

# APPENDIX

## DATA, SAMPLES, AND ANALYTIC APPROACH

In this Appendix, we describe the data sources (Section A), provide key sample and poverty definitions (Section B), and describe our analytic approach (Section C).

### A. DATA

Our data come from the 2001 SIPP, a large, multipanel, longitudinal survey that collected demographic and socioeconomic information on a nationally representative sample of U.S. households. The data cover the period from late 2000 through 2003. SIPP provides detailed monthly measures on labor force participation (for those age 15 and older), income, participation in public programs, and household composition.

Adults followed in the SIPP panel come from a nationally representative sample of households in the civilian, noninstitutionalized population of the United States. Sample members were interviewed once every four months during the 36-month panel period. If original (*primary*) sample members older than age 14 moved from their original residences, they were interviewed at their new addresses. *Secondary* sample members—those who were not part of the original sample but who lived with primary sample members after the first interview—were interviewed if they were in the same household as primary sample members.

The Census Bureau used multistage sampling techniques to select a representative set of households for the 2001 SIPP panels. The first interviews for the panel began in February 2001 with a sample of about 36,700 households and oversampling of low-income households. Sample households were divided into four “rotation groups” of roughly equal size, and one group was interviewed each month. Thus, each household was interviewed in four-month intervals, called “waves.” The 2001 SIPP contains 9 waves that provide 36 months of data for each person in the sample. The 2001 SIPP interviews were administered using computer-assisted interviewing (CAI) to increase data quality.

At each interview, sample members provided information about their experiences during the preceding four-month period, called the “reference period.” For example, people in rotation group 1 whose wave 1 interviews were conducted in February 2001 (the earliest interviews) were asked about their experiences between October 2000 and January 2001. Similarly, people in rotation group 4 whose wave 9 interviews were conducted in January 2004 (the latest interviews) were asked about their experiences between September 2003 and December 2003. Thus, the 9 reference periods for the 2001 SIPP panel cover October 2000 through December 2003.

The SIPP questionnaire is made up of the core questions and the topical modules. The core questions, asked in every wave interview, provide information on (1) demographic

characteristics and (2) work behavior, income, and program participation for each of the four months preceding the interview date.

In addition to data from the SIPP, we used state-level data that included information on states' economic conditions, poverty levels, and welfare rules. We merged this state-level information to the SIPP data file using information on the state in which each sample member lived.<sup>1</sup> We used this information to explore the relationship between state characteristics and poverty dynamics in the multivariate analysis. State-level data includes the unemployment rate from the U.S. Department of Labor's Bureau of Labor Statistics [BLS], poverty rate from the Statistical Abstract of the United States, and state TANF policy parameters (Blank and Schmidt 2001; Rangarajan, Castner and Cark 2005).

## **B. DEFINING POVERTY, SINGLE MOTHERS, THE UNIT OF ANALYSIS, AND POVERTY SPELLS**

This section describes our approach to defining poverty, single mothers, the unit of analysis, and poverty spells.

### **1. Selecting the Poverty Measure**

A large literature explores alternative definitions of poverty (see Sawhill 1988 and Ruggles 1990). Some of the major sources of debate in defining poverty are whether to use an absolute, relative or subjective poverty standard, whether to include wealth and in-kind transfers as available assets, how to adjust poverty standards across time, whether to measure poverty at a particular point in time or across a longer period of life, how to account for family size, family need, and different needs at different life stages, how to deal with non-family members of a household, among others.

Despite the detailed debate on the most conceptually appropriate poverty standard, no consensus has developed on a "best" poverty definition. As a result, the majority of the literature that investigates general questions related to the dynamics of poverty relies on the federal poverty standard or some close variant (e.g., Hoynes et al. 2004; Bane and Ellwood 1986; Stevens 1994; Stevens 1999; Rank and Hirschl 2001; Iceland 1997a; Ruggles and Williams 1987; Eller 1996; Naifeh 1998; McKernan and Ratcliffe 2002). This measure has been criticized for its lack of connection to consumption, for the arbitrariness of the threshold, for changing little over the past 30 years despite large changes in relevant public policy, among other reasons (Citro and Michael 1995; Sawhill 1988). However, its use has been justified based on its ease of application, comparability to other studies, and the arbitrariness of any absolute standard.

We used the official U.S. Census Bureau poverty measure as the primary one for the study. Despite its shortcomings, it is the one most commonly used in research examining poverty-

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<sup>1</sup>For nine states with relatively few SIPP respondents, the data do not identify the state individually but rather in three groups: (1) Maine and Vermont; (2) Iowa, North Dakota, and South Dakota; and (3) Alaska, Idaho, Montana, and Wyoming. For these groups, we used the mean characteristics across all states in the group.

related issues, and it offers a straightforward and easily understood method for gauging poverty. Thus, the use of the official measure will facilitate comparisons of our study results with those of previous research.

Under the official measure, a family is “poor” if its total family income is less than its poverty threshold (based on the Office of Management and Budget’s Statistical Policy Directive 14). Income includes earnings, cash assistance (such as TANF benefits, unemployment compensation, SSI), child support, educational assistance, pension income, and interest and dividends. Income does not include noncash benefits such as food stamps, Medicaid, public housing subsidies, and Special Supplemental Nutrition Program for Women, Infants, and Children [WIC]. There are 48 possible poverty thresholds that vary according to the size of the family and the ages of its members.<sup>2</sup> These thresholds do not vary geographically, but they are updated annually for inflation using the Consumer Price Index for All Urban Consumers (CPI-U). Originally developed in 1963–1964, the thresholds are calculated by dividing the cost of food needs for families under economic stress (using the Economy Food Plan priced by the U.S. Department of Agriculture) by the proportion of after-tax income spent on food (one-third for families of three or more).

One commonly suggested revision to the federal poverty definition is to include food stamp benefits as income, since this benefit is generally considered “near cash.” We implemented this change and found little difference in the size of our poverty exit sample; only 32 women were added to the sample by including food stamp income. This result is consistent with the food stamp literature’s finding that those who participate in the Food Stamp Program tend to be selected from the most needy. Because including food stamp income did not lead to major changes in the number of single mothers that leave poverty, we focused our analysis on the more commonly used official poverty measure.

## 2. Defining “Single Mothers”

We defined single mothers as those who, during the month before spell exit, were (1) older than 15 (so that employment information is available), (2) living with a child younger than 18, and (3) unmarried.<sup>3</sup> We included single mothers who were cohabiting with a partner, whose spouses were absent, or who were in school during the panel period. Our decision to include single mothers with a cohabiting partner was based on our focus on family-level poverty, rather than household-level poverty (since cohabiters are not members of the family). Consistent with this approach, we did not include cohabiters in constructing poverty thresholds, nor did we

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<sup>2</sup>These thresholds are annual measures. In order to convert them into monthly measures, the annual measures were divided by 12 and then adjusted for monthly changes in the Consumer Price Index.

<sup>3</sup>In order to do this, we first used SIPP variables EFREFPER (denotes family reference person) and ESEX (gender) to identify female family heads. We then used SIPP variables ERRP (household relationship), EPNMOM (person number of mother), ETYPMOM (type of child to mother), and TAGE (age) to identify the relationship of each child in the family to the female head. Based on this relationship, we defined a female head as a “single mother” if she is unmarried (based on SIPP variable EMS [marital status]), older than 15 (based on SIPP variable TAGE), and she lived with her own child, her grandchild (without the child’s parent), her younger sibling (without the sibling’s parent), or her niece, nephew, or cousin (without the child’s parent).

include their income as available family resources. This strategy is equivalent to assuming that cohabiters consume only their own resources and do not contribute toward or consume the resources of the family.

An important characteristic of our definition of a “single mother” is the inclusion of all single female family heads with related children under 18 in the family, rather than only single female family heads living with their *own* children under age 18. Thus, our sample includes single grandmothers living with their grandchildren, whereas a more literal definition of single mother would not. Because a considerable fraction of TANF families are non-parent families, it would be of interest to examine all female-headed families with children under 18 in them. However, this more inclusive approach adds few additional women to our analysis sample compared to using only unmarried women living with their own children. In particular, counting all SIPP single female family heads with children under 18 as “single mothers” increases our sample size by 47. Of these, 31 were grandmothers living with their grandchildren, 5 were female heads living with their younger siblings, and 8 were women living with their nieces or nephews. Because this group of non-parent single female heads is small, we did not conduct formal subgroup analysis using this group. However, we found that this group did not have dramatically different poverty dynamics than more narrowly defined single mothers.

### **3. Examining Poverty at the Family or Subfamily Level**

We measured poverty at the *family* level rather than the subfamily level, largely because the family is the basis for the official definition of poverty.<sup>4</sup> However, we experimented with using the subfamily, rather than the family, in defining poverty since the subfamily may more closely represent a TANF household. We found that this change made little difference in the size of our sample; only 36 SIPP respondents were added to our sample by considering subfamilies. This finding further supports the use of the SIPP family as our poverty family unit.

### **4. Changes in Family Composition**

Another issue for our analysis was dealing with changes in family composition. For example, a woman might move out of the family she is living in and move in with others, or other people might join her family. In our analysis, we treated the *single mother* as the unit of analysis and tracked her poverty status in whatever family she was in during any given month using the income of that family, even if its members changed from month to month. Thus, our analyses focused on obtaining estimates of, for example, the duration of nonpoverty spells of single mothers who exited poverty rather than the duration of nonpoverty spells of families that contained these women.

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<sup>4</sup>A SIPP family is a group of two or more persons related by birth, marriage, or adoption and living together; a SIPP family does not include cohabiters. A SIPP subfamily is a nuclear family unit.

## 5. Defining Poverty Spells and Nonpoverty Spells

Another critical issue for the study was defining poverty spells. Two key decisions related to this issue were how to deal with censored spells and how to smooth “transitional” poverty spells.

***Censored Spells.*** An important methodological consideration related to defining spells is dealing with spells that begin or end outside of the analysis period, i.e., dealing with censored spells. Spells that continue beyond the end of the sample period are easily accommodated in a life-table approach and thus pose no methodological problem. However, inclusion of left-censored spells represents a greater issue since the length of ongoing spells is not known; eliminating such spells could represent a form of selection bias since those who have made one poverty transition are more likely to make another (Stevens 1999). Iceland (1997b) argues that when concerned with poverty transitions, rather than the precise duration of poverty spells, omitting left censored spells could introduce greater bias than including them. As such, Iceland (1997a) does not omit left-censored spells. However, he finds that in practice, there are small differences in his results regardless of whether left censored spells are omitted. Stevens (1999) also finds little difference when left censored spells are included in a duration specification. McKernan and Ratcliffe (2002) include left-censored spells, but identify such spells with a dummy variable in their duration model.

The issue of left-censoring is somewhat different when considering post-poverty-exit non-poverty spell dynamics. Without observing a poverty exit preceding a non-poverty spell, there is no way of distinguishing whether poverty entry represents poverty recidivism or a first time poverty entry. Since we were interested in patterns following poverty exits, we determined that left-censored non-poverty spells should be omitted from our spell analyses.

***Poverty Smoothing.*** In data sets that try to capture monthly income, “transitional” poverty spells are sometimes observed—that is, in a given month, a family can have an income spike or dip due either to real changes in income or to measurement error. Such dips can lead to more people being “ever” poor than “consistently” poor. It is also possible that for those with incomes near the poverty threshold, small deviations in income could lead to frequent changes in poverty status which exaggerate the “true” volatility experienced by single mothers. Ideally, a smoothing procedure should reflect a poverty concept that eliminates noise, leaving only “real” poverty transitions.

Most studies using SIPP data have smoothed poverty transitions by eliminating one month poverty entries and exits. Justification for this convention has been elimination of random fluctuations in income data (Eller 1996; Naifeh 1998), and reduction of seam bias problems in the SIPP (McKernan and Ratcliffe 2002). A similar approach has been used in the literature examining program participation spells using SIPP data (Burstein 1993; Gleason, Rangarajan, and Schochet 1998; Gleason, Schochet, and Moffitt 1998).

We explored this issue using four different smoothing procedures. These methods include (1) not using any smoothing techniques, (2) smoothing poverty volatility by eliminating “near-threshold” poverty spells, (3) smoothing poverty volatility by eliminating one-month poverty spells, and (4) smoothing poverty volatility by using a moving average of family income.

Because of its intuitive appeal, we decided to smooth poverty volatility by eliminating “near threshold” poverty spells. We defined a near-threshold spell as a spell in which income is within 10 percent of the poverty threshold for the duration of the spell. We first recoded near-threshold poverty spells as nonpoverty months. Next, we recoded near-threshold nonpoverty spells as poverty months. The implicit assumption of this approach is that when single mothers have income that only slightly exceeds the poverty threshold, they don’t experience nonpoverty in a meaningful way. Similarly, when single mothers have income that is only slightly less than the poverty threshold, they don’t experience poverty in a meaningful way.

Implementing this smoothing technique resulted in 115 fewer initial nonpoverty spells compared to implementing no smoothing techniques. We found that, regardless of the smoothing method used, transitions into and out of poverty were common and spells were quite short. Therefore, the high levels of poverty volatility observed for single mothers appear to be “real.”

## C. ANALYTIC METHODS

This study relies on descriptive analysis, life table methods, and multivariate analysis. This section provides details on the implementation of each of these analyses.

### 1. Descriptive Analysis

Our analysis was primarily based on descriptive analysis where we tabulated means and distributions of variables of interest. The primary sample for the descriptive analysis consists of single mothers who, during the 12 months of the panel period, were *in poverty* in one month and *exited poverty* during the following month. If a sample member had more than one poverty exit during the one-year window, we used the first exit for the analysis. As discussed earlier, we defined single mothers as unmarried, female family heads older than 15 and living with a child younger than 18, we defined poverty using the official poverty measure, and we smoothed near-threshold poverty and nonpoverty spells. This approach yields a total sample size of 615 women. All figures were calculated using longitudinal sample weights in SIPP to make the findings representative of the U.S. civilian population in April 2001.

Descriptive methods were used in analyses (1) to calculate poverty rates and poverty exit rates among single mothers in 2001; (2) to profile single mothers who exited poverty in 2001 and how they compare to other single mothers; (3) to profile the three groups of single mothers who exited poverty based on their poverty and non-poverty spells during the two-year follow-up period; and (4) to compare the income, poverty, and job experiences of the three groups over the follow-up period. Where relevant, we conducted t-tests or chi-square tests to gauge whether or not observed differences in variable distributions across different groups of single mothers are statistically significant. All standard error estimates used in these tests account for clustering and stratification in the SIPP design.

Our descriptive analysis also examined events that lead to sample members’ initial poverty exits and subsequent poverty re-entries. In most trigger analysis, we considered five mutually exclusive types of trigger events: (1) changes in sample members’ own employment or earnings, (2) earnings changes of other family members, (3) family composition changes (including

becoming married, changes in the number of adults in the family, changes in the number of children in the family, and changes in the number of children under age 6), (4) combinations of the first three types of changes, and (5) changes other than the first four types of changes. Where appropriate we also examined triggers that were not mutually exclusive.

We identified trigger events over a two-month window and a four-month window prior to the poverty exit. We defined our triggers by considering month-to-month changes in status. For example, we considered the sample member to have experienced a gain in employment during a two-month window if they were employed in the month before the poverty exit but not in the previous month, or if they were employed in the month of the poverty exit but not in the month before the poverty exit. Similarly, we considered a sample member's own earnings to have increased during a two-month window if the earnings in the month before the poverty exit were higher than they were in the previous month, or if the earnings in the month of the poverty exit were higher than they were in the previous month.

Since there were two possible months during which an earnings or employment event may have occurred, we had to select one of these two months when examining the magnitude of earnings increases or changes in job characteristics that were associated with experiencing the event. For these purposes, we selected the month during which the earnings increase was largest. Consider a situation in which there is a small earnings increase in the month before the poverty exit (compared to the previous month) and a larger earnings increase in the month of the poverty exit (compared to the previous month). In this case, we would refer to the month of the poverty exit as the "month of the trigger event" and the month before the poverty exit as the "base month." Changes in job characteristics and in earnings would be based on differences between these two months.

We examined trigger events using different window lengths because using a longer window allowed us to consider events that may have a delayed effect on poverty transitions. However, using longer windows also limits the sample to those for whom we observe a period at least as long as the window before their initial spell. For instance, in assessing whether a change in family composition was associated with a poverty transition within a four-month window, we can only observe the full four-month period before the poverty exit for sample members who began their first nonpoverty spell in the fifth month or later of the sample period.

## **2. Life Table Methods**

To examine the duration of spells, we used life table methods. For each month, the life table displays the estimated hazard rate and cumulative exit rate. The *hazard* rate is the probability that a spell ended in a particular month, given that the spell lasted at least until the beginning of that month. The *cumulative exit* rate, obtained from the estimated hazard rates, is the unconditional probability that a spell ended within a given number of months. The cumulative exit rate enables policymakers to answer such questions as (1) Of the next 100 single mothers who exit poverty, how many will reenter poverty within one year? and (2) Of those who reenter poverty, how many will again escape poverty within 6 months?

A major advantage of using life table methods is that they can treat right-censored spells (that is, spells still in progress at the end of the observation period) effectively. Right-censored

spells contribute information to the life table up to the month in which they are right-censored (that is, up to the time we no longer have information on them). For example, if a spell is right-censored 12 months after it started, then it is included in the hazard rate calculations (that is, it enters the denominator of the calculations) for months 1 to 12 but not afterward. However, because post-poverty exit spells tended to be quite short, right-censoring is not common for our sample.

### **3. Multivariate Analysis**

In order to assess which factors may be associated with membership in each of the three poverty profile groups, we estimated a multinomial logistic model to assess factors associated with being a poverty leaver, a poverty cyler, or a poverty returner. We examined a diverse set of covariates in each of these models, including demographic and family characteristics, state economic conditions and welfare rules, reasons for leaving poverty, and initial job characteristics. Included demographic characteristics, which were all measured at the month before the poverty exit, were age, race/ethnicity, educational attainment, school enrollment, whether had a work-limiting health condition, age of youngest child, number of adults in the family, whether ever married, cohabitation status, TANF participation, food stamp participation, whether live in public housing, poverty ratio, and region of residence. State characteristics include unemployment rate, poverty rate, level of TANF earnings disregard, severity of TANF sanction, and length of TANF time limits. We also included a set of dummy variables that correspond to the reason for poverty exit (trigger events), namely own employment or earnings changes, other family member's employment changes, family composition changes, combinations of earning and family composition changes, or other changes. Finally, we included measures related to the job quality of the job held in the first month of the nonpoverty spell, including whether the job was full-time, whether it provided health insurance coverage, and whether it offered an hourly wage greater than \$10.

Our presentation of findings from these models focuses on the predicted probability of having a particular outcome given a each characteristic, rather than on coefficient estimates. Predicted probabilities are easier to interpret than coefficient estimates due to the nonlinearity of the models. We calculated predicted probabilities using parameter estimates from our multivariate models. This was done by evaluating the estimated model after assigning each sample member the particular value for the characteristics in question (e.g. age category), but then assigning them their own values for all other characteristics. These individual predicted probabilities were then averaged across all sample members. We also tested whether the predicted probability associated with each dummy variable was statistically different from that of the relevant omitted category.