Crisis, Chronic, and Churning: an Analysis of Varying Poverty Experiences

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Abstract

Previous research on longitudinal poverty has shown that 44 percent of poverty spells over the period from 2009 to 2011 lasted between 2 to 4 months, and that the duration of poverty spells varied across a number of demographic characteristics. (Edwards 2014a) However, analysis of spell-level data often masks the implications of multiple spells of poverty occurring over a given period for a single individual. (Stevens 1994)

This analysis investigates how much variation exists in the frequency of poverty spell occurrences across demographic groups, and uses clustering techniques to categorize poverty experiences based on both the total time spent in poverty as well as the number of poverty spells experienced. Using these clustering techniques, I highlight individuals in clusters characterized by short and isolated periods of poverty (crisis), long-term poverty spells (chronic), or frequent movement in and out of poverty over the course of a SIPP Panel (churning).

I find variation in the frequency of poverty spell occurrences across demographic groups, and find that individuals categorized using crisis, chronic, and churning classifications vary across a number of demographic characteristics, as well as in the events associated with their transitions both into and out of poverty. I also find variation in the magnitude of transition events across the crisis, chronic, and churning populations as measured by the arc percent change in individuals income-to-poverty ratio when entering or exiting a poverty spell.

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[1] This report is released to inform interested parties of ongoing research and to encourage discussion of work in progress. The views expressed on methodological or operational issues are those of the author and are not necessarily those of the U.S. Census Bureau. Any error or omissions are the sole responsibility of the author. All data are subject to error arising from a variety of sources, including sampling error, non-sampling error, model error, and any other sources of error. For further information on SIPP statistical standards and accuracy, go to http://www.census.gov/programs-surveys/sipp/tech-documentation/source-accuracy-statements.html.

I. Background

U.S. Census Bureau reports using data from the Survey of Income and Program Participation (SIPP) typically report the characteristics of poverty spells in addition to other longitudinal measures of poverty (Edwards 2014a, Anderson 2011, Stern 2008, Iceland 2003).

From these reports, we know that poverty spells are generally temporary in their duration. The most recent report from the 2008 SIPP Panel indicates that 44.0 percent of all poverty spells observed over the 3-year period of 2009 to 2011 ended within 4 months, while only 15.2 percent of poverty spells lasted over 2 years. The median length of a given poverty spell over this period was shown to be 6.6 months. There were differences in median poverty spell lengths by demographic characteristics, with non-Hispanic Whites having shorter median spells than Blacks, and individuals in married-couple families having shorter median poverty spells than individuals in female-householder families (Edwards 2014a).

While these findings show that for most individuals entering poverty, a given spell will be relatively short, this analysis of individual spell lengths masks the often cyclical nature of poverty, as individuals may experience multiple poverty spells over a given time period (Stevens 1999).

If individuals experience multiple spells of poverty, and the probability of experiencing multiple poverty spells varies by demographic groups, then data based on individual spell durations may be over or underestimating the cumulative effect of poverty spells for select populations. Investigating the interaction of spell frequency and the cumulative amount of time an individual spends in poverty over the course of a panel is expected to provide additional insight into the dynamics of poverty transitions, by highlighting specific patterns across individual's experiences.

II. Previous Literature

Previous research on the dynamics of poverty has highlighted the limitations of cross-sectional surveys in accounting for the dynamics of individuals entering and exiting poverty over time. Bane and Ellwood (1986) found that at a given point in time, the majority of persons found to be in poverty using a cross-sectional measure are in the midst of a long spell of poverty, causing cross-sectional poverty estimates to over-represent the chronically poor population while failing to capture the characteristics of the episodically poor (Bane and Ellwood 1986). By using longitudinal data, most commonly referenced through the Panel Study of Income Dynamics (PSID), the Survey of Income and Program Participation (SIPP), and the National Longitudinal Survey of Youth (NLSY), researchers have been able to supplement cross-sectional estimates of poverty with analysis of the dynamics of poverty entries and exits as well as the events associated with poverty transitions (Cellini, McKernan, and Ratcliffe 2008).

Researchers have used a variety of criteria to measure entries and exits from poverty spells, with the criteria often depending on the data source being used and whether data is released annually or monthly. Regardless of the dataset used, there is agreement in the literature that the definition used to assign entries and exits from poverty should be robust to trivial changes in income that might send individuals above or below the poverty line in a given month without reflecting genuine changes in material well-being (McKernan and Ratcliffe 2005).

Research on poverty spells have most often defined "significant" spells based on the magnitude of the change in an individual's income-to-poverty ratio (Bane and Ellwood 1986) or by using a minimum duration threshold to assign poverty entries and exits (Short and Shea 1993, Card and Blank 2008). Research from Ruggles and Williams (1989) and Rank and Hirschl (2001) have also used asset measures in order to determine the level of hardship experienced.

Although an entry or exit from poverty can result from changes in earned income, unearned income, or changes in household size or composition, researchers have consistently found that changes in employment and earned income are most commonly associated with poverty transitions. (Bane and Ellwood 1986; Ruggles and Williams 1987; McKernan and Ratcliffe 2002; McKernan and Ratcliffe 2005) McKernan and Ratcliffe (2002) applied discrete-time multivariate hazard models to account for the fact that multiple, often co-occurring events are related to the likelihood of entering and exiting poverty, again finding that the likelihood of entering or exiting poverty was highest in cases of employment change, followed by changes in household structure (McKernan and Ratcliffe 2002).

While Bane and Ellwood (1986) focused on the duration and probability of exiting individual spells, Stevens (1994 and 1999) emphasized the importance of considering the presence of multiple poverty spells over an observed period, finding that half of all individuals who exit a poverty spell in a given year will fall back below poverty within the next 5 years, highlighting the need to account for multiple poverty spells.

Recent research has attempted to create a more dynamic framework for understanding poverty based on the frequency, pattern, and duration of spells. Arranz and Canto (2011) and Gradin et al. (2012) both propose a methodology for accounting for individual's longitudinal income and poverty profiles through an aggregate measure of wellbeing over a reference period.

Research on longitudinal poverty has often made distinctions across individuals based on their poverty experiences, however, most of these distinctions are based on distinguishing between the chronic (long-term) and episodically (short-term) poor. There has been limited discussion of classification based on person-level spell frequency and how individuals may have varying poverty experiences based on the frequency of their movements in and out of poverty. While the concept of churning is fairly established in the context of the broader labor market and business cycle, the concept of churning as it relates to person-level economic security has most recently been applied in the United States to Supplemental Nutrition Assistance Program (SNAP) enrolment. Mills et al. (2014) investigated churning among SNAP enrollees by defining churning based on the number of months (4 or less) off SNAP before a reentry.

This research fits into this literature by looking at the impact of multiple poverty spells on individuals' aggregate experiences over time. I quantify how much variation exists in the frequency of poverty spell occurrences across demographic groups and use clustering techniques to identify individuals who are experiencing frequent poverty transitions. I compare these individuals to other distinct populations in the poverty universe, both in terms of their demographic characteristics and in the events associated with their entries and exits from poverty.

III. Data

Data for this research comes from the 2008 Panel of the Survey of Income and Program Participation (SIPP). The SIPP is a longitudinal nationally representative household survey conducted by the Census Bureau, and is unique in providing data on household composition and income at a monthly level. SIPP interviews were conducted at 4-months intervals over the course of a panel, with SIPP Panels typically lasting between 3 to 4 years. The most recent data from the 2008 SIPP Panel covers the period of May 2008 to November 2013.[2]

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[2] There were 52,000 eligible household in sample in Wave 1 and 42,000 were interviewed. For more information on the SIPP, go to http://www.census.gov/programs-surveys/sipp/tech-documentation/source-accuracy-statements.html.

As a longitudinal survey, individuals may enter or exit the SIPP sample at various times over the interview period. Since this research investigates person-level movements into and out of poverty over time, this analysis is limited to only those individuals who were in the SIPP sample and poverty universe throughout the 48 months from January 2009 to December 2012 in order to provide a balanced sample where each individual is observed in every month.[3] Population controls for some characteristics of those in sample are used to adjust final persons' longitudinal weights and replicate weights are used to calculate standard errors for estimates shown in this paper.

Data from the SIPP has historically been used less frequently than the PSID by researchers investigating the dynamics of poverty. The greatest strength of the SIPP over the PSID is the reporting of income and household composition at a monthly level, as opposed to the PSID which reports data annually or biannually (Cellini, McKernan, and Ratcliffe 2008).

One concern with using longitudinal data from the SIPP relates to the presence of seam bias across successive interviews. A SIPP interview references the 4 preceding months, and individuals are more likely to report changes across interviews rather than within the months referenced in a given interview. Seam bias creates problem when measuring poverty, as well as the duration of other events, as the start and end dates of spells are likely to contain measurement error (Moore 2007). I do find some evidence of clustering in the reporting of spell lengths in durations divisible by 4, which appears to be more common among relatively short poverty spells. However, while seam effects may have some impact on the reporting of the beginning and end dates of poverty spells, this effect is not expected to lead to false reporting of spells themselves, and any presence or location of a seam effect will consistently effect both transitions in poverty status as well as associated economic or household triggering events.

IV. Methods

A. Defining and Measuring Poverty Spells

I define poverty spells consistently with the definition used in Census Bureau reports, a period of at least 2 consecutive months in poverty, with multiple spells separated by at least 2 months out of poverty. Therefore, the minimum length of a poverty spell is 2 months, although spells may last the duration of the observed period, 48 months (Edwards 2014a, Anderson 2011, Stern 2008, Iceland 2003).

Unlike previous research on poverty spells in the 2008 SIPP Panel, which have focused exclusively on spell length, this research highlights a number of associated measures of spell characteristics. In addition to discussing the duration of spells, often referred to in this paper as "spell length," this paper will also discuss the number of distinct spells observed, referred to as "spell frequency" or "spell count" and the total time that an individual spends in poverty across all spells, referred to as "total time in poverty."

Depending on the measure presented, spell length, spell frequency, or total time in poverty, the universe for these measures will vary between spell and person-level data. Since individuals may have more than one spell, estimates of spell length are based on all observed spells over the 48-month period, whereas estimates of spell frequency and total time in poverty are calculated at the person-level. The 4-year sample used for this analysis is based on 41,858 unweighted persons. Of the individuals in sample,

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[3] Unweighted n= 41,858 individuals. The poverty universe does not include children under the age of 15 who are not related to a reference person within the household by way of birth, marriage or adoption (for example, foster children).

13,644 unweighted persons experience at least one poverty spell. Those individuals cumulatively experience 22,827 unweighted poverty spells (See Table 1 in Appendix) .

When discussing measures of duration, either in terms of spell length or total time in poverty, this analysis is consistent with the methods used in SIPP reports released by the Census Bureau, in which left-censored cases are excluded and right-censored cases are controlled for using the lifetable survival method. Left censoring refers to the limitation of researchers to observe events, or transitions, before an individual appears in the survey or administrative record. In this research, if an individual is first observed as being in poverty in January 2009, I am unable to discern how long that individual may have been in poverty before appearing in the survey record. Because there is no observed start period for this spell, left-censored cases are truncated to an unknowable degree. The consideration of left-censored cases, and to a lesser extent right-censored cases, in poverty duration analysis has been explored extensively in the previous literature, and while there remains no single accepted method for treating left-censored cases, this paper is designed to be comparable to official Census reports (Cellini, McKernan, and Ratcliffe 2008; Iceland 1997; Bane and Ellwood 1986).[4]

Both individual spells as well as an individual's total time spent in poverty are considered to be left-censored if a poverty spell had an observed beginning in January 2009. Lifetable methods are used to calculate the duration of spells and the total time an individual is in poverty, and are also used to calculate the median number of spells experienced across populations. However, estimates of spell frequency include left censored spells, and no spells are flagged as right-censored. The primary benefit of using the lifetable method in these instances is to improve precision in the calculation of the median number of poverty spells experienced across populations.

B. Classifying Poverty Experiences

In addition to investigating the number and duration of poverty spells, the second key purpose of this research centers on a classification question. This research attempts to classify individuals based on their cumulative poverty experience over the period, and investigate how the characteristics of individuals vary across those classifications.

In order to classify individuals, I use the FASTCLUS procedure in SAS to group individuals based on their spell frequency and total length of time spent in poverty over the period. Only individuals who experienced at least one poverty spell over the 4-year period are included in this analysis, and for the purpose of assigning clusters, both left and right-censored spells are included.[5]

The FASTCLUS procedure utilizes a k-means clustering model to converge clusters based on a least-squares criterion from the mean of the observations assigned to each cluster. The FASTCLUS procedure is non hierarchical, and each observation belongs to only one cluster. (SAS Institute Inc. 2014)

I run the FASTCLUS procedure under a number of max cluster specifications. General recommendations suggest running the procedure under a large number of cluster specifications and then selecting the maximum number of clusters based on cubic clustering criterion (CCC) values as well as the pseudo F statistic (SAS Institute Inc. 1988). I identify a max of 27 clusters used in this analysis based on these statistics. Once clusters are generated, I group clusters into meaningful segments for this analysis (See Table 2 and Figure 1 in Appendix). These classifications are designed to provide an initial

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[4] Statistical methods to control for right-censored cases are more easily applied as well as more commonly agreed upon. (Allison, 1982)
[5] The FASTCLUS procedure is run using final weights, as the FASTCLUS procedure does not support replicate weights.

framework to investigate how individuals in these various classifications experience poverty differently over the 4-year period; they are not meant to account for all potential experiences or outcomes.

I define the "crisis" population as individuals in clusters with 2 or fewer average poverty spells and an average total time in poverty of 5 months or less. These individuals spent approximately 10 percent of the reference period in poverty, and experienced a limited number of movements in their poverty status. The unweighted count of individuals identified in the crisis group is 3,274 persons, who experienced 3,489 spells. Individuals in the crises group make up 23.5 percent of the population ever-poor over the 48-month period, but account for only 14.7 percent of all poverty spells (See Table 1 and Table 2 in Appendix).

I define the "chronic" population as individuals in clusters with 2 or less average poverty spells and an average total time in poverty greater than or equal to 44 months. These individuals spent approximately 90 percent of the reference period in poverty, while also experiencing a limited number of movements in their poverty status. The unweighted count of individuals identified in the crisis group is 2,050 persons, who experienced 2,508 spells. Individuals in the chronic group make up 14.7 percent of the population ever-poor over the 48-month period, but account for only 10.6 percent of all poverty spells (See Table 1 and Table 2 in Appendix).

I define the "churner" population as individuals in clusters with 3 or more average poverty spells. Individuals in this classification spent anywhere from 23 to 69 percent of the reference period in poverty, making them more heterogeneous than the crisis or chronic populations, but I classify them as a single unit for this analysis as they are unique in experiencing a high frequency of poverty transitions. The churning group is the most dynamic of those included in this analysis, as they experience a number of transitions into and out of poverty, and spend significant time both below and above the poverty threshold over the 4-year period. The churner population is of particular interest as this population experiences the greatest misrepresentation when analysis is done at a spell rather than person-level, as spell-level analysis does not account for the cumulative impact of multiple poverty spells.

The unweighted count of individuals identified in the churning group is 1,107 persons, who experienced 4,058 spells. Individuals in the churner classification account for only 8.5 percent of the population ever-poor over the 48-month period, but account for a disproportionality high 18.5 percent of all spells (See Table 1 and Table 2 in Appendix).

Using these three classifications, I am able to account for 46.8 percent of all individuals entering poverty over the 48-months from 2009 to 2012, and 43.9 percent of all spells occurring over the period. However, these classifications cover a very small percentage of the total population. Approximately 65.5 percent of individuals did not experience a poverty spell over the period from 2009 to 2011. Of the total population, 8.1 percent of individuals experienced a crisis poverty spell over the 48-month period, 5.1 percent experienced a chronic poverty spell, and 2.9 percent churned in and out of poverty from 2009 to 2012 (See Table 1 in Appendix).

C. Identifying and Measuring Transition Events

Differences in the household and economic events associated with transitions into and out of poverty are explored across the crisis, chronic, and churning population. For analysis of transition events, analysis was done on a spell-level dataset, and characteristics were based on demographics in the month an individual entered or exited a given spell. Analysis was run separately based on whether entry or exit events were being investigated.

Transition events were only included in this analysis if they could be observed. Therefore, poverty spells that were underway in January 2009 (left-censored) were excluded from the analysis of entry events, and poverty spells that continued through December 2012 (right-censored) were excluded from the analysis of exit events. Across all poverty spells, 22.5 percent were excluded due to left censoring, and 22.6 percent were excluded due to right censoring.[6] However, the impact of left and right-censored sample reduction varied across the crisis, chronic, and churning subpopulations. As shown in Appendix Table 3, the censoring criteria was least restrictive for spells experienced by the crisis population, with only 10.1 percent of spells omitted due to left censoring and 8.2 percent of spells omitted due to right censoring. The removal of censored spells had more impact when investigating the events associated with entries or exits from a chronic poverty spell. Given that the majority of chronic poverty spells last the entire observation period, it is very difficult to observe poverty transitions among this population. Among chronic spells, 72.2 percent were omitted due to left censoring, and 73.6 percent were omitted due to right censoring.[7]

Of spells where an entry or exit transition could be observed, events associated with a transition were flagged if a change in household composition or economic situation occurred within the two months preceding an entry or exit from poverty.[8] Analysis of changes associated with income are based on fluctuations in pooled family income, as poverty status is determined based on family as opposed to individual income. Income changes were flagged if the absolute change across months was greater than $50.00 and comparisons across reported monthly income do not account for inflation across months. To disassociate events associated with employment, a change in hours worked was only flagged if it was not related to a new or lost job, similarly, a change in pay rate was only flagged if the change in earnings was not related to a change in the number of jobs or hours worked.

For a given entry or exit from poverty, multiple associated economic or household events may have occurred within two months of the transition, and associated events presented in this analysis are not mutually exclusive. Given that events associated with poverty transitions are not mutually exclusive, there is likely some degree of correlation among the economic and household shocks that move individuals in or out of poverty. This analysis calculates correlation coefficients across the economic and household shocks associated with poverty transitions for the population ever-poor, as well as those assigned to the crisis, chronic, and churner classification.

In order to evaluate the magnitude of a transition into or out of poverty across months, I calculate the arc percent change (APC) of an individual's income-to-poverty ratio across consecutive months with a transition in poverty status. The APC in an individual's income-to-poverty ratio (Y_i) in two months is calculated as

$$APC = ((Y_t - Y_{t-1}) / (Y_t + Y_{t-1}))/2$$

Arc percent change is a common measure used to evaluate volatility across two periods, because it allows for symmetric estimates of change that can be defined when one of the two measures is 0.[9] (Monti and Gathright 2013; Larrimore et al. 2014) Arc percent change is therefore useful in this context

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[6] The percent of spells excluded due to left censoring was not significantly different from the percent excluded due to right censoring.

[7] Left and right-censored spells are not mutually exclusive as a single spell may be both left and right-censored. The percent of chronic poverty spells omitted due to left censoring was not statistically different than the percent omitted due to right censoring.

[8] If a poverty entry occurred in February 2009 only changes in the previous month were used to assign associated entry events.

[9] The arc percent change measure is considered symmetric as the change across two time periods is not dependent on the order of the time periods. For example, if an individuals enters poverty with an income-to-poverty ratio change from 1.25 to 0.5, the percent change is 60 percent while the arc percent change is -86 percent; alternatively if an individual exits poverty with an income-to-poverty ratio change from 0.5 to 1.25, the percent change is 150 percent while the arc percent change is symmetric at 86 percent.

as individuals may enter poverty by moving from an income-to-poverty ratio above 1 to an income-to-poverty ratio of 0, or exit in a vice versa case.[10] Measures of APC are bound by negative and positive 2. An individual entering poverty with an income-to-poverty ratio of 0 has an arc percent change of negative 2 regardless of their income-to-poverty ratio in the previous month. Similarly, an individual exiting poverty with a 0 income-to-poverty ratio in the previous period has an APC of positive 2. The closer an individuals APC is to 0, the lower the magnitude of the change in income-to-poverty ratios across the two months.

V. The Number and Duration of Poverty Spells

The most recent Census Bureau release states that 52.9 percent of poverty spells occurring from 2009 to 2012 lasted between 2 to 6 months (Edwards 2014b). I find that of individuals experiencing a poverty spell over this period, 45.5 percent of individuals experienced more than one poverty spell. Figure 2 in the Appendix presents the weighted frequency of individuals based on the total number (including left and right-censored cases) of observed months they spent in poverty over the 48-month period from 2009 to 2012, as well as by the total number of unique spells experienced.[11]

I find when looking at the distribution of individuals ever-poor across the 48-month period, that while the majority of individuals, 54.5 percent, experienced only a single spell of poverty, 28.1 percent experienced 2 spells, 12.5 percent experienced 3 spells, 4.9 percent experience 4 or more spells, with 0.1 percent experiencing an observed max of 8 poverty spells. Individuals show heavy clustering at the tails of the distribution, 7.1 percent of ever-poor individuals had only 1 poverty spell lasting 2 months, while 9.0 percent of ever-poor individuals had one poverty spell lasting the entire 48-month period. Ever-poor individuals are much more evenly dispersed across the middle of the distribution (See Figure 2 in Appendix).

Spell-level data shown in Figure 3 provide an alternate interpretation of how individuals are experiencing poverty over the 48-month period. When looking at the length of individual poverty spells tabulated against the total number of poverty spells experienced by that individual, I find that 15.4 percent of all poverty spells lasted 2 months, but only 4.2 percent of poverty spells lasted 2 months and were the only spell experienced by an individual over the entire 48-month period. Among all spells lasting 2 months, 72.8 percent were experienced by an individual who had more than 1 spell of poverty. As shown in Figure 3, analysis of spell-level data is particularly problematic given that individuals experiencing multiple spells are more likely, by definition, to experience shorter spells than those who experience fewer spells. Therefore, estimates of spell length are skewed by the frequency of spells among those who experience frequent churning in and out of poverty. Spell durations may be short because individuals only briefly experience poverty, or they may be short because of frequent churning in and out of poverty, in which case, the duration of a single spell masks individuals true experience of hardship over the entire reference period.

Clustering is also evident in Figure 3; over 35 percent of all observed poverty spells lasted between 2 to 4 months and are experienced by individuals who experienced between 1 to 3 poverty

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[10] If an individual has a negative income-to-poverty ratio in a given month, their income-to-poverty ratio is recoded as zero.
[11] Note: Frequencies presented in Figure 2 and Figure 3 include both left and right-censored spells and are not designed to be used to accurately interpret the total length of time an individual is in poverty but rather to show the distribution of individuals across two characteristics.

spells.[12] On the opposite end of the spectrum, 5.3 percent of all spells lasted the entire 48-month period, and were therefore the only spell experienced by an individual (See Figure 3 in Appendix).

I also find evidence in both the person and spell-level data indicating the presence of potential seam bias. I find clustering of both individual's total time in poverty as well as spell lengths reported in multiples of 4.[13] These spikes in the distribution appear to be most prominently concentrated in lengths of 4 and 8 months (See Figure 2 and Figure 3 in Appendix).

Although data shown in Figure 3 include all observations and do not control for left or right censoring, my findings are fairly consistent with those released in Edwards 2014b which found that the majority of poverty spells experienced from 2009 to 2012 lasted between 2 to 6 months (52.9 percent in Edwards 2014b and 51.4 percent in Figure 3 which does not drop left-censored cases or adjust for right censoring). However, as shown in Figure 3, of all observed poverty spells lasting 2 to 6 months, 73.1 percent were experienced by individuals who had more than one poverty spell.

The median length of poverty spells across demographic groups are shown in Table 4 and Figure 4. Here, left-censored spells are excluded and lifetable methods provide estimates consistent with those previously published in Edwards 2014b. Table 4 and Figure 4 also provide estimates of the median number of spells experienced, as well as the median total time spent in poverty across those same demographic groups. Of those ever-poor from 2009 to 2012, the median number of spells experienced was 1.92. Individuals aged 65 and over as well as unrelated individuals experienced fewer poverty spells than the overall population (1.73 and 1.86 median spells respectively), with individuals aged 65 and over experiencing fewer poverty spells than all other demographic groups. Children under the age of 18 and Hispanics were the only demographic groups to experience higher poverty spell frequency than the overall population (1.96 and 2.00 median spells respectively).

Among individuals experiencing at least a single poverty spell over the course of 2009 to 2014, the median total length of time individuals spent in poverty over the entire period was 12.1 months. Blacks, Hispanics, and individuals in female-householder families experienced longer median lengths of total time poverty than the overall population (16.7, 15.7, and 16.9 months respectively).[14] Blacks and individuals in female-householder families did not experience more spells than the overall population, but their median individual spell lengths were longer. In contrast, Hispanics did not have significant differences from the total population in their median spell durations, but experienced more spells, leading to significant differences in their total length of time in poverty. Non-Hispanic Whites and individuals in married-couple families were the only demographic groups with median total time in poverty shorter than the overall population (10.1 and 10.6 months respectively).[15] Non-Hispanic Whites did not have median spell durations or spell frequencies that were statistically different from the overall ever-poor population, while individuals in married-couple families experienced shorter median spell durations.

VI. The Crisis, Chronic, and Churning Populations

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[12] This estimate does not control for the impact of left or right censoring and is only based on the frequency of spell durations as observed over the reference period.

[13] SIPP interviews are conducted every 4 months, so if transitions are disproportionately occurring across interviews (seams) rather than within interviews, we would expect to see more poverty spells lasting 4, 8, 16, etc. months.

[14] Median total time spent in poverty over the 4-year period was not statistically different across Black, Hispanic, or individuals in female-householder families.

[15] Median total time spent in poverty over the 4-year period was not statistically different across non-Hispanic Whites and individuals in married-couple families.

While the median number of spells experienced by the ever-poor over the period of 2009 to 2014 was approximately 2 spells, Figure 2 and Figure 3 in the Appendix illustrate that a number of individuals observed over the period from 2009 to 2012 experience much higher spell frequency.

By classifying individuals based on their spell frequency and total amount of time spent in poverty, I am able to highlight populations that have very different poverty experiences over the 4-year period. Approximately 23.5 percent of the ever poor population experienced poverty very briefly, the "crisis" population, while 14.7 percent were in poverty for almost the entire period, the "chronic" population (See Table 1 in Appendix). These populations are frequently highlighted in the research literature, and represent two extremes for how individuals might experience poverty over an observed period. However, one group that has received less investigation is the 8.5 percent of the ever-poor who move in and out of poverty multiple times over the 4-year period. This population, referred to here as "churners," are responsible for 18.5 percent of all poverty spells, and differ in a number of ways from both the overall ever-poor population as well as those classified as experiencing "crisis" or "chronic" poverty.

Broadly, the population experiencing a poverty spell over the period of 2009 to 2012 is more likely to be Black, Hispanic, female, under the age of 18, experience a work limiting disability, in a household headed by a non-married householder, without a college education, and living in the South than the overall population of the United States. However, these generalizations mask significant differences in demographic characteristics across the crisis, chronic, and churning populations (See Table 5 in Appendix).

Compared to the population experiencing at least 1 poverty spell over the 2009 to 2012 period, the population experiencing crisis poverty are more similar to the overall population of the United States. The racial composition of individuals experiencing crisis poverty spells is not statistically different from the overall population, although individuals experiencing crisis poverty are to more likely to be Hispanic. Individuals experiencing crisis poverty spells are more likely than the ever-poor population to have higher educational attainment, and to be of working age and there is no statistical difference in the proportion who are male or female. Individuals experiencing crisis poverty are also less likely than the ever-poor to be in female-householder families, and are more likely to be in married-couple families.

Individuals in prolonged chronic poverty spells are more likely than the ever-poor population to be Black, Hispanic, under the age of 18 or over the age of 65, and without a college education. Approximately 60.0 percent of the population in a chronic poverty spell are female, and 57.0 percent live in a family with a female householder. Approximately 30.0 percent of individuals in chronic poverty over the period of 2009 to 2012 had a work limiting disability.

I find that while the churning population experiences poverty somewhere between the severity of the crisis and chronic population, their demographic characteristics are not uniformly more like the crisis or chronic population. The composition of the churning population by gender is not statistically different from the crisis population, but individuals churning in and out of poverty are more similar to the chronic population across measures of Hispanic origin. By age, there are significant differences across all three groups, with churners less likely than both the crisis and chronic population to be elderly (See Table 5 in Appendix).

Capturing the poverty experiences of the crisis, chronic, and churning population also greatly depends on the poverty measure being used. Although the crisis population makes up 23.5 percent of the population experiencing poverty over the 4-year period from 2009 to 2012, their experiences are routinely excluded in measures of annual poverty. Only 5.4 percent of individuals experiencing crisis poverty over

the period were found to be in poverty using an annual measure in any of the 4 years from 2009 to 2012. Alternatively, individuals churning in and out of poverty are much more likely to be captured in annual poverty measures, with 87.4 percent of the churner population showing up in an annual measure of poverty for at least one year (See Table 6 in Appendix). Additionally, although the definition of the crisis population implies that these individuals face only a brief period of financial hardship, 4.1 percent of individuals experiencing crisis poverty over the 4-years were found to be in near-poverty over the entire period.

VII. Poverty Transitions

Identifying events preceding an entry or exit from a poverty spell provides a basic descriptive analysis of events associated with transitions in poverty status. Previous research on transition events have shown that changes in employment and earned income are most commonly associated with poverty transitions (Bane and Ellwood 1986; McKernan and Ratcliffe 2002; Ruggles and Williams 1987; McKernan and Ratcliffe 2005).

This research looks at changes in income across detailed income sources, and evaluates whether the events associated with entries or exits from poverty spells vary based on the type of poverty an individual experiences, defined here as crisis, chronic, and churning. For each classification, I compare the events associated with entries or exits to those experienced by the ever-poor population, and then make comparisons among the crisis, chronic, and churning groups.

A. Entries

Table 7 in the Appendix reports the frequency of events associated with poverty spell entries. Consistent with previous literature, I find that 79.0 percent of all poverty entries follow declines in family earned income, while declines in "other" income are the second most prevalent associated event (21.2 percent of entries). Changes in family composition are only present in a small proportion of poverty entries; divorce, decreases in the number of adults, and the presence of a new child are associated with 0.9, 4.7 and 3.6 percent of entries respectively.

Detailed data on income source changes indicate that 42.5 percent of all individuals entering a poverty spell experienced a decline in their pay rate, while 22.0 percent of entries occur following a job loss.[16] Of specific non-employment related events, declines in Social Security and Unemployment Income were associated with the greatest proportion of entries, 7.7 and 7.4 percent respectively.[17]

1. Crisis Entries

Individuals experiencing crisis poverty are more likely than the ever-poor population to enter poverty spells following a decline in family earned income, and declines are more frequently associated with a drop in pay rates. Crisis spells are less frequently associated with declines in transfer income, and more likely associated with declines in property income than entries among the ever-poor. Individuals entering a crisis poverty spell are also less likely to enter following the addition of a new child (See Table 7 in Appendix).

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[16] Declines in pay rate are assigned to cases where there was no reduction in hours worked and no loss of jobs.
[17] The percent of all poverty entries associated with a decline in Social Security income was not statistically different than the percent associated with a decline in Unemployment income.

The crisis population is more likely than both the chronic and churning population to enter a poverty spell following a decline in family earned income, with declines in pay rates occurring more frequently than among the chronic and churning population. Approximately 50.6 percent of poverty spell entries among the crisis population follow a decline in pay rates. Crisis spells are also less likely than chronic and churning spells to follow a decline in transfer income, and more likely to follow a decline in property income, particularly from dividend or interest sources (See Table 7 in Appendix).

2. Chronic Entries

Individuals experiencing chronic poverty are less likely than the ever-poor population to enter poverty spells following declines in earned income, and their entries are more often associated with the loss of all employment and less likely associated with a decline in pay rates. Poverty entries for the chronic population are more likely than the ever-poor population to be associated with a loss of transfer income, particularly related to Supplemental Security Income (SSI), Temporary Assistance for Needy Families (TANF), and other welfare sources as well as with the loss of other income provided from relatives or friends (See Table 7 in Appendix).

Compared to the crisis and churning populations, declines in earned income are less often precursors to a poverty spell entry among the chronic population, and entries are more often associated with the loss of all employment and less likely associated with a decline in pay rates. Chronic poverty entries are also more frequently associated with declines in transfer income or income from family and friends than among the crisis and churning populations, with 16.6 percent of poverty entries among the chronic population occurring following a decline in transfer income and 2.1 percent occurring following a decline in transfers from family or friends (See Table 7 in Appendix).

3. Churning Entries

Individuals who experience frequent churning in and out of poverty are less likely than the ever-poor population to enter a poverty spell following the loss of any or all jobs, although the overall proportion of entries associated with a decline in earned income is not statistically different from the ever-poor population. Churners are less likely than the ever-poor to enter a poverty spell following a decline in "other" income, with a smaller proportion of poverty entries associate with declines in unemployment, veterans, and pension income. Churners are also less likely than the ever-poor population to experience poverty entries associated with household composition changes stemming from divorce or a decrease in the number of adults. Among the events shown in Table 7, no events are more associated with poverty entries among churners than among the overall ever-poor population.

Comparing the churner population to the crisis and chronic populations, I find that the churner population doesn't uniformly experience entry events more similarly to the chronic or churner populations. For some events, such as declines in earned income, pay rates, or property income, the proportion of associated spell entries among the churning population is higher than for the chronic population, but lower than for the crisis population. For other events, such as the loss of a job, decline in workers compensation income, decline in transfers from relatives/friends, or the onset of a work-limiting ability, the proportion of entries among churners is more consistent with the crisis population. Alternatively, the proportion of entry events associated with divorce or a decline in SSI, dividend, interest, unemployment, or pension, income is not statistically different from the chronic population. There is no event associated with poverty spell entries shown in Table 7 where the churning population is more or less likely to enter a poverty spell following an event than both the chronic or crisis population.

It's important to note, however, that although a number of events associated with poverty entries among the churner population appear to be more similar to the chronic population, an important caveat is that standard errors associated with estimates for the chronic population tend to be larger due to the limited number of spell entries captured among this population (See Table 7 in Appendix).

4. Entry Event Correlations

For the crisis, chronic, and churning populations, declines in the number of jobs held by family members preceding an entry into poverty were positively associated with losing all jobs, as well as with declines in the number of adults in the family. Divorce was positively correlated with declines in pension income among the population ever-poor as well as the crisis, chronic, and churning populations. Positive correlation in the reduction of hours worked and the presence of a new child was significant for the churning and ever-poor population, but was not statistically correlated among individuals entering a crisis or chronic poverty spell. Declines in moonlighting income[18] preceding a poverty spell were positively correlated with declines in other welfare income among individuals ever-poor as well as those entering a churning poverty spell, but the two events were uncorrelated among the crisis and chronic populations. Declines in SSI income were positively correlated with declines in disability compensation for individuals entering a chronic poverty spell, but the two events were statistically unrelated among other populations (Results not shown).

B. Exits

Table 8 in the Appendix reports the frequency of events associated with poverty spell exits. Similar to poverty entries, I find that the majority, 79.7 percent, of all poverty exits occur following increases in family earned income, while increases in "other" income are the second most prevalent associated event (21.9 percent of exits). Across the population ever-poor from 2009 to 2012, the proportion of events associated with a poverty exit was largely consistent with the events associated with an entry to poverty. Individuals exiting poverty had a greater proportion of transitions associated with an increase in total family income compared to those entering poverty, and a lower proportion associated with changes in household composition related to changes in the number of adults or children in the household. Individuals exiting poverty also more frequently experienced changes in their Social Security income, while less frequently experiencing a change in their Unemployment Insurance income than those entering poverty (See Table 7 and Table 8 in Appendix).

1. Crisis Exits

Individuals exiting a crisis poverty spell are less likely than the ever-poor population to exit following a new job, but exits are more often associated with an increase in pay rate. Almost half of all crisis poverty spells end following an increase in pay (49.8 percent). Individuals exiting a crisis poverty spell are also less likely than the ever-poor population to exit poverty following the receipt of increased aggregate transfer income, but more often exit poverty following increases in aggregate property income. The proportion of spell exits associated with an increase in aggregate "other" income is not significantly different across the crisis and ever-poor population, but detailed income categories indicate crisis spells exits are more often associated with the receipt of pension income and less likely to follow an increase in child support than exits among the ever-poor population (See Table 8 in Appendix).

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[18] Moonlighting income refers to earned income individuals may receive for performing work outside of their regular job or business, such as through freelancing, consulting, or irregular work arrangements.

Although the crisis population was more likely to enter a poverty spell following a decline in earned income than both the chronic and churning population, when exiting poverty there was no statistical difference in the proportion of spells following an increase in earned income across the crisis and churning population.[19] However, as with entries, a greater proportion of crisis spell exits followed an increase in pay than exits among the chronic or churning population. Poverty exits among the crisis population more frequently followed an increase in property income than the chronic and churning population, but were less likely to end following an increase in transfer income (See Table 7 in Appendix).

2. Chronic Exits

Individuals experiencing chronic poverty are less likely than the ever-poor population to exit poverty spells following increases in earned income, and are more likely than the above groups to exit following an increase in transfer income. Approximately 17.8 percent of chronic poverty spells ended after increases in the receipt of transfer income, with increases related to SSI most prevent among that income category. Exits related to increases in "other" income were also more prevalent among the chronically poor than among the ever-poor, with 29.2 percent of chronic poverty spell exits following an increase in "other" income. Transfers from relatives and friends were more significant for the chronically poor than the ever-poor, and a smaller proportion of chronic poverty spells ended following a marriage than among the ever-poor.

Similar to entries, exits from chronic poverty were more likely than crisis and churning exits to end following an increase in transfer income, specifically increases of SSI. Chronic poverty spells were less likely than crisis and churning spells to occur after an increased in earned income (See Table 7 in Appendix).

3. Churning Exits

Individuals who experience frequent churning in and out of poverty are less likely than the overall ever-poor population to exit a poverty spell following a new job or the receipt of increased interest income. Individuals exiting a churning spell are also less likely than the ever-poor population to exit following an increase in family "other" income, with a smaller proportion of exits associated with increases in Social Security, veterans, or pension income. Exits from churning spells are also less likely to be associated with an increase in the number of adults when compared to exits among the ever-poor. Among the events shown in Table 8, only the aggregate increase of family total income is found to be more frequently associated with exits from churning poverty spells than among spell exits experienced by the ever-poor (See Table 8 in Appendix).

Analysis of exit events across the crisis, chronic, and churning population are largely similar to spell entries. In some cases the proportion of events associated with exits from churning spells was more similar to the crisis population (changes in earned income, number of jobs, moonlighting income, Social Security income, marital status, and transfers from relatives/friends). While for other events, frequency among the churning population was more similar to the chronic population (changes in pay rates, TANF, aggregate property income, as well as unemployment, veterans, and pension income) indicating that the churner population doesn't uniformly experience exit events more similarly to the chronic or churner populations. Unlike spell entries, there is one event shown in Table 8, increases in aggregate family

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[19] Both the crisis and churning population were more likely to exit a poverty spell following an increase in aggregate family income than the chronic population.

"other" income, that is less associated with exits among the churning population than both the crisis and chronic population. However, there remains no event shown in Table 8 that is more associated with exits among the churning population than both the crisis and chronic populations.

4. Exit Event Correlations

For the crisis, chronic, churning, as well as ever-poor populations, increases in the number of jobs held by family members preceding an exit from poverty was positively associated with adding adults to the family both within and outside of marriage. Gaining a new source of employment was also positively associated with the receipt of increased child support among the ever-poor and chronic population, but not statistically correlated among the crisis or churner populations. Increases in hours worked prior to an exit from poverty was positively associated with having fewer children in the household among the crisis, chronic, and churning population, but correlations were not significant among the ever-poor population. Increases in the amount of income received from SSI and TANF prior to an exit from poverty were positively associated among the ever-poor and chronic population, but not among those exiting crisis or churning poverty spells (Results not shown).

VIII. Changes in Income-to-Poverty Ratios

One of the biggest questions related to how individuals experience transitions in their poverty status relates to the magnitude of the income shocks that move families into or out of poverty. This question of magnitude is particularly relevant for the population experiencing frequent churning in and out of poverty. Churning may be due to the fact that families are hovering near the poverty line and experiencing frequent small fluctuations in their income that move them slightly above or below the poverty line without having a significant impact on their overall consumption or perception of hardship. Alternatively, they may be frequently experiencing large swings in their income that move them dramatically in and out of poverty with large implications for their perceived economic stability.

I use a measure of arc percent change (APC) in individual's income-to-poverty ratio across months to evaluate the magnitude of transitions across months where there is a poverty transition. As discussed in the methods section, measuring the magnitude of change using the APC has a number of advantages, particularly as it allows us to measure change across months when an individual exits poverty following a period when their income-to-poverty ratio was 0. The APC is bound by negative and positive 2. If an individual's income-to-poverty ratio was unchanged across months, their APC would be 0. Individuals exiting poverty have an APC greater than 0, and those exiting poverty in cases where their previous income-to-poverty ratio had been 0 have an APC of 2 regardless of their income-to-poverty ratio in the month of their poverty exit. Alternatively, individuals entering poverty have a negative APC, bound by negative 2 when entering poverty with an income-to-poverty ratio of 0.

Measures of APC in income-to-poverty ratios across months with a poverty transitions reveal that the magnitude of change in both poverty entries and exits vary across individuals experiencing crisis, chronic, or churning poverty spells. Comparisons to the ever-poor population indicate that the average APC experienced by individuals entering or exiting a churning poverty spell was not statistically different than the APC for individuals transitioning into or out of any poverty spell. However, individuals entering or exiting a crisis poverty spell experienced a larger APC when entering or exiting a poverty spell than the ever-poor population, while the chronic population experienced smaller APC than the ever-poor population for both poverty spell entries and exits (See Table 9 in Appendix).

The average APC when entering a poverty spell was largest among individuals entering a crisis spell, at -1.3, while the APC for churners was -1.1, and individuals entering a chronic poverty spell experienced the smallest APC in their income-to-poverty ratios across transition months, at -0.9 (See Table 9 in Appendix). To provide some context to the interpretation of APC, a -1.3 APC in income-to-poverty ratios for individuals entering a crisis poverty spell can be interpreted as a 78 percent decline in income-to-poverty ratios across months, while the -1.1 APC experienced by the churning population is consistent with a 71 percent decline, and the APC of -0.9 experienced by the chronic population is consistent with a 60 percent decline in income-to-poverty ratios across months where a poverty entry occurs.

Trends in APC across months where an individual exited a poverty spell were consistent with trends for entries. The average APC when exiting a poverty spell remained largest among individuals exiting a crisis spell, at 1.2, while changes for churners were 1.1, and individuals exiting a chronic poverty spell experienced the smallest APC in income-to-poverty ratios across transition months, at 0.9 (See Table 9 in Appendix). Since calculations of APC are symmetric, one can compare the average magnitude of APC when entering a poverty spell to the average APC when exiting, finding that there are no statistical differences in the absolute value of APC when entering verses exiting a poverty spell across the crisis, chronic, churning or ever-poor populations.

In addition to statistical differences in the mean value of APC across transition months into or out of a poverty spell, the distribution of APC values when entering or exiting poverty among the crisis, chronic and churning population are also statistically different based on the Kruskal-Wallis Test, which provides a non-parametric ANOVA test of the distributions. As shown in Appendix Figure 5 and Figure 6, the kernel distributions of APC for the churner population show limited clustering around 0, with approximately 90 percent of churners experiencing an absolute APC greater than 0.3 when entering or exiting a poverty spell, indicating that fairly large changes in income-to-poverty ratios are pushing these individuals into and out of repeated poverty spells.[20]

IIX. Conclusions

This research reiterates the importance of accounting for the presence of multiple poverty spells when describing individual's longitudinal poverty experiences. Although the majority of poverty spells over the period from 2009 to 2012 were relatively short (a median of 6.2 months), nearly half of individuals entering poverty over this period experienced more than one poverty spell (45.5 percent).

This analysis classified individuals based on the number of poverty spells they experienced as well as the total length of time they spent in poverty, and highlighted differences in how individuals experience poverty over a 4-year period. Using only a three category classification system "crisis, chronic, or churning" summarizes nearly half of all individuals entering poverty over the period (46.8 percent).

The demographic characteristics of the population defined as churners were different in various ways from the both the crisis and chronic population; their most defining characteristic was that they were composed of a smaller proportion of elderly individuals, consistent with the finding that the elderly experienced the fewest median number of poverty spells across demographic groups.

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[20] An APC of -0.3 when entering a poverty spell can be interpreted as a decline of approximately 26 percent in an individuals income-to-poverty ratio across months, alternatively an APC of 0.3 when exiting a poverty spell can be interpreted as an increase of approximately 36 percent in an individual's income-to-poverty ratio across months.

Preliminary assumptions about churners going into this research proposed that they might experience more infrequent or casual earnings, or be engaged in seasonal work patterns which may led to regular transitions in poverty status. However, evidence on events associated with entries and exits from poverty do not indicate that changes in earned income are more associated with transitions in poverty status among churners than with the ever-poor population. In fact, poverty entries among churners are less often associated with a lost job or business and exits are less often associated with a new job or business. Differences in the proportion of poverty spell transitions following a change in hours worked or pay rates were also not statistically different across the churner and ever-poor population.

Other income and household change events assumed to be associated with poverty entries and exits do not appear to be particularly unique among the churners. Among the detailed transition events included in this analysis, no single event is more associated with entries or exits from poverty among the churner population than among the overall ever-poor population. The only event more associated with churner transitions than the ever-poor population is aggregate increases in total family income, which is associated with more exits among churner spells than among those ever-poor. However, a number of events are less associated with churner poverty transitions than with the ever-poor population. This finding is particularly interesting, as it suggests that mechanisms by which churners enter and exit poverty are largely similar to the overall population, although an explanation for the increased frequency of those events among the churning population is outside the scope of this research.

This research is also limited to descriptive analysis of the events preceding a poverty transition. As has been previously shown by McKernan and Ratcliff (2005) and further supported by the analysis of correlation rates among transition events shown in this paper, many triggering events occur in tandem as a precursor to a transition into or our of poverty, and, as discussed by McKernan and Ratcliff (2005), the nature of the relationship across triggering events likely varies across both person-level characteristics as well as with the number of earlier transitions and the events associated with those prior poverty transitions.

Measuring arc percent change in income-to-poverty ratios across transition months into or out of poverty provides additional insight not just into how individuals are transitioning in poverty status based on their associated transition events, but the magnitude of the change moving individuals into or out of poverty. I find that the churning population is not moving frequently into and out of poverty because they are more likely to experience small fluctuations in their income-to-poverty ratios, but rather it is the chronically poor who experience the smallest fluctuations pushing them into or out of poverty. This makes sense theoretically, as individuals who were nearest to the poverty line before entering a poverty spell likely face greater challenges exiting poverty, leading to prolonged spell lengths.

IX. Next Steps

While this analysis has shown that the events associated with entries and exits from poverty spells vary across individuals experiencing crisis, chronic, and churning poverty, the next step for this research is to investigate how the magnitude of an individual's APC in income-to-poverty ratios across transition months varies based on the event associated with their transition. Presumably, transitions associated with job loss would lead to a larger APC than a transition associated with a decline in child support. Furthering this research would provide some insight on the impact of volatility across various income or household composition variables, and how the occurrence of multiple triggering events might amplify the magnitude of that change based on person-level characteristics.

One consideration with modeling the change in APC is that the variable is bounded, and cannot be predicted using a linear model. One option moving forward might be to transform the APC into a beta distribution so that it is bounded by 0 and 1 can be predicted using a generalized linear model.

An additional consideration when moving forward with future analysis looking at the volatility of income and household composition for these populations over time is the role that imputed data may be playing in masking or over amplifying transitions both in poverty status as well as associated trigger events. Previous research using data from the SIPP to investigate the impact of imputed data on the volatility of income as it related to food insecurity has found that the inclusion of imputed data, as is the case in this analysis, understates the association between declines in household income and food insufficiency. (Dahl et. al., 2012) Future work on how imputed data affects the measurement of poverty spells, as well as the events associated with those spells would benefit from comparisons across estimates including and excluding imputed data.

X. Appendix

Table 1. Sample Size and Distribution

	Unweighted Person Count	Unweighted Spell Count	Percent of All People	Percent of People Ever Poor	Percent of All Spells
Crisis	3,274	3,489	8.1 (0.2)	23.5 (0.6)	14.7 (0.5)
Chronic	2,050	2,508	5.1 (0.2)	14.7 (0.5)	10.6 (0.4)
Churners	1,107	4,058	2.9 (0.2)	8.5 (0.4)	18.5 (0.9)
Uncategorized Poor	7,213	12,772	18.4 (0.3)	53.2 (0.7)	56.1 (0.9)
Never Poor	28,214	(X)	65.5 (0.4)	(X)	(X)
Total	41,858	22,827	100.0	100.0	100.0

Note: Standard errors shown in parentheses where appropriate.

Table 2. Cluster Assignment

Max Clusters = 27

		Cluster Means		
Cluster	Freq.	Total Time in Poverty	Spell Frequency	Classification
1	156	28.21	3.37	Churner
2	13	20.26	7.13	Churner
3	42	26.74	4.82	Churner
4	305	14.08	2.58	
5	484	10.31	2.14	
6	848	6.44	1.61	
7	1,690	2.41	1.00	Crisis
8	228	23.60	3.54	Churner
9	321	37.77	1.81	
10	610	15.96	1.63	
11	914	8.24	1.59	
12	1,584	4.20	1.13	Crisis
13	479	19.14	1.63	
14	1,404	47.83	1.00	Chronic
15	439	35.10	2.21	
16	202	20.76	3.43	Churner
17	316	39.55	2.46	
18	432	24.99	1.84	
19	646	44.22	1.72	Chronic
20	708	12.00	1.57	
21	367	28.29	1.53	
22	365	32.08	1.85	
23	27	13.50	6.02	Churner
24	356	22.03	1.53	
25	229	31.21	3.49	Churner
26	269	41.18	1.63	
27	210	17.42	3.74	Churner

Note: Counts and frequencies shown here are unweighted.

Figure 1. Cluster Assignment and Final Classifications
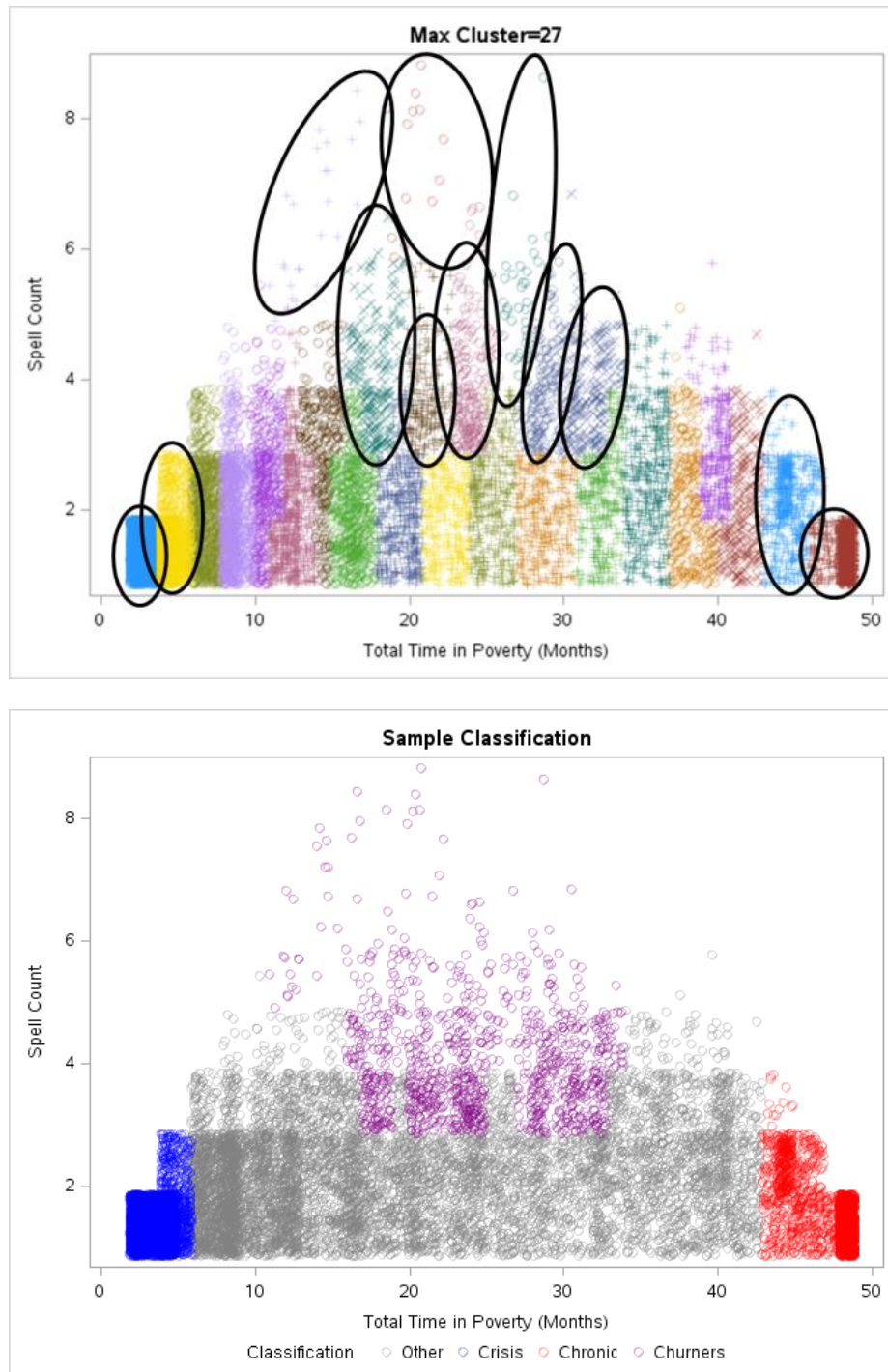
Table 3. Sample Restrictions for Transition Event Analysis

	All Spells			Crisis Spells			Chronic Spells			Churner Spells		
	Unweighted	Weighted	Wgt. Percent	Unweighted	Weighted	Wgt. Percent	Unweighted	Weighted	Wgt. Percent	Unweighted	Weighted	Wgt. Percent
All Spells	22,827	166,584,364	100.0	3,489	24,531,607	100.0	2,508	17,726,643	100.0	4,058	30,803,183	100.0
Left Censored	5,150	37,438,867	22.5	368	2,485,546	10.1	1,810	12,804,357	72.2	562	4,342,008	14.1
Right Censored	5,301	37,643,252	22.6	309	2,019,522	8.2	1,859	13,053,893	73.6	580	4,320,927	14.0

Note: Left and right censored spells are not mututally exclusive. A spell may be left censored, right censored, or both left and right censored.

Figure 2. Distribution of Spell Frequency by Total Time in Poverty (Person-Level): Ever-Poor 2009 to 2012

Distribution of Spell Frequency by Total Time in Poverty (Person Level)

Main grid — Spell Count (rows) by Total Time in Poverty, Months (columns)

Spell Count	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	Total
8															0.0		0.0		0.0								0.0																					0.1
7													0.0		0.0			0.0																														0.1
6											0.0		0.0	0.0	0.0		0.0	0.0		0.0			0.0		0.0		0.0	0.0	0.0																			0.2
5									0.0	0.0	0.1		0.0		0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0		0.0				0.0		0.0										0.9
4				0.4	0.1	0.0	0.1	0.1	0.0	0.0		0.0	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.1	0.3	0.1	0.2	0.0	0.1	0.1	0.2	0.2	0.1	0.3	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.0			0.0							3.7
3			0.4	0.1	0.4	0.1	0.3	0.5	0.5	0.4	0.4	0.5	0.3	0.4	0.3	0.3	0.4	0.3	0.2	0.5	0.6	0.3	0.3	0.1	0.5	0.1	0.4	0.2	0.4	0.4	0.2	0.3	0.4	0.3	0.4	0.2	0.6	0.2	0.1	0.1	0.0							12.5
2		0.9	0.6	1.5	1.2	2.3	0.8	1.1	0.7	1.3	0.6	0.5	0.7	1.0	0.5	0.4	0.6	0.6	0.4	0.5	0.5	0.7	0.4	0.4	0.4	0.5	0.2	0.3	0.5	0.7	0.3	0.3	0.5	0.5	0.3	0.4	0.7	0.7	0.3	0.3	0.4	1.8	0.5	0.4				28.1
1	7.1	4.9	8.3	1.7	1.5	1.4	2.6	0.9	0.8	1.1	1.2	0.5	0.3	0.5	1.0	0.5	0.4	0.4	0.7	0.5	0.3	0.5	0.4	0.3	0.4	0.3	0.4	0.3	0.1	0.2	0.4	0.2	0.3	0.3	0.2	0.4	0.4	0.5	0.3	0.4	0.3	0.4	0.5	0.6	0.6	0.5	9.0	54.5
Total	7.1	4.9	9.2	2.3	3.4	2.7	5.4	1.8	2.3	2.4	3.1	1.5	1.4	1.8	2.6	1.6	1.4	1.4	2.0	1.4	1.1	1.8	1.9	1.1	1.2	1.0	1.6	0.8	1.1	1.0	1.8	1.1	0.9	1.1	1.2	1.1	1.2	1.4	1.6	0.8	0.6	0.9	2.3	1.0	1.1	0.5	9.0	

Spell Count (y-axis) — Total Time in Poverty (Months) (x-axis)

Note: Color indicates relative frequency. These graphs show weighted distributions across all observed poverty spells, they are not intended to report accurate spell durations as both left and right censored cases are included.

Figure 3. Distribution of Spell Frequency by Spell Length (Spell-Level): Ever-Poor 2009 to 2012

Distribution of Spell Frequency by Spell Length (Spell Level)

Spell Count* (vertical axis) by Spell Length (Months) (horizontal axis):

Spell Count	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	Total
8	0.3		0.0		0.0									0.0																																			0.3
7	0.3	0.0	0.0			0.0																																											0.3
6	0.4	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0			0.0																																					0.7
5	1.0	0.2	0.7	0.1	0.2	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0			0.0					0.0																										2.6
4	1.6	0.9	2.1	0.5	0.6	0.5	0.9	0.3	0.2	0.2	0.4	0.1	0.1	0.0	0.2	0.1	0.0	0.0	0.1		0.0		0.0																										8.8
3	3.5	2.2	4.8	1.3	1.0	0.7	1.9	0.5	0.5	0.5	1.1	0.5	0.3	0.2	0.7	0.2	0.2	0.2	0.3	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0					0.0												22.1
2	4.1	2.7	6.1	1.5	1.3	1.3	2.2	1.1	0.9	0.8	1.0	0.6	0.6	0.4	0.9	0.5	0.4	0.4	0.6	0.4	0.4	0.4	0.4	0.3	0.3	0.2	0.3	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0											33.1
1	4.2	2.9	4.9	1.0	0.9	0.8	1.5	0.5	0.5	0.6	0.7	0.3	0.2	0.3	0.6	0.3	0.3	0.2	0.4	0.3	0.2	0.2	0.3	0.2	0.1	0.1	0.3	0.1	0.2	0.2	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.3						5.3	32.1

Spell Length (Months)

| Total | 15.4 | 9.0 | 18.7 | 4.3 | 4.0 | 3.4 | 6.7 | 2.5 | 2.1 | 2.3 | 3.3 | 1.5 | 1.2 | 1.0 | 2.4 | 1.2 | 0.8 | 0.8 | 1.4 | 0.8 | 0.6 | 0.8 | 0.9 | 0.6 | 0.6 | 0.7 | 0.8 | 0.7 | 0.5 | 0.5 | 0.6 | 0.4 | 0.4 | 0.3 | 0.3 | 0.4 | 0.3 | 0.4 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.3 | | 5.3 |

Spell Length (Months)

* Spell count is assigned at the person level based on the total number of unique spells an individual experiences over the period.

Note: Color indicates relative frequency. These graphs show weighted distributions across all observed poverty spells, they are not intended to report accurate spell durations as both left and right censored cases are included.

Table 4. Spell Length, Spell Frequency, and Total Time in Poverty: Ever-Poor 2009 to 2012

	Median Poverty Spell Length[1,2]	Median Number of Spells[3,4]	Median Total Time in Poverty[3,2]
All People	6.16	1.92	12.09
	(0.28)	(0.01)	(0.35)
	0.28	0.01	0.35
White	5.76	1.92	11.32
	(0.35)	(0.02)	(0.53)
	0.35	0.02	0.53
White, non-Hispanic	5.45	1.89	10.08
	(0.44)	(0.02)	(0.7)
	0.44	0.02	0.70
Black	8.16	1.92	16.68
	(0.61)	(0.03)	(1.19)
	0.61	0.03	1.19
Hispanic	6.45	2.00	15.74
	(0.53)	(0.04)	(1.46)
	0.53	0.04	1.46
Non-Hispanic	6.04	1.89	11.34
	(0.35)	(0.01)	(0.64)
	0.35	0.01	0.64
Under 18 years	6.63	1.96	13.41
	(0.45)	(0.02)	(1.11)
	0.45	0.02	1.11
18 to 64 years	5.77	1.92	11.28
	(0.25)	(0.01)	(0.52)
	0.25	0.01	0.52
65 years and over	8.38	1.73	12.53
	(0.2)	(0.02)	(0.5)
	0.20	0.02	0.50
Married-couple families	5.06	1.93	10.61
	(0.38)	(0.02)	(0.72)
	0.38	0.02	0.72
Female-householder families	8.07	1.95	16.89
	(0.53)	(0.03)	(1.67)
	0.53	0.03	1.67
Male-householder families	6.56	1.90	12.28
	(1.67)	(0.03)	(0.81)
	1.67	0.03	0.81
Unrelated individuals	6.84	1.86	12.59
	(0.56)	(0.02)	(0.53)
	0.56	0.02	0.53

[1] Characteristics based on demographics at the beginning of a poverty spell.
[2] Left censored spells excluded and lifetable method used to calculate median, adjusting for right censored cases.
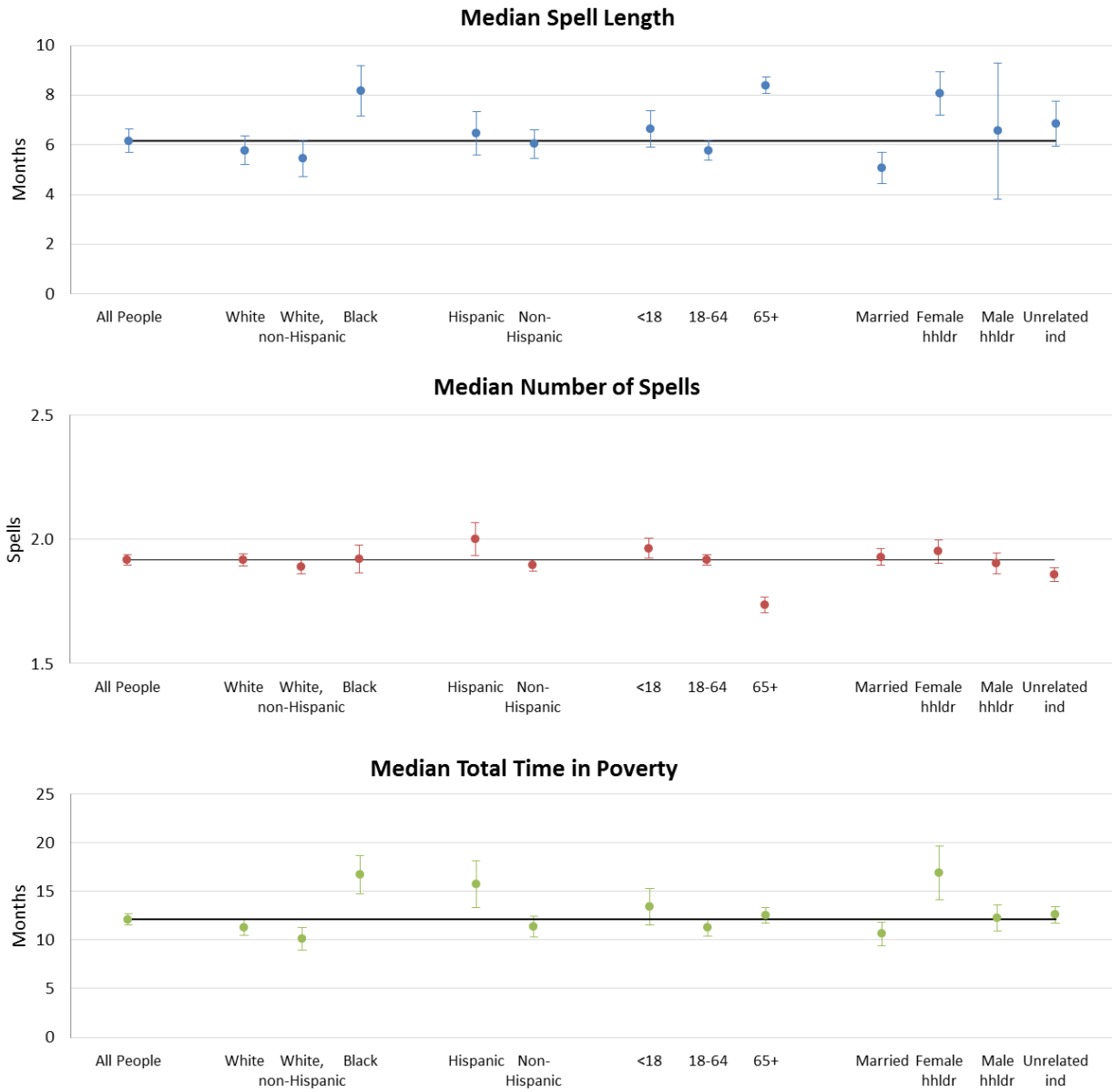[3] Characteristics based on demographics at the beginning of the reference period, January 2009.
[4] Left censored spells included and lifetable method used to calculate median, not accounting for right censored cases.
Note: Standard errors shown in parentheses.

Figure 4. Spell Length, Spell Frequency, and Total Time in Poverty: Ever-Poor 2009 to 2012

Note: Confidence intervals shown at 90 percent.

Table 5. Descriptive Characteristics

	Total Population	Ever-Poor	Crisis	Chronic	Churners
White alone	80.0	74.7	81.2	64.6	78.3
	(0.1)	(0.6)	(1.1)	(1.9)	(2.1)
Black alone	12.5	18.0	11.9	28.8	15.4
	(0.1)	(0.5)	(1)	(1.8)	(1.8)
Residual race	7.4	7.3	6.9	6.6	6.2
	(0)	(0.3)	(0.7)	(0.9)	(1.1)
Hispanic	15.3	23.6	17.5	30.4	25.7
	(0.1)	(0.5)	(1.2)	(1.9)	(2.5)
Non-Hispanic	84.7	76.4	82.5	69.6	74.3
	(0.1)	(0.5)	(1.2)	(1.9)	(2.5)
Under 18 years	25.3	31.9	26.0	42.1	32.6
	(0.1)	(0.4)	(0.9)	(1.3)	(1.5)
18 to 64 years	63.2	62.2	68.2	50.6	64.1
	(0.1)	(0.4)	(0.9)	(1.2)	(1.5)
65 years and over	11.5	5.9	5.8	7.2	3.3
	(0.1)	(0.2)	(0.4)	(0.7)	(0.5)
Male	48.3	46.4	50.3	40.0	51.5
	(0.1)	(0.4)	(0.8)	(1)	(1.5)
Female	51.7	53.6	49.7	60.0	48.5
	(0.1)	(0.4)	(0.8)	(1)	(1.5)
Work limiting disability	12.2	17.6	11.7	30.0	18.1
	(0.2)	(0.5)	(0.7)	(1.7)	(1.7)
No work limiting disability	87.8	82.4	88.3	70.0	81.9
	(0.2)	(0.5)	(0.7)	(1.7)	(1.7)
Married-couple families	63.7	48.8	59.5	28.6	46.3
	(0.3)	(0.7)	(1.5)	(1.9)	(2.4)
Male-householder families	12.7	16.3	17.2	14.4	19.9
	(0.1)	(0.4)	(1.1)	(1.2)	(1.7)
Female-householder families	23.6	34.9	23.2	57.0	33.8
	(0.2)	(0.6)	(1.1)	(1.8)	(2.4)
Less than 4 years of high school	17.6	27.5	17.2	38.1	31.1
	(0.3)	(0.7)	(0.9)	(1.7)	(2.2)
High school graduate, no college	23.4	25.4	22.9	27.9	25.5
	(0.3)	(0.6)	(1.1)	(1.4)	(1.9)
One or more years of college	59.0	47.1	59.9	34.0	43.5
	(0.3)	(0.6)	(1.3)	(1.6)	(2.4)
Northeast	18.1	15.1	16.4	14.8	13.6
	(0.1)	(0.5)	(1.3)	(1.5)	(1.8)
Midwest	22.0	20.8	21.7	21.6	25.5
	(0.1)	(0.5)	(1.3)	(1.6)	(2.1)
South	36.7	40.1	37.3	42.7	38.8
	(0.1)	(0.6)	(1.4)	(2)	(2.4)
West	23.2	24.1	24.6	20.9	22.1
	(0.1)	(0.6)	(1.5)	(1.6)	(1.7)
Weighted N	284,613,989	98,172,207	23,056,689	14,456,114	8,384,307
Unweighted N	41,858	13,644	3,274	2,050	1,107

Note: Demographic characteristics based on those reported in January 2009.

Table 6. Annual Poverty and Near Poverty Rates by Classification Group

	Poor At Least 1 Calendar Year	Near Poor At Least 1 Calendar Year	Poor Entire 4-year Period	Near Poor Entire 4-year Period
Crisis	5.4	22.3	0.2	4.1
	(0.7)	(1.2)	(0.1)	(0.7)
Chronic	100.0	100.0	99.3	99.6
	-	-	(0.3)	(0.2)
Churning	87.4	95.1	26.1	63.3
	(1.9)	(1.3)	(2.5)	(2.5)

Note: Poverty estimates calculated at the person level by comparing individuals total family income to their sum of their poverty thresholds over a given period.
Note: Standard errors shown in parentheses.

Table 7. Events Associated with Poverty Spell Entries

	Spell Entries			
	All Entries	Crisis	Chronic	Churner
Family total income decreases	96.2	98.3	94.6	97.2
	(0.3)	(0.4)	(1.4)	(0.6)
Family earned income decreases	79.0	85.1	69.1	79.6
	(0.6)	(0.9)	(3.1)	(1.6)
Loss of job/business	22.0	21.0	24.7	18.4
	(0.6)	(1.3)	(2.9)	(1.2)
Loss of all jobs/businesses	7.4	5.8	11.8	4.8
	(0.4)	(0.7)	(2.2)	(0.7)
Hours worked decreases	9.3	9.2	7.6	10.5
	(0.4)	(0.9)	(2)	(1.2)
Pay rate decreases	42.5	50.6	33.2	43.2
	(0.7)	(1.6)	(3.3)	(1.6)
Moonlighting income decreases	1.7	2.4	1.4	1.3
	(0.2)	(0.6)	(0.6)	(0.3)
Family transfer income decreases	7.8	2.7	16.6	9.8
	(0.4)	(0.5)	(2.6)	(1.2)
SSI income decreases	5.4	2.2	9.0	7.1
	(0.3)	(0.4)	(1.8)	(1)
TANF income decreases	1.2	0.3	4.2	1.3
	(0.2)	(0.2)	(1.6)	(0.3)
GA income decreases	0.3	0.1	0.0	0.2
	(0.1)	(0.1)	-	(0.1)
Other welfare income decreases	0.7	0.0	3.9	0.6
	(0.1)	-	(1.5)	(0.2)
Family property income decreases	4.2	7.3	2.1	4.3
	(0.3)	(0.8)	(0.6)	(1)
Dividend income decreases	0.7	1.3	0.2	0.4
	(0.1)	(0.3)	(0.2)	(0.2)
Interest income decreases	1.3	2.6	0.4	0.5
	(0.1)	(0.5)	(0.2)	(0.1)
Property income decreases	2.8	4.5	1.6	3.7
	(0.3)	(0.7)	(0.5)	(1)
Family other income decreases	21.2	20.3	23.8	16.5
	(0.6)	(1.2)	(2.7)	(1.3)
Social Security income decreases	7.7	7.4	7.1	6.1
	(0.4)	(0.6)	(1.4)	(0.8)
Unemployment income decreases	7.4	7.9	7.3	4.6
	(0.4)	(0.9)	(2)	(0.8)
Veterans income decreases	0.3	0.7	0.0	0.0
	(0.1)	(0.2)	-	(0)
Workers compensation income decreases	0.6	0.6	0.3	1.0
	(0.1)	(0.2)	(0.2)	(0.3)
Sickness/disability income decreases	0.5	0.2	1.0	0.5
	(0.1)	(0.1)	(0.5)	(0.2)
Child support income decreases	2.9	2.2	4.0	2.4
	(0.3)	(0.5)	(1.6)	(0.6)
Pension income decreases	1.8	2.0	1.4	0.8
	(0.2)	(0.3)	(0.5)	(0.3)
Transfers from relatives/friends decreases	0.5	0.4	2.1	0.5
	(0.1)	(0.2)	(0.6)	(0.2)
Other cash earnings/income decreases	1.6	1.1	2.7	1.6
	(0.2)	(0.3)	(1.2)	(0.4)
Onset of work limiting disability	0.9	0.9	1.6	0.7
	(0.1)	(0.2)	(0.5)	(0.2)
Divorce	0.9	1.2	0.1	0.3
	(0.1)	(0.2)	(0.1)	(0.1)
Number of adults decreases (not divorce)	4.7	4.1	5.6	2.9
	(0.3)	(0.5)	(1.5)	(0.5)
New child in family	3.6	2.3	4.5	3.1
	(0.3)	(0.5)	(1.5)	(0.6)
Weighted n	129,145,497	22,046,061	4,922,285	26,461,175
Unweighted n	17,677	3,121	698	3,496

Note: Standard errors shown in parentheses.
Note: Declines in income based on a $50 threshold. Declines in hours worked based on a 5 hour threshold.
Note: Declines in hours worked are limited to cases where there was no loss of jobs. Declines in pay rate are limited to cases where there was no reduction in hours worked.

Table 8. Events Associated with Poverty Spell Exits

	Spell Exits			
	All Exits	Crisis	Chronic	Churner
Family total income increase	98.7	98.8	99.4	99.1
	(0.1)	(0.4)	(0.3)	(0.2)
Family earned income increase	79.7	81.6	72.6	81.4
	(0.5)	(1.2)	(3.3)	(1.6)
New job/business	22.1	18.8	24.0	16.9
	(0.6)	(1.3)	(3.1)	(1.4)
Hours worked increases	9.6	9.4	7.4	10.4
	(0.5)	(0.9)	(2.1)	(1)
Pay rate increases	43.5	49.8	38.5	44.9
	(0.7)	(1.6)	(4)	(2.2)
Moonlighting income increases	1.3	1.2	0.3	1.4
	(0.2)	(0.4)	(0.2)	(0.5)
Family transfer income increase	8.3	3.3	17.8	10.2
	(0.4)	(0.6)	(3)	(1.2)
SSI income increases	6.2	2.5	15.1	6.8
	(0.3)	(0.4)	(2.9)	(1)
TANF income increases	1.0	0.0	3.8	1.3
	(0.2)	(0)	(1.7)	(0.4)
GA income increases	0.2	0.0	0.0	0.4
	(0.1)	-	-	(0.3)
Other welfare income increases	0.8	0.4	2.6	1.0
	(0.1)	(0.3)	(1.2)	(0.4)
Family property income increase	4.0	6.8	2.2	4.0
	(0.3)	(0.7)	(0.8)	(1.1)
Dividend income increases	0.6	1.2	0.1	0.5
	(0.1)	(0.3)	(0.1)	(0.2)
Interest income increases	1.0	1.6	0.1	0.4
	(0.1)	(0.4)	(0)	(0.2)
Property income increases	2.7	4.6	2.1	3.2
	(0.3)	(0.6)	(0.8)	(1)
Family other income increase	21.9	22.2	29.2	16.9
	(0.6)	(1.3)	(3.1)	(1.2)
Social Security income increases	9.6	9.0	13.9	7.0
	(0.4)	(0.8)	(2.3)	(0.9)
Unemployment income increases	5.7	7.3	5.9	4.6
	(0.4)	(0.9)	(1.9)	(0.6)
Veterans income increases	0.4	0.7	0.2	0.1
	(0.1)	(0.3)	(0.2)	(0.1)
Workers compensation income increases	0.6	1.4	0.0	0.9
	(0.1)	(0.4)	-	(0.3)
Sickness/disability income increases	0.3	0.4	0.5	0.4
	(0.1)	(0.1)	(0.4)	(0.2)
Child support income increases	3.2	2.1	4.6	2.3
	(0.3)	(0.4)	(1.6)	(0.5)
Pension income increases	1.8	2.8	1.3	0.4
	(0.1)	(0.4)	(0.7)	(0.1)
Transfers from relatives/friends increases	0.4	0.2	1.7	0.4
	(0.1)	(0.1)	(0.7)	(0.1)
Other cash earnings/income increases	1.5	0.8	2.7	1.1
	(0.2)	(0.3)	(1.1)	(0.3)
End of work limiting disability	0.8	0.5	1.3	0.7
	(0.1)	(0.1)	(0.5)	(0.2)
Married	1.0	0.9	0.3	0.8
	(0.1)	(0.2)	(0.2)	(0.2)
Number of adults increases (not marriage)	3.0	2.5	2.3	1.7
	(0.2)	(0.5)	(0.7)	(0.3)
Fewer children in family	2.4	2.3	1.2	2.1
	(0.2)	(0.6)	(0.7)	(0.5)
Weighted n	128,941,112	22,512,085	4,672,750	26,482,257
Unweighted n	17,526	3,180	649	3,478

Note: Standard errors shown in parentheses.
Note: Increases in income based on a $50 threshold. Increases in hours worked based on a 5 hour threshold.
Note: Increases in hours worked are limited to cases where there was no increase of jobs. Increases in pay rate are limited to cases where there was no increase in hours worked.

Table 9. Arc Percent Change in Income-to-Poverty Ratios when Entering or Exiting a Poverty Spell

	Poverty Entries	Poverty Exits
	APC	APC
Ever Poor	-1.08	1.08
	(0.01)	(0.01)
Crisis	-1.27	1.25
	(0.02)	(0.02)
Chronic	-0.85	0.93
	(0.04)	(0.04)
Churners	-1.10	1.10
	(0.03)	(0.03)

Note: Standard errors shown in parentheses.

Figure 5. Kernel Distributions of APC across months with a Poverty Entry
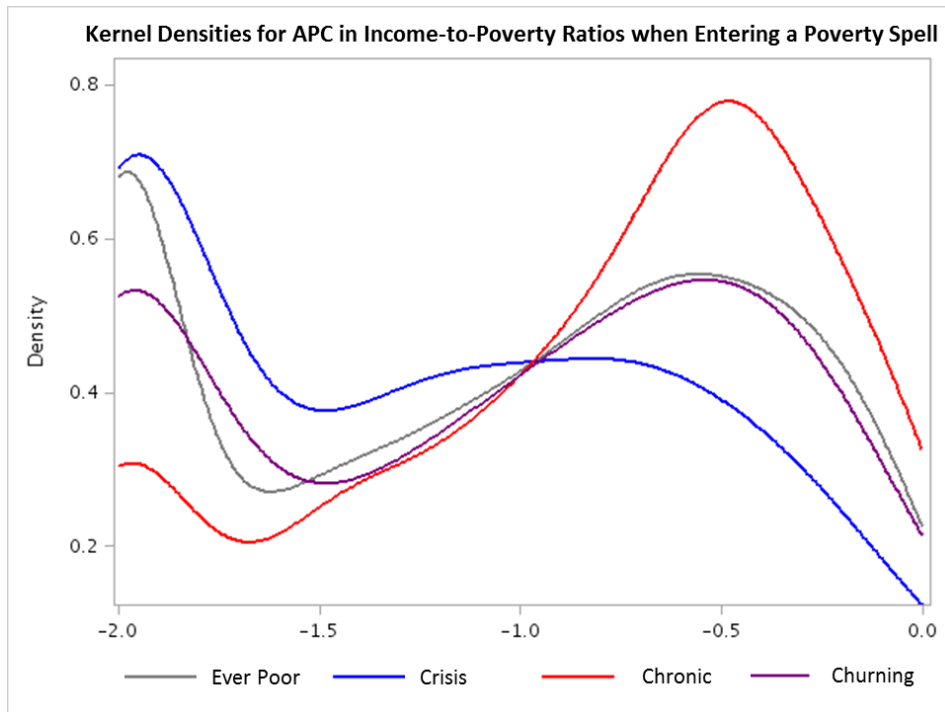
Note: Uses simple normal reference method based on the interquartile range to compute bandwidth.

Figure 6. Kernel Distributions of APC across months with a Poverty Exit
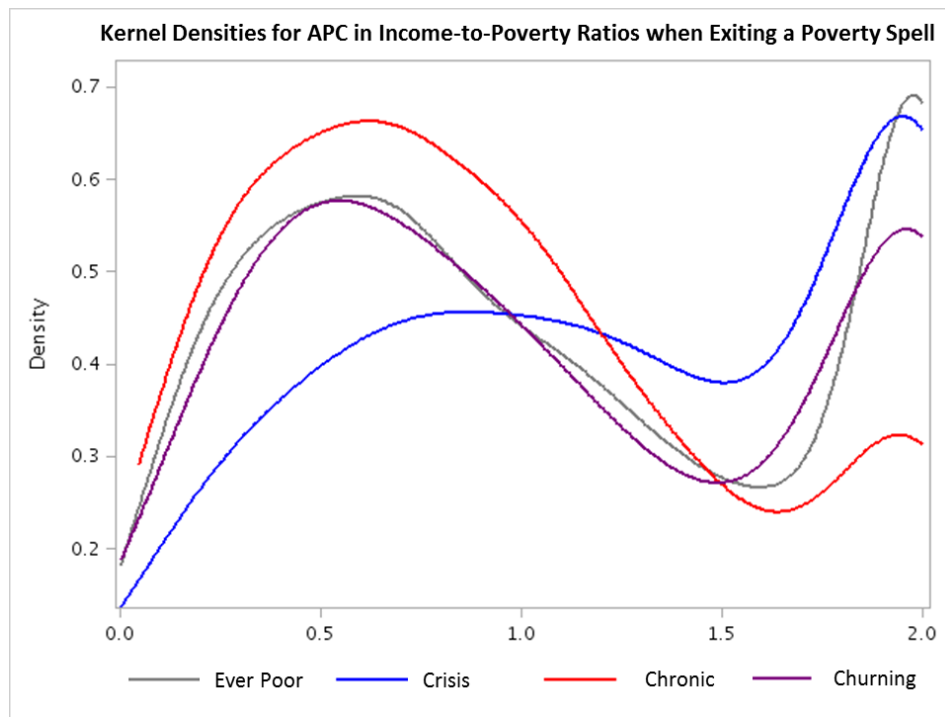
Note: Uses simple normal reference method based on the interquartile range to compute bandwidth.

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