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Poverty Dynamics among Young Adults in Rural and Urban United States
(Under the Direction of TERESA A. MAULDIN)

The five objectives of this study were to examine whether individuals with characteristics associated with lower poverty exit rates were more likely to be in poverty upon becoming young adults, to assess the impact of left-censoring on poverty exit rate estimation, to examine if rural residency was associated with lower poverty exit rates than urban residency, to determine if time-varying variables associated with exit from and reentry into poverty were symmetric, and to assess the relationship between rural-to-urban migration and timing of exit from poverty, all among young adults (age 25 to 36). Discrete-time logistic regression was utilized, and the data came from the *National Longitudinal Survey of Youth 1979 Cohort*.

When demographic, human capital, and labor market factors were compared, young adults who were in poverty at the beginning of the observation period (age 25) were different from those who experienced poverty later during the observation period. The poverty exit rate estimates using the data with poverty duration information only from age 25 were different from those using the data with poverty duration information from pre-young adulthood (for those who were in poverty at age 25). Young adults living in rural areas had lower poverty exit rates than those living in urban areas; however, when other factors (described above) were controlled for, this difference disappeared. Using a two-way transit model that simultaneously assesses poverty exit and reentry rates, it was found that having had a health problem in a given year was associated with lower poverty exit rates and lower poverty reentry rates in that year. Lastly, poverty spells that involved rural-to-urban migration had lower exit rates than those that were experienced only in rural areas. In addition, after relocating to an urban area, the longer

young adults remained in poverty, the less likely they were to exit from poverty. Public policy implications are discussed.

INDEX WORDS: Event history analysis, Poverty, Poverty duration, Poverty dynamics, Poverty spell, Rural-to-urban migration, Young adults

POVERTY DYNAMICS AMONG YOUNG ADULTS
IN RURAL AND URBAN UNITED STATES

by

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DEDICATION

To my grandfather, Kikuo Abe, who is a model life-time learner, and
to my grandmother, Naoko Abe, who is a Human Capital advocate

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CHAPTER I

INTRODUCTION

The United States has had about 10 to 15% of its population in poverty during the past few decades (U.S. Census Bureau, 2000, September 20). The poverty rates among different groups of individuals and families vary. For example, the range of poverty rates has been continuously higher in rural (non-metropolitan) areas than in urban (metropolitan) areas since 1967. Central cities and suburbs comprise urban areas. Among rural areas, central cities, and suburbs, the rural areas have been ranking in the middle since 1976; except for 1986, poverty rates in rural areas have been lower than in central cities and higher than in suburban areas (U.S. Census Bureau, 2000, September 26a). In recent years, 25- to 34-year-olds had lower poverty rates than younger groups, but higher poverty rates than older groups (11.9% in 1998 and 10.5% in 1999) (U.S. Census Bureau, 1999, September). These figures give a cross-sectional view of poverty, while this study focuses on the dynamics of poverty, such as duration in, exit from, and reentry into poverty that rural young adults experience in the United States.

Research Problem

Poverty dynamics of young adults are the focus of this study. Young adults will be future leaders in society in various ways. Their personal and public effectiveness can be hindered by economic hardship, and persistent poverty not only costs individuals, for instance by making them unable to fulfill basic human needs and hindering them from future opportunities, but also their children and the rest of the society. Residential location was the main interest of this study, and its relationship to poverty dynamics was assessed. Between March 1998 and March 1999, 16% of the total U.S. population age one or older moved, while 25% of those in their twenties and thirties moved (U.S. Census

Bureau, 2000, July 12). In a study of a population which is building its future potential and whose relocation rates are higher than those of other cohorts, a focus on location (rural/urban) and poverty dynamics has significance.

One of the earliest studies that examined the dynamics of poverty in the U.S. revealed the fact that being poor in terms of household income was not a way of life; indeed, most American families' income group classification fluctuated over time (Duncan & Morgan, 1984). Application of the spell-based approach by Bane and Ellwood (1986) enabled examination of poverty dynamics in association with life course events that were related to exit from and entry into poverty. Further studies by Stevens (1995, 1999) and Cox (1997) included multiple poverty spells which individuals or families experienced. These studies assessed the impact of left-censoring, and also examined poverty reentry (entry in Cox's study).

The issue of left-censoring is an important methodological problem in studies of poverty dynamics. Since both the data collection of longitudinal studies and the beginning time of the observation period (window) in a given study often begin at an arbitrary time (for example, by the calendar year or the respondents' age), researchers make conscious decisions as to whether or not individuals who were in poverty at the beginning of the observation period will be included in the studies. Left-censored cases in poverty exit analysis are individuals who were already at risk of exiting from poverty at the beginning of the observation period. Left-censoring in data means that researchers do not know how long these individuals had been in poverty at the beginning of the observation period. One of the main objectives of this study was to assess how the poverty exit rate estimates would be influenced by the treatment of left-censored observations. For example, Iceland (1997a, January) identified association between certain family characteristics and the increased likelihood of being left-censored among urban residents. If such a pattern is observed, then the decision about how to handle the

left-censored observations could lead to an over- or underestimation of young adults' poverty exit rates.

The literature shows that various factors explain group differences in poverty dynamics. This study focused on the association between poverty dynamics and residential location, family and household characteristics, human capital, and labor market factors. Places of residence may explain differences in young adults' poverty experiences. A substantial number of individuals in both urban and rural areas have experienced the dynamics of economic well-being in the past decades, but in different ways. Rural residents face unique challenges such as limited employment opportunities and lack of public transportation (Duncan, 1996; Lichter, Cornwell, & Eggebeen, 1993; Lichter & McLaughlin, 1995). One study found that living in rural areas was associated with increased poverty exit and entry rates for African American women, and decreased poverty exit rates and increased entry rates among White women during their twenties to mid-thirties (Cox, 1997). Another study (Mimura & Mauldin, 2000) found that there was no rural and urban difference in poverty exit rates among young adults aged between 23 and their mid-thirties, when other factors (such as family and household characteristics, human capital, and labor market factors) were controlled.

In general, domestic migration plays a significant role in determining economic well-being (Borjas, Bronars, & Trejo, 1992; Harris, 1981; Yankow, 1999). Migration is a form of human capital investment (Becker, 1993), and for poor young adults living in rural areas who do not have other forms of capital, economic opportunities may be more abundant in urban areas than in rural areas. Does such a difference in economic opportunities motivate poor young adults living in rural areas to relocate? Young women aged 18 to 23 decreased their poverty duration by relocating from rural areas to urban areas (Wenk & Hardesty, 1993). However, the economic gain from migration among poor young adults of older cohorts has not been studied.

Family background, such as family structure during one's childhood, marital status, and household composition, is often associated with economic well-being. In addition, the relationships among family and individual characteristics are intertwined; for example, young women were more likely to marry if they are not in poverty and if they had a job (Brown & Hirschl, 1995; McLaughlin & Lichter, 1997). Living in female-headed households was associated with being at an economic disadvantage (Bureau of Labor Statistics, 2000, June 19; Yellen, 1998), and it was associated with lower poverty exit rates and higher poverty reentry rates (Stevens 1995).

Human capital, for example, in the form of education, job experiences, or health, was related to residential location and family and household characteristics, as well as to experience of poverty (Cox, 1997; Lichter, et al., 1993; Mauldin, 1990, 1991; Stevens, 1995; Wolfe & Hill, 1993). The labor market was the source of income for most poor young adults and was directly related to their economic well-being, both in terms of local labor market conditions and individuals' employment status (Borjas, Bronars, & Trejo, 1992; Cox, 1997; Duncan & Morgan 1984; Harris, 1981; Iceland, 1997b).

Overview of the Research

The general goal of this study is to advance the understanding of poverty dynamics among young adults in the United States by using the *National Longitudinal Survey of Youth 1979* to assess the impact of left-censoring on poverty exit rate estimation, factors associated with poverty exit rates, and factors associated with poverty exit and reentry rates, and to examine the impact of rural-to-urban migration on poverty exit rates. The first of five objectives focused on young adults who were in poverty at the beginning of the observation period (age=25) and comparing them with the young adults who later experienced poverty during the observation period. The second objective involved assessing the differences in poverty exit rate estimates when two different approaches were used. One approach used the poverty status information only from each

subject's young adulthood (age > 25), and the other also used poverty duration information from pre-young adulthood (age<25).

The third objective was to examine the relation between poverty exit rates and rural and urban (central cities and suburban) residency, in order to assess the unique economic opportunities that young adults face and the experiences they have in rural and urban areas. The fourth objective was to compare, simultaneously, the association of factors related to poverty exit rate with those related to the reentry rate into poverty, which has not been examined in the previous poverty dynamics studies. Both Cox (1997) and Stevens (1995, 1999) analyzed poverty exit rates and (re)entry rates in separate models. Since poverty exit and reentry may not be independent from each other, this study contributes to the literature by using one model to assess these two transitions. The final objective was to analyze the economic consequences of rural-to-urban migration among poor young adults and the timing of exit from poverty after migrating from rural to urban areas. This part of the study focuses on the poverty spells that began while individuals were living in rural areas. If the economic opportunities are more abundant in urban areas, then young adults may have an incentive to relocate from rural to urban areas.

Specific Research Questions

There are five specific research questions:

1. Are the characteristics of young adults with lower poverty exit rates similar to those who are more likely to be in poverty upon becoming young adults (age=25), as opposed to the characteristics of those entering poverty later during the observation period (age>25)?
2. Are the estimates of poverty exit rates of young adults the same when poverty duration information only from young adulthood (age > 25) is used as when information from prior years (age<25) is also used?

3. Are young adults (age > 25) living in rural areas less likely to exit from poverty than young adults living in urban (central cities, suburban) areas, regardless of mobility? Does the difference remain when demographic and household characteristics, human capital, and labor market factors are controlled?
4. Are demographic and household characteristics, human capital, and labor market factors that are associated with exit from and reentry into poverty of young adults opposite in their direction and equal in their magnitudes?
5. What is the relationship between young adults' rural-to-urban migration and the timing of their exit, if any, from poverty?

Limitations and Significance of the Study

Limitations

Clarification of timing, duration, and order of events does not explain the causes of certain human experiences nor does it prove what characteristics individuals should possess or alter in order for an event (such as exit from poverty) to occur to them. In other words, the findings of this study about individual characteristics and environment cannot be interpreted as causes of entry into, exit from, or reentry into poverty. Rather, their interpretations are limited to factors associated with experiencing, exiting from, or reentering into poverty.

Significance of the Study

One significant contribution of this study is the assessment of the effect of left-censoring in poverty duration data on the exit rate estimates among young adults living in the United States. Although there is no agreed upon solution when individual information prior to a certain time is unavailable, the findings should suggest the importance of understanding the implications of selecting a certain method of defining the observation period.

The second important contribution of this study is its implication for public policy as it relates to young adults' poverty in the United States. The significance of duration in and reentry into poverty has been increasing both from the public policy perspective and for individuals who seek public assistance. Assuming that most poverty episodes are of short-term, the welfare reform that took place in 1996 imposed a time limit on the receipt of need-based public assistance. Poverty exit rate assessment and the simultaneous assessment of poverty exit and reentry rates play important roles in identifying populations that may suffer most from the reform. Lastly, the analyses about rural-to-urban migration offer a caution that simply migrating to cities will not make rural young adults exit from poverty.

CHAPTER II

LITERATURE REVIEW

The first part of this chapter describes the development of poverty dynamics studies, starting from descriptive studies to analytical and multivariate studies that used the event history approach. Event history analysis of poverty dynamics may look into the duration in poverty, timing of exit from poverty, or changing experiences and environment that are associated with the poverty exit or reentry. The second part of this chapter is a review of literature that investigates factors associated with the poverty dynamics of individuals in five categories: residential location, family and household (for example, family structure), human capital, labor market, and attitudes and motivation. The review of poverty dynamics literature precedes the review of literature on factors associated with poverty dynamics to first capture the larger picture and then to focus on the specific details and possible reasons for variations in experiences. The literature on economic well-being in general, which typically uses a cross-sectional approach identifying who is poor, is only briefly mentioned because it is less directly related to the proposed research.

Poverty Dynamics, Longitudinal Data, and Event History Analysis

Poverty Dynamics and Longitudinal Data

The use of longitudinal data has provided an understanding of poverty dynamics by counting the number of years in and out of poverty during a fixed observation period (Ashworth, Hill, & Walker, 1994; Duncan & Morgan, 1984; Hill, 1981). Longitudinal studies that show patterns of poverty and non-poverty have given new insights into individual and family poverty experiences. Duncan and Morgan (1984) examined the changes in family economic status and their causes using the *Panel Studies of Income*

Dynamics (PSID) for the period from 1971 through 1978 and found that the majority of families (60%) changed their relative income position during this seven year period. According to Hill (1981), among individuals who experienced poverty at least once between 1969 and 1978 in the *PSID*, 40% were poor only for a year, and only 3% were poor in all 10 years. The study by Ashworth et al. (1994) on a 1968 to 1972 birth cohort through age 15, also used the *PSID*. They found that many children who experienced poverty during childhood were poor for a short time, while at the same time, children who were in poverty in a given year were more likely to be in poverty for many years than to be experiencing a very short poverty spell.

Despite the importance of their findings, the methods used were limited to univariate analysis. Duncan and Morgan (1984) found that factors such as changes in household composition, such as marriage, divorce, child bearing, and a child leaving the parental home were associated with income dynamics. This finding motivated analysis of the relative impact of these factors on ever experiencing poverty and the inter-relationships among them. The longitudinal studies described above did not incorporate factors associated with the poverty dynamics in a multivariate model. Ashworth et al.'s (1994) comparison of the proportion of children in their *PSID* sample who experienced poverty by socio-economic characteristics used cross-tabulation. For example, the findings suggested being born in a one-parent family, having an African American family head, and living in the South were associated with an extended duration in childhood poverty. All factors cross-tabulated with the six poverty patterns the authors defined were static; thus, the study lacked explanation of the impact of changes in the environments upon entry into or exit from poverty.

Overall, availability of longitudinal data on family and individual well-being gave insight into poverty dynamics and suggested factors associated with longer poverty spells. Such data continue to be sources for further understanding of poverty dynamics.

Poverty Dynamics and Event History Analysis

A step forward from the univariate analysis was the descriptive, spell-based event history analysis approach incorporating factors associated with poverty dynamics (Bane & Ellwood, 1986). Using a spell-based approach and exit probabilities, Bane and Ellwood (1986) examined duration of poverty among non-elderly individuals and life-course events they experienced at the beginning and ending of poverty in an attempt to explore the reasons that lead them into and out of poverty. Longitudinal and cross-sectional comparisons of poverty duration suggested that, among those who were in poverty at any time, a majority of those were in the midst of long spells. Although nearly half of the poverty spells lasted a year, only about one-tenth of persons who were in poverty at any time experienced spells that lasted a year. Further, identification of events (such as changes in marital status) at the beginning and ending of the spell implied the poverty population was heterogeneous.

The shortcomings of Bane and Ellwood's (1986) study include the beginning and ending events' identification procedure and the focus on single spells. Bane and Ellwood (1986) identified a single event related to earnings or family structure changes that explained each beginning and ending of a poverty spell, and they gave priority to changes in family structure over changes in earnings. In other words, when these two changes occurred, for instance at the beginning of the spell, the authors classified the event at the beginning of the spell as changes in family structure, without giving further assessment. This simplicity was also a weakness, because there could be multiple factors associated with the beginning and ending of poverty, that contribute to poverty dynamics in different degrees. For example, earnings of both husband and wife might have risen in the year a family exited from poverty, although the magnitude of the increase in husband's earnings was greater than that of the wife's. Another shortcoming of Bane and Ellwood's (1986) study is that it measured poverty duration by taking into account only one poverty spell

each individual experienced. Exiting from poverty one year does not imply being out of poverty during the rest of the observation period, not to mention during one's life time, as researchers would like to infer; thus, their presentation most likely underestimated individuals' time in poverty.

What followed Bane and Ellwoods' seminal research was the analysis of multiple spells and both exit and (re)entry rates with a multivariate approach (Cox, 1997; Stevens, 1995, 1999). Stevens (1999) and Cox (1997) did more comprehensive research on exit from and reentry (entry in Cox) into poverty in separate models. Stevens (1999) used the *PSID* data, and her findings suggest that poverty dynamics studies need to incorporate multiple spells of poverty because of high reentry rates. For the total sample, when a single spell of each observation was considered, half the sample were in poverty only for a year, and about 80% were in poverty for three years or less. In contrast, when multiple spells were included, fewer than one-fifth of the individuals who experienced poverty in 10 years were in poverty for only one year. Fewer than half were in poverty for three years or less. Using the *National Longitudinal Survey of Youth 1979 (NLSY79)* data, Cox (1997) focused on the relationship between job engagement in different occupational groups among women in three race and ethnicity groups and their likelihood of falling into and emerging from poverty. Both studies compared socio-economic factors, such as race and ethnicity, gender, marital status, and educational attainment, and found that some factors were associated with increased poverty exit rates and decreased (re)entry rates, but other factors related differently to the poverty dynamics across different demographic groups. Further, both studies examined the exit rates and (re)entry rates in separate models.

Even in the advanced methodology described above, left-censoring may still affect poverty dynamics estimation (Iceland, 1997a, January; Stevens, 1995). Measurement of duration in poverty involves identification of the beginning and the end

of the poverty spell. Omitting persons who were already in a poverty spell may cause over- or underestimation of the duration in poverty. Without having individual information on key variables in poverty dynamics studies, including household composition and income prior to observation or data collection periods, timing of the beginning of the spells is unknown. Stevens (1995, 1999) compared the results of two approaches. In one she excluded left-censored spells, defined as spells that began in the initial year of survey in 1967. In the other she delayed the beginning of the observation by six years and made the longest duration category as “six years or more” so that none were left-censored and all spells had duration information. The results from these two approaches were remarkably similar. Another concern is whether left-censored observations have demographic and environmental characteristics different from the rest of the sample; if so, then significance of poverty among certain people will still be underestimated. In his study of a metropolitan sample from the *PSID*, Iceland (1997a, January) found that being African American, female, younger, having more children in the family, not being in a dual-headed family, and having fewer years of education significantly increased the likelihood of being in poverty at the beginning of the observation period (which means being left-censored). He defined the left-censored case as “a subject has already been exposed to the risk of an event for an unknown amount of time before he or she comes under observation” (p. 1). Controlling for other socio-demographic factors, being in a female-headed family was not significantly related to the odds of being left-censored.

In summary, although existing data sets have a limitation in that they do not cover individuals throughout the life course, application of the spell-based approach has enhanced the assessment of family and individual characteristics and life course events associated with their exit from, entry into, and duration in poverty spells. Including more

than one poverty spell per person from the observation period further clarified the nature of poverty dynamics.

Overall, event history analysis, which, for example, examines timing of exit from and duration in poverty, is a useful technique for identifying duration in poverty and factors that explain individual differences in exit from and entry into poverty spells. Surveying for the existing data sets such as *NLSY79* may have begun at any time, and depending on the research questions, researchers may not have the interviewees' key information from a time prior to the data collection. Interviewing for the *NLSY79* began in 1979 while the respondents were 14 to 21 years old, and the *NLSY79* provides no information about poverty status of the respondents prior to 1979. This may impose a censoring problem depending on the assumptions made for a study about the population, as is explained in Chapter 3.

Factors Associated with Poverty Dynamics

Various factors explain group differences in poverty dynamics directly or indirectly. The following pages summarize these factors in five categories: residential location such as rural and urban residency and migration, family and household characteristics, human capital, local labor market and employment status, and individuals' attitude and motivation. The terms rural and urban are used as synonyms for the terms metropolitan and non-metropolitan that the Census Bureau uses to classify counties.

Residential Location

The kind of places where poor young adults live may explain differences in their poverty experiences. Overall, poverty rates in the United States have been higher in rural areas than in urban areas. Between 1967 and 1999, poverty rates in rural areas continued to be higher than those in metropolitan areas (central city and suburban). Between 1976 and 1999, poverty rates in rural (non-metropolitan) areas ranged from 13.5% to 18.3%.

The figures were higher than in suburban areas (6.8% to 10.3%) and lower than in central cities in urban areas (15.4% to 21.5%), except in 1986 when 18.1% of rural residents and 18.0% of central city residents were in poverty. (U.S. Census Bureau, 2000, September 26a). In terms of duration in poverty, a study by Cox (1997) using 1979 to 1994 *NLSY79* on women aged 20 to 36 (19 to 36 in entry rate models) found that living in rural areas was associated with higher poverty entry rates than living in urban areas for both African American and White women. Living in rural areas was associated with increased exit rates for African American women and with decreased exit rates for White women, when other factors were controlled.

Rural residents faced unique challenges such as limited employment opportunities including underemployment, industrial restructuring (Lichter & McLaughlin, 1995), and lower employment growth rates throughout the 1980s (Kusmin, 1995). Perhaps for this reason, when other factors were controlled, there was no rural and urban difference in poverty exit rates among young adults between 1981 and 1993 (Mauldin & Mimura, 2001). In addition, the social structure including social class, institutions, and norms affecting poverty dynamics in rural areas differs by regions of the country (Duncan, 1996). Specifically, Duncan (1996) compared Appalachia, rural Mississippi, and rural Texas to find these differences.

Rural and urban differences in conditions associated with the individual and family economic well-being may motivate young adults to migrate from rural to urban areas. Migrants are typically ambitious and have a higher drive for a better life than non-migrants (Lee, 1966). Studies show that migration plays a significant role in determining economic well-being (Borjas, Bronars, & Trejo, 1992; Harris, 1981; Yankow, 1999), and it is a form of human capital investment (Becker, 1993). Mulder (1993) maintains that a decision of whether or not to move is affected by individual preferences, opportunities,

resources, and constraints; and that migration is a way to adjust household, family, education, job, and housing needs individuals have over their life course.

Who benefits from migration? Mimura and Mauldin (2000) found that when relocation occurred in a given year, the poverty exit rate of rural young adults (defined as those 23 and older who lived in rural areas at least once during the observation period, 1981-1993) in that year was significantly lower than when relocation did not take place. Since there are few studies on poverty and domestic migration in industrialized nations, the following review focuses on the research on earnings and migration within the United States.

Based on cross-sectional data, Borjas, et al. (1992) found that internal migrants (people who moved from one place to another within the United States) initially earned less than the natives, but after a few years, their earnings became no different from natives'. Yankow (1999) used longitudinal data and followed young men in the labor market from the time they left school and found that migrants earned more than non-migrants throughout the post-migration years studied.

In terms of their economic situation, poor young adults could face more disadvantageous conditions in rural areas than in urban areas. The proportion of workers engaged in lower paying jobs was higher in rural areas (43%) than in urban areas (32%) in 1993 (Swaim, 1995). This proportion in rural areas increased about 10 percentage points between 1979 and 1990, and it remained stable between 1990 and 1993 (Swaim, 1995). Higher wages, a wider variety of occupations, and various training opportunities may encourage rural young adults to move from rural to urban areas. However, previous studies showed that not all urban areas give the same economic opportunities (Borjas, et al., 1992; Harris, 1981). Also, men and women face different job opportunities, in both rural and urban areas (Wenk & Hardesty, 1993); as will be explained in later pages. Households headed by women with young children, thus, may face lower poverty exit

rates than those headed by married couples, because of the gender differences in opportunities available in rural areas.

Family and Household Characteristics

Individuals enter the observation period of any study or survey by having “initial family characteristics.” Family background, such as family structure in one’s childhood, marital status, and household composition, is often associated with economic well-being, and the relationships among family and individual characteristics are intertwined. For example, young women were more likely to marry if they were not in poverty and if they had a job (McLaughlin & Lichter, 1997).

Between 1966 and 1999, poverty rates among women were higher than among men. The lowest for women was 12.5% (in 1973), and the highest was 16.9% (in 1994), while the lowest for men was at 9.6% (in 1973 and 1978), and the highest was 13.5% (in 1983) (U.S. Census Bureau, 2000, September 20). Brown and Hirschl (1995) found that the likelihood of poverty in 1984 was higher for single-parent households relative to married-couple households when rural and urban residence was controlled. Using the *PSID* data from 1967 to 1988, Stevens (1995) identified that being in a female headed household was associated with lower exit rates and higher reentry rates. In both 1998 and 1999, a lower proportion of single mothers were employed than were single fathers, and their unemployment rates were nearly twice those of single fathers (Bureau of Labor Statistics, 2000, June 19). In general, low income among families headed by single mothers was attributed to these households’ lack of second worker, the fact that women tended to earn less than men, and the fact that some single mothers were not employed (Yellen, 1998).

In the studies of individual earnings, men who migrated earned more prior to migration than those who did not migrate, and the gap between the migrants and non-migrants remained after the move (Maxwell, 1988). Married women who moved earned

less than those who did not move and less than non-married women who moved (Lichter, 1983; Maxwell, 1988); in the short run, migration had an adverse impact on married women's earnings, regardless of their resources (Lichter, 1983). A study by Wenk and Hardesty (1993) using the *NLSY79* cohort found that, for young women aged 18 to 23, moving from rural to urban areas was associated with decreased duration in poverty when other factors were controlled. This study incorporated only the first poverty spell each individual experienced during the observation period. The results implied that the potential economic advantage of relocation to urban areas was greater compared to young men for these young women, who may have had fewer labor opportunities in rural areas than men have.

Human Capital

Another key category that is related to the residential location and family and household characteristics is human capital. According to human capital theory, individuals and families invest in experiences such as education, job training, job experience, or migration to increase their future income and satisfaction. Investment in human capital can "improve health, raise earnings, or add to a person's appreciation of literature over much of his or her lifetime" (Becker, 1993, pp. 14-16). Rural and urban residents have different human capital formation opportunities and, subsequently, different economic well-being. Certain environmental factors such as schooling and job opportunities affect young adults by altering their human capital formation and accumulation (Becker, 1993).

Education and job experiences are also forms of human capital associated with poverty experiences. Lichter, et al. (1993) found that a disproportionate number of high school dropouts were from rural areas despite the fact that compared with urban areas, rural areas had advantageous social environment factors. These factors included closer family and friend networks, smaller school size, stronger informal social controls, and

greater neighborhood diversity in terms of income compared with urban areas. Larger household size, higher poverty rate, lower age at marriage, and younger age of birth to first child were related with increased high school dropout rate, thus decreasing human capital of rural youths. Stevens (1995) found that having 12 years or more education was associated with higher poverty exit rates and lower reentry rates. In a study comparing the poverty entry rates (age 19 to 36) and exit rates (age 20 to 36) among women, Cox (1997) found that longer years of education was associated with the decreased likelihood of falling into poverty for African American, Latina, and White women, and with the increased likelihood of exiting from poverty for White women, when other factors were controlled.

According to Mauldin (1991), in general, married women were less likely to be in poverty than those who were not married. However, among women who had been in poverty and who had just experienced marital dissolution, those with job experiences and more education were more likely to have exited from poverty than those who had less of these human capital features. Adult women whose per capita income increased following divorce had more education and job training and were in good health compared with women whose per capita income did not increase (Mauldin, 1990).

Studies show that one underlying human capital factor, health, is associated with poverty. Health problems are more prevalent among lower income adults than among their higher income counterparts (Wolfe & Hill, 1993). Therefore, health may also be associated with poverty dynamics.

Labor Market and Employment

Having promising human capital itself does not provide young adults with the basic ingredients of economic well-being. Studies showed that factors related to the labor market such as employment, hours of working, and wage rate were related to poverty status. Few adults remain in full-time jobs with regular hours throughout their work

career, and men's entering or exiting the labor force had greater impact on family economic well-being than that of women (Duncan, 1984). Iceland (1997b) examined structural features that affected the exit from poverty among adults in urban areas, in addition to the individual's social and economic characteristics. He found industrial restructuring, skill mis-matches between firms and workers, changes in racial residential segregation, and changes in welfare benefit amounts explained poverty dynamics differently between African Americans and Whites, suggesting the economic disadvantages African Americans face. A study by Cox (1997) on labor demand and poverty of African American, Hispanic, and White women suggested marital status, school enrollment status, existence of other adult women in the household, and labor demand were related to poverty exit and entry differently among these three groups of women. Area-specific labor demand variable reflected "the degree to which women of different racial-ethnic groups tend[ed] to be represented in the occupations of an area" (p. 37).

Job-related conditions in the local community play a significant role in determining the economic outcome of migration. Migrating from smaller to larger communities did not enable adults to earn more, but migrating from lower-wage communities to higher-wage was associated with higher earning (Harris, 1981). Further, migrants who relocated within the same census geographical region and those who relocated to the states with higher economic growth rates had fewer disadvantages than those who relocated to different regions or those who moved to the states with less economic growth (Borjas, et al. 1992).

Attitude and Motivation

Although this study is limited to assessment of the relation between objective factors related to socio-demographic, human capital, and labor market and economic well-being, there are various explanations on the causes of poverty or ideas about why

some individuals are poor. One of them is the idea that the poor are not trying hard enough (Schiller, 1998). Individuals' attitudes and motivations may be associated with economic outcomes. The opposite is reflected in the view that attitude does not bring success to one's life; youth counselor Inoue (1980) argued that it was achievements that produce positive attitudes and motivation. Moreover, how families, neighbors, and communities perceive young people can affect their attitudes and motivation. Various statistical analyses Duncan and Morgan (in Duncan & Morgan, 1984) performed showed no significant impact that attitudes had on later economic achievements. The researchers assessed the possible effect of three attitudinal items included in the 1972 *PSID* questionnaire on the changes in earning category between 1971 and 1978. Three items were "achievement motivation, sense of personal efficacy (e.g., control over one's life), and orientation toward future" (Duncan & Morgan, 1984, p. 24).

In summary, studies identified residential location, family characteristics, human capital, and labor market factors associated with exit from, entry into, and duration in poverty. Combined with the event history analysis approach, understanding of poverty dynamics in the U.S. has been advancing, partially due to publicly available comprehensive longitudinal data. One of the limitations in using existing data, however, is left-censoring.

CHAPTER III

METHODS AND PROCEDURES

The purpose of this study is to add to the knowledge of poverty dynamics among young adults in the United States by comparing two approaches of counting the beginning of poverty spells among those who were in poverty at the beginning of the observation period at age 25, by assessing factors associated with poverty exit rates, by comparing factors associated with poverty exit and reentry rates, and by examining the impact of rural-to-urban migration on poverty exit rates. After stating the hypotheses, this chapter describes the data and sample selection and then covers the analytical methods used to answer the research questions.

Hypotheses

Based on the literature reviewed in the previous chapter, the following hypotheses are proposed.

1. Young adults who have characteristics that are associated with lower poverty exit rates are more likely to be left-censored (in poverty at the beginning of the observation period) than those who enter poverty later during the observation period.
2. Incorporating poverty duration information from pre-young adulthood (before age 25) produces lower poverty exit rate estimates than not doing so.
3. Poor young adults living in rural areas are less likely to exit from poverty than those living in urban areas; however, there is no difference in poverty exit rates of rural and urban young adults after controlling for demographic and household characteristics, human capital, and labor market factors. Similarly, poor young adults living in rural areas are less likely to exit from poverty than those living in

suburban areas but are more likely to exit from poverty than those living in central cities; however, there is no difference in poverty exit rates of rural, central cities, and suburban young adults after controlling for demographic and household characteristics, human capital, and labor market factors.

4. Factors associated with exit from and reentry into poverty are parallel to each other. In other words, a variable associated with increased poverty exit rates is also associated with decreased poverty reentry rates, and the magnitudes of the associations are the same.
5. Migrating from rural areas to urban areas does not increase the young adults' poverty exit rates.

Hypotheses 1 and 2 are focused on the first interest in this study: the general issue of left-censoring that arises when a decision needs to be made regarding the beginning time of the poverty spell that young adults experienced. First, in the test of Hypothesis 1, an assessment will be made as to whether or not the left-censored cases are different from the rest of the individuals experiencing poverty later during the observation period as indicated in research by Iceland (1997a, January). Hypothesis 2 was derived from Hypothesis 1. Poverty exit models with two different approaches were evaluated. If left-censorship is not randomly distributed, then whether or not to incorporate pre-young adulthood poverty duration should directly affect the poverty exit rate estimates. The appropriate approach was to be selected and used to define the duration in other parts of the study. Hypotheses 3 and 4 focused on rural and urban (central cities and suburban) residency and poverty dynamics among young adults. Hypothesis 3 examined the poverty exit rates, while Hypothesis 4 attempted to relate the exit and reentry rates by focusing on time-varying variables using two-way transition models. Hypothesis 5 assessed the relation between rural-to-urban migration and exit from poverty among young adults.

While Wenk and Hardesty (1993) analyzed 18 to 23 year-olds, this study focused on the age group that is less likely to relocate for educational purposes.

Data and Sample

The data for the study came from the *National Longitudinal Survey of Youth 1979 Cohort (NLSY79) Geocode Data*¹. The Bureau of Labor Statistics of the U.S. Department of Labor currently sponsors and administers this longitudinal survey. The age cohort of the *NLSY79* ranges from 14 to 21 as of December 31, 1978. The data were collected through personal and telephone interviews annually until 1994 and biannually since 1994. The survey initially included 12,686 youths. Among them, 11,406 were non-military. Of these non-military individuals, approximately 90% were still interviewed in 1990. The original survey included over-sampled non-military (civilian) youths (Center for Human Resource Research, 1997). These over-sampled civilians were excluded from this study so that the sample remains nationally representative. A total of 6,111 youths were interviewed in 1979 as a nationally representative sample; and among them, 3,648 met the criteria for this study. Data were not weighted. An assessment by Cox (1997), who also used the *NLSY79* to examine women's poverty exit rates, confirmed that the utilization of the weight variable did not give different estimates.

Young adults were defined as individuals aged 25 to 36. By this age, individuals were likely to have experienced early life course transitions, such as being away from home to attend college. During the period before age 25, a meaningful assessment of the young adults' economic well-being is suspect. The sub-sample for the poverty dynamic analyses included civilian young adults who experienced poverty at least once in rural or urban areas in the United States between 1983 and 1993. Poverty had to occur at least

¹ The usage of the *NLSY79 Geocode Data* for this dissertation is approved by the U.S. Department of Labor, Bureau of Labor Statistics (agreement #00-04) and by the Human Subjects Office of Office of The Vice President for Research at the University of Georgia (H2002-10236-0).

once between the year individuals were age 25 and 1993. Whether or not the respondents lived with their parents during the observation period was not assessed. Because the research interest was in poverty dynamics among young adults who ever experience poverty by the U.S. Census' definition, as explained later, young adults who did not experience poverty during the observation period were not included. When analyzing the exit from poverty, individuals "at risk" of experiencing the exits are those who are in poverty. The sub-sample for the rural-to-urban migration analyses included civilian young adults who experienced poverty spells that began while they resided in rural areas between age 25 and 1993.

The youngest in the sample, individuals who were 14 years old in 1979, entered the observation period for this study in 1990 and were 28 years old at the end of the observation period. The oldest, those who were 22 years old at the time of interview in 1979, entered the observation period in 1983 and were 36 years old at the end of the observation period. The term "observation period" refers to the time frame during which each individual may be included in the sample if they experienced poverty. Because the observation period differs according to the age cohort, the analyses throughout the study controlled for age in 1979.

Individuals who lacked the key information, including background characteristics when interviewed in 1979, were excluded. Depending on the analyses and the data criteria, missing poverty status and rural/urban residency information during the observation period made individuals left-censored or right-censored. Individuals who had no information about the beginning of the poverty spell (also left-censored) were excluded from the analyses from the year left-censoring occurred. Also, some missing information could make individuals right-censored, or in other words no information was available about what happened to the poverty or non-poverty spell after a certain point; thus, observations became missing beginning the first year these key variables were not

observed. In the migration analyses, the key variables were both poverty status and residential category, while in poverty exit rate estimates and poverty exit and reentry rate estimates, poverty status was the only key determinant in deciding who was censored. An exception in the latter analyses was when residential information was missing throughout the observation period. These individuals were not included in the sample. The results of deleting the observations with missing values are likely to be minimally biased because of the large data size.

Individuals who remained in rural areas while in poverty throughout the observation period, those who relocated between rural and urban areas, and those who remained in urban areas, were included in the poverty exit rate analyses. In the two-way transit model, or the comparison between factors associated with exit from and reentry into poverty, only the individuals with multiple poverty spells experienced reentry during the observation period. Individuals with a single poverty spell during the observation period were right-censored when the focus was on reentry and were kept in the analyses.

Young adults may have been in the poverty spell when the observation period ended or when key information was not available the following year, either due to sample attrition, missed survey, or because they moved overseas. For example, in the migration analyses, an increased number of observations were right-censored due to relocation to rural areas after moving from rural to urban areas. The event history analysis technique this study used automatically controls for bias concerning the first case, fixed censoring period, or Type I censoring according to Allison (1995). In fact, deleting right-censored observation leads to biased estimates, according to Blossfeld, Hamerle, and Mayer (1988), and “the maximum likelihood method offers the possibility of considering explicitly right censored data within the estimation procedure” (p. 69). Understanding this mechanism requires knowledge of maximum likelihood method, and Blossfeld, et al. (1988, pp. 69-71) explain the mechanism. On the other hand, the rest of the cases that are

terminated due to situations unrelated to the study design are called random censoring and pose a problem particularly if there is any relationship between random censoring and poverty dynamics. There is no specific reason to believe this was the case in this study. The final sample included up to 3,648 young adults, and these individuals resulted in up to 12,727 person-year observations, depending on the analyses.

Explanatory Variables

The explanatory variables used in the models are described in Table 1. Each variable can be placed into one of three groups: background information that is unchanged for a given respondent throughout the observation period, spell-specific variables used for migration analyses, and time-varying variables whose values may change from year to year. The time-invariant background information included the followings: age in 1979; gender; being Black, being Hispanic or other race, as opposed to being White; number of parents lived with at the time the respondent was 14 years old; availability of reading materials in the home at age 14; mother's educational achievement asked in 1979 as a proxy for parental educational achievement; and number of siblings reported in 1979. For the race and ethnicity control variables, young adults were first identified as Hispanic, Black, White, or "other." First, Hispanics were identified as those who selected *Cuban, Chicano, Mexican, Mexican-American, Puerto Rican, or Other Hispanic*, as their "origin or descendent." Then those who chose *Black* as their "origin, descendent, or race" were identified as Black. The majority who chose various European origins or *White* as their race was coded as White. The "other" group included individuals who reported Asian and Pacific Islander, Native American, or other origins (1.48%). They were merged with the Hispanic category after finding there were the least differences between these groups in poverty exit rates.

Unlike background variables, certain factors that were expected to be associated with individuals' economic well-being may change over time; these were coded as time-

Table 1
Definition of Explanatory Variables

| Variables | Definition and categories |
|---|--|
| <i>Time-invariant background variables: interviewed in 1979</i> | |
| Age in 1979 | Age in 1979 |
| Female | female=1; male=0 |
| Race/ethnicity | First, <i>Hispanic</i> was identified. Among the rest, <i>Black</i> and <i>White</i> were identified, and the rest were coded as <i>Other</i> . The <i>Other</i> category was later merged with <i>Hispanic</i> . |
| Household structure at age 14 | The respondents were asked whom they lived with at age 14. If the answer was any combination of mother and father, then they were coded as “lived with two parents.” If the answer was any combination that indicated that they lived with mother or with father without the other, then they were coded as “lived with one parent.” If the answer included neither mother nor father, then they were coded as “lived with no parent.” |
| Had reading materials at home at age 14 | If anyone in the household was receiving a magazine or newspaper regularly or had a library card, then it was coded 1. If the answer to all these three items was not yes, then it was coded 0. |
| Mother had high school education | If mother was known to have had high school education or more at the time of the 1979 interview, it was coded 1. If not, then it was coded 0. |
| Number of siblings | Number of siblings that the respondent reported |
| <i>Spell-specific variable</i> | |
| Migration spell | This was used only in the first part of the migration analysis. If the spell began in a rural area and either completed or became right-censored while continuously in a rural area, then it was coded 0. If the spell began in a rural area and the respondent relocated to an urban area before exiting from poverty, then it was coded 1. |
| <i>Time-varying variables: coded annually from age 25</i> | |
| Number of spells previously experienced as a young adult | This is the number of completed poverty spells each individual had experienced. This was counted by adding the number of exits from poverty that occurred between age 25 and the current year. |
| Elapsed duration in the spell | The first year in a poverty spell was coded 1. Thereafter, every additional year in poverty spell added 1 to the previous year’s elapsed duration in the spell. |

Table 1 (Continued)

| Variables | Definition and categories |
|---|---|
| Rural residency | If <i>SMSA</i> for residence was “not in <i>SMSA</i> ,” then it was coded 1. If the respondent was in <i>SMSA</i> , then it was coded 0. |
| <i>MSA</i> status | If <i>SMSA</i> of residence was “not in <i>SMSA</i> ,” then it was coded rural. If it was “ <i>SMSA</i> in central city,” then it was coded as central city, “ <i>SMSA</i> , not central city” was coded as suburb, and “ <i>SMSA</i> , central city not known” was coded as missing. |
| Region of residence | Geographic region of residence was one of the following: Northeast, North central, South, and West. South is the baseline in this study. |
| Marital status | Three categories recoded were never married (baseline), currently married, and other. The classification is based on a created variable that classified each respondent as never married, married, separated, divorced, remarried, or widowed. |
| Number of small children in the household | Information for up to 15 persons living in the same household was included in the survey. Every individual aged 6 or less was identified, then the total number of such individuals was coded. |
| High school education or more | If the respondent had high school education or more, it was coded 1. If not, then it was coded 0. |
| Had health problem | If the respondent answered yes to the question of whether the respondent has health limitations, then it was coded 1. If the answer was no, then it was coded 0. This question is based on three previous questions asking whether health prevents them from working for pay, whether health limits the kind of work they can have for pay, and whether health limits the amount of work they can do for pay. |
| Employment status | This is based on the created variable that classifies each respondent in one of four groups. Those who were in military services were not included in this study. Being employed, being unemployed, and being out of labor force are the included categories. |
| Local unemployment rate | This is the continuous unemployment rate for the labor market of the current county of residence in <i>NLSY79</i> divided by 1000. |

varying. The time-varying variables included residential location, migration-related variables (migrant spell or non-migrant spell, timing of migration) in migration analyses, marital status, number of young children (age six or younger) in the household, educational attainment, health problem, employment status, local unemployment rate, number of previous poverty spells, and elapsed duration in spell. Each analysis that compared rural and urban poverty exit rates was followed by an analysis comparing rural, central cities, and suburban residency. Region of residence (Northeast, North central, South, and West) was included in poverty transit models, both exit rates and exit and reentry rates, as control variables. The number of previous spells completed after age 25 was included to treat spells from an individual differently and to assess whether multiple spells were associated with the poverty exit rates. Elapsed duration in spell had increased by one (year) while the respondent remained in a poverty spell. It is the interval between the beginning of the spell and the person-year observation of interest. Elapsed duration in spell is the variable used to examine the relationship between the duration in poverty and the poverty exit rates. Concerning the interpretation of poverty exit rate estimates, higher exit rates are directly associated with shorter duration, and lower exit rates are associated with longer duration in poverty spells.

Data Analysis Procedures

For all analyses except for the comparison of left-censored cases and other observations, the discrete-time logistic model was used. The data were converted to person-year format, where the response variable in the poverty exit models was coded as a dichotomous variable of whether an individual remained in a poverty spell or just exited from poverty in a given year, for example. As the annual household income was used to determine poverty status, whether the exit occurred at the beginning or end of year could not be determined. Using person-year observations means that individuals who stayed in

poverty longer during the observation period accounted for a larger number of person-year observations in poverty exit rate models than those who experienced temporary poverty. The Appendix discusses why this does not cause dependency among the observations. In the two-way transition model of exit from and reentry into poverty, the response variable was coded as a dichotomous variable indicating whether a person was in poverty in a given year or not, starting from the year an individual was in poverty for the first time as young adult.

Poverty thresholds used in this research were from the traditional poverty measurement suggested by the U.S. Census Bureau, which determines poverty status by total household income and the number of individuals in the household. The thresholds for each family size and number of related children in the family were adjusted annually using a factor based on the changes in average Consumer Price Index from a year to year (U.S. Census Bureau, 2001, January 26). Specifically, the 1999 thresholds were \$8,667 for a one-person family of a non-elderly adult (under 65 of age), \$11,156 for a family of two non-elderly adults, and \$13,410 for a family of two non-elderly adults and a child (U.S. Census Bureau, 2000, September 20b).

There has been a volume of discussion about how the threshold can be improved to better reflect economic well-being in today's society; however, this issue is outside the scope of this study. A comprehensive report may be found in literature such as Citro and Michael's (1995) *Measuring poverty: a new approach*. In this study, the poverty status of each respondent's household in each year were determined, using the total household income less transfer income in one calendar year and number of persons in the household at the time of the interview conducted during the calendar year. For example, information on number of persons in the household for 1993 came from the 1993 interview, and the household income information of calendar year 1993 was generated from the information

obtained from the 1994 interview ('total net family income in past calendar year' minus income from welfare).

Assessing the Impact of Left-censoring

The focus in this section is the individuals who were in poverty at the beginning of the observation period—when they were 25 year old. The goal was to assess various approaches to assigning duration information for these individuals. Two questions were asked. Are left-censored individuals, those individuals who were in poverty at the beginning of the observation period at age 25, different from other people in terms of family background, human capital, and labor market factors at age 25 (Hypothesis 1)? When pre-young adulthood (age 24 and before) information is not incorporated, are the estimates from the poverty exit rate model different from those when it is incorporated (Hypothesis 2)?

Are left-censored individuals different from others? The purpose of this subsection was to assess the implication of left-censorship in a general sense by comparing left-censored individuals and those who were not left-censored in the poverty exit model. This comparison used logistic regression to examine the differences between individuals who were in poverty at age 25, and those who experienced poverty some time after age 25 and before the end of the observation period. The sample in this analysis was young adults who experienced poverty at any time during the observation period. The unit of analysis is individuals.

In this analysis, even an individual who experienced two or more spells during the observation period counts for one observation. The response variable was coded as whether an individual was in poverty at age 25 or not, i.e. that he or she experienced poverty at some older age (by 1993). The explanatory variables were individual, family, and labor market factors which were included in the later analyses that were expected to be related to the probability that an individual was in poverty at age 25. Before running

logistic regression analyses, association between the individual's likelihood of being left-censored (being in poverty at age 25) and each multi-categorical explanatory variable was assessed using a univariate general linear model (GLM). This type of univariate analysis was considered before running all the rest of logistic regressions as well, and if any categories were found to have no difference in explaining the variation in the response variable (such as whether or not individuals were in poverty at age 25) then these categories were merged.

The logistic regression model comparing left-censored cases and other observations is:

$$\ln[P_i/(1-P_i)] = \mathbf{a}_0 + \sum_{k=1}^K (\mathbf{b}_k X_{ik}),$$

where P_i is the probability that the person i was in poverty at age 25, thus left-censored, \mathbf{a}_0 is an intercept estimate, and \mathbf{b}_k are parameter estimates for fixed and time-varying explanatory variables X_k for each individual i interviewed in 1979 for fixed variables and measured at age 25 for time-varying variables. The difference between these two groups of young adults would give a partial picture of individuals who were eliminated from the analyses if only those who entered poverty after age 25 are included.

Incorporating or not incorporating the left-censored information. When the study population is young adults, and information regarding their economic well-being during their pre-young adulthood is available, at least two ways of assigning duration information are possible. One way is to assume that individuals arrive in young adulthood at age 25, and to define the poverty spells of interest as those experienced only by young adults. In other words, no consideration would be given to their poverty status prior to age 25, and therefore individuals who were in poverty at age 25 would not be considered left-censored. A question arises if dependency is suspected between poverty exit rates after age 25 and the time spent in poverty prior to becoming a young adult. About 40% of the respondents included in the left-censorship assessment model were in poverty at age

25. For some of them, age 25 would have been the first year in the poverty spell, while others would have already been in a poverty spell at the time they entered the observation period at age 25. If no pre-young adulthood information is used, elapsed duration in spell would be recorded as 1 for all observations that were in poverty at age 25, regardless of their status at age 24 or earlier. With such an approach, it should be noted that the variable is capturing the first year in poverty only as young adults as defined in this study.

The objective of this part of the study was to assess whether estimated poverty exit rates would differ by incorporating as much of the poverty status information prior to young adulthood as the data provide, as opposed to not using available information from pre-young adulthood as described above. With the approach of not using the information from pre-young adulthood, no differences were assumed between individuals who had been continuously in poverty until age 25 and those who entered poverty at age 25. By tracking the information from earlier ages, the actual duration of poverty spells that began prior to age 25 were acknowledged for many of the cases that would be left-censored using the previous approach. However, it is possible that some individuals had been in poverty since the beginning of the survey and were still in poverty at age 25. For example, the oldest cohort was 22 years old in the year that the annual interview for the *NLSY79* began. Thus, they were more likely to have been in poverty continuously from the beginning of the survey in 1979 (age 22) until age 25 than the younger cohorts who entered the observation period later. (The youngest cohort was 14 years old in 1979, and they had 10 years until reaching age 25 and thus entered the observation period for this study. They were less likely to continuously remain in poverty for these 10 years than the oldest cohort was to remain in poverty for four years, if other factors are kept equal). Those cases where identification of the actual beginning year of the poverty spell was impossible to determine because the individuals were continuously in poverty from 1979

to the year they were 25 year old were included in the analyses, using the information that is available. This way, incorporating left-censored information does not make the sample size much smaller.

The general form of the analyses to address questions related to the poverty exit rates, including the one incorporating left-censored information discussed here, is as follows. Let P_{it} be the probability that a person i experienced an event (exit from poverty) in year t given that he or she had been in a spell in the previous year.

$$\ln[P_{it}/(1-P_{it})] = \mathbf{a}_t + \mathbf{S}(\mathbf{b}_k X_{itk}) + \mathbf{S}(\mathbf{g}_k Y_{ik})$$

where $t=1, 2, 3, \dots$ is the year under observation, X_{itk} is a time-varying explanatory variable k for individual i in the year t , Y_{ik} is a fixed explanatory variable k for individual i , and \mathbf{a} , \mathbf{b} , \mathbf{g} and are the parameter estimates of each coefficients. The observation unit is person-year.

Rural and Urban Residency and Poverty Dynamics

Re-stating Hypotheses 3 and 4, the following questions were asked. First, are young adults in rural areas and urban areas (central cities and suburbs) equally likely to exit from poverty? Second, after controlling for demographic and household characteristics, human capital, and labor market factors, are young adults in rural areas and urban areas (central cities and suburbs) equally likely to exit from poverty? Third, if not, what other factors are associated with the duration in poverty? Fourth, are factors associated with exit from and reentry into poverty the same and the same in their magnitude of impact?

The U.S. Census divides urban areas into central cities and suburban areas. For definitions and detailed information, please refer to the U.S. Census sources. The poverty rates in central cities have been historically higher than in rural areas, and those in the suburbs have been lower than in rural areas. For this reason, that the poverty rates vary within urban areas even with a simple sub-classification, rural poverty was not only

compared with urban poverty, but also compared both with that in central cities and suburban areas. The general form of the exit rate model described earlier was used here to assess poverty exit rates of individuals who experienced poverty as young adults.

Poverty exits in rural and urban areas. In the poverty exit rates model, the response variable was coded as whether an individual who experienced poverty remained in or exited from poverty in a given year, given he or she had not exited from the poverty spell so far. To answer the first question of the poverty exit rates in rural and urban areas, the main explanatory variable was residence in two categories in the first set of models and three categories (rural, central cities, and suburbs) in the second set of models. The control variables included gender, age in 1979, race and ethnicity, marital status, region, elapsed duration in spell, and number of previously completed spells. The model to assess the differences in poverty exit rates in rural areas compared with urban areas (central cities and suburbs) when other factors are controlled for included the rest of the explanatory variables listed in Table 1, except for two migration-related variables (migration spell, and timing of relocation to urban area).

Poverty exit and reentry rates. Given that a substantial proportion of the sample was expected to experience multiple poverty spells during the observation period, there was a motivation to know if the very factors associated with the increased poverty exit rates contributed to the decreased poverty reentry rates with the same magnitude. This interest was reflected in Hypothesis 4, and a two-way transit model of exit and reentry rates as described by Yamaguchi (1991) was used to test this hypothesis. This approach is different from that used in previous studies by Stevens (1995; 1999) and Cox (1997) in which the authors separately assessed the exit and (re)entry rates. The purpose of using the two-way transit model here, instead of separate assessment, was to focus on the magnitude of the relationship that explanatory variables have with both the exit and reentry rates in a single multivariate model.

The left hand side of the model is the log ratio of the probability of being in poverty in a given year and the probability of not being in poverty in that year. Each explanatory variable may fall into one of the two categories: symmetric or not symmetric. Symmetric refers to variables whose relationship with the exit and reentry rates has opposite direction but their magnitude is not different. Non-symmetric refers to variables whose relation with the exit and reentry rates has either the same direction or has opposite direction and their magnitudes are different.

Let $P(Y_i=1)$. The model is as follows: ***bglh***

$$\ln[P_{it}/(1-P_{it})] = \mathbf{a}_0 + \sum_{k=1}^K \mathbf{g}_k Y_{i(t-1)k} + \sum_{k=1}^K \mathbf{b}_{ik} X_{itk} + \sum_{k=1}^K \mathbf{d}_{ik} Z_{itk} + \sum_{k=1}^K \mathbf{h}_k Y_{i(t-1)k} \times Z_{itk},$$

where $Y_{i(t-1)}$ is a time-varying variable of poverty status that takes $Y_i = 1$ when an individual i was in poverty, and $Y_i = 0$ when he or she was out of poverty, for each year t . Z_k is an explanatory variable k , hypothesized to have an interaction with $Y_{(t-1)}$. If \mathbf{h}_k , the coefficient of Z , was found to be not statistically significant, then the Z variable became an X variable. X_{itk} is the control variable k of individual i in year t whose interaction effect with $Y_{(t-1)}$ was not found to be statistically significant; thus its interaction term is excluded from the final model. \mathbf{b}_{ik} shows an impact of X_k on transition from non-poverty to poverty (poverty reentry), and $\mathbf{d}_k - \mathbf{h}_k$ shows an impact of Z_k on the transition from non-poverty to poverty. The impact of X_k on the shift from poverty to non-poverty (exit from poverty) is expressed by $-\mathbf{b}_k$ and that of Z_k is expressed by $-(\mathbf{d}_k + \mathbf{h}_k)$ (Yamaguchi, 1991).

Simply stated, the two-way transit model further added interaction terms to variables of interest to the general exit rate model described earlier. If an interaction term's parameter estimate is significant, then its magnitude is related differently for exit and reentry rates. The two-way transit model can be helpful in determining the relation between two transitions when individuals can experience the transition from one state to another (event) in both directions.

Rural-to-urban Migration and Exit from Poverty

Using the discrete-time logistic model, the purpose of this part of the study was to assess how migration from rural areas to urban areas is associated with the economic well-being of young adults, after controlling for demographic and family characteristics, human capital, and labor market factors, as is stated in Hypothesis 5. Based on the fact that the poverty rates have been generally higher in rural areas than in urban areas, and in order to maintain the focus on rural young adults and their poverty duration, the spells included in this analysis are only those observed to have started while the respondents were in rural areas. For example, a hypothetical individual might have experienced three poverty spells during the observation period: one began and ended while in a rural area, another began in a rural area but ended upon or after relocating to an urban area, and the third spell began after the individual relocated to an urban area. This individual contributes two poverty spells to this study: one that is counted as a spell experienced in rural area, and the other counted as a migration spell. Because poverty rates are in general different between central cities and suburban areas, ideally these two should be distinguished. However, due to the small number of migration spells, migration to central cities and migration to suburban areas were not distinguished. Further, this way of defining rural poverty may imply an assumption that once former poor young adults relocate from rural to urban areas, they are considered no different from those who have been in urban areas. This is certainly a limitation of this study and will be discussed in the concluding chapter.

The analyses on rural-to-urban migration consisted of two parts. In the first part, comparisons were made between poverty spells experienced only in rural areas and those in which the respondents eventually moved to urban areas while in the spell of interest. The second part of the analyses was to assess the poverty exit rates of the spells began in rural areas and the respondents relocated to urban areas before exiting the spell.

In the models that compared differences in poverty exit rates between the spells which began and ended in rural areas and those in which the respondents migrated to urban areas, the response variable was coded whether or not an exit from poverty took place or not in a given year. The main explanatory variable is whether it was a spell in which the respondent eventually moved to an urban area. In several situations an individual entered a poverty spell while in a rural area, moved to an urban area, and then went back to a rural area while in the spell. For such spells, a spell specific variable “migration spell” was coded as 1 until the last year he or she was in the urban area and then the observation was right-censored when he or she returned to a rural area.

In the second set of analyses, which assessed the timing of exit from poverty after relocating to urban areas, the response variable is whether an exit occurred in the given year or not. The main explanatory variables are a series of dichotomous variables indicating whether the relocation took place this year (t_m), last year (t_m-1), two years ago (t_m-2), and so on.

CHAPTER IV

RESULTS

Impact of Left-censoring Assessment

The first analysis was to compare left-censored young adults with those who entered poverty later during the observation period. The purpose is to answer two questions, one, whether these two groups are different, and two, if they are different, whether the characteristics of individuals who are more likely to be left-censored are similar to those of individuals who are more likely to experience poverty later during the observation period.

The first model, which compared left-censored individuals with those who entered poverty later during the observation period without decomposing urban areas, excluded 358 individuals, because these individuals who experienced poverty during their young adulthood had missing information in one or more age-25 specific variables. These variables are listed in the latter half of Table 2. Table 2 shows the mean of each variable for young adults without missing information (n=3,290 total, n=2,275 total for *Metropolitan Statistical Area (MSA)* variables only) who were included in the exit rate logistic regression analyses and those who had at least one missing value (n=358) and thus were not included in the analyses. For example, among all individuals without missing value at age 25, 44% were in poverty at age 25, thus were left-censored; the mean age in 1979 was 17.89; and 56% were female. The statistical comparisons are based on univariate analysis and reflect t-test for continuous variables such as age in 1979 and chi-square test for categorical variables such as race and ethnicity. Among these variables, local unemployment rate had the highest number of missing values (335 missing), followed by rural residency status (325 missing), region of residence (204

Table 2
Mean Values of Young Adults with No-missing Information and Missing Information at Age 25

| Variables | No missing information | At least one missing value |
|---|------------------------|----------------------------|
| Left-censored (poor at age 25)*** | 0.44 | 0.17 |
| <i>Background Information</i> | | |
| Age in 1979 | 17.89 | 18.10 |
| Female | 0.56 | 0.52 |
| Race/ethnicity (baseline: White)** | | |
| Black | 0.16 | 0.10 |
| Hispanic and/or other | 0.09 | 0.11 |
| Background household structure (baseline: lived with 2 parents at age 14) | | |
| lived with no parent | 0.06 | 0.05 |
| lived with 1 parent | 0.16 | 0.16 |
| Had reading materials at home at age 14 | 0.91 | 0.93 |
| Mother had high school education in 1979 | 0.59 | 0.61 |
| # of siblings in 1979 | 3.57 | 3.39 |
| <i>Age 25 Information</i> | | |
| Rural residency | 0.23 | 0.27 |
| Region of residence (baseline: South) | | |
| Northeast | 0.18 | 0.23 |
| North central | 0.28 | 0.19 |
| West | 0.19 | 0.18 |
| Marital status (baseline: never married) | | |
| married | 0.41 | 0.41 |
| other | 0.13 | 0.12 |
| # of small children in the household*** | 0.65 | 0.22 |
| Had at least high school education*** | 0.81 | 0.72 |
| Had health problem | 0.04 | 0.02 |
| Employment status (baseline: out of labor force) | | |
| employed | 0.72 | 0.68 |
| unemployed | 0.08 | 0.09 |
| Local unemployment rate** | 0.08 | 0.05 |
| N (persons) | 3,290 | 23~358 |
| MSA status (omitted: rural) | | |
| central cities | 0.22 | |
| suburban | 0.44 | |
| N (persons) | 2,275 | |

*** $p < 0.0001$; ** $p < 0.01$; * $p < 0.05$

missing), and both employment and marital status (193 missing). Whenever relevant, analyses throughout this study were carried out with two types of samples. One did not decompose urban areas into central cities and suburbs, and the other did, comparing rural areas with both central cities and suburbs but with a reduced sample size.

Young adults without missing information were more likely to be left-censored than individuals with one or more missing values. Dependence between the group assignment, missing or not missing, and four other explanatory variables was identified. Among background characteristics, race and ethnicity was related to the group assignment. Information derived from when the respondents were 25 years old showed that number of small children in the household, educational attainment, and local unemployment rate were associated with the group assignment. For dichotomous variables, young adults without missing information were more likely to have had at least high school education than those who had at least one missing value at age 25. For continuous variables, on the average, young adults without missing information had more small children in their households and lived in places with higher unemployment rates than those who had at least one missing value at age 25.

Shown at the bottom of Table 2 are the proportions of the respondents included in the second logistic regression model by *MSA* status at age 25. A third of young adults who were included in the analysis lived outside metropolitan areas (rural) at age 25, about a fifth (22%) lived in central cities of metropolitan areas, and slightly less than half (44%) the young adults lived in metropolitan areas outside the central cities (suburbs).

Are Left-censored Individuals Different from Others?

In order to compare young adults who were left-censored (were in poverty at age 25) and those who were not (were in poverty later during the observation period), first, association between the individual's likelihood of being left-censored (being in poverty at age 25) and each multi-categorical explanatory variable was assessed using a univariate

general linear model (GLM). In poverty exit rate analysis, being in poverty at age 25—the beginning of the observation period—is equivalent to being left-censored; therefore, these expressions are used interchangeably. Based on the preliminary results, first, those having lived with no parent and those having lived with one parent at age 14 were grouped together. Second, four racial and ethnic groups (White, Black, Hispanic, other) were regrouped into three groups by merging “other” individuals with Hispanic. The “other” group was not statistically significantly different from all other three groups ($p < 0.05$), although they were least similar to Black ($p = 0.05$) and least different from Hispanic ($p = 0.31$).

Among variables that are specific to the year when respondents were 25 years old, the four Census regions did not have explanatory power. In other words, living in a particular region at age 25 did not make individuals more likely to be in poverty at this age as opposed to entering poverty later during their young adulthood. However, region was still left in the model, for this was one of the variables of interest. Young adults in three marital status categories—never married, currently married, and other such as divorced, separated, or widowed—showed different likelihood of being left-censored (being in poverty at age 25); therefore, there was no regrouping of this variable. Employment status, which originally had three categories, showed no difference between young adults who were out of the labor force at age 25 and those who were unemployed at age 25; therefore, these categories were merged into one, which was compared with young adults who were employed at age 25.

Table 3 has five columns; the first lists variables, the second and third show the results of the rural and urban model, and the fourth and fifth columns show the results of the rural, central cities, and suburban model. The second and third column in Table 3 shows the results of logistic regression on left-censorship among individuals who had necessary information, including rural or urban residency at age 25. Specifically, this

Table 3
Likelihood of being in Poverty at Age 25 (or being Left-Censored) among Young Adults who Experienced Poverty between Age 25 and 1993

| Variables | Rural/Urban | | MSA | |
|--|---------------------|------------|---------------------|------------|
| | Parameter estimates | Odds ratio | Parameter estimates | Odds ratio |
| Intercept | 3.42*** | | 3.26*** | |
| <i>Person-specific variables</i> | | | | |
| Age in 1979 | -0.14*** | 0.87 | -0.13*** | 0.88 |
| Female | -0.01 | 0.99 | -0.08 | 0.92 |
| Race/ethnicity (baseline: White) | | | | |
| Black | 0.47*** | 1.61 | 0.58*** | 1.79 |
| Hispanic and/or other | 0.24 | 1.27 | 0.32 | 1.38 |
| Lived with 2 parents at age 14 | -0.13 | 0.88 | -0.10 | 0.91 |
| Had reading materials at home at age 14 | -0.34* | 0.71 | -0.54** | 0.58 |
| Mother had high school education in 1979 | -0.07 | 0.93 | -0.01 | 0.99 |
| # of siblings in 1979 | 0.03 | 1.03 | 0.05* | 1.05 |
| <i>Variables specific to the year when respondents were 25 years old</i> | | | | |
| Rural residency | 0.09 | 1.10 | - | - |
| MSA status (baseline: rural) | | | | |
| central cities | - | - | -0.11 | 0.90 |
| suburban | - | - | -0.17 | 0.85 |
| Region of residence (baseline: South) | | | | |
| North central | 0.28 | 1.32 | 0.38** | 1.46 |
| Northeast | 0.30 | 1.35 | 0.45** | 1.57 |
| West | 0.05 | 1.05 | 0.24 | 1.27 |
| Marital status (baseline: never married) | | | | |
| married | -0.97*** | 0.38 | -0.96*** | 0.38 |
| other | 0.12 | 1.13 | 0.12 | 1.13 |
| # of small children in the household | 0.25*** | 1.28 | 0.24*** | 1.27 |
| Had at least high school education | -0.54*** | 0.58 | -0.43** | 0.65 |
| Had health problem | -0.12 | 0.89 | -0.09 | 0.92 |
| Employed | -0.93*** | 0.40 | -0.47*** | 0.39 |
| Local unemployment rate | 2.67 | 14.48 | 2.44 | 11.43 |
| Log-Likelihood Ratio | 3,517.67 | | 2,743.96 | |
| | (df=20) | | (df=20) | |
| N (persons) | 3,290 | | 2,275 | |
| # being left-censored | 1,443 | | 1,018 | |

*** $p < 0.0001$; ** $p < 0.01$; * $p < 0.05$

analysis assessed how young adults who were in poverty at age 25 were different from those who were not in poverty at age 25 but experienced poverty later during their young adulthood. Among 3,648 previously selected as individuals who experienced poverty as young adults at age 25 or later (up until 1993), 358 were excluded from this analysis due to missing information among one or more variables from the survey year when they were age 25. A comparison between individuals who had missing values and those who did not is discussed earlier in this section.

Being Black as opposed to White was associated with an increased likelihood of having been in poverty at age 25, and having had reading materials at home at age 14 was associated with a decreased likelihood of having been in poverty at age 25, rather than later during the observation period, when other factors were kept equal. The following factors specific to the year when the respondents were 25 years old were associated with the likelihood of being in poverty at this age. Having had more small children was associated with an increased likelihood of having been in poverty at age 25. Being married as opposed to being never married at age 25, having had at least high school education, and being employed as opposed to not being employed were associated with a decreased likelihood of being in poverty at age 25. Age in 1979 was included in the model as a control variable and suggests that the older individuals were the less likely they were to be in poverty at age 25 than at a later time.

Specifically, in the order that appears on column two and three of Table 3, young adults who were of a specific age in 1979 were 0.87 times as likely (13% less likely) as their one-year younger cohort to have been in poverty at age 25, when other factors are kept equal. Blacks were 1.61 times as likely (61% more likely) to have been in poverty at age 25 as their White counterparts. Individuals whose home had reading materials when they were 14 year old were 0.71 times as likely to have been in poverty at age 25 as those who had no reading materials at home. Young adults who were married at age 25 were

0.38 times as likely to have been in poverty at this age as those who had never been married. With each additional small child lived with when young adults were 25 year old, these young adults were 1.28 times as likely to have been in poverty at this age than those who had less children living with them. Individuals who had high school education or more at age 25 were 0.58 times as likely to have been in poverty at age 25 as those who did not have high school education. Lastly, individuals who were employed at age 25 were 0.40 times as likely to have been in poverty at this age as those who were not employed.

The findings suggest that if duration in poverty as young adults with the *NLSY79* data is assessed without concern for the fact some poverty spells might have started before these individuals entered young adulthood, it is possible that the results will underestimate poverty duration among younger cohorts, Blacks, and individuals who did not have reading materials at home. Among variables recorded at age 25, marital status, number of small children living in the household, educational attainment, and employment status were associated with the likelihood of being left-censored.

Poverty rates in suburban areas and central cities, both defined as urban areas in this study, differ and those of rural areas have generally fallen between these two in the past few decades. For this reason, the previous analysis on left-censorship was performed by separating suburban and central cities, and the results are presented in Table 3 column four and five. The disadvantage of using this apparently more reasonable classification rather than simply using rural versus urban is that nearly a third of the observations became unusable due to missing information. Individuals with missing information lived in the *Metropolitan Statistical Areas (MSA)*, but whether they were in the central cities or not is unknown in the *NLSY79* data due to reasons such as living in a zip code area that falls in multiple counties with multiple classifications.

A univariate analysis (GLM) of poverty status and residency at age 25 indicated that among 2,275 young adults who experienced poverty and were included in this analysis, individuals who lived in central cities at age 25 were most likely to have been in poverty at this age; 51% of them were in poverty at age 25, while the rest of those who were in central cities at age 25 entered poverty later during the observation period. Individuals in rural areas were next likely to have been in poverty at age 25; 46% of them were. Those who were in suburban areas at age 25 were least likely to have been in poverty at age 25, and 40% of them were in poverty at this age. The differences in probabilities were statistically significant: rural verses suburban ($p=0.001$), rural verses central cities ($p=0.0682$), and central cities verses suburban ($p<0.0001$).

The logistic regression results here gave slightly different results compared with the analysis using rural and urban classification described earlier, but expect for the number of siblings in 1979 and regions of residence that are significant in the current model, the differences were only in their magnitudes when focusing on the statistically significant variables. When this alternative residential classification was used and urban areas were reclassified as central cities and suburban areas, and when other factors included in the model were controlled for, there was no difference in the likelihood of being in poverty at age 25 among respondents who lived in rural areas, central cities, or suburban areas.

Rural and Urban Residency and Poverty Dynamics

Descriptive statistics of the sample used for poverty exit rate analyses are shown in Table 4. Columns list variables, total sample, rural residents, rural and urban residents for fixed variables, and urban residents. Residential classification of young adults for the fixed variables is based on the rural and urban classification of the area where each individual lived at the time of annual interview from age 25. Urban residents' column is split into central cities and suburban for time-varying variables. Unless noted otherwise,

Table 4
Characteristics of Young Adults by Residence Patterns (1983-1993)

| Variables | Total | Rural | Rural & Urban | Urban |
|---|-------|--------------------|---------------------|--------------------|
| <i>Person-specific Variables: column means</i> | | | | |
| Age in 1979 | 17.91 | 17.70 ^a | 18.35 ^{ac} | 17.85 ^c |
| Female | 0.55 | 0.55 | 0.55 | 0.55 |
| Race/ethnicity (baseline: White)*** | | | | |
| Black | 0.16 | 0.12 | 0.10 | 0.18 |
| Hispanic and/or other | 0.09 | 0.07 | 0.08 | 0.10 |
| Background household structure (baseline: lived with 2 parents at age 14) | | | | |
| lived with no parent | 0.06 | 0.05 | 0.07 | 0.06 |
| lived with 1 parent | 0.16 | 0.14 | 0.14 | 0.16 |
| Had reading materials at home** | 0.91 | 0.88 | 0.90 | 0.92 |
| Mother had high school educ.*** | 0.59 | 0.51 | 0.58 | 0.61 |
| # of siblings in 1979 | 3.55 | 3.70 | 3.67 | 3.49 |
| # of completed poverty spells | 0.78 | 0.73 ^a | 0.93 ^{ac} | 0.75 ^c |
| <i>N</i> (persons) | 3,648 | 557 | 628 | 2,463 |
| | Total | Rural | | Central Cities |
| | | | | Suburbs |
| <i>Time-varying variables: column means</i> | | | | |
| Region of residence (baseline: South)*** | | | | |
| North central | 0.27 | 0.33 | - | 0.25 |
| Northeast | 0.19 | 0.03 | - | 0.30 |
| West | 0.17 | 0.13 | - | 0.14 |
| Marital status (baseline: never married)*** | | | | |
| married | 0.40 | 0.45 | - | 0.26 |
| other | 0.21 | 0.24 | - | 0.17 |
| # of small children in the hh | 0.71 | 0.81 ^{ab} | - | 0.81 ^a |
| High school or more*** | 0.76 | 0.72 | - | 0.70 |
| Had health problem | 0.08 | 0.09 | - | 0.08 |
| Employed*** | 0.64 | 0.61 | - | 0.57 |
| Local unemployment rate | 0.07 | 0.09 ^{ab} | - | 0.06 ^{ac} |
| Elapsed duration in the spell | 3.50 | 3.61 ^{ab} | - | 4.04 ^{ac} |
| <i>N</i> (person-years) | 8,604 | 2,981 | | 1,872 |
| | | | | 3,751 |
| <i>Time-varying variables from the full model that did not incorporate left-censored duration information: column means</i> | | | | |
| Elapsed duration in the spell | 2.40 | 2.42 ^{ab} | - | 2.55 ^{ac} |
| <i>N</i> (person-years) | 9,041 | 3,095 | | 2,003 |
| | | | | 3,943 |

*** $p < 0.0001$; ** $p < 0.01$; * $p < 0.05$

Notes: Unless noted, values are from the sample used for the analyses incorporating left-censored duration information.

Superscripts indicate that two residential categories that share the same letter in the same row have statistically significantly different means, all at $p < 0.05$.

The distributions were unweighted for the unequal number of observations in three residential categories.

information came from a sample for the models that compared rural, central cities, and suburban residency by including left-censored information. Figures were remarkably similar from other samples (comparing rural and urban by including left-censored information; comparing rural, central cities, and suburban by not including left-censored information; comparing rural and urban by not including left-censored information).

Poverty Exits in Rural and Urban Areas

Table 5 shows the results of simple logistic regression models of poverty exit rates among young adults in rural and urban areas. The data preparation for the first model incorporated duration information from pre-young adulthood if individuals were already in poverty upon entering young adulthood, whereas the data preparation for the second model did not use any poverty-related information from pre-young adulthood. In other words, if one was in the third year in poverty at age 25, his or her elapsed duration in the spell at age 25 was coded as 3 in the former model and was coded as 1 in the latter model.

Residential location and poverty exit. Overall, poor young adults who lived in rural areas were less likely to have exited from poverty than those who lived in urban areas, when age cohort, gender, race, marital status, number of previous spells experienced in young adulthood, and elapsed duration in years in the current spell were controlled. Specifically, the model that incorporated poverty duration information from pre-young adulthood suggests that poor rural young adults were 0.90 times as likely to have exited from poverty in a given year as their urban counterparts when other factors were kept equal. The model that only used the poverty information from age 25 exhibits that poor rural young adults were 0.84 time as likely to have exited from poverty in a given year as their urban counterparts.

The association between basic demographic control variables and poverty exit rates was similar between these two models but two variables had differences in their

Table 5
Simple Models with Left-censored Information and without: Parameter Estimates and Odds Ratios of Exit from Poverty among Rural and Urban Young Adults (1983-1993)

| Variables | Left-censored Information | | | |
|---|---------------------------|------------|---------------------|------------|
| | Included | | Not-included | |
| | Parameter estimates | Odds ratio | Parameter estimates | Odds ratio |
| Intercept | -2.94*** | | -5.82*** | |
| Age in 1979 | 0.03** | 1.03 | 0.07*** | 1.08 |
| Female | -0.09 | 0.91 | -0.15** | 0.86 |
| Race/ethnicity (baseline: White) | | | | |
| Black | -0.45*** | 0.64 | -0.59*** | 0.55 |
| Hispanic and/or other | -0.35** | 0.71 | -0.48* | 0.62 |
| Rural residency | -0.11* | 0.90 | -0.17** | 0.84 |
| Marital status (baseline: never married) | | | | |
| married | 0.46*** | 1.59 | 0.51*** | 1.66 |
| other | 0.08** | 1.08 | 0.03 | 1.03 |
| # of spells previously experienced as a young adult | -0.13** | 0.88 | -0.16** | 0.85 |
| Elapsed duration in the spell | 0.74*** | 2.10 | 2.54*** | 12.69 |
| Elapsed duration in the spell squared | -0.07*** | 0.93 | -0.35*** | 0.70 |
| Log-Likelihood Ratio | 12,139.41 | | 11,576.42 | |
| <i>N</i> (person-years) | 12,146 | | 12,727 | |
| # of events | 2,720 | | 2,811 | |

*** $p < 0.0001$; ** $p < 0.01$; * $p < 0.05$

significance. In the model that assumed all poverty spells began at age 25 or later, being female was associated with lower poverty exit rates than being male, whereas such difference was not noted in the model which incorporated left-censored information. In the model which incorporated left-censored information, being in other marital status was associated with higher poverty exit rates than being never married, but this statistical difference was not noted in the model that did not incorporate left-censored information.

A notable difference between these two models is the curvilinear effect of elapsed duration in poverty on poverty exit rates. In the model that incorporated left-censored duration information, likelihood of exiting from poverty changes its direction from positive to negative after the fifth year. Until the fifth year, staying in poverty one year longer was associated with much higher odds of exiting from poverty.² In the model that did not use the pre- young adulthood poverty information, the turning point in direction was one year earlier than in the other model. Until the fourth year, an additional year in the spell had positive impact on the exit rates.

The models were then run by controlling for family background and household characteristics, human capital, and labor market factors. The results are presented in Table 6, which shows the parameter estimates and odds ratios of two models. The first model incorporated the left-censored duration information, and the second model did not. When further factors were controlled, there was no difference between rural and urban residency in poor young adults' likelihood of exiting from poverty.

Individual and family background. Older cohorts had higher poverty exit rates than younger cohorts. Blacks were 0.70 (in the model that used pre-young adulthood

² For example, an impact on the odds when elapsed duration (ED) changes from 5 to 6 is approximately 0.97. $\exp\{\beta_0 + \beta_{ED}(5+1) + \beta_{ED}^2(5+1)^2 - [\beta_0 + \beta_{ED}(5) + \beta_{ED}^2(5)^2]\}$
 $= \exp[\beta_{ED} + \beta_{ED}^2 + 2(\beta_{ED}^2(5))] = \exp[0.74 + (-0.07) + 2(-0.07)(5)] \approx 0.97$ Prior to the fifth year, the impacts on odds were greater than 1, indicating the additional year in the spell was associated with an increased exit rates.

Table 6
Full Models with Left-censored Information and without: Parameter Estimates and Odds Ratios of Exit from Poverty among Rural and Urban Young Adults (1983-1993)

| Variables | Left-censored Information | | | |
|---|---------------------------|------------|---------------------|------------|
| | Included | | Not-included | |
| | Parameter estimates | Odds ratio | Parameter estimates | Odds ratio |
| Intercept | -4.09*** | | -7.17*** | |
| Age in 1979 | 0.04*** | 1.05 | 0.07*** | 1.08 |
| Female | 0.01 | 1.01 | -0.00 | 1.00 |
| Race/ethnicity (baseline: White) | | | | |
| Black | -0.36*** | 0.70 | -0.42*** | 0.66 |
| Hispanic and/or other | 0.13 | 0.88 | -0.19* | 0.82 |
| Lived with 2 parents at age 14 | -0.03 | 0.97 | -0.01 | 0.99 |
| Had reading materials at home at age 14 | 0.16 | 1.17 | 0.26** | 1.29 |
| Mother had high school education in 1979 | -0.00 | 1.00 | 0.04 | 1.04 |
| # of siblings in 1979 | -0.02* | 0.98 | -0.02* | 0.98 |
| Rural residency | 0.11 | 1.11 | 0.03 | 1.03 |
| Region of residence (baseline: South) | | | | |
| North central | -0.09* | 0.92 | -0.17** | 0.85 |
| Northeast | -0.05 | 0.95 | -0.08 | 0.92 |
| West | 0.13* | 1.13 | 0.12** | 1.13 |
| Marital status (baseline: never married) | | | | |
| married | 0.61*** | 1.84 | 0.63*** | 1.88 |
| other | 0.23 | 1.26 | 0.16** | 1.17 |
| # of small children in the household | -0.10** | 0.91 | -0.11** | 0.90 |
| High school education or more | 0.37*** | 1.45 | 0.43*** | 1.54 |
| Had health problem | -0.16 | 0.85 | -0.18 | 0.84 |
| Employed | 0.84*** | 2.31 | 0.96*** | 2.61 |
| Local unemployment rate | -5.37*** | 0.01 | -3.66* | 0.03 |
| # of spells previously experienced as a young adult | -0.13** | 0.88 | -0.21*** | 0.81 |
| Elapsed duration in the spell | 0.84*** | 2.32 | 2.71*** | 15.03 |
| Elapsed duration in the spell squared | -0.08*** | 0.92 | -0.37*** | 0.69 |
| Log-Likelihood Ratio | 11,705.64 | | 11,031.57 | |
| N (person-years) | 12,146 | | 12,727 | |
| # events | 2,720 | | 2,811 | |

*** $p < 0.0001$; ** $p < 0.01$; * $p < 0.05$

duration information, and 0.66 in the model that did not) times as likely to have exited from poverty as Whites. The results from the model that did not include left-censored duration information shows individuals of Hispanic ethnic origin or other race were 0.82 times as likely to have exited from poverty as Whites, but this association was not significant in the model that incorporated left-censored duration information. Both models show that having more siblings in 1979 was associated with decreased poverty exit rates. For each additional sibling individuals had, they were 0.98 times as likely to have exited from poverty as those who had fewer siblings.

Family and household characteristics, human capital, and labor market. Whether the respondents had access to reading material at home at age 14 or not had a significantly positive association with the poverty exit rate only in the model that did not incorporate the left-censored information. If the respondents had reading materials at home, they were 1.29 times as likely to have exited from poverty as those who did not have such an environment.

Among time-varying variables, region of residence, marital status, number of small children in the household, educational attainment, employment status, local unemployment rate, number of spells previously experienced as young adults, and elapsed duration in spell were statistically significantly associated with the poverty exit rates, thus with the poverty duration. Married individuals were 1.84 (1.88) times as likely to have exited from poverty as those who had never married. In the model that did not incorporate left-censored duration information, poor young adults whose marital status was “other” were 1.17 times as likely to have exited from poverty as those who were never married. Poor young adults who lived with an additional child who was younger than six year-old were 0.91 (0.90) times as likely to have exited from poverty as those who lived with one less child. When young adults had high school education or more, they were 1.45 (1.54) times as likely to have exited from poverty as those who did not

have high school education. When young adults were employed, they were 2.31 (2.61) times as likely to have exited from poverty as if they had been either unemployed or out of labor force.

Control variables. Compared to poor young adults who were living in the South, those who were living in North central region were 0.92 (0.85 in model without left-censored information) times as likely to have exited from poverty in a given year. Compared to poor young adults in the South, those in the West were 1.13 (1.13) times as likely to have exited from poverty. With each additional poverty spell individuals experienced as young adults prior to the current poverty spell, they were 0.88 (0.81) times as likely to have exited from the current poverty as those who experienced one less poverty spell previously. Elapsed duration in current spell had curvilinear relationship with the poverty exit rates. According to the model that incorporated the poverty duration information from pre-young adulthood, the likelihood of young adults exiting from poverty were higher the longer they were in poverty until the fifth year. After the fifth year, the likelihood of their exiting from poverty began declining.

Poverty Exits in Rural, Central Cities, and Suburbs

Table 7 and 8 show the results of poverty exit rate logistic regression models by separating urban residency into central city and suburban residency. The results of the simple models that only controlled for key factors are presented in Table 7. When age cohort, gender, race, marital status, number of spells previously experienced as young adults, and elapsed duration in the spell were kept equal, there was no difference in poverty exit rates between young adults living in rural areas and central cities and between young adults living in rural areas and suburban areas in the model that incorporated poverty duration information from pre-young adulthood. In the other model that did not incorporate poverty duration information and assumed all poverty began at age 25 or later, suburban residents were 1.19 times as likely to have exited from poverty

Table 7

Simple Models with Left-censored Information and without: Parameter Estimates and Odds Ratios of Exit from Poverty among Young Adults in Rural, Central Cities, and Suburban Areas (1983-1993)

| Variables | Left-censored Information | | | |
|---|---------------------------|------------|---------------------|------------|
| | Included | | Not-included | |
| | Parameter estimates | Odds ratio | Parameter estimates | Odds ratio |
| Intercept | -2.90*** | | -5.79*** | |
| Age in 1979 | 0.03* | 1.03 | 0.07*** | 1.07 |
| Female | -0.07 | 0.93 | -0.14* | 0.87 |
| Race/ethnicity (baseline: White) | | | | |
| Black | -0.40*** | 0.67 | -0.56*** | 0.57 |
| Hispanic and/or other | -0.36 | 0.70 | -0.49*** | 0.61 |
| MSA status (baseline: rural) | | | | |
| central cities | 0.01 | 1.01 | 0.07 | 1.07 |
| suburban | 0.11 | 1.12 | 0.18** | 1.19 |
| Marital status (baseline: never married) | | | | |
| married | 0.50*** | 1.64 | 0.55*** | 1.73 |
| other | 0.09* | 1.09 | 0.05 | 1.05 |
| # of spells previously experienced as a young adult | -0.13* | 0.88 | -0.15** | 0.86 |
| Elapsed duration in the spell | 0.71*** | 2.03 | 2.43*** | 11.37 |
| Elapsed duration in the spell squared | -0.07*** | 0.93 | -0.34*** | 0.72 |
| Log-Likelihood Ratio | 8,539.59 | | 8,201.54 | |
| N (person-years) | 8,604 | | 9,041 | |
| # events | 1,896 | | 1,963 | |

*** $p < 0.0001$; ** $p < 0.01$; * $p < 0.05$

as rural residents. Table 8 shows the results of full models comparing rural, central cities, and suburban poverty exit rates. When other factors were kept equal, there was no difference between rural residents' poverty exit rates and those in central cities and suburbs. The covariates' signs and significance are similar to those from the previous exit rate models comparing rural and urban young adults. One difference is with the health problem variable. In both models presented in Table 8, young adults who had a health problem that affected work in a given year were 0.76 times as likely to have exited from poverty in that year as those without such a problem.

Exit Rates Simulations

Using the poverty spell information from the above analyses, Table 9 presents poverty exit rates by residence patterns. The data incorporating poverty status from pre-young adulthood generally gave lower exit rates (hazard rates) than the analyses that used poverty duration information only from young adulthood. In the analyses that used left-censored information, over all, until the sixth year, individuals who lived in rural areas throughout the observation period had lowest poverty exit rates, and those who lived in both rural and urban areas during the observation period had the highest exit rates. The rank by residential patterns was the same in the analyses that did not use left-censored information, but only until the fifth year. Particularly with the data that did not incorporate left-censored duration information, exit rates estimates are less reliable for longer duration, for example the longest poverty the youngest cohort could experience was four years. Overall, data that incorporated left-censored duration information gave lower exit rates than those that did not.

Based on the results presented on Tables 5 and 6 described earlier, following are some of the exit odds predictions for different individual characteristics. These hypothetical estimates would give a more intuitive interpretation of the findings by providing specific poverty exit rates for different hypothetical individual characteristics

Table 8
Full Models with Left-censored Information and without: Parameter Estimates and Odds Ratios of Exit from Poverty among Young Adults in Rural, Central Cities, and Suburban Areas (1983-1993)

| Variables | Left-censored Information | | | |
|---|---------------------------|------------|---------------------|------------|
| | Included | | Not-included | |
| | Parameter estimates | Odds ratio | Parameter estimates | Odds ratio |
| Intercept | -3.68*** | | -6.83*** | |
| Age in 1979 | 0.04** | 1.04 | 0.07*** | 1.07 |
| Female | 0.03 | 1.03 | 0.01 | 1.01 |
| Race/ethnicity (baseline: White) | | | | |
| Black | -0.33** | 0.72 | -0.42*** | 0.66 |
| Hispanic and/or other | -0.13 | 0.88 | -0.17 | 0.85 |
| Lived with 2 parents at age 14 | -0.09 | 0.92 | -0.10 | 0.90 |
| Had reading materials at home at age 14 | 0.09 | 1.10 | 0.21* | 1.24 |
| Mother had high school education in 1979 | 0.03 | 1.04 | 0.10 | 1.10 |
| # of siblings in 1979 | -0.02 | 0.98 | -0.02 | 0.98 |
| MSA status (baseline: rural) | | | | |
| central cities | -0.18 | 0.84 | -0.10 | 0.91 |
| suburban | -0.11 | 0.90 | -0.05 | 0.96 |
| Region of residence (baseline: South) | | | | |
| North central | -0.03 | 0.97 | -0.14* | 0.87 |
| Northeast | -0.00 | 1.00 | -0.04 | 0.96 |
| West | 0.13 | 1.14 | 0.13* | 1.14 |
| Marital status (baseline: never married) | | | | |
| married | 0.62*** | 1.86 | 0.66*** | 1.94 |
| other | 0.21 | 1.24 | 0.16* | 1.17 |
| # of small children in the household | -0.09** | 0.92 | -0.11** | 0.90 |
| High school education or more | 0.32*** | 1.38 | 0.37*** | 1.45 |
| Had health problem | -0.27* | 0.76 | -0.28* | 0.76 |
| Employed | 0.79*** | 2.21 | 0.92*** | 2.52 |
| Local unemployment rate | -5.17*** | 0.01 | -3.56** | 0.03 |
| # of spells previously experienced as a young adult | -0.12* | 0.88 | -0.18** | 0.84 |
| Elapsed duration in the spell | 0.80*** | 2.22 | 2.58*** | 13.25 |
| Elapsed duration in the spell squared | -0.07*** | 0.93 | -0.35*** | 0.71 |
| Log-Likelihood Ratio | | 8,263.70 | | 7,841.96 |
| N (person-years) | | 8,604 | | 9,041 |
| # events | | 1,896 | | 1,963 |

*** $p < 0.0001$; ** $p < 0.01$; * $p < 0.05$

Table 9
Poverty Exit Rates among Young Adults by Residence Patterns (1983-1993)

| Duration in years | Left-censored information | | | | | | | |
|----------------------|---------------------------|------------------|-----------------------|------------------|------------------|------------------|-----------------------|------------------|
| | Included | | | | Not included | | | |
| | Total | Residence | | Urban | Total | Residence | | Urban |
| | | Rural | Rural and Urban | | | Rural | Rural and Urban | |
| 1 | 0.465 (0.011) | 0.418 (0.026) | 0.488 (0.026) | 0.469 (0.014) | 0.562 (0.012) | 0.509 (0.029) | 0.577 (0.028) | 0.570 (0.015) |
| 2 | 0.259 (0.012) | 0.219 (0.027) | 0.293 (0.029) | 0.259 (0.015) | 0.319 (0.014) | 0.255 (0.031) | 0.353 (0.034) | 0.325 (0.018) |
| 3 | 0.184 (0.012) | 0.150 (0.027) | 0.217 (0.031) | 0.183 (0.015) | 0.223 (0.015) | 0.187 (0.033) | 0.305 (0.041) | 0.209 (0.019) |
| 4 | 0.126 (0.012) | 0.121 (0.028) | 0.135 (0.029) | 0.124 (0.015) | 0.157 (0.016) | 0.161 (0.038) | 0.164 (0.038) | 0.154 (0.020) |
| 5 | 0.106 (0.012) | 0.089 (0.027) | 0.125 (0.031) | 0.104 (0.015) | 0.122 (0.017) | 0.08 (0.033) | 0.190 (0.051) | 0.115 (0.021) |
| 6 | 0.123 (0.015) | 0.100 (0.031) | 0.171 (0.041) | 0.115 (0.018) | 0.116 (0.021) | 0.141 (0.053) | 0.042 (0.029) | 0.129 (0.027) |
| 7 | 0.113 (0.016) | 0.108 (0.036) | 0.133 (0.042) | 0.108 (0.020) | 0.084 (0.022) | 0.066 (0.046) | 0.125 (0.062) | 0.078 (0.026) |
| 8 | 0.077 (0.015) | 0.104 (0.039) | 0.104 (0.043) | 0.060 (0.017) | 0.082 (0.027) | 0.171 (0.099) | 0.053 (0.053) | 0.068 (0.031) |
| 9 to 15 | 0.101 (0.020) | 0.075 (0.038) | 0.132 (0.054) | 0.099 (0.025) | 0.055 (0.031) | 0 - | 0.2 (0.141) | 0.028 (0.028) |
| <i>N</i> | 5,103 | 777 | 955 | 3,372 | 5,133 | 778 | 954 | 3,401 |
| failed | 2,830 | 409 | 583 | 1,839 | 2,922 | 419 | 588 | 1,915 |
| censored | 2,273 | 368 | 372 | 1,533 | 2,211 | 359 | 366 | 1,486 |
| % censored | 44.54 | 47.36 | 38.95 | 45.46 | 43.07 | 46.14 | 38.36 | 43.69 |

Notes: Numbers in parentheses are hazard rate standard errors.

In the data that incorporated left-censored information, the maximum possible duration for the right-censored poverty spells was 15, that for the completed poverty spells was 14. In the data that did not incorporate left-censored information, the maximum possible values were 11 for the right-censored spells and 10 for the completed spells.

and situations. Unless otherwise indicated, the baseline characteristics for simulations using the simple model results are 18 years old in 1979, female, White, married, has not had any completed poverty spell since age 25, and has been in poverty for four years. These were chosen based on the sample mean values.

First, following are the exit odds for rural and urban residents of each of three race and ethnicity groups using the duration information from pre-young adulthood. The odds that White young adults living in rural areas exited from poverty were 0.74,³ whereas the odds that their urban counterparts exited were 0.83. The odds that Black young adults living in rural areas exited from poverty were 0.47, whereas the odds that their urban counterparts exited were 0.53. The odds that Hispanic or other race's young adults living in rural areas exited from poverty were 0.52, and the odds that their urban counterparts exited were 0.58. Among these six groups, White young adults living in urban areas had the highest exit odds, followed by White young adults living in rural areas, Hispanics or other race's individuals living in urban areas, Blacks living in urban areas, Hispanics or other race's individuals living in rural areas, and Blacks living in rural areas were least likely to have exited from poverty.

The next exit odds comparison across race and ethnicity groups used a simple model that did not incorporate left-censored duration information. This time the baseline elapsed duration in spell is two years based on the sample means. The odds that White young adults living in rural areas exited from poverty were 0.50,⁴ and the odds that White young adults living in urban areas exited from poverty were 0.59. The odds that Black young adults living in rural areas exited from poverty were 0.28, whereas the odds that Black young adults living in urban areas exited from poverty were 0.33. The odds that

³ $0.74 \approx \exp[-2.94(1)+0.03(18)-0.09(1)-0.45(0)-0.35(0)-0.11(1)+0.46(1)+0.08(0)-0.13(0)+0.74(4)-0.07(4^2)]$

⁴ $0.50 \approx \exp[-5.82(1)+0.08(18)-0.15(1)-0.59(0)-0.48(0)-0.17(1)+0.51(1)+0.03(0)-0.16(0)+2.54(2)-0.35(2^2)]$

Hispanic or other racial categories' young adults living in rural areas exited from poverty were 0.31, and the odds that their urban counterparts exited from poverty were 0.37. The rank order of the six groups by exit rates is the same as that from the previous simulation that used the left-censored information.

Using the simple model results that used the left-censored duration information, the following contrast was made among three marital statuses by their residency. The baseline race and ethnicity category is White. The odds that young adults who had never been married and who lived in rural areas exited from poverty were 0.47, while the odds that comparable young adults living in urban areas exited from poverty were 0.52. The odds that married young adults living in rural areas exited from poverty were 0.74, whereas the odds that married young adults living in urban areas exited from poverty were 0.83. The odds that young adults whose marital status was other (divorced, separated, or widowed) and who lived in rural areas exited from poverty were 0.51, whereas the odds that comparable young adults living in urban areas exited from poverty were 0.57.

The next simulation presents the exit odds for different years in poverty spells among young adults who have the baseline characteristics. This simulation also used the results from the simple model that used left-censored information (with the exit odds based on the results of the simple model that did not incorporate left-censored duration information in parentheses). The odds that young adults living in rural areas exited from poverty in the second year were 0.39 (0.50), whereas the odds for those living in urban areas were 0.44 (0.59). The odds that those living in rural areas exited from poverty in the third year were 0.58 (1.11), whereas the odds for those living in urban areas were 0.64 (1.31). The odds that those living in rural areas exited in the fourth year were 0.74 (1.21), whereas the odds for those living in urban areas were 0.83 (1.43). If they were in the fifth year since entering a spell and had not yet exited, the odds that young adults living in

rural areas exited from poverty were 0.82 (0.66), whereas the odds that those living in urban areas exited from poverty were 0.92 (0.78). If they were in the sixth year in poverty spell, the odds that young adults living in rural areas exited from poverty were 0.80 (0.18), whereas the odds that those living in urban areas exited from poverty were 0.90 (0.21).

The highest exit odds in the model that incorporated left-censored duration information were observed around the fifth year in the spell as they were in the earlier interpretation of curvilinear effects. The highest exit odds in the model that did not incorporate left-censored duration information were observed in the fourth year in the spell, and this occurred one year earlier than when left-censored duration information was incorporated. The differences between these numbers and those from the model that used the data incorporating left-censored information is shown in Figure 1.

The following simulation used the full model that used left-censored information (whose results are presented in Table 6). The baseline background characteristics are 18 year old in 1979, female, White, lived with two parents at age 14, had reading materials at home at age 14, mother had high school education, and had 4 siblings in 1979. The baseline characteristics for time-varying variables are living in rural areas, living in the South, married, one small child living in the same household, having high school education, having no health problem affecting paid work, local unemployment rate being 7%, having had no completed poverty spell since age 25, and being in a poverty spell for four years.

The following series of simulations show how a difference in one variable affects exit odds. The baseline characteristics include being White and living in rural areas, and other variables' characteristics remain the same as described in the earlier paragraph. The odds that young adults who have never been married exited from poverty were 1.28, whereas the odds that their married counterparts exited from poverty were 2.02. The odds

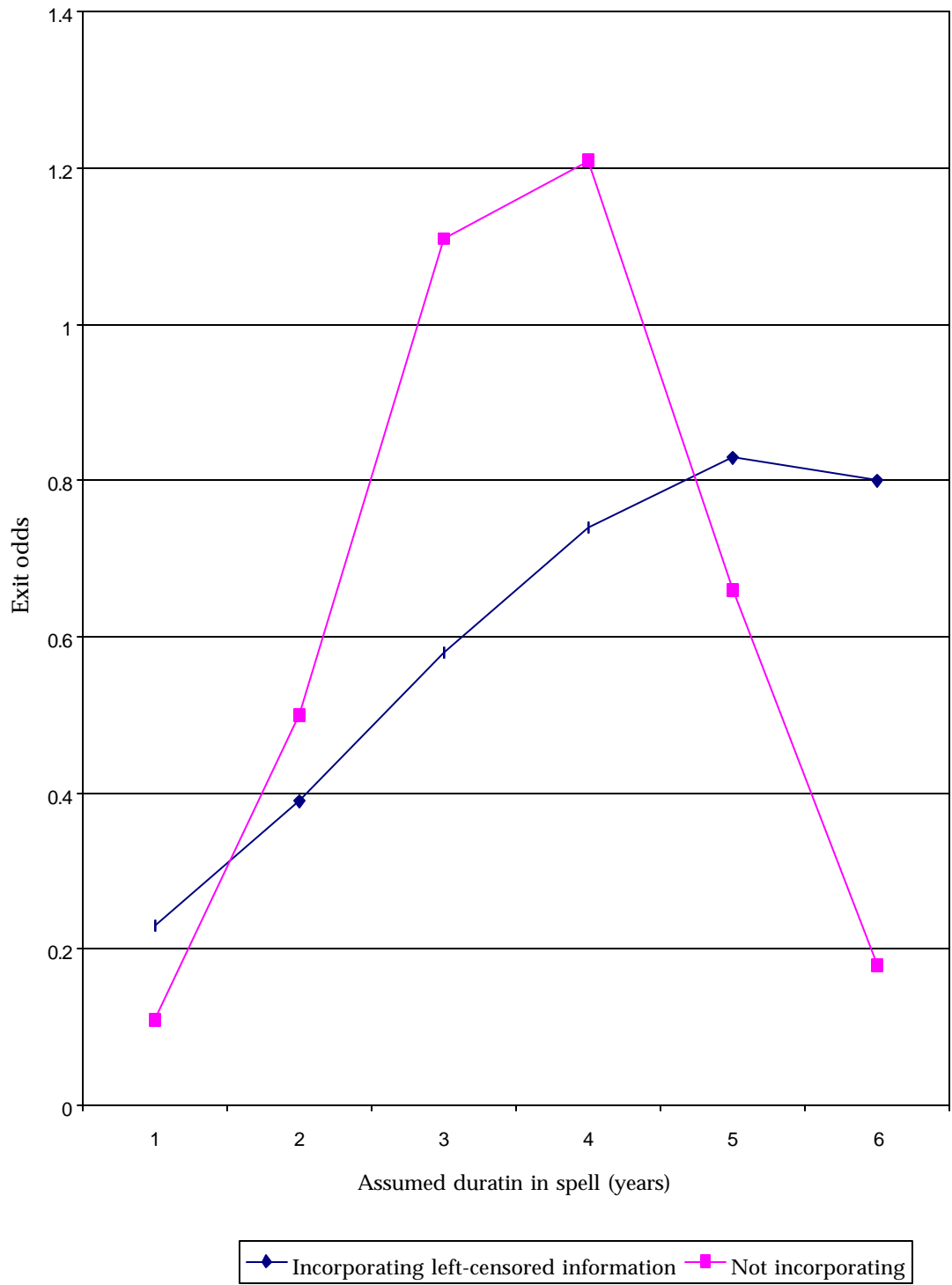


Figure 1
Poverty Exit by Duration
(Rural residents, source: Simple Models)

that young adults with baseline characteristics, including being married, with no small child living with them exited from poverty were 1.56, whereas the odds that those with one child living with them exited from poverty were 1.41. The odds that young adults with baseline characteristics, including having one small child living with them, and having high school education exited from poverty were 1.56, whereas the odds that those without high school education exited from poverty were 1.08. The odds that young adults with baseline characteristics, including having high school education, and being employed, exited from poverty were 1.28, whereas the odds that those who were not employed exited from poverty were 0.87. The odds that young adults with baseline characteristics, including being employed, and living in areas with 7% unemployment rate exited from poverty were 1.41, whereas the odds that the comparable young adults living in areas with 9% unemployment rate exited from poverty were 1.27. Lastly, the odds that young adults with baseline characteristics, including living in areas with 7% unemployment rate, and having no completed poverty spell since age 25 exited from poverty were 1.56, whereas the odds that the comparable young adults who had one completed spell exited from poverty were 0.95.

In summary, this part of the study compared two methods of counting poverty duration using the *NLSY79* and defining young adults as aged 25 or older. One was to incorporate poverty duration information from pre-young adulthood for those who were in poverty at the beginning of young adulthood, and the other was not to use such information. The four comparisons above (Tables 5 through 8) confirmed that these two approaches would give similar estimates on the various factors' relation with poverty exit rates. However, these two gave different estimates on poverty exit rates. Incorporating poverty duration information from pre-young adulthood (before age 25) gave more conservative poverty exit rate estimates than not doing so. Therefore, Hypothesis 2 is supported.

Young adults living in rural areas were less likely to have exited from poverty than those in urban areas. However, when urban areas were reclassified into central cities and suburban areas, there was no difference in the poverty exit rates between individuals in rural areas and central cities. The model that did not incorporate pre-young adulthood poverty information showed that young adults living in rural areas were less likely to have exited from poverty than those in suburban areas. Therefore, the first part of Hypothesis 3 is partially supported and partially rejected. The latter part of this hypothesis is supported; there was no difference in poverty exit rates between rural and either urban or central cities and suburban areas when demographic and household characteristics, human capital, and labor market factors were controlled.

Incorporating or Not Incorporating the Left-censored Information

Characteristics of the young adults who were in poverty at age 25 as opposed to those who were in poverty later during the observation period were similar to the characteristics of young adults who had lower poverty exit rates. Variables that had positive associations with left-censorship were also found to be associated with negative poverty exit rates. The only differences when significant variables are focused is that local unemployment rates were not significant in either model in Table 3 but were significant in both models in Table 6. Hypothesis 1 is therefore partially supported.

Poverty Exit and Reentry Rates

Two-way transit models were used to compare the relationship between time-varying variables and transition out of and reentry into poverty for rural and urban young adults and then for rural, central city, and suburban young adults. In both models, the purpose was to find how various time-varying factors relate to the exit from and reentry into poverty. The sample for these analyses included young adults who experienced poverty during the observation period and had complete information about the beginning of each poverty spell experienced during the observation period. Each non-poverty spell

was observed after a completed poverty spell experienced as a young adult, and non-poverty spells had to have complete information about their beginning. Each year they were in poverty as young adults and each year they were out of poverty (after having been in poverty at least once) formed a person-year observation. The response variable was coded 1 if the respondent was in poverty in a given year and was coded 0 if he or she was out of poverty that year.

The descriptive statistics of the observations included in the two-way transit models are shown in Table 10. A total of 3,208 individuals were included, where 488 lived in rural areas throughout the observation period, 2,144 lived in urban areas, and 576 lived in both rural and urban areas for at least a year during the observation period. Among variables specific to individuals, distributions or means of age in 1979, race and ethnicity, availability of reading materials at home at age 14, mother's education, and total number of completed poverty spells experienced since age 25 were different across the residential groups. Individuals included in the sample contributed 11,309 person-year observations, among which 3,905 were in rural areas, 2,296 were in central cities, and 5,108 were in suburbs. Among time-varying variables, distributions or means of region of residence, marital status, number of small children in the household, having high school education or more, employment status, local unemployment rate, and elapsed duration in the spell were different across the three residential categories.

Each multi-categorical variable, both control and time-varying, was examined with a univariate GLM model to see if any categories could be collapsed to explain the poverty status. With the data prepared for two way transit analyses, it was found that living with no parents at age 14 and living with one parent did not differ in their variances in poverty status. Therefore, these two categories were collapsed and a new dichotomous variable indicating whether or not the respondent lived with two parents at age 14 was created.

Table 10
Characteristics of Exit and Reentry Rate Model Observations by Residence Patterns (1983-1993)

| Variables | Total | Rural | Rural & Urban | Urban |
|---|--------|--------------------|---------------------|--------------------|
| <i>Person-specific Variables: column means</i> | | | | |
| Age in 1979 | 17.94 | 17.67 ^a | 18.40 ^{ac} | 17.88 ^c |
| Female | 0.56 | 0.56 | 0.56 | 0.56 |
| Race/ethnicity (baseline: White)*** | | | | |
| Black | 0.16 | 0.13 | 0.10 | 0.18 |
| Hispanic and/or other | 0.09 | 0.06 | 0.08 | 0.10 |
| Background household structure (baseline: lived with 2 parents at age 14) | | | | |
| lived with no parent | 0.06 | 0.05 | 0.07 | 0.05 |
| lived with 1 parent | 0.16 | 0.15 | 0.13 | 0.16 |
| Had reading materials at home at age 14** | 0.91 | 0.87 | 0.90 | 0.93 |
| Mother had high school education in 1979** | 0.59 | 0.51 | 0.59 | 0.61 |
| # of siblings in 1979 | 3.55 | 3.72 | 3.59 | 3.51 |
| # of completed poverty spells since age 25 | 1.09 | 1.21 ^a | 1.03 ^{ac} | 1.07 ^c |
| <i>N</i> (persons) | 3,208 | 488 | 576 | 2,144 |
| | Total | Rural | Central Cities | Suburbs |
| <i>Time-varying variables: column means</i> | | | | |
| Region of residence (baseline: South)*** | | | | |
| North central | 0.29 | 0.33 | - | 0.24 |
| Northeast | 0.16 | 0.04 | - | 0.29 |
| West | 0.19 | 0.14 | - | 0.15 |
| Marital status (baseline: never married)*** | | | | |
| married | 0.47 | 0.52 | - | 0.29 |
| other | 0.19 | 0.21 | - | 0.15 |
| # of small children in the hh | 0.70 | 0.78 ^{ab} | - | 0.61 ^{ac} |
| High school or more*** | 0.80 | 0.77 | - | 0.75 |
| Had health problem | 0.08 | 0.08 | - | 0.07 |
| Employment status (baseline: out of labor force)*** | | | | |
| employed | 0.69 | 0.66 | - | 0.64 |
| unemployed | 0.08 | 0.10 | - | 0.09 |
| Local unemployment rate | 0.07 | 0.09 ^{ab} | - | 0.06 ^{ac} |
| Elapsed duration in the spell | 3.21 | 3.28 ^{ab} | - | 3.58 ^{ac} |
| <i>N</i> (person-years) | 11,309 | 3,905 | | 2,296 |

*** $p < 0.0001$; ** $p < 0.01$; * $p < 0.05$

Note: The distribution is unweighted for the unequal number of person-year observations in three residential patterns.

Superscripts indicate that two residential categories that share the same letter in the same row have statistically significantly different means, all at $p < 0.05$.

Another decision was to exclude the interaction between elapsed duration in spell and previous year's poverty status. This variable, together with poverty status, previous year's poverty status, and elapsed duration in spell, was suspected to be causing a multicollinearity problem.

The next step was to run a full model that included interaction terms between previous year's poverty status and each time-varying variable. Interaction terms that were not statistically significant ($p < 0.05$) were then excluded. These factors did not have significant asymmetric association with exit and reentry rates. In rural and urban comparison analysis, a few multi-categorical variables showed no significant difference between the baseline and another category (never being married and married, unemployed and out of labor force). In this case, the category that did not differ from the baseline was merged with the baseline. Yet, after merging, the interaction terms were not significant, therefore, these interaction terms were removed from the model and the original multi-category was used in the final model.

Along with the final models, both Table 11 and 12 presented later show the baseline model whose only parameter estimates are the intercept and the previous year's poverty status. These results represent constant impact of transition between two stages, poverty and non-poverty. Intercept parameter estimates show the relative likelihood of the two transitions. The negative signs here indicate that the transition from poverty to non-poverty was less likely than the transition from non-poverty to poverty. In other words, it was easier for young adults to fall back into poverty than to exit from poverty between 1983 and 1993. Parameter estimates for previous year's poverty status represent the Markovian effect (Yamaguchi, 1991). This is the effect that the previous year's poverty status has upon current year's poverty status. The parameter estimates, 0.93 in Table 11 and 0.95 in Table 12, indicate that poverty status in a given year had positive and strong impact on the following year's poverty status.

Poverty Exit and Reentry in Rural and Urban Areas

Table 11 shows the parameter estimates of transition out of and reentry into poverty among young adults in rural and urban areas. As was the case for the analyses presented earlier, this model, which does not distinguish between central cities and suburban areas within the urban (metropolitan) areas, includes significantly more observations (n=16,165 person years) than the ones that used three-level classification (Table 12, n=11,309 person-years).

Residential location and poverty dynamics. Rural or urban residency did not show statistically significant ($p < 0.05$) interactions with previous year's poverty status, thus the interaction terms were excluded from the model. Further, the main variables were not statistically significant. Overall, when other factors were controlled, living in rural or urban areas did not explain the differences in poverty exit or reentry rates.

Family and household characteristics. The interaction terms of both marital status and number of small children in the household were not significant. Marital status was symmetrically associated with poverty exit and reentry. Married young adults in poverty were 1.72⁵ times as likely to exit as those who had never been married and 0.58⁶ times as likely to reenter poverty. Number of small children in the household was not significantly related to poverty exit and reentry.

Human capital. Whether poor young adults had high school education or not was associated with poverty exit and reentry symmetrically. Individuals who had high school education were 1.35 times as likely to have exited from poverty and 0.74 times as likely to have reentered poverty as those who did not have high school education. Interaction term between health problems and previous year's poverty status was significant, suggesting health problems had an asymmetric association with poverty exit and reentry.

⁵ $1.72 \approx \exp[-(-0.54)]$

⁶ $0.58 \approx \exp(-0.54)$

Poor young adults with a health problem that affected their labor force participation in one way or the other were 0.36⁷ times as likely to have exited from poverty, and they were 0.54⁸ times as likely to have reentered poverty. If poor young adults with health problems did manage to exit from poverty, health itself was less likely to bring them back into poverty.

Labor market and employment. Both employment status of the respondents and unemployment rates in local areas where they were living were symmetrically associated with the poverty exit and reentry. Young adults who were employed in a given year were 2.08 times as likely to have exited from poverty and 0.48 times as likely to have reentered poverty as those who were out of the labor force. There was no statistically significant difference in exit and reentry rates between individuals who were unemployed and those who were out of labor force. When local unemployment rate was one percent point higher, young adults were 0.01 times as likely to have exited from poverty and were 91.84 times as likely to have reentered poverty as those who lived in lower unemployment rate areas.

Control variables. Region of residence did not show statistically significant ($p < 0.05$) interactions with previous year's poverty status, thus the interaction terms were excluded from the model. Further, the main variables were not statistically significant. Overall, when other factors were controlled, whether or not one lived in a particular region did not explain the differences in poverty exit or reentry rates. The number of previously completed poverty spell individuals experienced since age 25 had an asymmetric relation with the poverty dynamics. Each additional poverty spell experienced previously was more associated with greater magnitude of exit rates than it was associated with reentry rates. (With each additional poverty spell experienced as

⁷ $0.36 \approx \exp[-(0.20 + 0.82)]$

⁸ $0.54 \approx \exp(0.20 - 0.82)$

Table 11
Parameter Estimates of Exit from and Reentry into Poverty among Young Adults in Rural and Urban Areas (1983-1993)

| Variables | Markovian model | Parameter estimates |
|--|---------------------|----------------------|
| Intercept | -0.23*** | 3.00*** |
| <i>Control Variables</i> | | |
| Age in 1979 | | 0.00 |
| Female | | -0.08 |
| Race/ethnicity (baseline: White) | | |
| Black | | 0.43*** |
| Hispanic and/or other | | 0.09 |
| Had reading materials at home at age 14 | | -0.22** |
| Mother had high school education in 1979 | | -0.13** |
| # of siblings in 1979 | | 0.05*** |
| Elapsed duration in the spell | | -0.19*** |
| <i>Time-varying Variables to Test Two-way Transit</i> | | |
| Previous year's poverty status | 0.93*** | 1.55*** |
| <i>Variables without Significant Interaction with Previous Year's Poverty Status</i> | | |
| Lived in rural area | | 0.07 |
| Region of residence (baseline: South) | | |
| North central | | -0.08 |
| Northeast | | -0.03 |
| West | | -0.10 |
| Marital status (baseline: never married) | | |
| married | | -0.54*** |
| other | | -0.08 |
| # of small children in the household | | -0.01 |
| Had at least high school education | | -0.30*** |
| Employment status (baseline: out of labor force) | | |
| employed | | -0.73*** |
| unemployed | | 0.14 |
| Local unemployment rate | | 4.52*** |
| <i>Variables whose Interaction with Previous Year's Poverty Status was Significant</i> | | |
| Had health problem | | 0.20 |
| # previous spell(s) completed | | -2.04*** |
| <i>Interaction variables</i> | | |
| Had health problem * previous year's poverty status | | 0.82*** |
| # previous spell* previous year's poverty status | | -1.49*** |
| Log-Likelihood Ratio | 21,363.20 (df=1) | 13,753.45 (df=24) |
| <i>N</i> (person-years) | 16,165 | 16,165 |

*** $p < 0.0001$; ** $p < 0.01$; * $p < 0.05$

young adult, individuals were 34.12 times as likely to have exited from poverty and 0.58 times as likely to have reentered poverty as those who experienced one less poverty spell as young adults.) This is probably because more people experienced poverty exit than poverty reentry during the observation period.

Poverty Exit and Reentry in Rural, Central Cities, and Suburbs

Presented in Table 12 are the results of poverty exit and reentry models among young adults who were living in rural, central cities, and suburban areas who experienced poverty during the observation period. Because the results are similar to those in the previous table comparing rural and urban poor young adults, only those findings that are different are mentioned below to avoid repetition.

Residential location and poverty dynamics. Neither the interaction between *MSA* categories and previous year's poverty status nor *MSA* categories' main effects were statistically significant. Living in rural areas as opposed to central cities or suburban areas did not explain the poverty exit and reentry rates when other factors were controlled. Among region of residence, living in the West as opposed to the South was symmetrically associated with poverty exit and reentry. Individuals living in the West in a given year were 1.17 times as likely to have exited from poverty in that year and were 0.85 times as likely to have reentered poverty in the year as those living in the South.

Family and household characteristics and human capital. The findings regarding the marital status, number of small children in the household, educational attainment, and health condition were similar to those in the rural and urban comparison model presented earlier (Table 11). Being married compared to never being married as well as having high school education were symmetrically related to exit and reentry. These two features were associated with increased poverty exit rates and decreased reentry rates. Having a health problem was asymmetrically related to the exit and reentry.

Table 12
Parameter Estimates of Exit from and Reentry into Poverty among Young Adults in Rural, Central Cities, and Suburban Areas (1983-1993)

| Variables | Markovian model | Parameter estimates |
|--|-----------------|---------------------|
| Intercept | -0.21*** | 2.86*** |
| <i>Control Variables</i> | | |
| Age in 1979 | | -0.00 |
| Female | | -0.02 |
| Race/ethnicity (baseline: White) | | |
| Black | | 0.47*** |
| Hispanic and/or other | | 0.15 |
| Had reading materials at home at age 14 | | -0.19* |
| Mother had high school education in 1979 | | -0.18** |
| # of siblings in 1979 | | 0.04*** |
| Elapsed duration in the spell | | -0.18*** |
| <i>Time-varying Variables to Test Two-way Transit</i> | | |
| Previous year's poverty status | 0.95*** | 1.94*** |
| <i>Variables without Significant Interaction with Previous Year's Poverty Status</i> | | |
| MSA status (baseline: rural) | | |
| central cities | | -0.05 |
| suburban | | -0.01 |
| Region of residence (baseline: South) | | |
| North central | | -0.11 |
| Northeast | | -0.13 |
| West | | -0.16* |
| Marital status (baseline: never married) | | |
| married | | -0.55*** |
| other | | -0.03 |
| # of small children in the household | | -0.03 |
| Had at least high school education | | -0.35*** |
| Local unemployment rate | | 3.69** |
| <i>Variables whose Interaction with Previous Year's Poverty Status was Significant</i> | | |
| Had health problem | | 0.28* |
| Employment status (baseline: out of labor force) | | |
| employed | | -0.42*** |
| unemployed | | 0.42* |
| # previous spell(s) completed | | -1.94*** |

Table 12 (Continued)

| Variables | Markovian model | Parameter estimates |
|---|---------------------|---------------------|
| <i>Interaction Variables</i> | | |
| Had health problem * previous year's poverty status | | 0.70** |
| Employment status (baseline: out of labor force) | | |
| employed * previous year's poverty status | | -0.53*** |
| unemployed * previous year's poverty status | | -0.57* |
| # previous spell* previous year's poverty status | | -1.40*** |
| Log-Likelihood Ratio | 14,884.28 (df=1) | 9,743.70 (df=27) |
| <i>N</i> (person-years) | 11,309 | 11,309 |

*** $p < 0.0001$; ** $p < 0.01$; * $p < 0.05$

Labor market and employment. The young adults' employment status and its association with poverty exit and reentry rates were different from the findings from the earlier comparison between rural and urban residency. The interaction term between the employment status and previous year's poverty status was found significant; the variation in employment status was asymmetrically associated with the poverty exit and reentry rates. Compared with young adults who were not in the labor force, those who were employed were 2.59 times as likely to have exited from poverty and were 1.12 times as likely to have reentered poverty. Compared with young adults who were not in the labor force, young adults who were unemployed were 1.16 times as likely to have exited from poverty and were 2.69 times as likely to have reentered poverty.

To summarize the findings from the two-way transit analyses on poverty dynamics, in the first model, all time-varying variables but health status and number of previous spells completed were found not to be symmetrically associated with poverty exit and reentry rates. Marital status, high school education, employment status, and local unemployment rate were symmetrically associated with poverty exit and reentry rates. Having a health problem and the number of previously completed poverty spell were both asymmetrically associated with poverty exit and reentry rates. Health problem's directions of association with these rates were the same. On the other hand, the number of previously complete spell's directions of association with these rates were opposite from each other; therefore, it was the magnitude that was not symmetric. In the second model which assessed the poverty dynamics in rural, central cities, and urban areas, employment status was also asymmetrically associated with poverty exit and reentry rates, and living in the West was differently associated with these rates from living in the South. Hypothesis 4 is partially supported, because factors associated with increased poverty exit rates were associated with decreased poverty reentry rates except for health status

(and employment status in the model that used three *MSA* categories), and the magnitudes of the associations were the same for some variables but not for the others.

Rural-to-Urban Migration and Exit from Poverty

The purpose of this part of the study was to examine the association between rural-to-urban relocation and exit from poverty that began in rural areas while individuals were 25 years or older. Due to the small sample size, urban areas were not decomposed into central cities and suburban areas for this part of the study. Also, the migration analysis did not incorporate poverty information prior to age 25 to avoid losing some samples for being left-censored due to missing duration information. In the first part of the analyses, poverty spells experienced by individuals were followed from the beginning until the individuals exited from poverty or until they became right-censored. Two types of spells were compared. One was those experienced in rural areas throughout, and the other was those in which young adults moved from rural to urban areas before exiting from poverty. The second part of the analysis focused on the poverty that involved rural-to-urban migration to assess the timing of exiting from poverty after moving to urban areas.

Migrant and Non-migrant Poverty Exit Rates

Table 13 shows the description of the sample included in the models that compared migration and non-migration poverty. A total of 882 individuals were included in the analyses, who contributed 3,014 person-year observations. Among these individuals, 152 persons (65 men and 87 women) relocated to urban areas while in poverty and comprised 506 person-year observations (190 by men and 316 by women).

Preliminary exploration of the multi-categorical explanatory variables suggested that the number of parents the respondents lived with at age 14 had no variations in explaining the poverty exit; therefore, this variable was excluded from the full model. Employment status was reduced to a dichotomous variable.

Table 13
Characteristics of Rural-to-urban Migrant and Non-migrant (Rural-stayer) Young Adults by Gender (1983-1993)

| Variables | Total | Male | | Female | |
|--|-------|----------|--------------|----------|--------------|
| | | Migrants | Non-migrants | Migrants | Non-migrants |
| <i>Person-specific Variables: column means</i> | | | | | |
| Age in 1979 | 17.90 | 17.79 | 17.97 | 18.13 | 17.81 |
| Race/ethnicity (baseline: White) ^m | | | | | |
| Black | 0.11 | 0.24 | 0.10 | 0.11 | 0.10 |
| Hispanic and/or other | 0.07 | 0.12 | 0.07 | 0.10 | 0.06 |
| Had reading materials at home at age 14 | 0.88 | 0.89 | 0.87 | 0.83 | 0.90 |
| Mother had high school education in 1979 | 0.52 | 0.52 | 0.53 | 0.54 | 0.52 |
| # of siblings in 1979 | 3.72 | 3.92 | 3.68 | 3.90 | 3.67 |
| # of completed poverty spells since age 25 | 0.72 | 0.82 | 0.72 | 0.76 | 0.69 |
| Was in poverty at age 25 ^m | 0.45 | 0.62 | 0.39 | 0.51 | 0.45 |
| <i>N</i> (persons) | 882 | 65 | 327 | 87 | 403 |
| <i>Time-varying variables: column means</i> | | | | | |
| Region of residence (baseline: South) ⁱ | | | | | |
| North central | 0.31 | 0.31 | 0.30 | 0.19 | 0.35 |
| Northeast | 0.04 | 0.03 | 0.05 | 0.07 | 0.02 |
| West | 0.13 | 0.13 | 0.12 | 0.19 | 0.13 |
| Marital status (baseline: never married) ^{mf} | | | | | |
| married | 0.46 | 0.33 | 0.45 | 0.35 | 0.51 |
| other | 0.23 | 0.12 | 0.17 | 0.37 | 0.26 |
| # of small children in the household ^{mf} | 0.80 | 0.46 | 0.69 | 0.79 | 0.92 |
| High school or more | 0.73 | 0.69 | 0.69 | 0.25 | 0.74 |
| Had health problem | 0.09 | 0.11 | 0.08 | 0.10 | 0.09 |
| Employment status (baseline: out of labor force) ^{mf} | | | | | |
| employed | 0.62 | 0.59 | 0.75 | 0.47 | 0.55 |
| unemployed | 0.11 | 0.16 | 0.13 | 0.16 | 0.08 |
| Local unemployment rate | 0.09 | 0.08 | 0.09 | 0.08 | 0.09 |
| Elapsed duration in the spell ^f | 2.34 | 2.31 | 2.26 | 2.83 | 2.30 |
| <i>N</i> (person-years) | 3,014 | 190 | 1,119 | 316 | 1,389 |

*** $p < 0.0001$; ** $p < 0.01$; * $p < 0.05$

Superscripts indicate mean differences within each gender group at $p < 0.05$, where m=male and f=female.

Note: The distribution is unweighted for the unequal number of person-year observations in gender and migration status.

The results of simple and full models comparing poverty exit rates between migrants and non-migrants are in Table 14. According to the simple model results, the odds that an exit occurred while in poverty spells that involved migration were about 0.65 times as those in all-rural poverty spells when age cohort, gender, marital status, number of completed spells already experienced as young adult, elapsed duration in the current spell, and elapsed duration in the current spell squared were kept equal. Compared with never-married poor young adults, married women were 1.75 times as likely to have exited from poverty.

The full model on the right column also shows lower exit rates of migration spells than those of rural-only spells. When poor young adults were in migration spells, they were 0.58 times as likely to have exited from poverty in a given year as they were in rural-only spells, *ceteris paribus*.

Other factors were also associated with exit rates. Young adults who were born a year earlier were 1.10 times as likely to have exited from poverty as those who were born later. Blacks were 0.51 times as likely to have exited from poverty as Whites were. Individuals living in North central region were 0.75 times as likely to have exited from poverty as those in the South. Compared with never-married young adults, married individuals were 1.97 times as likely to have exited from poverty. With each additional small child living in the household in a given year, young adults were 0.82 times as likely to have exited from poverty as those who had one less child living with them. Young adults were 1.77 times as likely to have exited from poverty if they had high school education as those who did not. Employed young adults were 2.27 times as likely to have exited from poverty as those who were either unemployed or out of the labor force. With each additional percent point in the local unemployment rate, young adults were 0.004 times as likely to have exited from poverty as those who lived in lower unemployment rate areas. With each additional poverty spell previously completed since age 25, young

Table 14
Parameter Estimates and Odds Ratios of Exit from Poverty Begun in Rural Areas among Migrant and Non-Migrant Young Adults (1983-1993)

| Variables | Simple model | | Full model | |
|---|---------------------|------------|---------------------|------------|
| | Parameter estimates | Odds ratio | Parameter estimates | Odds ratio |
| Intercept | -6.28*** | | -7.36*** | |
| Age in 1979 | 0.07** | 1.08 | 0.09** | 1.10 |
| Female | -0.18 | 0.83 | -0.06 | 0.94 |
| Race/ethnicity (baseline: White) | | | | |
| Black | | | -0.68*** | 0.51 |
| Hispanic and/or other | | | 0.16 | 1.17 |
| Had reading materials at home at age 14 | | | 0.03 | 1.03 |
| Mother had high school education in 1979 | | | 0.18 | 1.19 |
| # of siblings in 1979 | | | -0.03 | 0.98 |
| Migration spell | -0.43** | 0.65 | -0.54** | 0.58 |
| Region of residence (baseline: South) | | | | |
| North central | | | -0.29* | 0.75 |
| Northeast | | | -0.13 | 0.88 |
| West | | | 0.15 | 1.16 |
| Marital status (baseline: never married) | | | | |
| married | 0.56*** | 1.75 | 0.68*** | 1.97 |
| other | 0.11 | 1.12 | 0.22 | 1.24 |
| # of small children in the household | | | -0.19** | 0.82 |
| High school education or more | | | 0.57*** | 1.77 |
| Had health problem | | | 0.08 | 1.08 |
| Employed | | | 0.82*** | 2.27 |
| Local unemployment rate | | | -5.41** | 0.004 |
| # of spells previously experienced as a young adult | -0.32** | 0.73 | -0.40** | 0.67 |
| Elapsed duration in the spell | 2.77*** | 15.94 | 3.01*** | 20.33 |
| Elapsed duration in the spell squared | -0.40*** | 0.67 | -0.42*** | 0.65 |
| Log-Likelihood Ratio | 2,667.011 | | 2,500.46 | |
| N (person-years) | 3,014 | | 3,014 | |
| # events | 633 | | 633 | |

*** $p < 0.0001$; ** $p < 0.01$; * $p < 0.05$

adults were 0.67 times as likely to have exited from poverty as those who experienced one less poverty spell as young adults.

Both elapsed duration in the spell and elapsed duration in the spell squared were statistically significantly associated with the poverty exit rates, indicating a curvilinear relationship between the poverty duration and the exit rates. Until the fourth year, the longer individuals remained poor, the more likely they were to exit from poverty. After the fourth year, the relation between the elapsed duration in poverty and exit rate changed, and it became less and less likely that young adults exited from poverty the longer they remained in the spell. It should be noted that the migration analysis did not incorporate poverty information prior to age 25. Given the previous finding, if duration prior to age 25 had been accounted for, then the change in direction might have occurred later.

Timing of Exit from Poverty Among Rural-To-Urban Migrants

The results of discrete-time logistic regression on poverty exit rates that focused on the migration spells and timing of exit from poverty are presented on Table 15. A model that included some of the other explanatory variables indicated that these variables had no significant association with the poverty exit rates among migrant poverty spells when timing of relocation was controlled. This simple model suggests that the longer young adults were in urban areas without exiting from poverty, the less likely they were to exit from poverty. Compared with young adults who were in urban areas for the first year, those who had been in urban areas two years longer were 0.24 times as likely to have exited from poverty, and those who had been in urban areas at least three years longer were 0.09 times as likely to have exited from poverty. Overall, those in their first year in urban areas had a higher likelihood of being out of poverty than those in subsequent years. The findings were that in general, poverty spells that involved migrating from rural areas to urban areas had lower exit rates than all-rural spells, and

Table 15
Parameter Estimates and Odds Ratios of Exit from Poverty among Young Adults who Relocated from Rural to Urban Areas (1983-1993)

| Variables | Parameter estimates | Odds ratio |
|---|---------------------|------------|
| Intercept | -0.30 | |
| When relocated to urban area? (baseline: this year) | | |
| last year | -0.19 | 0.83 |
| 2 years ago | -1.44* | 0.24 |
| 3 or more years ago | -2.41** | 0.09 |
| Log-Likelihood Ratio | 299.14 | |
| <i>N</i> (person-years) | 249 | |
| # events | 87 | |

** $p < 0.01$; * $p < 0.05$

staying in urban areas longer without exiting from poverty only decreased the likelihood of ever exiting from poverty; Hypothesis 5 is supported.

Summary

This chapter presented results from analyses on poor young adults in rural and urban areas and found the following: among individuals living in rural and urban United States who experienced poverty during young adulthood, those with certain characteristics were more likely to have been in poverty at age 25 than to have been in poverty later during their young adulthood. These characteristics were mostly similar to those that were associated with the lower poverty exit rates. Factors associated with poverty exit rate estimates were similar regardless of how the beginning of the poverty spell was defined for those who were already in poverty at age 25. One way to define it was to incorporate all available information about such poverty spell, tracking the poverty status information back to pre-young adulthood. The other way was to assume all poverty of young adults began at age 25.

The estimated poverty exit rates were different depending on how duration of these left-censored poverty spells was calculated. When left-censored information was not incorporated, the results showed higher estimated exit rates between two to four years in poverty and lower rates in other years. Young adults in rural areas were less likely to have exited from poverty than those in urban areas; however, when residential location, family-related, human capital, and labor market factors were controlled for, there was no difference between poverty exit rates among young adults living in rural and urban areas. The findings were similar when young adults living in rural areas were compared with those living in central cities and suburbs. In the model that compared rural and urban poverty dynamics, all but one of the factors associated with increased poverty exit rates were also associated with poverty reentry rates, and for most of these time-varying variables, the relation between the poverty exit and reentry rates was symmetric. An

exception was having a health problem that affected labor force participation. Having a health problem in a year was associated with both decreased poverty exit and reentry rates. In the model that compared rural poverty dynamics with those in central cities and suburbs, employment status also had asymmetrical association with exit and reentry rates. Being out of the labor force in a year was associated with both decreased poverty exit and reentry rates.

In cases where poverty began while young adults were living in rural areas, individuals who relocated to urban areas before exiting from poverty were less likely to have exited from poverty than those who remained in rural areas. In other words, moving to urban areas, where poverty exit rates were generally higher, did not make poor young adults from rural areas exit from poverty sooner. Once they relocated to an urban area, the longer they remained in urban areas without exiting from poverty, the less likely they were to have exited from poverty.

CHAPTER V

SUMMARY AND DISCUSSION

Summary of the Findings and Discussion

The overall purpose of this study was to understand poverty among young adults in the United States better by focusing on how living in rural areas was associated with duration in poverty between 1983 and 1993. Although young adults' poverty in rural areas lasted longer than in urban areas during the observation period, when controlling for demographic and household characteristics, human capital, and labor market factors, rural residency was not associated with decreased poverty exit rates or longer poverty spells. Given the proportion of the sample who were in poverty when they entered the observation period at age 25, whether or not the poverty duration from pre-young adulthood is included or not made a difference in poverty exit rate estimates.

Impact of Left-censoring

Data for this study came from the *National Longitudinal Survey of Youth 1979 (NLSY79) Geocode Data*, and information used was gathered through annual interviews conducted between 1979 and 1994. Young adults were defined as individuals who were 25 years of age or older (up to 36 years old). Civilian young adults who experienced poverty for at least one year while in the observation period (between age 25 and 1993)⁹ were included in this study. Some of them were in poverty at the beginning of the observation period, or at age 25, making them left-censored.

⁹ The *NLSY79* cross-section sample includes individuals who were aged 14 to 21 at the end of 1978. The year each individual entered this study's observation period (age 25) is different according to one's year of birth. All individuals who were included in the sample for this study exited the observation period after 1993.

Left-censored individuals are different from others. Not including left-censored observations in a poverty exit study would provide underestimated exit rates for young adults with certain characteristics. The first logistic regression model which compared young adults who were in poverty at age 25 with those who were in poverty later during the observation period included a dichotomous residential location variable for rural and urban. The results suggest that being among the younger cohorts, being Black, and not having had reading materials at home at age 14 were the background factors associated with an increased likelihood of being in poverty at age 25, as opposed to entering poverty later during young adulthood. Among factors specific to when young adults were 25 years old, never being married (as opposed to being married), having more small children in the household, not completing high school, and not being employed were associated with an increased likelihood of being in poverty at age 25. Rural residency was not related to the likelihood of being in poverty at age 25.

A similar model that compared the likelihood of being in poverty at age 25 among young adults who had rural, central city, or suburban residency information revealed similar findings. Three variables that were found significant in this model but not in the earlier one were the positive association between the likelihood of being in poverty at age 25 and the number of siblings reported in 1979, North central residency as opposed to Southern residency at age 25, and Northeast residency as opposed to Southern residency at age 25. The findings were similar to Iceland's (1997a, January), in which he found that being African American, female, having more children in the family, not being a dual-headed family, and having fewer years of education were among the factors associated with increased odds of being left-censored among metropolitan residents (1979-1985).

Incorporating or not incorporating the left-censored information. Among young adults who were in poverty at age 25, two different ways of identifying the beginning of these poverty spells were compared. One way used to define the beginning of poverty

was to fully utilize the *NLSY79*, which provides information about respondents' family and economic information since 1979, and to identify the beginning of the poverty spells that individuals were in at age 25. The earliest possible year to use was 1979, and if individuals were in poverty continuously from 1979 until age 25, this duration was assigned as the elapsed time in the spell for age 25 data. Another way used to define the beginning of poverty was to use the information from age 25 only and to assume that poverty as young adults began at age 25 or later, regardless of the poverty status prior to young adulthood. If a young adult had been in poverty from age 20 until 25, then in the data prepared using the former method that incorporated left-censored information, he or she was in the sixth year in poverty at the beginning of the observation period. In the data prepared with the latter method that did not incorporate left-censored information, he or she was in the first year in poverty at the beginning of the observation period.

Without incorporating the left-censored duration information, poverty exit rates of certain individuals would be overestimated. These individuals possessed similar characteristics to those who were likely to be in poverty at age 25. However, some background factors such as being Hispanic or of other racial (neither Black or White) and ethnic origin and having had access to reading materials at home at age 14 seemed to have captured some of the possible biases caused by not incorporating the left-censored information. These factors were not found to be associated with the poverty exit rates when left-censored duration information was incorporated, but they were found to be associated with the exit rates when left-censored information was not incorporated.

Assessing the specific exit rates for each elapsed duration in the spell by using the results from the models that did not incorporate left-censored information gives different rates than doing so using the results from the models that incorporated left-censored information. Table 9 shows that, until about the fifth year in a poverty spell, the data that did not incorporate left-censored information provided higher poverty exit rates than the

data that incorporated left-censored information. For example, in the simulation shown on Figure 1, the former yields much steeper convex curves than the latter, making exit odds appear higher between around three to four years and lower during the later years.

In future studies, if poverty duration information from the period prior to the observation period is not incorporated because of unavailability, and if there is some information available about individuals' background, then including such information may partially control the bias caused by the censored information. At the same time, when both background and poverty duration information from earlier years are included, as it was in the full models in this study, it is possible that the background variables partially explain the poverty duration as young adults.

Rural and Urban Residency and Poverty Exit Rates

The results of the simple models show that poverty exit rates in rural areas were lower than those in urban areas when age, gender, race and ethnicity, marital status, number of poverty spells previously experienced as a young adult, and elapsed duration in the spell were kept equal. Also, including the left-censored duration information reduced the gap between rural and urban exit rates. If left-censored information is not incorporated, poor rural young adults appear to be in poverty much longer compared with poor urban young adults than when more accurate information about the beginning of the poverty spell is used. When further demographic and household characteristics, human capital, and labor market factors were included in the explanatory variables, rural residency could not explain the variation in poverty exit rates. In fact, although they were not statistically significant, rural poverty exit rates became higher than urban poverty exit rates in these full models, both with and without incorporating left-censored information. Further, factors associated with higher poverty exit rates, and thus shorter duration in poverty, were associated with a lower likelihood of being in poverty at age 25.

Central cities tend to have higher poverty rates than rural areas, while suburbs tend to have lower poverty rates than rural areas. This classification provided a reduced effective sample size. The results from the simple model showed significantly higher poverty exit rates in suburban areas than in rural areas, when left-censored information was not incorporated. All other comparisons in these simple models showed lower poverty exit rates in rural areas than in central cities and in suburbs, but they were not statistically significant. As was the case with the rural and urban classification models, the results of full models on poverty exit rates show lower poverty exit rates in both central cities and suburban areas than in rural areas, although these differences were not statistically significant.

The findings support that the explanatory variables added to the full models explain the overall differences between U.S. urban and rural areas. Among the time-varying variables, distribution or means of region of residence, marital status, number of small children in the household, high school education, employment status, and local unemployment rate were not the same in rural and urban (central cities and suburbs) areas (Table 4, bottom). The socio-demographic characteristics of poor young adults living in rural areas and their labor market environments were different from those living in central cities or suburban areas.

The importance of including multiple poverty spells in the analyses was supported. This study, along with studies by Stevens (1995, 1999) and Cox (1997), accounted for multiple poverty spells, whereas Bane and Ellwood (1986) identified the life-course events associated with the beginning and ending of poverty based on a single spell that families experienced during the observation period, and provided simple explanations. Young adults who previously had more poverty spells had lower poverty exit rates than those who previously had fewer poverty spells. This finding suggests that

individuals who experienced more spells had more difficulty in exiting from poverty than those who had fewer spells.

Poverty Exit and Reentry Rates

Poverty exit rates' relations with the poverty reentry rates were examined by using two-way transit models. The purpose of using these models was to simultaneously assess which time-varying variables were symmetrically related to the poverty exit and reentry rates, and which were not. An example of symmetric association is positive impact of a certain magnitude on poverty exit rates and a negative impact at the same magnitude on poverty reentry rates.

The model that compared rural and urban residency identified that being married (as opposed to never being married), having had at least a high school education, and being employed (as opposed to being out of the labor force) were associated with the increased poverty exit rates and the decreased poverty reentry rates symmetrically. Higher local unemployment rate was symmetrically associated with decreased poverty exit rates and increased poverty reentry rates.

Interesting findings were related to the health problems that affected labor force participation in some way and employment status. Poor young adults who had a health problem in a given year were less likely to have exited from poverty in that year than those who did not have a health problem. Non-poor young adults who were previously in poverty and had a health problem in a given year were also less likely to have reentered poverty in that year. In the model that compared poverty exit and reentry rates in rural areas, central cities, and suburban areas, it was found that young adults who were employed and those who were unemployed were more likely to have exited from poverty and were also more likely to have reentered poverty than those who were out of labor force. Restating this, among non-poor young adults who had experienced poverty at least once since age 25, those who were out of the labor force were less likely to have

reentered poverty than those who were either employed or unemployed. It should be noted that the model did not examine the employment status of previous years; thus, the duration of the employment status was not taken into account.

Rural-to-Urban Migration and Exit from Poverty

The primary motivation for analyzing the impact of relocation from rural to urban areas on poverty exit rates was that if poverty rates were generally lower in urban areas than in rural areas, then individuals living in rural areas under the poverty threshold might be motivated to relocate to urban areas which have more opportunities, in order to improve their economic status. A comparison between the poverty that began in rural areas and continued in rural areas and the poverty that began in rural areas and continued until or after the young adults relocated to urban areas found that the latter had lower exit rates than the former. This difference remained when demographic, family background, regional, and other family, human capital, and labor market factors were kept equal. Although urban areas may have more opportunities, merely being in an urban area does not make poor young adults from rural areas exit from poverty; the likelihood of exiting from poverty became less and less as they remained in poverty after relocating to urban areas.

The findings suggest that simply relocating oneself to an urban area does not increase the poverty exit rates for young adults who entered poverty while living in rural areas. The findings were different from Wenk and Hardesty's study (1993), which focused on younger cohorts; they found higher poverty exit rates among young women who migrated to urban areas. On the other hand, although it was not statistically significant in this study, female young adults were less likely to have exited from poverty upon migration than men. This area needs further investigation. The data preparation for the migration analyses was relatively complex, and the dynamics in individual socio-

economic factors along with residency might not have been fully captured in the analyses.

Summary

Based on the results, the following statements are supported. First, young adults who had characteristics that are associated with lower poverty exit rates were more likely to have been in poverty at age 25, or to be left-censored, than those who entered poverty later during the observation period. Second, incorporating poverty duration information from pre-young adulthood (before age 25) and not doing so gave different poverty exit rate estimates for duration in a poverty spell. Third, poor young adults living in rural areas were less likely to have exited from poverty than those living in urban areas; however, when demographic and household characteristics, human capital, and labor market factors were controlled for, there was no difference between rural and urban poverty exit rates. When urban areas are decomposed into central cities and suburbs and the data that incorporated the left-censored information was used, there was no difference in poverty exit rates between rural and these two areas even in a simple model. Fourth, some factors associated with exit from poverty were also associated with reentry into poverty in different directions and at the same magnitudes, whereas health status and employment status (the latter was noted only in the model that compared rural, central city, and suburban poverty dynamics) were associated with exit and reentry rates in the same directions. Fifth, rural-to-urban migration spells of young adults did not have increased poverty exit rates compared with all-rural poverty spells.

Limitations

This study is not without limitations. Some are related to the way the existing data set was used, and some are related to the event history technique used.

Measurement Unit of the Data

Annual income and needs are the basis of many policies (Duncan & Morgan 1984; Walker, 1994), and poverty status was determined for each year in this study. In reality, individuals may not perceive their economic well-being during a given calendar year as constant. For example, unexpected bonus at the end of the year may bring an individual out of poverty for the calendar year, whereas he or she was in poverty throughout most of the year. Using a large data set, I assumed such an influx of income occurred at different times of the year, and thus, the annual classification of poverty status was a more or less realistic reflection of poverty dynamics.

Another point to note in relation to using the annual data concerns the relationship between individual characteristics and poverty status (income and needs). A woman in poverty may experience an increase in earnings earlier in a given calendar year and then marry a man with moderate income. If this much is known, she is assumed to have exited from poverty because of the increase in her earnings, but an analysis with the annual data would suggest it was the marriage that was associated with the exit; occurrences in a given year are treated as those experienced in one year, not sequentially.

Interdependency of the Variables

Another problem with the analysis of longitudinal data is the issue of interdependence. The explanatory variables may be dependent on each other (Petersen, 1995). For instance, Duncan and Morgan (1984) found a relationship between initial individual characteristics and the life events they experience, both of which were included in the exit rate models as explanatory variables. Because there is no definitive solution, the issue is left to future study.

Similarly, this study found that availability of reading materials at home at age 14 was not significantly associated with the poverty exit rate when the data incorporated duration information from pre-young adulthood, whereas the variable was associated

with poverty exit rates when the data did not incorporate poverty information from pre-young adulthood. It may be the case that poor households were less likely to subscribe to periodicals than non-poor households, not because the adults in the households were not encouraging children to read, but because they needed to spend their money on other necessities. Therefore, there may be double accounting of background family economic status in the full models that incorporated left-censored pre-young adulthood poverty status information.

Metropolitan Statistical Area and Non-migrating “Migration”

The analyses of rural-to-urban migration did not differentiate between central city and suburban, two types of areas that make up urban areas, as destinations of migration. If the sample size were sufficient, a further study which analyzes migration from rural areas to central cities and migration from rural areas to suburbs as different behavioral choices may give a new insight, given the different features of central cities and suburbs. However, the main interest of assessing the rural-to-urban migration in general was fulfilled by the current definition of urban area. Overall, migration to either central cities or suburbs was associated with lowered poverty exit rates.

As long as the fundamental concern that the rural and urban classification does not accurately reflect the level of social and economic development of each county remains, the methods used to classify counties will be controversial. This point leads to another and perhaps more awkward concern. To assign residency for each person-year observation, this study used the *NLSY79's Metropolitan Statistical Area (MSA)-Central City* variables that designate each county into four groups: not in *SMSA*; *SMSA*, not central city; *SMSA*, central city not known; and *SMSA* in central city. To compare rural and urban poverty exit rates, “not in *SMSA*” was recoded as rural, and the other three were recoded as urban. For comparison between rural and central cities as well as suburbs, “*SMSA* in central city” was recoded as central city, “*SMSA*, not central city” was

recoded as suburb, and “*SMSA*, central city not known” was recoded as missing. A rough assessment identified some cases in this study where individuals in the migration sample remained in the same county from one year to the next but were classified as migrants, most likely due to changes in their county’s *MSA* status. The degree of urbanization of a county may vary from time to time. The *NLSY79* adjusted for such changes by using the *City Reference File (CRF)* data files from 1973 for 1979 to 1982 variables, the 1982 file for 1983 variables, the 1983 file for 1984 to 1987 variables, and the 1992 file for 1993 to 1998 variables. Therefore, the study with the observation period from 1983 through 1993 included *MSA* classification from three different *CRF* data files (Center for Human Resource Research, 1997). A more accurate way to describe “a young adult who migrated from a rural to an urban area,” thus, would be “a young adult whose residential classification changed from rural to urban area.”

MSA Residency in the Past

Throughout the study, no consideration was given to the young adults’ residency in the past. For example, in the migration study, two poverty spells that began in rural areas in the same year by two individuals with identical demographic characteristics were treated equally even if one grew up in a rural area and the other grew up in an urban area. Previous residency both during the observation period and during pre-young adulthood can affect young adults’ experiences in different ways. However, such differences were not assessed in this study.

Implications

Given the results, what does this study say about poverty dynamics among young adults living in the United States? What follows are some implications related to left-censorship; residential location; individual, family, and household characteristics and human capital; and labor market and employment.

Incorporating Left-censored Information or Not

There are different ways to select a sample based on left-censorship status and different ways to define the beginning of the risk period (years continuously in poverty in case of poverty exit rate assessment). It is likely that different definitions come with different weaknesses; therefore, the choice should be made to suit the study purpose. If it is impossible to incorporate left-censored poverty status information because of the data, the researchers need to recognize how the estimates from the study may be biased. Because the definition of the beginning of the spell can make a difference in the poverty exit rate or duration in poverty estimates, it is important to fully explain the definition when conducting a study. Since Aid to Families with Dependent Children (AFDC) was replaced in 1997 by Temporary Assistance for Needy Families (TANF), which places a maximum limit on welfare coverage, the significance of duration has increased. Specifically in this study, the highest poverty exit rates were seen around the fourth year when left-censored poverty status information was not incorporated, whereas they were seen around the fifth year when left-censored poverty status information was incorporated. In addition, the estimated poverty exit rates for different elapsed durations were different depending on the approaches used.

Residential Location

Poverty among young adults lasted longer in rural areas than in urban areas during the observation period; however, when other factors were controlled for, the difference disappeared. A rural young adult and a comparable urban counterpart had the same poverty exit rates, or were in poverty for the same number of years. In reality, both the individual's and the community's socio-economic characteristics were not comparable among rural areas, central cities, and suburban areas. The opportunities and culture may be different in different locations. Further, each area within a category is unique. If the poverty thresholds are to indicate who may be suffering economically, one

of the major factors that keeps the measures unrealistic is the difference in living costs in different locations. The multi-variate analyses suggested that if certain conditions were the same in rural and urban areas, then the poverty exit rates among young adults would have been the same. However, it does not suggest that rural areas with high poverty rates among young adults ought to change their environment to match that of urban areas with lower poverty rates.

Although in general, people who migrate have higher aspirations and achievements (Lee, 1966), when it comes to poor young adults living in rural areas in the United States, this study suggests that relocation itself may not make them better off economically. If poor young adults from rural areas do not exit from poverty shortly after relocating to urban areas, it becomes harder and harder for them to cross the poverty threshold. When a young adult is in poverty at the time of relocation, then the characteristics associated with higher poverty rates might keep him or her in poverty even in an area with greater opportunities. There are two public policy approaches to immediately deal with this issue. One is to make it more advantageous for poor young adults from rural areas to reside in urban areas, and the other is to reduce local poverty among young adults in both rural and urban areas.

Individual, Family, and Household Characteristics and Human Capital

Overall, Black young adults experienced lower poverty exit rates than White young adults, even when other factors were kept equal. One of the possible reasons is that the list of explanatory variables was not comprehensive enough to capture individual differences in poverty experiences. There may be other differences between Black and White young adults such as their experiences, opportunities, or expectations.

Poor young adults who had a larger number of siblings tended to have lower poverty exit rates than comparable young adults who had fewer siblings. If family income was the same while growing up, then children who grow up in larger families receive less

financial investment than those who grow up in smaller families. By contrast, children who grow up in larger families receive other forms of investment (such as interpersonal skills) that cannot be purchased with money, although this did not appear to be associated with increased poverty exit rates. It is possible that the number of siblings was also associated with poverty status during the pre-young adulthood years. Among families with children, if poor families tend to have more children than non-poor families in the U.S., then those who grew up with more siblings are more likely to come from poor families than those who grew up with fewer siblings.

Throughout the analyses, married young adults had higher poverty exit rates than non-married adults or young adults who had never married. Two issues associated with marital status and public policy include measurement and selectivity. The 1993 poverty threshold for a one-person household was \$7,517, whereas the threshold for a two-person household was \$9,726. Young adults who are in a marital or cohabiting relationship are less likely to be officially poor than individuals living alone, assuming each individual's income is about the same. Perhaps each individual's earnings (or earning potential) are different by their marital status. There is a possible relationship between entry into marriage and individual characteristics, such as income and earning potential. Characteristics associated with higher likelihood of being in poverty or being in poverty longer may make a young adult a poor candidate for marriage.

An additional small child in the household decreased the poverty exit rates. Without considering other factors, an additional child would raise the threshold. Thus, a young adult who made around \$8,000 and lived alone was not in poverty in 1993, but a comparable young adult who lived with a child was in poverty. However, the increased demand small children place on the household is not simply a slightly higher poverty threshold, because parental resources required by small children can affect how other family members spend their time.

Labor Market and Employment

The fact that non-married young adults were less advantaged than married individuals and that having young children at home decreased the odds of exiting from poverty confirm how single mothers in poverty may remain poor longer than other individuals. This is a population with a higher unemployment rate and a lower employment rate; and when they are employed, they may be underemployed. For example, between 1999 and 2000, 24.5% of women who were maintaining families were not employed, while the numbers were 13.5% for men who were maintaining families, and among married-couple families, 2.5% had neither parent being employed, on average (Bureau of Labor Statistics, 2001, April 19). Having only a part-time job or having a job that provides insufficient income may be the primary reasons young adults remain in poverty. For female and male parents of young children, it is essential to have flexible work arrangements. This arrangement is not only helpful to single parents but also to married parents, and it further benefits all employed individuals, regardless of their parental, marital, or poverty status.

The findings showed that higher unemployment rates were associated with lasting poverty, and often being unemployed (looking for work for pay) and being out of the labor force (not working for pay and not seeking work for pay) made no difference in poverty exit rates. The former agrees with the finding from earlier studies by Harris (1981) that found that the economic success of migrants had to do with their destination's economic status, not the size of the community. The latter implies a possibility that poor young adults who were out of work were discouraged from seeking work for pay. If there were employment opportunities in or around the local community for which young adults were not qualified, programs that fill the gap between what employers expect in employees and what the potential employees have would be helpful for both parties. The *NLSY79* data set contains a detailed questionnaire about job training; however,

information such as “having had job training the year before” did not show significant association with positive poverty exit rates in a previous study (Mimura & Mauldin, 2000). For this reason, job training experience was not included in this study. Now that a more comprehensive training program, the Workforce Investment Act of 1998, has been in effect in the United States, in future studies, job training experience may become one of the key factors that explain poverty dynamics.

Migrants from rural to urban areas may face inadequate employment opportunities more frequently than do urban residents. Poverty among young adults is not just an issue of creating more employment opportunities for them. It involves their entire environment, such as transportation, adequate child-care, health care, and housing, to name a few. These costs have increased during the past few decades in the United States, and public policies that ease these burdens on poor young adults, for example upon migration, can help make their transitions smoother and thus make them economically better-off sooner. The outcome is that migrants and non-migrants will give back to their local community and families by being independent and having increased purchasing power. For a majority of young adults who experience poverty, their employment status is directly related to income, and, therefore, to their poverty status. Perhaps further analysis associated with this variable, such as assessing underemployment, may give a better understanding of poverty dynamics and paid work.

Educational attainment and employment status are identified to be associated with poverty exit rates. The findings give strong motivation for individuals, families, municipal and civic communities, and the nation to increase high school graduation rates and provide adequate job opportunities for young adults in both rural and urban areas. Greater job opportunities given to poor parents of young children living in rural areas, for instance by reducing barriers to work through child care and transportation aid, may encourage these parents to remain in these areas.

By implementing a simple plan, migration to urban areas may become unnecessary for some poor rural young adults. One of the possible programs to increase job opportunities in rural and urban areas without sufficient employers is to provide transportation to and from the nearest areas with better job opportunities to rural residents who are looking for jobs and those who commute to work. The transportation service may run free of charge to each commuter while he or she is looking for a job and for a certain duration thereafter. Such a program is in practice in the city of Chicago. It is “The Chicago Suburban Job Link” program, transporting and carpooling several hundred city residents to suburban areas with job opportunities (Gramlich & Heflin, 1998)

Programs like this that move workers to jobs are more economically efficient and better suited to some areas than programs that move jobs to workers, for example through tax incentives or mandatory minimum wages. Programs that move workers to jobs can be implemented in areas where poor young adults are leaving, where they are relocating for a better life, and where poverty rates are high. Having local adults commuting to other areas for jobs has an indirect impact on local economic enhancement in the areas where they live. For example, having more adults working for pay and being away from home would increase the demand for childcare and after-school programs, which also offer job opportunities to local residents. These now-productive persons bring in income to spend on housing, leisure, and various services in the local areas.

In conclusion, this study helped to further understand poverty among young adults in the United States by identifying the relation between rural residency and longer poverty spells, and by confirming the significance of individual characteristics and family background and the importance of household characteristics such as marital status, human capital (such as high school education), and labor market factors in determining poverty exit and reentry rates. In addition, left-censoring in duration information affects

the exit rate estimates in this age group; thus, its implication needs to be recognized in future poverty dynamics research.

APPENDIX

*Dependence of Observation*¹⁰

In the analyses that use person-year observations, a single individual contributes to multiple observations. In addition, depending on their age cohort and number of years lived under the poverty thresholds, different individuals contribute different numbers of observations.

Discrete-time transit models give an approximation of the partial likelihood estimates in which the response variable is the duration until event occurrence. Previous studies showed that the standard errors in both estimates were almost the same, supporting that there is no dependency among observations when discrete-time models are used (Allison, 1995).

Multiple observations come from “factoring the likelihood function for the data” (Allison, 1995, p. 223). The original likelihood function without censored observations is the “product of probabilities over all n observations” (p. 223).

$$\prod_{i=1}^n P(T_i=t_i),$$

where P is the probability that the event (for example poverty exit) occurred given it has not occurred beforehand, “ T_i is the random variable and t_i is the particular value observed for individual i ” (p. 223). Then, factoring each probability in the above equation, for example $t_i=5$ is

$$P(T_i=5)=P_{i5}(1-P_{i4}) (1-P_{i3}) (1-P_{i2}) (1-P_{i1}),$$

¹⁰ The entire discussion is based on Allison (1995), “Dependence among the Observations?” pp.223-224.

where “ P_{it} is the conditional probability of an event at time t , given that an event has not already occurred” (p. 223). Each of the five time-periods’ terms in the above equation can be treated as an independent observation (Allison, 1995).

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