as most important in poverty transitions. Individuals living in a household that experiences a loss or gain of employment are the most likely to enter and exit poverty. Controlling for household characteristics and other variables reduces the observed relationship between household structure shifts and poverty, and employment changes emerge as being most strongly related to poverty entries and exits. We also find that changes in employment are more important in the 1996 to 1999 time period—after welfare reform and during a booming economy—than in the 1988 to 1992 time period—prior to welfare reform.

Our results suggest that many events throw people into poverty and many events help people exit from poverty. There appears to be no single path into or out of poverty. We find that household events—including changes in composition, employment, and disability status—are important, as are economic conditions. These findings suggest that multiple policies can be considered to help alleviate poverty.

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