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Boomerang Kids: Labor Market Dynamics and Moving Back Home*

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ABSTRACT

This paper examines the relationship between the dynamics of parent-youth living arrangements and labor market outcomes for youths who do not go to college in the United States. The data come from a newly constructed panel data set based on retrospective monthly coresidence questions in the NLSY97. This is the first data set containing information on the labor market circumstances of youths at the time of movements in and out of the parental home. Based on estimates from duration models that allow for unobserved heterogeneity, I find that moving from employment to non-employment increases the hazard of moving back home in a given month by 64% for males and 71% for females. These results suggest that labor market factors play an important role in determining the dynamics of parent-youth living arrangements and that coresidence may be an important way in which insurance against labor market shocks takes place within the family.

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1 Introduction

This paper provides new empirical evidence on the relationship between living arrangements and labor market outcomes for young people who do not go to college in the United States. I use this evidence to argue that household formation is a dynamic process, and that employment and earnings dynamics are key determinants of the patterns of coresidence between youths and their parents. To understand the household formation process, it is thus necessary to understand the uncertainties and opportunities that exist for young people in the labor market. Conversely, to understand young people's early labor market decisions, it is important to understand their movements in and out of their parents' home.

This paper departs from much of the existing literature on household formation in that rather than concentrating on the initial decision to move out of home, the focus is on the subsequent dynamics of living arrangements after a youth has already moved out: movements back home, and movements out again, after having moved back. The data and analysis presented here extend the existing literature in at least three ways. First, the use of data from the National Longitudinal Survey of Youth 1997 (NLYS97) means that the focus is on a newer cohort of youths than has been previously studied. This is the same cohort that has been labeled the "boomerang generation" in the popular press because of the large amount of anecdotal evidence for young adults moving back in with their parents after having initially moved out of home.[1]

Second, this is the first study of parent-youth living arrangements that uses monthly panel data, along with contemporaneous data on labor market variables. This makes it possible to study the high-frequency dynamics of parental coresidence and the particular economic circumstances of youths around the time of movements in and out of home. As a result, it is not necessary to rely on cross-sectional variation (which may be driven by non-labor market factors and unobserved heterogeneity) to identify the effects of employment and earnings on coresidence. Instead, within-person time-series variation can be used to identify the impact of the labor market on the likelihood of moving in and out of home.

Third, having access to a monthly panel data set is ideal for a duration-based analysis of parent-youth coresidence. This allows identification of the effects of the labor market on two previously unstudied hazards: the hazard of moving back home, and the hazard of moving out again after having moved back. A related contribution is that it is possible to learn about the distribution of durations of spells back home and answer an hitherto unanswered question about how long youths stay home after they move back.

Two basic conclusions can be drawn from the empirical results presented here. The first is that moving back home is a common phenomenon for youths who do not go to college. Rather than a one-way transition to independent living, there may be an extended transitional period in

[1] See the Wikipedia entry at http://en.wikipedia.org/wiki/Boomerang_Generation and the numerous references cited there.

which youths move in and out of the parental home as their circumstances dictate. Conditional on having lived away from the parental home for at least one month (and hence being at risk of moving back home), 51% of males and 49% of females move back home for at least a month by age 23.

The second conclusion is that these movements in and out of home are closely related to events in the labor market. Controlling for a host of observable characteristics, as well as unobserved heterogeneity, I find that the effect of transitioning from employment to non-employment is to increase the hazard of moving back home by 64% for males and 72% for females. Although non-labor market factors (marriage, childbirth, parental circumstances) also play an important role, coresidence movements, and household formation in general, is very much an economic phenomenon.

The existing empirical evidence on young people's household formation has primarily focused on the determinants of the decision to leave home for the first time through proportional hazard models for departure from the parental home.[2] Another set of papers has focused on cross-sectional predictions of living away from home at a point in time.[3] However, data on the *dynamics* of parent-youth living arrangements after initially leaving home are scarce. This is true despite the large body of anecdotal evidence and numerous reports in the popular literature about young adults moving back in with their parents when economic circumstances necessitate.[4]

The handful of studies that have examined the determinants of movements back home have focused on older cohorts and used either retrospective questions, posed to adults, about the timing of the first movement back home[5] or annual data on living arrangements.[6] DaVanzo and Goldscheider (1990) use data from the national Longitudinal Study of the High School Class of 1972 (NLS), in which subjects were sampled four times over a 7.5 year period from age 17.5 to 25. They estimate cross-sectional logistic regressions for living at home as a function of characteristics in the previous survey for youths who lived away from home at the time of the last survey. They find that income and unemployment enter significantly in these regressions. Goldscheider and Goldscheider (1999) use data on the age that subjects first left and first returned home from the National Survey of Families and Households to estimate proportional hazard models for moving back home. However, the retrospective nature of the survey and the lack of labor market data prevent them from studying the effects of labor market variables on these movements. Ermisch (1999) estimates probit models of annual return to the parental home using data from the British Household Panel Survey and finds that a spell of unemployment during the year increases the annual probability of return.

[2]See Buck and Scott (1993), Ermisch and Di Salvo (1997) and Goldscheider and Goldscheider (1999).

[3]See Rosenzweig and Wolpin (1993), Rosenzweig and Wolpin (1994),Ermisch (1999), Card and Lemieux (2000), and Manacorda and Moretti (2006).

[4]See for example Gordon and Shaffer (2005) and Furman (2005).

[5]See Goldscheider and Goldscheider (1999).

[6]See DaVanzo and Goldscheider (1990) and Ermisch (1999).

None of these studies are able to examine the individual circumstances that surround movements back home. Nor can they answer questions about how long youths stay home when they return and why they move out again. However, two key features of the NLSY97 allow a data set to be constructed that can address all of these issues. The first feature is the existence of retrospective questions about monthly living arrangements at each annual interview up until 2002. The answers to these questions can be pieced together to form a monthly panel of coresidence outcomes. The second feature is highly detailed weekly data on respondents' employment, and job-level data on earnings and hours. These can be merged with the coresidence data to create a panel that allows for the study of the *joint dynamics* of employment, earnings and coresidence in the United States.

The experience of Italy and other western European countries has also received much attention in recent literature. There, the focus has been on documenting and accounting for the large fraction of 18-30 year-olds who live with their parents.[7] The phenomenon in the United States that is being examined empirically in this paper is subtly different. In western Europe young people move out late, and the literature has developed around finding out why. In the United States, young people move out much earlier but may move back home repeatedly once they have left. This paper attempts to document and understand these dynamics.

The main limitation of this study is that it restricts attention to youths who do not go to college. This restriction is driven primarily by the age of the NLSY97 cohort. It is feasible that in future years, the NLSY97 will be sufficiently advanced to study the empirics of moving back home for youths post-college. Interestingly, the phenomenon of youths moving back home has nonetheless been the most frequently discussed in relation to college participants.[8] The fact that I find evidence for frequent movements back home for non-college youth suggests that overall, coresidence dynamics may be an even more important component of youth behavior than is currently thought.

Moreover, the focus on youths with low lifetime earnings is itself not misplaced. A number of recent macroeconomic studies have suggested that two important subpopulations where our understanding of insurance and support mechanisms could be improved are young individuals and those with low wealth. For example, Kaplan and Violante (2009) examine the amount of consumption insurance implicit in a standard macroeconomic model of life cycle savings behavior and compare it to the data. They find that the two groups for whom the model predicts less insurance than the data are the young and those with low wealth. Support from parents, particularly in the form of shared residence, is one possible insurance channel that is missing from

[7]There is disagreement about whether this is due to economic factors. Manacorda and Moretti (2006) argue that it is not and find that parents' strong preference for coresidence is what drives high cohabitation rates. In contrast, Fogli (2004) and Becker, Bentolila, Fernandes, and Ichino (forthcoming) explain the phenomenon through labor market channels.

[8]Almost all of this discussion has focused around anecdotal evidence. Few hard facts can be found about the phenomenon for recent cohorts.

standard models. Similarly, Gomme, Rogerson, Rupert, and Wright (2004) and Jaimovich and Siu (2006) have found that the key individuals for whom standard models of the business cycle cannot predict labor market behavior are those at the beginning of their careers. These findings also suggest the importance of improving our understanding of the environment in which young people make their labor market decisions. Finally, since movements in and out of the parental home have the potential to interact with publicly provided insurance programs, and since these programs are targeted primarily at the low-skilled, focusing attention on the non-college population is appropriate.

This paper is purely empirical. However, the results could be interpreted within a number of possible conceptual and theoretical frameworks.[9] In a companion paper (Kaplan (2009)) I use a similar sample to estimate the structural parameters of a model of interaction between male youths and their parents, incorporating labor supply, savings, and coresidence decisions. Economists have long recognized that coresidence can be an important form of intergenerational support.[10] Most of this literature has focused on the end of the working life cycle with support from the younger generation to the older. However, the empirical findings presented in this paper strongly suggest that coresidence may be equally important as a form of support from the older generation to the younger at the beginning of the working life cycle.

The remainder of the paper proceeds as follows. Section 2 describes the data set used in the analysis, and Section 3 describes some important characteristics of the data. In Section 4 I use a discrete choice framework to take an initial look at the data. Sections 5 and 6 report the estimates of duration models for the hazards of moving back home and moving out again, respectively. Section 7 concludes.

2 Monthly Panel Data on Parental Coresidence

Since this is the first time that a monthly data set has been used to study the joint dynamics of parental coresidence and labor market variables, in this section I describe the data set and the way in which the coresidence panel was constructed.

NLSY97 The sample is drawn from the NLSY97, which is a longitudinal survey of 8,984 individuals from the cohort born between 1980 and 1984. The survey contains extensive information on labor market behavior and educational outcomes, together with detailed information on the youth's family and community background. Interviews have been conducted approximately annually since 1997.

Coresidence variables In principal, information about parental coresidence in the NLSY97 may be optained in two ways.. The simplest way is through the household roster, which records

[9] The models sketched in McElroy (1985), Rosenzweig and Wolpin (1993), and Ermisch (1999) are good examples.

[10] See Bianchi, Hotz, McGarry, and Seltzer (2006) for an excellent review.

the relationship to the youth of all individuals living in his/her household at the time of the interview. However, using the household roster as the basis for coresidence information has two problems. The first is that it provides only an (approximately) annual snapshot of living arrangements. This means that using the household roster does not allow one to observe the circumstances that surround any change in living arrangements. Since a key aim of this study is to examine events surrounding changes in living arrangements, use of the household roster is problematic.

The second problem with using the household roster is that it does not necessarily correspond to the current residence of the youth. Rather, it refers to the residence that the youth considers to be his/her primary residence. For example, a youth who has recently moved out of home may report not living with either of his parents but still report that his parents' home is his primary residence. The rosters are thus not reliable indicators of current residential status, particularly for youths whose coresidence status has recently changed.

Instead, what makes the NLSY97 an ideal data set to study the dynamics of parent-youth living arrangements, is a set of retrospective questions about monthly coresidence that were asked in rounds 2 to 6 (1998-2002). At each interview, these questions asked respondents to list each period of one month or more in which they lived separately from each of their parents. A parent is defined in the NLSY97 as a biological, step, adoptive, or foster parent. Accordingly, this is the definition that I adopt throughout the paper.

The specific wording of the questions varied slightly across rounds and depended on whether the youth was observed to be living with his/her parents according to the household roster. A typical question for a youth who was living with his parents at the date of the last interview was worded as follows:

> Since [date of last interview], has there been a continuous period of one month or more when you and your [mother (figure)/father (figure)] lived in different places? If you were temporarily away at summer camp, but lived with your [mother (figure)/father (figure)] before and after that time, please include those months as months you were living with [him/her].

Note that youths are explicitly asked to ignore periods of temporary separation from their parents due to summer camp. The full set of coresidence questions is discussed in Appendix A. By piecing together the responses to these coresidence questions across rounds, it is possible to reconstruct a monthly panel of parental coresidence outcomes for each respondent.

A youth is defined as living away from his parents in a given month only if he is observed to be not living with any of his living parent figures for the entire month. Conversely, a youth is defined to be living at home if he reports living with at least one parent figure at any point during the month. This implies that only spells away from home that are longer than one month's

duration are considered to be valid spells in the analysis that follows, and all spells back home will be recorded as lasting at least one month.

Labor market variables Labor market variables in the NLSY97 are constructed from three sources: (i) the employer roster, which records details about each job that the youth has held; (ii) the employment event history, which is a weekly record of which employers the youth worked for in a given week; and (iii) created variables for total hours worked in the week and hourly compensation for each job in each week. The challenge is to construct monthly variables for employment, hours, and earnings from these weekly data. To do this, I define a week as falling in a particular month if the start date was on or before the 28th of the month (25th for February). This means that each month has either four or five assigned weeks.

A youth is defined as working in a particular month if he/she is recorded as working for at least one employer during at least one week in that month. Monthly earnings for working youths are defined as 52/12 times average weekly hours in that month, multiplied by average hourly compensation, where the averages are taken across all jobs and all working weeks in the month. Where hours are missing but wages are available and the youth reports working full-time, 40 hours are assumed. Some youths report unrealistically high wages and hours. I deal with this misreporting by setting weekly hours above 100 to 100, and hourly wages above \$75 to \$75, in 2007 dollars.[11]

Sample selection The fact that the monthly coresidence questions were discontinued in 2002 restricts the ages at which it is possible to observe contemporaneous labor market and coresidence outcomes for youths in the NLSY97. In particular, this means that studying the interaction between labor market dynamics and coresidence dynamics for youths who go to college is not possible. In this paper, I thus focus attention on the population of low-skilled youths who do not attend college. After 2002 (round 6), the retrospective coresidence questions were replaced with two questions that ask about the month and year that a youth first lived away from his/her parents, and the month and year when he/she returned home for a period of at least three months. It is possible, as the cohort ages, that these questions could also be used to study movements back home for college graduates.

However, implementing the restriction to the non-college population raises its own challenges. First, for youths in this age group, the decision about whether to attend post-secondary education is almost certainly endogenous with respect to labor market opportunities and coresidence outcomes. Hence, selecting on the basis of observed education choices may introduce non-random selection on unobservable characteristics into the sample. Second, many youths may initially decide to enter the labor market in the years immediately following high school, but may return to education at some point in the future. Moreover, it is common for youths

[11] None of the results are sensitive to the choice of these thresholds.

to attend non-traditional part-time colleges, a decision that may also be correlated with labor market opportunities.

My approach is to choose a baseline sample of youths who are never observed to participate in any type of post-secondary education (Sample A). Choosing a sample of youths for whom we can condition on the decision to not attend college allows the focus to be placed clearly on the interaction between residential movements and labor market events. It seems a natural starting point for understanding the economic implications of coresidence movements for youths and avoids the complications that arise from the interaction with college choice.

To address the potential concerns regarding endogeneity of the education decision, I also compare the results from this sample with those from two alternative samples that implement the restriction to low-skilled youth in different ways. Reassuringly, none of the results are significantly affected. Results for the main findings using these alternative samples are reported in Appendix B. Sample B selects on the basis of low test scores, which are a strong predictor of future college participation.[12] Hence, selection in this sample is based on a purely exogenous variable, and there are no issues of endogeneity of education. Sample C is less restrictive than the baseline sample. Rather than dropping any youth who is ever observed to participate in post-secondary education of any type, I only drop youths who are "traditional" college participants - those youths who start college immediately after graduating from high school, or within one year of graduating. The purpose of Sample C is to retain youths who may attend college part-time.

Youths are included in the final panel from the first month after they stop attending high school or after they turn 16, whichever is later. Only youths who have non-missing residence data are included in the final sample. Youths who have ever been in the military or with parents who are all deceased are dropped. The numbers of males and females that are lost at each stage of the selection process are reported in Table 1. The final baseline sample consists of $41,406$ $(34,254)$ month-youth observations for males (females), based on $1,613$ $(1,238)$ male (female) youths ranging in age from 16 to 23. These generate 427 spells back home for males and 385 for females, where a spell is counted only if it is not left-censored.

The NLSY97 is itself not representative, due to an oversampling of black and Hispanic youths, as well as non-random attrition. Hence, in all estimations I use a custom set of cross-sectional weights to account for oversampling and attrition for the period 1997 to 2002. The weights are based on the characteristics of youths who are present in all six rounds (1997-2002).[13]

[12] Selection on test scores is implemented by retaining only youths who scored in the bottom quartile of the combined Armed Services Vocational Aptitude Battery, as constructed by NLS staff. The tests were administered prior to the first wave, during the NLSY97 screening process.

[13] See http://www.nlsinfo.org/web-investigator/custom_weights.php for information on the construction of customized weights for use with the NLSY97.

3 Sample Characteristics

In this section, I report summary statistics for various observable characteristics of the youths in the sample. It is reassuring to note that nothing stands out as being obviously unusual about the sample. The summary statistics for individual-level variables that do not change over the sample period are shown in Table 2, statistics for variables that change at monthly and annual frequencies are displayed in Tables 3 and , respectively, and Table 5 reports variables that refer to parental characteristics.

Age and education distribution Because the sample is restricted to youths who do not go to college but have completed their high school education, the final sample is not a balanced panel with respect to age. Moreover, because coresidence decisions are likely to be correlated with the decision to complete high school, those ages where data are missing for some youths are generally not missing at random. Thus becoming familiar with the age distribution of youths in the sample is useful.

The distributions of monthly observations across six-month age bands for males and females are shown in Figure 1. Notice that the bulk of the observations are between the ages of 18 and 21. Table 2 reports that the average age that youths enter the sample is approximately 18 and the average age at which they leave the sample is 20.3. The overall average age for the monthly observations is 19.2. On average, we observe males for 26 consecutive months and females for just under 28 consecutive months.

The small number of observations at younger ages in Figure 1 refers to high school dropouts, whereas the roughly linear decrease in sample size as age increases above 20 is due to the four-year age range of NLSY97 respondents and the lack of coresidence data post-2002. Overall, 68% of the sample completed high school. To help control for the non-randomness of age and high school completion, age effects and a dummy for high school graduation are included as control variables in all analyses.

Family formation There is little doubt that the dynamics of parent-youth coresidence are strongly influenced by factors that relate directly to household formation: marriage, non-marital relationships, and fertility. To the extent that the data allow, it is thus important to control for such factors when trying to ascertain the role of the labor market in affecting coresidence outcomes. Table 3 shows that whereas only a small proportion of the sample are married (3% of youth-month observations for males, 12% for females), a substantially higher proportion report that they are involved in a non-marital cohabiting relationship, particularly for females (15% for males, 36% for females).

Data on fertility are observed only at an annual frequency and are reported in Table 4. A substantial fraction of females (43% of annual observations) have at least one biological child, while the corresponding fraction for males is far lower at 17%.

The formation and dissolution of marital and non-marital relationships and the birth of children are best viewed as non-labor market shocks to the relative desire to cohabit or live away from parents. It is possible that these types of shocks are correlated with labor market shocks for purely non-economic reasons. For example, a good job may make one more attractive in the marriage market. To control for the effect of family formation shocks on coresidence, I include contemporaneous variables on marital status and biological children in all analyses.

Parental characteristics The characteristics of the parents of youths in the sample are shown in Table 5. On average, youths have 2.2 parents with an average age of 45. For males (females), in 46% (37%) of youth-year observations the biological parents were observed to be married. Unfortunately, observing changes in parents' marital and defacto relationships at a monthly frequency is not possible.

Coresidence patterns Table 2 shows that the sample contains a mixture of youths living at home and away: 53% (68%) of males (females) are observed to be living away from home for at least one month while under observation, while 89% (82%) lived at home at some point during the sample period.

For the purposes of this study, however, it is important that the sample contains information on a substantial number of individual *movements* in and out of home. The statistics in Table 2 confirm that this is in fact the case: 38% (45%) of males (females) move out of home at least once while under observation, while 23% (29%) are observed to move back home after having lived away from home. Note that given that only 53% (68%) are observed to ever live away from home, and are hence at risk of moving back home, these numbers represent a substantial fraction of youths that move back home. We can thus conclude the sample has sufficient movements in and out of home to warrant an analysis of the factors associated with these movements, and that moving back home is indeed a common phenomenon for this sample of youths who do not go to college. This is true for both males and females.

Living arrangements by age Figure 2 shows the fraction of youths living away from their parents, grouped in six-month age bands. First note that the age range of the sample captures the transitional period from living at home to living away; for males (females) the fraction living out of home increases from 21% (30%) at age 16.5 to 65% (76%) at age 23. Also note that females tend to move out of home earlier than males. The fraction of females living away from home at any given age is on average 11 percentage points higher than the corresponding fraction for males.

The non-monotonic nature of this age profile may at first appear surprising. However, this characteristic is an artifact of the unbalanced nature of the panel and the selection of youths with at most a high school education. It arises because the selection criteria dictate that a youth enters the sample only when he/she finishes school. Thus, those 16-year-old youths included in

the sample are high school dropouts, who have a higher propensity to live away from home. The drop in the fraction away occurs because of youths entering the sample as they finish high-school and continuing to live at home (see Figure 1).

Figure 3 shows the fraction of males and females in each six-month age group who have ever experienced a move back home. A move back home is defined as being present in the sample and living away from home, then subsequently being observed to live at home. The slight decrease around age 18 for females occurs for the same reason as discussed in the previous paragraph. Figure 3 again confirms that it is common for youths who do not go to college to move back home. By age 22.5, over 50% of this group have moved back in with their parents at least once. In the remainder of the paper, I explore the extent to which labor market factors are associated with these coresidence dynamics.

4 Discrete Choice Models for Coresidence: A First Look

In this section, I report parameter estimates from standard discrete choice models for living away from home. The purpose hereis to understand the effect of labor market variables on cross-sectional and within-individual coresidence outcomes. The results in this section differ from existing studies (such as Ermisch (1999) and Rosenzweig and Wolpin (1993)) primarily in that they are based on monthly data, so the labor market variables refer to the individuals status in the same month that coresidence is observed. This approach is in contrast to models estimated with annual data where earnings variables typically refer to the calendar year prior to the coresidence observation.

I consider the effect of two labor market variables on coresidence: an indicator for whether the youth was working in a given month, and the logarithm of monthly earnings. For the models that use log earnings as the labor market variable, the estimation sample is restricted to those youths who worked (and thus had non-zero earnings) in that month.

Static discrete choice models The first model that I consider is a simple logit for living away from home, with and without individual fixed effects. The results for males and females are reported in the first two columns of Tables 6 and 7, respectively. Coefficients are reported in exponentiated form, e^{β}, so the coefficients in the tables should be interpreted as the multiplicative effect of a 1% change (continuous variables) or a discrete change (discrete variables) on the odds ratio for living away from home. Coefficients that are greater than 1 increase the probability of living away and vice versa. All models include a rich set of time-varying and fixed conditioning variables, which include polynomials in the age of the youth and the age of the youth's parents, and a set of regional dummies. These variables are in addition to those listed in Tables 6 and 7. Asymptotic standard errors are reported and allow for clustering by individual as well as autocorrelation in the error term.

Starting with results for males, columns (1) and (2) of Table 6 show that contemporaneous labor market variables have small and insignificant effects on the odds of living at home. The results in column (2) of Table 7 indicate a similar finding for females, oncee fixed effects are included in the specification.

Allowing for dynamics At first glance, the results in the previous section are puzzling and seem to suggest a contradictory role, if any, for employment and earnings on parental coresidence. This section and the next illustrate that this is mostly due to a failure of static discrete choice models to allow for important dynamics and persistence in living arrangements.

As a first pass, columns (3) and (4) in Tables 6 and 7 report the same model estimates discussed in the previous section, but with a lagged coresidence term included along with the dependent variables. A number of interesting findings immediately emerge.

For males, column (3) of Table 6 shows that with lagged coresidence included as a regressor, the effect of employment on living away becomes positive, in line with basic intuition. Working increases the odds of living away from home by around 16% once individual heterogeneity is allowed for, although this point estimate is not significant for males. Moreover, for employed male youths, earnings now have a strong and statistically significant effect on coresidence; a 1% increase in earnings is associated with a 17.5% increase in the odds of not living with ones parents.

For females, including lagged coresidence also changes the sign of the effect of employment on coresidence so that it is also positive. However, both this estimate as well as the effect of earnings with unobserved heterogeneity (column (4) in Table 7) are not statistically significant.

The results in this section suggest that properly allowing for individual heterogeneity and dynamics is crucial if we are to understand the role of labor market factors in shaping coresidence outcomes. To this end, the following two sections develop and estimate a fully dynamic framework for coresidence outcomes, based on *movements in and out of home* rather than coresidence outcomes at a point in time. Section 5 focuses on movements back home for youths currently living away from home, while Section 6 focuses on the decision to move out again, after having already moved back home.[14]

5 Moving Back Home

Consider a setting where time, $t \in [0, \infty)$, is continuous and a youth who is currently living away from home has individual characteristics (possibly time-varying) given by X_t. Denote the hazard of moving back home by $\theta(t, X_t)$. I assume a proportional hazards representation, of the type outlined in Jenkins (2005), where the log-hazard is separable between a baseline time-varying

[14] In related work (Kaplan (2009)) I outline and estimate a complete structural model that is able to rationalize the difference in the cross-sectional and dynamic estimates of the effect of labor market variables on coresidence.

hazard, $\theta_0(t)$, and a linear function of X_t :

$$\theta(t, X) = \theta_0(t) e^{\beta' X_t}.$$

The survivor function is thus given by

$$S(t, X) = \exp\left\{-e^{\beta' X} \int_0^t \theta_0(s)\, ds\right\}.$$

Since the data are discrete and organized in months, we can only observe that a youth moved back during a particular month. It is thus useful to derive the discrete time hazard of moving back home in a given month. Define month t as the month between time $t-1$ and t. Then the hazard during month t is

$$h_t(X) = 1 - \exp\left\{-e^{\beta' X} \int_{t-1}^t \theta_0(s)\, ds\right\}.$$

If we define $\gamma_t = \log\left[\int_{t-1}^t \theta_0(s)\, ds\right]$ as a measure of duration dependence (it reflects the integrated baseline hazard during month t), then we can write the discrete time hazard as

$$\log\left[-\log\left(1 - h_t(X)\right)\right] = \beta' X_t + \gamma_t.$$

which is a complementary-log-log regression. I estimate the parameters β and report e^{β}. This is the multiplicative effect on the underlying continuous time baseline hazard: it tells how much the baseline hazard of moving back home is affected at all durations, given a change in the variable X_t.

For the model of moving back home, duration dependence through γ_t is proxied with a polynomial in the age of the youth. This is because it is likely that it is the age of the youth rather than the number of months since he/she first moved out that is important for moving back home. This also avoids the issue of left-censoring for moving back home, since for a number of spells we do not observe when the youth first moved out of home.

I report results that allow for a rich set of background variables, X_t, and five alternative labor market variables: (i) an indicator for whether the youth is currently working; (ii) an indicator for whether the youth stopped working in the current month; (iii) an indicator for whether the youth stopped working in the previous three months; (iv) current log monthly earnings; and (v) growth in log monthly earnings. Estimations with the last two variables use only the relevant employed subsample.

The model can also allow for unobserved heterogeneity in the form of random effects:

$$\log\left[-\log\left(1 - h_t(X)\right)\right] = \beta' X_t + \gamma_t + \alpha_i.$$

I estimated models with two types of unobserved heterogeneity, one in which α_i is distributed according to a Gamma distribution and one in which α_i is distributed according to a Normal

distribution. Both models delivered quantitatively similar results, so to conserve space only results from the Normal model are reported. In these models, α_i reflects a spell-level, rather than a person-level, fixed effect. This specification allows different spells away from home for the same youth to be characterized by different unobserved characteristics.

The results from these estimations are reported in Table 8 and show that current labor market variables have strong and significant effects on the hazard of moving back home. Being employed is associated with a 24% (33%) reduction in the instantaneous probability of moving back home for males (females). For employed youths, a 1% increase in earnings also significantly reduces the hazard of moving back home - by around 10% (11%) for males (females). A *change* in employment status has an even stronger effect on this hazard: moving from employment to non-employment in a given month is associated with a 64% (72%) increase in the likelihood of moving back home in that month.

6 Moving Out Again

One of the key advantages of using monthly rather than annual data on coresidence is that it allows for an analysis of the durations of spells back home. I start by studying the distribution of the length of spells back home and how the hazard of leaving home again changes with duration. After that I explore how labor market variables are associated with the likelihood that a youth will move out again after a spell back home.

How long do youths stay back home? Table 9 reports some statistics about the distribution of spell lengths back home. As shown, 177 (168) of the 427 (385) spells back home for males (females) were completed, meaning that the youth was observed to move out of home again before the sample period ended. Once the remaining right-censored spells are taken into account, the median duration back home is 12 months for males and 11 months for females. Hence, spells back home are of fairly long duration: when youths move back home, they tend to stay for a while. Further evidence of the long duration of stays back home can be found in the estimated survival function, also shown in Table 9. In the first 3 months after moving back, only around 15% of youths leave again, with a further 15% moving out in the next 3 months. After one year back home, around half of youths have moved out again.

A hazard model for moving out again In order to assess the association between labor market outcomes and the hazard of moving out of home again, Table 10 reports estimates from a discrete time hazard model of the same form described in Section 5. All specifications include a piecewise constant function to capture duration dependence (duration dependence is assumed to be constant within each of the first 6 months, and then over months 7 to 9, 10 to 12, 13 to 18 and 19 to 24). The models also allow for unobserved heterogeneity in the form of Normally distributed

random effects. Because of the relatively small number of spells back home, it is not surprising that none of the estimates are precise enough to be statistically significant at conventional levels. However, the point estimates are of the correct sign to indicate an association between labor market outcomes and the hazard of moving out of home again..

Taken at face value, the point estimates for males, reported in the first two columns of Table 10, indicate that being employed increases the baseline hazard by around 30% and that for employed males, a 1% increase in monthly earnings is associated with a 30% increase in the likelihood of moving out. For females, employment has almost no effect on the hazard, while a 1% increase in earnings increases the moving out hazard by around 18%.

7 Conclusions

This paper has introducd the first monthly panel data set on parental coresidence and labor market outcomes for low-skilled youths in the United States, and used these data to examine the relationship between coresidence dynamics and the labor market. Since this is the first high-frequency data set with contemporaneous information on parent-youth coresidence and labor market variables, estimating the effects of current employment and earnings on the likelihood that youths move in and out of homeis possible for the first time.

One very simple albeit important contribution of the paper has been to provide quantitative evidence from a recent cohort that household formation and separation from one's parents is not a one-way process. The evidence suggests that there is no clear point at which youths begin to live independently from their parents. Rather, there appears to be an extended transitional period of coresidence dynamics, during which youths move in and out of home. For many youths, the process of household formation takes place over a number of years and is characterized by multiple movements in and out of home.

This long process of household formation implies that to understand the relationship between coresidence and the labor market, it is necessary to recognizethat these variable have important joint dynamics. This is most apparent in the different conclusions one would draw about the effect of employment on coresidence in the cross-sectional discrete choice model versus the properly specified duration model of moving in and out of home. The estimates suggest that the labor market is much more important for understanding *individual changes in living arrangements* than it is for understanding *cross-sectional differences*, a hypothesis that is consistent with a large amount of fixed unobserved heterogeneity in the relative preference for living with one's parents.

To this end, another contribution has been to show that employment and earnings do in fact have strong associations with changes in coresidence states. The sizes of the point estimates are economically meaningful. For example, a 64% increase in the hazard of moving back home for

youths who have stopped working in a given months is a clear indication that job loss affects the trade-off between living at home versus living away from home. It also suggests that the choice of whether or not to live with one's parents may be an important margin that youths can adjust in response to labor market shocks and thus play an important role as a channel of insurance within the family, potentially interacting with publicly provided insurance programs. This hypothesis is developed further in a structural model of the labor market and coresidence in Kaplan (2009).

An important channel for future work is to explore the patterns of parent-youth coresidence for other subpopulations, particularly youths who go to college. As the youths in the NLSY97 age, this work may become possible, although the absence of coresidence questions post-2002 may place constraints on such a study. Finally, there is a need for more work that attempts to understand the household formation process. Virtually all such work to date has treated household formation synonymously with marriage. This paper has showed that household formation is at least in part an economic phenomenon - one that for many youths takes place independently of marriage. To properly understand individual labor market outcomes, it is necessary to understand youth living arrangements, and vice versa.

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A Wording of coresidence questions

This appendix describes how the specific wording of the retrospecive monthly coresidence questions differed across waves. The main differencs are that in the first 5 rounds, the respondent is given a list of each calendar month since the previous interview, and asked about his/her coresidence status in each of the months. However, in round 6 the youth is instead asked to report directly the calendar months in which changes in coresidence status took place. For each parent figure, the youth was asked the following set of questions:

Rounds 2 to 5 (1998-2001)

> Now I'm going to ask you about your parents and any other people you consider to be parent figures. I will ask about each parent separately. My computer tells me that at the time of your last interview, you were living [under joint custody/[blank]] with your [mother (figure)/father (figure)] [name]. Was this information correct on [date of last interview] when we had your last interview?
>
> [questions are then asked about updating any changes in the parent's characteristics from the previous wage]
>
> Are you currently living with [him/her] full-time, living with [him/her] as part of a joint custody arrangement, or not living with [him/her] at all? Since [date of last interview], has there been a continuous period of one month or more when you and your [mother (figure)/father (figure)] lived in different places? If you were temporarily away at summer camp, but lived with your [mother (figure)/father (figure)] before and after that time, please include those months as months you were living with [him/her].
>
> Since [date of last interview] what months have you lived with your [mother (figure)/father (figure)] at least some of the time? If you were temporarily away at summer camp or on vacation, but lived with your [mother (figure)/father (figure)] before and after that time, please include those months as months you were living with [him/her].
>
> Now I'd like to ask you about parents and parent figures you weren't living with at the time of our last interview. Since [date of last interview], has there been a continuous period of one month or more when you and your [mother (figure)/father (figure)] lived in different places? Since [date of last interview] what months have you lived with your [mother (figure)/father (figure)] at least some of the time? If you were temporarily away at summer camp or on vacation, but lived with your [mother (figure)/father (figure)] before and after that time, please include those months as months you were living with [him/her].

Round 6 (2002)

> Since [date of last interview], has there been a continuous period of one month or more when you and your [mother (figure)/father (figure)] lived in different places?
>
> Since [respar1datefill] what month did you [resparent1firstnext] stop living with your [mother (figure)/father (figure)]? What month did you [resparent1firstnext] start living with your [mother (figure)/father (figure)]?
>
> Was there another period of a month or more when you did not live with your [mother (figure)/father (figure)]?
>
> [this group of questions is then repeated in a loop...]

B Results from alternative sample selection criteria

This appendix compares estimates of the effect of labor market variables on the hazard of moving in and out of home for alternative sample selection criteria. Sample A is the main sample analyzed in the paper.

Sample B addresses the issue of endogeneity with respect to education decisions by selecting on the basis of aptitude test scores, rather than education outcomes. This sample restricts attention to youths

who scored in the bottom quartile of the combined Armed Services Vocational Aptitude Battery, as constructed by NLS staff. These tests were administered prior to the first wave, during the NLSY97 screening process. Less than one-third of youths with test scores in this range were observed to attend college, compared with over 70% in the complementary sample.

Sample C addresses the issue of part-time and non-traditional college attendance by only dropping youths who start college within 15 months of graduating from high school. Thus, the sample retains youths who simultaneously work and attend post-secondary education in the evenings.

Table 11 reports the estimated coefficients for the effect of the various labor market variables on the hazards of moving in and out of home.

Figure 1: Number of Monthly Observations by Age

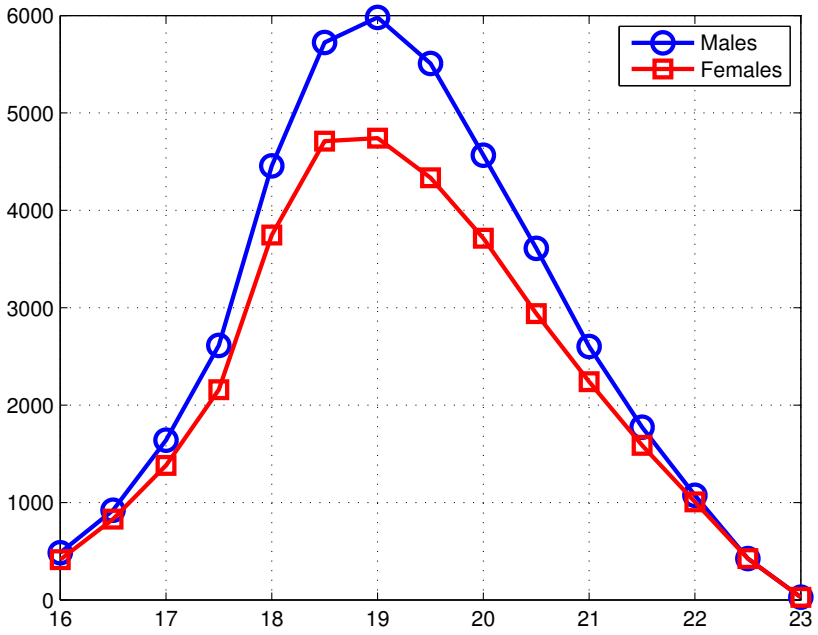

Figure 2: Fraction of Youths Living Away from Parents by Age

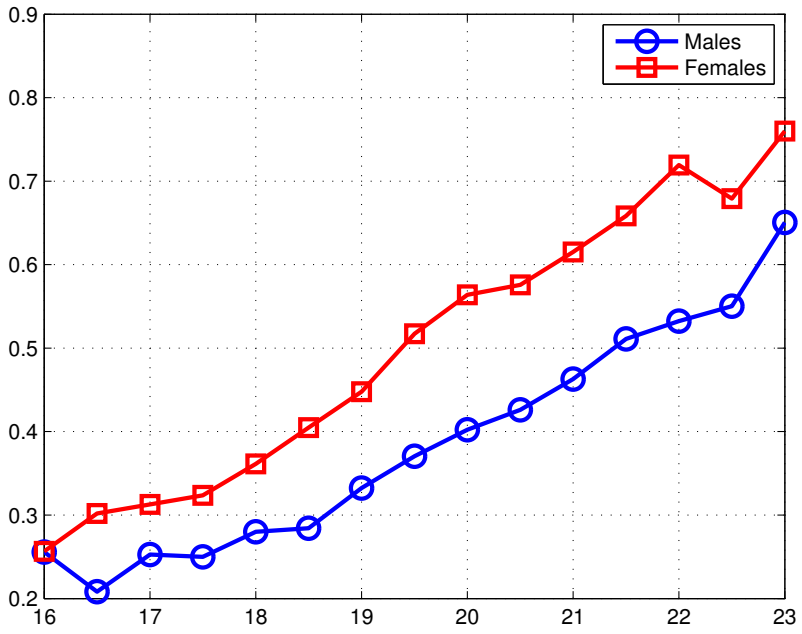

Figure 3: Fraction of Youths Who Ever Moved Back Home by Age

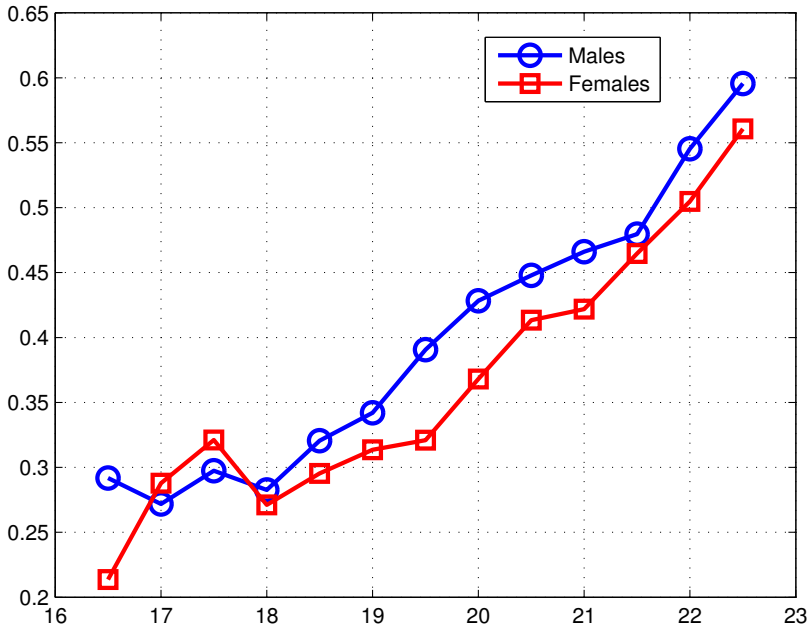

Table 1: Number of Respondents Lost at Each Stage of Sample Selection

	Males			Females		
Sample	(A)	(B)	(C)	(A)	(B)	(C)
Raw NLSY97	4599	4599	4599	4385	4385	4385
Raw NLSY97						
Drop resp with 1998 interview missing	316	316	316	282	282	282
Drop resp still in high school	740	740	740	613	613	613
Sample A/B/C selection	1683	1570	2619	2137	1990	2713
Gaps in coresidence data	21	23	12	29	29	13
Ever have all parents dead	21	21	15	13	15	8
Ever in military	131	150	27	24	33	5
Age>=16	1	1	1	2	2	0
Gaps in employment data	73	76	33	47	50	27
Final Sample	1613	1702	836	1238	1371	724

Table 2: Sample Summary Statistics: Individual-Level Fixed Characteristics

	Male	**Female**
n=	1,613	1,238
Age		
Age First Observed	18.18	18.07
Age Last Observed	20.27	20.30
Education		
Highest Grade Completed	11.47	11.49
High School Graduate	0.68	0.69
Coresidence		
Ever Away During Sample	0.53	0.68
Ever Home During Sample	0.89	0.82
Move Out During Sample	0.38	0.45
Move Back During Sample	0.23	0.29
Jail		
Ever In Jail	0.06	0.01
Sample Stats		
Months in Sample	26.05	27.82

Table 3: Sample Summary Statistics: Variables Observed at Monthly Frequency

	Male	**Female**
n=	41,406	34,254
Age	19.46	19.42
Away	0.35	0.48
Family Formation		
Married	0.03	0.12
Cohabiting	0.15	0.36
Labor Market		
Working	0.71	0.63
Monthly Earnings	2196	1611

Table 4: Sample Summary Statistics: Variables Observed at Annual Frequency

	Male	**Female**
n=	4,030	3,312
Family Formation		
Has Child	0.17	0.43
Number of Children	1.25	1.39
Parental Transfers		
Receive Transfer	0.32	0.31
Annual Transfer Amount	973	1061
Rent		
Monthly Rent	375	372

Table 5: Sample Summary Statistics: Parental Characteristics

	Male	**Female**
n=	4,030	3,312
Number of Parents	2.25	2.24
Average Age	45.3	44.7
Biological Parents Married	0.46	0.37
Total Parents Income	56390	51500

Table 6: Logit Models for Living Away from Home (Males)

	(1)		(2)		(3)		(4)	
	Logit	FE Logit	Logit	FE Logit	Logit	FE Logit	Logit	FE Logit
Working	0.904	0.89			1.127	1.161		
	(0.081)	(0.116)			(0.092)	(0.130)		
Log Earnings			1.052	1.066			1.106*	1.175*
(Monthly)			(0.039)	(0.064)			(0.036)	(0.049)
Away Previous					799.7*	133.2*	868.8*	138.9*
Month					(65.495)	(9.501)	(85.447)	(13.328)
Black	0.617*		0.537*		0.788*		0.725*	
	(0.085)		(0.090)		(0.071)		(0.082)	
Hispanic	0.733*		0.645*		0.778*		0.712*	
	(0.109)		(0.109)		(0.073)		(0.084)	
High School	0.83		0.819		0.928		0.875	
Graduate	(0.097)		(0.110)		(0.071)		(0.084)	
Married	8.204*	7.119*	8.611*	6.787*	3.596*	2.989*	4.231*	3.784*
	(2.662)	(4.292)	(2.986)	(4.799)	(0.975)	(1.566)	(1.154)	(1.958)
Children	1.973*	1.585	2.077*	1.736	1.492*	1.614*	1.467*	1.533
	(0.280)	(0.532)	(0.355)	(0.703)	(0.149)	(0.369)	(0.190)	(0.440)
Parent's	1.011+		1.010+		1.008		1.007	
Education	(0.006)		(0.006)		(0.005)		(0.005)	
Log Parental	1.06	0.925	1.062	0.899	1.026	0.968	1.003	0.985
Income (Annual)	(0.067)	(0.100)	(0.081)	(0.135)	(0.049)	(0.082)	(0.059)	(0.113)
Parents Married	0.640*	1.97	0.651*	4.947*	0.839*	3.193	0.800*	9.369*
	(0.073)	(1.457)	(0.081)	(3.974)	(0.062)	(2.457)	(0.071)	(5.959)
N (month/youth)	38239	36739	31652	30495	25860	24982	19301	18678
N (youths)	1519	1507	1168	1164	1382	1368	1045	1039
Pseudo R-Square	0.091	0.788	0.107	0.781	0.102	0.794	0.109	0.791

Note: All models include a cubic in age of youth (in months), quadratic in average age of parents (years), four region dummies, and missing variables dummies for parent's education and income. (1) and (3) are for the full sample, (2) and (4) are for the sample of employed youth/months only. Figures in parentheses are standard errors. * significant at 5% level.

Table 7: Logit Models for Living Away from Home (Females)

	(1)		(2)		(3)		(4)	
	Logit	FE Logit	Logit	FE Logit	Logit	FE Logit	Logit	FE Logit
Working	1.222*	0.912			1.185*	1.071		
	(0.106)	(0.115)			(0.098)	(0.125)		
Log Earnings			1.135*	1.031			1.121*	1.096
(Monthly)			(0.049)	(0.074)			(0.049)	(0.074)
Away Previous					662.4*	130.7*	766.0*	140.0*
Month					(55.806)	(9.486)	(78.720)	(14.143)
Black	0.510*		0.546*		0.711*		0.703*	
	(0.071)		(0.089)		(0.065)		(0.092)	
Hispanic	0.641*		0.588*		0.769*		0.697*	
	(0.100)		(0.110)		(0.078)		(0.095)	
High School	1.092		1.099		1.113		1.247+	
Graduate	(0.145)		(0.176)		(0.094)		(0.143)	
Married	3.951*	3.621*	3.846*	4.405*	2.126*	2.329*	2.237*	2.996*
	(0.802)	(1.417)	(0.907)	(2.150)	(0.316)	(0.624)	(0.465)	(1.046)
Children	1.895*	1.35	1.626*	1.056	1.361*	1.193	1.215+	1.056
	(0.218)	(0.405)	(0.227)	(0.442)	(0.109)	(0.269)	(0.137)	(0.356)
Parent's	1.008		0.988		0.998		0.977	
Education	(0.020)		(0.022)		(0.014)		(0.021)	
Log Parental	0.978	0.983	0.939	1.06	0.988	1.076	0.975	1.137
Income (Annual)	(0.058)	(0.123)	(0.066)	(0.195)	(0.046)	(0.109)	(0.061)	(0.164)
Parents Married	0.814	0.872	0.763+	0.627	0.935	1.55	0.888	1.025
	(0.102)	(0.634)	(0.112)	(0.557)	(0.076)	(1.121)	(0.095)	(0.844)
N (month/youth)	31652	30495	20033	19317	19301	18678	12709	12321
N (youths)	1168	1164	592	579	1045	1039	482	474
Pseudo R-Square	0.107	0.781	0.139	0.679	0.109	0.791	0.158	0.688

Note: Figures in parentheses are standard errors. All models include a cubic in age of youth (in months), quadratic in average age of parents (years), four region dummies, and missing variables dummies for parent's education and income. (1) and (3) are for the full sample, (2) and (4) are for the sample of employed youth/months only. Figures in parentheses are standard errors. * significant at 5% level.

Table 8: Proportional Hazard Models for Moving Back Home

	Males			Females		
Working	0.760*			0.668*		
	(0.088)			(0.078)		
Stopped Work		1.641*			1.716*	
		(0.353)			(0.344)	
Log Earnings			0.902*			0.887*
(monthly)			(0.036)			(0.051)
Black	0.993	1.071	1.178	0.894	0.932	1.152
	(0.165)	(0.174)	(0.274)	(0.162)	(0.169)	(0.294)
Hispanic	1.218	1.251	1.217	0.885	0.893	1.062
	(0.199)	(0.203)	(0.269)	(0.171)	(0.173)	(0.277)
High School Graduate	1.351*	1.317*	1.371+	0.825	0.787+	0.603*
	(0.170)	(0.165)	(0.229)	(0.108)	(0.102)	(0.111)
Married	0.433*	0.431*	0.257*	0.412*	0.433*	0.400*
	(0.147)	(0.147)	(0.132)	(0.081)	(0.085)	(0.118)
Children	0.707*	0.701*	0.645*	0.704*	0.755*	0.882
	(0.110)	(0.109)	(0.136)	(0.086)	(0.092)	(0.150)
Parent's Education	0.979	0.979	0.99	0.972	0.976	1.014
	(0.019)	(0.019)	(0.020)	(0.030)	(0.030)	(0.044)
Log Parental Income	1.06	1.05	1.112	1.033	1.02	1.102
(annual)	(0.082)	(0.082)	(0.120)	(0.072)	(0.071)	(0.107)
Parents Married	0.816+	0.810+	0.883	0.949	0.951	1.002
	(0.100)	(0.099)	(0.134)	(0.120)	(0.121)	(0.173)
Log Variance Heterogeneity	0.400*	0.402*	0.485	0.462*	0.491*	0.751
	(0.161)	(0.161)	(0.242)	(0.174)	(0.176)	(0.330)
N (months/youths)	12720	12720	8621	13920	13920	8803
N (youths)	959	959	801	927	927	766

Note: Figures in parentheses are standard errors. All specifications allow for Normally distributed random effects. All models include a cubic in age of youth (in months), quadratic in average age of parents (years), four region dummies, and missing variables dummies for parent's education and income. Figures in parentheses are standard errors. All specifications allow for Normally distributed random effects. * significant at 5% level.

Table 9: Distribution of Lengths of Spells Back Home

	Male	Female
Spells	427	385
- completed	177	168
- right censored	250	217
Median	12	11
Survivor Function		
Month:		
1	1.00	1.00
2	0.94	0.90
3	0.86	0.81
6	0.72	0.68
9	0.57	0.55
12	0.50	0.46
18	0.37	0.30
24	0.26	0.23

Table 10: Proportional Hazard Models for Moving Out Again

	Males		Females	
Working	1.297		0.952	
	(0.271)		(0.157)	
Log Earnings		1.303		1.176
(Monthly)		(0.224)		(0.224)
Black	1.157	1.457	0.765	0.612
	(0.317)	(0.415)	(0.189)	(0.229)
Hispanic	1.316	0.818	0.745	0.809
	(0.390)	(0.276)	(0.203)	(0.272)
High School Graduate	1.626	1.534	1.026	1.036
	(0.367)	(0.348)	(0.198)	(0.260)
Married	1.472	1.453	0.703	0.913
	(0.746)	(0.862)	(0.222)	(0.375)
Children	1.743	1.499	1.005	1.090
	(0.465)	(0.400)	(0.172)	(0.250)
Parent's Education	0.982	0.988	1.089	1.076
	(0.035)	(0.036)	(0.055)	(0.070)
Log Parental Income	0.959	0.874	0.832	0.772
(Annual)	(0.120)	(0.133)	(0.084)	(0.110)
Parents Married	0.878	0.929	0.852	1.032
	(0.185)	(0.198)	(0.157)	(0.255)
N (months/youths)	2669	1761	2446	1452
N (youths)	360	289	321	230
Log Likelihood	-599	-414	-592	-350

Note: Figures in parentheses are standard errors. All specifications allow for Normally distributed random effects. All models include a cubic in age of youth (in months), quadratic in average age of parents (years), four region dummies, and missing variables dummies for parent's education and income. Figures in parentheses are standard errors. All specifications allow for Normally distributed random effects. * significant at 5% level.

Table 11: Estimated Coefficients on Labor Market Variables

	Working	Stopped Work	Log Earnings
Effect on Hazard of Moving Back Home - Males			
Sample A	0.760*	1.641*	0.902*
Sample B	0.747*	1.876*	0.918*
Sample C	0.802	1.327	0.838*
Effect on Hazard of Moving Back Home - Females			
Sample A	0.668*	1.716*	0.887*
Sample B	0.724*	1.505*	0.922
Sample C	0.744*	0.793	0.898
Effect on Hazard of Moving Out Again - Males			
Sample A	1.297		1.303
Sample B	1.084		1.192
Sample C	1.665		1.018
Effect on Hazard of Moving Out Again - Females			
Sample A	0.952		1.176
Sample B	0.998		1.228
Sample C	0.962		0.981

Note: Figures in parentheses are standard errors. All specifications allow for Normally distributed random effects. All models include a cubic in age of youth (in months), quadratic in average age of parents (years), four region dummies, and missing variables dummies for parent's education and income in addition to all control variables in the baseline models. Figures in parentheses are standard errors. All specifications allow for Normally distributed random effects. * significant at 5% level.