

Migration, Residential Mobility and Union Formation

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Diverse changes have occurred in the family during last few decades, in particular, with regard to timing and types of family formation. Marriage has been delayed until finishing education and taking a stable job (Goldstein & Kenney 2001) while cohabitation has emerged as either an alternative or a precursor to marriage (Cherlin 2010). In addition, the number of children born to unmarried parents has increased from 18.4% in 1980 to 39.7% in 2007 (U.S. National Center for Health Statistics 2009). Despite the trends, some groups of population such as low educated (Goldstein & Kenney 2001; Glick et al. 2006) or Blacks (Corcoran & Kunz 1997) are more likely to undergo subsequent changes, which are negatively associated to their later life. Given that the disadvantages are likely transmitted across generations, family diversity provides a potent source of social inequality (Goldstein & Kenney 2001). Thanks to abundant studies on this issue, we now realize that multi-dimensions in individuals' life are entangled with each other and have contributed to diversity in the family (Corcoran & Kunz 1997; Walsemann et al. 2008; Glick et al. 2006).

Although most studies have pointed out a critical role of socioeconomic status in determining family diversity with regards to family formation, relatively few have considered roles of residence in determining the differences. Traditionally, there have been differences between metropolitan and nonmetropolitan¹ in terms of population composition, job and industry distributions (US Census Bureau 2011). Moreover, there have been differences in family formation across regions (Brown & Snyder 2006; Snyder et al. 2004; McLaughlin et al. 1993). Nonmetro women are more likely than their metro counterparts to be involved in marriage or marry at younger ages (Snyder et al. 2004; McLaughlin et al. 1993). Marriage has been a more prevalent type of first union formation than cohabitation and the first birth is more likely to occur within a marriage in nonmetropolitan areas compared to metropolitans (Snyder et al. 2004; Albrecht & Albrecht 2004). Previous studies have found that the differences are driven from

¹ Urban and metropolitan, and rural and nonmetropolitan are used interchangeably throughout this paper.

variability in degrees of traditional family values (Struthers & Bokemeier 2000) and conditions in local marriage markets (South & Lloyd 1992; Lichter et al. 1991; Lichter et al. 1992). Despite their contributions to the differences in family formation between regions, we need to account for a role of migration and residential mobility in family formation behaviors (Brown & Snyder 2006) since movers are expected to change their social networks (Hayine & South 2005), routines, roles, and identities (Oishi, Ishii, & Lun 2009; Oishi 2010; Brett 1982). Moreover, the move itself plays a significant role in transition to adulthood (Arnett 2004). Studies have presented that changes in residence are one of the milestone events in individual life courses, which not only brings numerous changes in their life but also is closely related to other events (Guzzo 2006; Garasky 2002; Arnett 2000). For example, Guzzo (2006) recently found that residential indicators, such as moving out of parental home and to a new city, are closely related to a likelihood of union formation, more so than any other individual and family background factors considered in the study. Those in nonmetropolitan areas, where fewer opportunities for education and occupations, are expected to show different life pathways than their metropolitan counterparts (Snyder, McLaughlin & Coleman 2009; Elder et al. 1996; Johnson et al. 2005). Young people in the nonmetropolitan are more likely to consider changes in residence in order to increase future opportunities (Hektner 1995; Elder et al. 1996; Johnson et al. 2005) and then reveal greater conflict between achieving career goals and leaving their home places (Elder et al. 1996; Johnson et al. 2005). Therefore, we can expect that life course trajectories vary between movers and stayers, and also be distinct by residences. We examine that possibility in this paper to better understand the diversity in family formation outcomes.

Existing studies that examine the association between mobility and family formation outcomes have given less attention to differentiating long-distance migration from short-distance residential mobility (Guzzo 2006; Speare & Goldscheider 1987; Quinn & Rubb 2011; Astone & McLanahan 1994; Boyle et al. 2008) although the distance is positively related to increasing costs of moving (Cadwallader 1992). Building on the previous research, we distinguish long-distance mobility from short-distance moves and investigate their implications for family formation outcomes. Migration and residential mobility have used interchangeably in prior studies, but we separate the two in this paper; between-county long-distance moves are defined as a migration event whereas within-county short-distance mobility is referred to as a residential mobility event (Schachter, Franklin, & Perry 2003).

By employing public and geocode data files from the National Longitudinal Survey of Youth 97 (NLSY97), this study investigates the role of migration and residential mobility in the transition to first union formation, and also the effect of yearly time-varying residences of nonmetropolitan or metropolitan areas. We expect that short and long distance moves have different implications for union formation behaviors between metropolitan and nonmetropolitan areas. This study will expand our knowledge of family diversity by closely measuring and examining the effects of time-varying measures of residence on union formation, and distinguishing long distance moves from short distance mobility.

Literatures

Union formation by Region

Despite abundant studies on diversity in union formation patterns, relatively less is known about the differences between nonmetropolitan and metropolitan regions (Snyder et al. 2004). We do know that marriage is considered a more favorable union formation than cohabitation in nonmetropolitan areas (Snyder et al. 2004; Albrecht & Albrecht 2004); that nonmetropolitan cohabitators are more likely than their metropolitan counterparts to end their relationship in a marriage or separation (Brown & Snyder 2006), and that this likely means that the cohabitation is regarded as a precursor to a marriage among those in nonmetropolitan. Although these studies provide fundamental knowledge of family formation behaviors in both metropolitan and nonmetropolitan areas, data limitations require further comparative studies in two areas. First, using either cross sectional or retrospective data sources has prevented time-varying measures of residence in existing studies, and thus we cannot be certain of the association between residential location and family formation, and also the timing of residential change and family formation (see Snyder et al. 2004, Brown & Snyder 2006). Second, these prior studies have included only female respondents (McLaughlin et al. 1993; Snyder et al. 2004; Brown & Snyder 2006), which partially explain the family formation patterns for entire populations. Given that males and females have revealed similar but distinct family formation behaviors (Thornton 1988), including male respondents in the analysis will help us better understand differences in family formation behaviors across residences. Moreover, it has been argued that a local supply of economically attractive mates plays a large role in the marital behaviors (Lichter et al. 1991; South & Lloyd 1992), which emphasizes the importance of including local marriage market conditions in the

discussion of differences in union formation across residences. By including nationally representative sample of both males and females in the NLSY97, and also incorporating yearly time-varying measures of residence and the distance moved, this study will expand our knowledge of how migration and residential mobility are associated to the union formation process between nonmetropolitan and metropolitan areas.

Life course perspective

Individual's developmental pathways vary in accordance with the socioeconomic contexts, in large part due to the constraints and opportunities provided by the historical time and places where they live (Elder 1998; Shanahan et al. 1997). Social and economic changes in the U.S. during the past few decades have resulted in a shift in traditional developmental pathways to adulthood (Arnett 2000). It is no longer expected that individuals experience a same order and timing of key life course events (Rindfus 1991), but rather transitions are subject to a sense of responsibility, independence, and autonomy (Oesterle et al. 2010). Despite the change, several key markers of the transition to adulthood, such as marriage, employment, and education, remain closely related with each other and often occur simultaneously (Oppenheimer 1988; Goldstein & Kenney 2001; Guzzo 2006). For example, school enrollment significantly influences the probabilities of childbirth and marriage among young adults (Glick et al. 2006), and individual's current labor market position affects timing and types of union formation (Oppenheimer 1988; Oppenheimer 2003). Adding to these factors, Arnett (2000) suggests that residential changes also reflect a key life course and demographic process that marks an explicit transition to adulthood. Among most youth in the United States, leaving the parental home and moving to another place often takes place around age 18 or 19 (Goldscheider & Goldscheider 1994). Mobility during this period is expected to hold special significance because these changes often represent the end of one developmental task or the onset of a new status (Arnett 2000). Supporting this idea, Guzzo (2006) recently found that residential factors such as living with parents, duration of parental coresidence, and move to a new city are significantly related to the likelihood of marriage and cohabitation. Moving to another city increases the odds of both cohabitation and marriage and the significance remains in models specifying residential mobility time lags (Guzzo 2006). Given that those in nonmetropolitan tend to move to another place for education and occupation

(Hektner 1995; Johnson et al. 2005), we expect that migration and residential mobility have different implications for family formation behaviors of those in nonmetropolitan and metropolitan areas.

Migration and Residential mobility

According to the US Census Bureau, about 12 to 18% of the total populations in the United States have moved to another place in a year during last three decades (US Census Bureau 2011). More than a quarter of moving (26.3%) occurred due to family-related issues such as changing marital status and establishing one's own household; 8.7% for a new job or job transfer; and 2.6% for attending a college in 2009 (US Census Bureau 2011). McAuley and Nutty (1982; 1985) demonstrated that both residential preferences and moving behavior vary across family life stages and young people are more likely to act upon their preferences. Since most moving occurs during the period of ages 15 to 29 (e.g., 37.8% of movers in 2009), we can expect that young people are willing to change their residence to pursue their life goals in terms of education, occupation, and family formation.

Even though most migration and residential mobility are motivated by better environments (e.g., getting a job, living in a safer neighborhood) (US Census Bureau 2011), the moving itself has been considered a stressful event (Holmes & Rahe 1967; McCollum 1990; Boyle et al. 2008). People who change their residence are supposed to change their routines, roles, and identities to adapt to a new environment (Brett 1982), which often involves great mental and physical stress (McCollum 1990). For example, couples who move frequently have a higher risk of union dissolution (Boyle et al. 2008) and even short distance mobility affects psychological well-being and depression for movers (Magdol 2002). Studies have also revealed that those living in nonmetropolitan areas are more likely to change their residence due to disadvantaged socioeconomic circumstances in the places (Hektner 1995). Nonmetropolitan adolescents, in particular, indicate conflict between achieving educational or career goals and staying close to parents and relatives (Elder et al. 1996; Johnson et al. 2005), which suggests that both movers and stayers from nonmetropolitan areas are more likely than their metropolitan counterparts to experience conflict. With regard to moving distance, those in nonmetropolitan disproportionately

make long-distance moves (i.e., moving across counties, 46.5%), compared to those in metropolitan areas (37.9%)² (US Census Bureau 2003). From a migration perspective, nonmetropolitan residents are more likely to make a costly decision either physically or mentally because the physical distance from the original place is positively related to mental and physical stresses (Cadwallader 1992). Therefore, it is necessary to separate types of moves by distance (migration versus residential mobility) when studying the effects of residences.

Few studies³ have accommodated or emphasized the roles of the migration and residential mobility in investigating union formation patterns (Guzzo 2006). By using data from the National Longitudinal Survey of Youth 97 (NLSY97), this study examines differences in union formation patterns between nonmetropolitan and metropolitan areas and the role of migration and residential mobility in union formation behaviors. We expect that types of mobility (i.e., within-county residential mobility (short-distance moves) and between-county migration (long-distance moves)) would contribute to different outcomes in union formation behaviors, and thus this study separates the mobility events into residential mobility and migration⁴.

Data and analysis

We use public and geocodes data from the National Longitudinal Survey of Youth 1997 (NLSY97), which contains information on various life course domains among 8,984 respondents. The NLSY97 has interviewed respondents annually from 1997, when the respondents were ages from 12 to 18, until recent years, when the respondents become their middle or late twenties. This study employs longitudinal information from 1997 to 2008 for 8,604 respondents, excluding 380 individuals who did not identify their residence in 1997. Data are transformed into person-year files to estimate event history models. Union formation is

² The share of moving within a same county is 50.6% and 55.2% for those in nonmetropolitan and metropolitan areas, respectively (US Census Bureau 2003).

³ Brown and Snyder (2006) once demonstrated the possible determinant of migration and residential mobility in their result of differences in cohabitators' union transitions between metropolitan and nonmetropolitan areas.

⁴ Studies demonstrating the importance of the residential moves in transition to family formation have used their own definition of residential moving: for example, moving to a new city (Guzzo 2006), change in a residence (Speare & Goldscheider 1987; Quinn & Rubb 2011), school change (Astone & McLanahan 1994), or moving between as well as within urban or rural areas (Boyle et al. 2008). Despite their contribution to literatures, it is hard to explain more detailed association between mobility and other life course events because of the discrepancy in the measurement.

defined as an entry into the first marriage or cohabitation; censoring occurs for 3,796 individuals who have never married (6,131) or cohabited (4,208), replacing to the date of interview. Discrete time competing risks model is used to treat marriage and cohabitation as competing risks; moreover, it fares well on the hazard of an event accommodating both time-constant and time-varying variables (Box-Steffensmeier & Jones 2004). The analyses are conducted using the survey setting command in Stata because this accounts for the complicated sampling strategy of the NLSY (Cleves et al. 2010; Center for Human Resource Research 2008).

Measures

Union formation among nonmetropolitan and metropolitan young adults is predicted with relevant individual and family background characteristics as well as their migration and residential mobility behaviors. By focusing on union formation separated cohabitation from marriage, this study explores the unfolding debate on the diversity in the transition of union formation among young adults, and contributes to the ongoing discussion regarding the dynamic role of migration and residential mobility in young adult's family formation outcomes.

Outcome variable

Union formation. Union formation is measured through either the date of first cohabitation or marriage. Given relatively young respondents in NLSY97, almost half of them (44.1%) have not yet involved in any union until 2008. Nevertheless, since the respondents have gone through their teens and twenties during the survey period, the data has an advantage by providing an intricate linkage among life course events during the period of young adulthood.

Independent variables

Geographic residence. This study uses a yearly time-varying measure of residences in nonmetropolitan and metropolitan areas. Due to changes in standards measuring the metropolitan and micropolitan statistical areas in the NLSY97⁵, 2003 Urban Influence Codes from USDA ERS (United States Department of Agriculture) were merged with the NLSY data. According to

⁵ For variables of classification in nonmetropolitan and metropolitan areas, the NLSY97 use the MSA (Metropolitan Statistical Area) code scheme from the 1994 County and City Data book in rounds 1 through 7, whereas the CBSA (Core-Based Statistical Areas) codes has been used since round 8 (Center for Human Resource Research, the NLSY97 codebook attachment 101). Due to this change, some respondents can appear to move from metro to nonmetro areas though they have not changed their residence.

the US Census Bureau, there are about 16.6% of the US populations in nonmetropolitan areas (USDA 2007); in this sample, 23.6% lived in nonmetropolitan in 1997.

Migration and Residential Mobility. The NLSY97 provides FIPS (Federal Information Processing Standards) codes for the state and county of residence for each respondent and actual distance of moving between survey years in the NLSY97 geocode file. A long distance moving is defined as a between-county move measured by a change in county FIPS codes between survey years, and is considered a migration event. A short distance moving is measured as a within-county move, indicating that a respondent has some distance between survey years but no county change, and is considered residential mobility. In the NLSY97, 85.8% of the sample has ever changed their residences from 1997 to 2008; 54.5% have experienced migration (i.e., between-county moves), whereas 72.7% have experienced residential mobility (i.e., within-county moves). We are only able to create the moving events annually in the NLSY97 but not monthly migration and residential mobility information. Thus, both mobility and union formation events are measured yearly, and it is not possible to determine which occurred first in a given year. To be certain about the timing and to examine the possibility of a time gap between migration and residential mobility and union formation, we estimate time lagged effects of these events (Box-Steffensmeier & Jones 2004).

Individual characteristics. For explanatory variables, individual characteristics include respondent's age, gender, race/ethnicity, educational attainments and employment. To measure age effects on each event in our multivariate models, we add variables for age in the analyses (Box-Steffensmeier & Jones 2004). Race/ethnicity is operationalized through two indicators: Black and Hispanic, with non-Black non-Hispanic being an omitted category. Education is measured by time-varying covariates of whether an individual earned high school diploma or bachelor degree in each year. For employment variables, we use data from the file of employment status history in the NLSY97. Those who have worked for more than 39 hours per week on average are coded as employed (1); others are considered unemployed (0). We include the employment status as a yearly time-varying variable; a variable with one year lag is also added in order to measure a plausible causal relationship between employment and family formation (Box-Steffensmeier & Jones 2004).

Household characteristics. Variables for mother's educational attainments and whether a respondent lived with both biological parents until age 18 are included as family background indicators in this paper. Mother's educational attainment is measured by a continuous variable indicating years completing school; a dummy variable indicating whether a respondent lives in an intact family until age 18 is included in the analysis.

Community characteristics. Individual behaviors are influenced by social and economic contexts (Elder 1998); limited opportunities to develop their careers often lead to conflict between staying in original places and moving to another place in particular for young people (Hektner 1995; Elder et al. 1996). This study included 4 indicators at a county level to measure community circumstances: unemployment rate, percentage of population under the poverty level, percentage of population with high school degree and with college degree. The NLSY97 geocode file contains detailed information about county characteristics based on the County and City Data Book (CCDB), provided by the US Census Bureau (Center for Human Resource Research 2008).

Results

Descriptive Results

Table 1 provides descriptive statistics for explanatory variables by 1997 residence. First, there are disproportionately more non-Hispanic Whites in nonmetropolitan areas. Despite concerns about few opportunities for educations and occupations in nonmetropolitan areas (Elder et al. 1996; Hektner 1995), no significant difference appears in educational attainments by residence in this sample. Similar proportion of those in nonmetropolitan and metropolitan places has completed high school and college. Moreover, respondents in nonmetropolitan areas are slightly more likely to be employed. Nevertheless, the characteristics of occupation need to be accounted for because only the proportion employed part-time reveals statistically significant differences between metropolitan and nonmetropolitan, but not for full-time job. Furthermore, the differences in employment status across regions can be related to changes in residence for some of the respondents since 1997. In other words, some of those who lived in nonmetropolitan

areas in 1997 have since moved and thus should not be counted as nonmetropolitan residents. For this reason, we treat the residence as a time-varying variable in our multivariate models.

Table 1. Description of Sample by Residence

	Nonmetro	Metro	Total	χ^2
Female	.49	.49	.49	0.28
Black	.10	.17	.15	43.07†
Hispanic	.04	.15	.13	139.51***
Education				
% of people completing high school	.88	.86	.87	5.23
% of people completing college	.21	.25	.24	9.19
Employment status^a	.77	.74	.75	88.03*
% of part-time job	.56	.54	.55	32.51†
% of full-time job	.21	.20	.20	9.63
Intact family until age 18	.55	.53	.53	4.09
Mom's education	12.54	12.42	12.45	t = 1.57
Union Formation				
Cohabitation as a first union	.54	.44	.46	
Marriage as a first union	.12	.11	.11	71.43***
Never formed a union	.39	.45	.44	
Mean age at union formation	21.01(.09)	21.17(.04)	21.14(.04)	t = -1.42

*Note: All statistics were adjusted under survey setting in Stata which accounts for the complexity of the NLSY97 sampling, and also weights the analysis to be representative of the overall U.S. population. a. percent of years that individuals are employed while they are at risk of experiencing union formation. †p≤.10, * p≤.05, ** p≤.01, *** p≤.001*

There are significant differences in the union formation patterns by regions. First, those in nonmetropolitan areas are more likely than their metropolitan counterparts to have either married or cohabited; about 39% of nonmetropolitan individuals remain single until 2008, compared to 45% of those in metropolitan areas. Consistent with previous studies (Brown & Snyder 2006; Albrecht & Albrecht 2004), nonmetropolitan young adults are more likely to be involved in a relationship either cohabitation or marriage. Although the sample may be too young to conclude the patterns, it supports the idea that those in nonmetropolitan areas are more likely to have a traditional family values (Albrecht & Albrecht 2004) and have experienced a different family formation process compared to their metropolitan counterparts (Brown & Snyder 2006). Timing of the first union formation appears similar across residences; the mean age at first union is about 21 years old in both metropolitan and nonmetropolitan areas. Figure 1 describes variation in timing of the first union formation by residences. Despite no difference in the mean age at first union, a distinct change appears after age 20. Consistent with the findings in

table 1, those in nonmetropolitan areas are more likely to be involved in a relationship. Up to their late twenties, almost 35% of metropolitan youths remain single, compared to less than 30% of their nonmetropolitan counterparts.

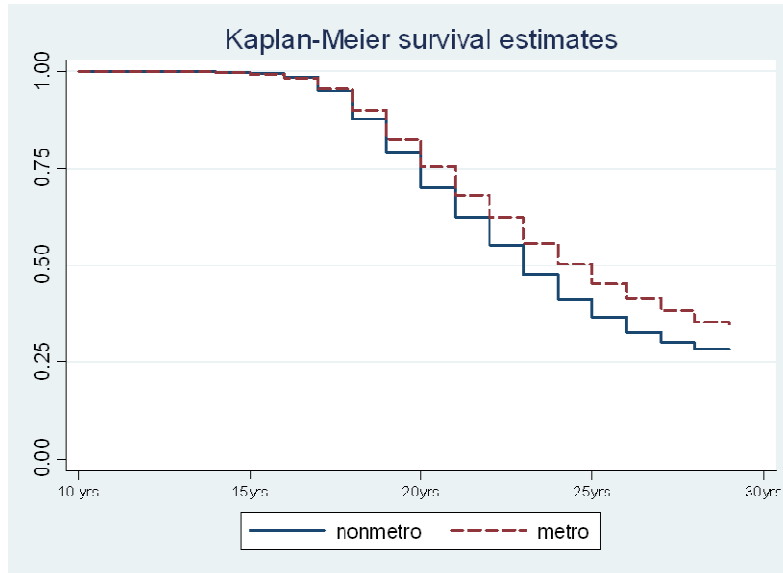


Figure 1. Life table estimates of cumulative percentage remaining single by residence

Differences appear in migration and residential mobility across residences. Table 2 reveals that nonmetropolitan young adults have experienced frequent mobility and left their residence of 1997 earlier than their metropolitan counterparts. More than 90% of the nonmetropolitan young adults have experienced changes in residence, compared to 84% of those in metropolitan areas. With regard to moving distance, those in nonmetropolitan areas are significantly more likely than their metropolitan counterparts to experience a migration event, consistent with the result from the Census data (US Census Bureau 2003). Those in nonmetropolitan areas have experienced 1.4 times as many between-county moves (1.59) as those in metropolitan areas (1.15). In addition, they are more likely than those in metropolitan to change their residences within a same county. Overall, the results demonstrated that migration and residential mobility patterns are significantly different between metropolitan and nonmetropolitan young adults; those from nonmetropolitan are more likely to experience residential mobility and migration, but also they make the mobility significantly earlier than those from metropolitan areas.

Table 2. Description of migration and residential mobility by 1997 Residence

	Nonmetro	Metro	Total	χ^2 / t value
Total Moves				
Age at first move (yrs)	18.58(0.07)	18.95(0.04)	18.88(0.03)	t = -4.17***
Total number of move	3.74(0.06)	3.07(0.03)	3.19(0.02)	t = 10.34***
Ever experienced moving (%)	0.92	0.84	0.86	$\chi^2=79.95^{**}$
Migration: Between-county move				
Age at first between-county move (yrs)	20.22(0.09)	20.45(0.05)	20.40(0.04)	t=-2.15**
Total number of between-county move	1.59(0.04)	1.15(0.02)	1.23(0.02)	t=10.90***
Ever experienced between-county moving (%)	0.67	0.55	0.57	$\chi^2=93.74^{**}$
Residential Mobility: Within-county move				
Age at first within-county move (yrs)	19.28(0.04)	19.50(0.05)	19.46(0.04)	t = -2.12**
Total number of within-county move	2.15(0.04)	1.92(0.02)	1.96(0.02)	t=4.34***
Ever experienced within-county moving (%)	0.79	0.70	0.72	$\chi^2=60.01^{***}$

Note: All statistics were adjusted under survey setting in Stata which accounts for the complexity of the NLSY97 sampling, and also weights the analysis to be representative of the overall U.S. population.
 $\dagger p \leq .10$, * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

Multivariate Results

Table 3 presents discrete-time competing risk models that predict first union formation and present marriage, cohabitation and remaining single as competing risks. Time is associated with increased relative risk of any union formation versus remaining single, and marginally associated with increased relative risk of marriage versus cohabiting. Females have higher relative risks of any union formation relative to remaining single, but are not associated with the competing risk of marriage versus cohabitation. Non-Hispanic Blacks have lower relative risks than Non-Hispanic Whites for forming any union (.48 and .70 for marriage and cohabitation, respectively), and also for marrying versus cohabiting (.69) when these two union types are presented as competing risks. In contrast, Hispanics have significantly higher relative risks of marriage versus cohabiting (1.69) or remaining single (1.64). There is no association between Hispanic ethnicity and the relative risks of cohabiting versus remaining single.

Table 3. Competing risks model predicting first union formation

	Marriage vs Single		Cohabitation vs single		Marriage vs cohabitation	
	β	e^β	β	e^β	B	e^β
Intercept	-.40	—	-1.32	—	.92	—
Age effects						

Age	.21***	1.23	.15***	1.16	.06†	1.06
Age2	-.03***	.97	-.02***	.98	-.01	.99
Age3	.0004†	1.00	.0001	1.00	.0003	1.00
Female	.39***	1.47	.44***	1.55	-.05	.95
Black	-.73***	.48	-.35***	.70	-.38**	.69
Hispanic	.52***	1.69	.03	1.03	.49***	1.64
Education						
tv_completed high school	.46***	1.58	.10*	1.10	.36***	1.43
tv_completed college	.45***	1.56	.23**	1.26	.22†	1.24
Employment						
tv_employed	.26***	1.29	.29***	1.34	-.04	.96
tv_employed 1 year ago	.15***	1.16	.19***	1.21	-.05	.96
Mother's education	-.02	.98	-.04***	.96	.02	1.02
Intact family until age 18	.24*	1.27	-.55***	.58	.79***	2.20
Residence						
tv_living in metro area	-.33***	.72	-.36***	.70	.03	1.03
Residence characteristics						
Unemployment rate	-.01*	.99	-.001	.999	-.01†	.992
% population under poverty level	.001	1.00	.001*	1.00	-.001	.999
% population with high school degree	-.0001	1.00	.003***	1.00	-.003**	.997
% population with college degree	-.004***	.996	-.003***	.997	-.001	.999
Moving factors						
tv_migration, 1 year ago	.06†	1.07	.07**	1.08	-.01	.99
tv_residential mobility, 1 year ago	-.05	.95	.14***	1.15	-.18***	.83
Total number of migration	.06	1.06	.08*	1.09	-.02	.98
Total number of residential mobility	-.15***	.86	-.01	.99	-.14***	.87

F (df) = 75.02(42,157)

Strata = 1, PSUs = 199, Design df = 198

Population size = 19,810,549,825

N = 91,848

Note: All statistics were adjusted under survey setting in Stata which accounts for the complexity of the NLSY97 sampling, and also weights the analysis to be representative of the overall U.S. population.

†p≤.10, * p≤.05, ** p≤.01, *** p≤.001

Time-varying measures of education and employment are also significantly associated with union formation in Table 3. Completing either high school or college is associated with significantly higher relative risks of forming any union, and also with significantly higher risks of marriage versus cohabitation. Employment and a 1-year lagged employment variable are both significantly associated with an increased relative risk of forming any union versus remaining single, but do not distinguish between marriage versus cohabitation, and the effects of these variables are very similar. Mother's education is associated with a significantly lower relative risk of cohabitation versus remaining single, and living in an intact family until age 18 is associated with higher relative risk of marriage versus either cohabitation or remaining single, and with lower relative risk of cohabitation versus remaining single.

We are mostly interested in the association between our various measures of migration and residential mobility and union formation. All migration and residential mobility variables are lagged one year. We do this because with the NLSY97 data it is only possible to measure moving yearly, which means our time-varying measures are in person-years. The moving variables are lagged to ensure that the moving event occurred before union formation. Living in a metropolitan county reduces the relative risk of forming any union versus remaining single, but does not distinguish between marrying and cohabiting. When we examine the association of moving, we distinguish moves within a county (residential mobility) from moves between counties (migration events). We see in Table 3 that these types of moves are differentially associated with union formation. Lagged migration is associated with significantly higher relative risk of forming any union, but does not distinguish between cohabitation and marriage. Lagged residential mobility is associated with cohabiting, increasing the relative risk of cohabiting versus remaining single (1.15) and decreasing the relative risk of marrying versus cohabiting (.83). The total number of migration moves increases the relative risk of cohabiting versus remaining single, whereas the total number of residential mobility moves decreases the relative risk of marriage, regardless of the competing risk.

Table 4 adds interaction terms of residential location by moving to examine if moving events have different impacts on union formation for metropolitan residents. When these variables are added to the full model we see some changes in the effect of the migration variables on first union formation. First, lagged migration is now associated with a lower relative risk of cohabiting versus remaining single and marrying. Second, lagged residential mobility lowers the relative risk of marriage versus all either remaining single or marrying, and increases the relative risk of cohabiting. When the interaction terms are added to the model we see that compared to nonmetropolitan resident who did not migrate, metro residents who did migrate have higher relative risks of forming any union versus remaining single, but lower competing risks of marrying versus cohabiting. Compared to nonmetropolitan residents who did not move within their county, metro residents who moved within their county also had higher relative risks of forming any union.

Table 4. Models for competing risks with interactive effect

	Marriage vs single	Cohabitation vs single	Marriage vs cohabitation
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	β	e^{β}	β	e^{β}	B	e^{β}
Intercept	-.40	—	-1.32	—	.92	—
Age effects						
Age	.21***	1.24	.15***	1.17	.06†	1.06
Age2	-.03***	.97	-.02***	.98	-.007	.99
Age3	.0004†	1.00	.0001	1.00	.0003	1.00
Female	.39***	1.47	.44***	1.55	-.05	.95
Black	-.73***	.48	-.36***	.70	-.38**	.69
Hispanic	.52***	1.69	.03	1.03	.49***	1.64
Education						
tv_completed high school	.46***	1.59	.10*	1.10	.36***	1.44
tv_completed college	.44***	1.55	.22*	1.24	.22†	1.25
Employment						
tv_employed	.26***	1.29	.30***	1.35	-.04	.96
tv_employed 1 year ago	.15***	1.16	.19***	1.21	-.05	.96
Mother's education	-.02	.98	-.04***	.96	.02	1.02
Intact family until age 18	.24*	1.27	-.55***	.58	.79***	2.20
Residence						
tv_living in metro area	-.37***	.69	-.41***	.67	.03	1.04
Residence characteristics						
Unemployment rate	-.009*	.99	-.001	.999	-.008†	.992
% population under poverty level	.001	1.00	.001*	1.00	-.001	.999
% population with high school degree	-.0002	1.00	.003***	1.00	-.003**	.997
% population with college degree	-.004***	.996	-.003***	.997	-.001	.999
Moving factors						
tv_migration, between county move, 1 year ago	-.14	.87	-.34***	.71	.20*	1.23
tv_residential mobility, within county move, 1 year ago	-.32*	.72	-.04	.96	-.28*	.76
Total number of migration	.06	1.06	.01**	1.09	-.03	.97
Total number of residential mobility	-.15***	.86	-.005	.995	-.14***	.87
Interactive effect						
metro* migration (1 year lag)	.24†	1.27	.51***	1.66	-.26*	.77
metro*residential mobility (1 year lag)	.35*	1.43	.22*	1.25	.13	1.14

F (df) = 68.00_(46,153)
Strata = 1, **PSUs** = 199, **Design df** = 198
Population size = 19,810,549,825
N = 91,848

Note: All statistics were adjusted under survey setting in Stata which accounts for the complexity of the NLSY97 sampling, and also weights the analysis to be representative of the overall U.S. population.
†p≤.10, * p≤.05, ** p≤.01, *** p≤.001

Thus, while metropolitan residence reduces the relative risk of forming any union, metropolitan residents who experience either a within or between county move have higher relative risks of forming any union versus remaining single. In addition, those who move between counties have lower relative risks of marriage versus cohabitation. Prior studies have found that metro residence is associated with lower relative risks of marriage versus cohabitation as a first union formation event (Brown & Snyder 2006) using NSFG data from 1995, but more

contemporary data from a young adult cohort in the NLSY97 finds that any moving and metropolitan status encourage union formation in general.

Summary and conclusions

This study expands previous studies in two ways; we first examined whether family formation behaviors differ between metropolitan and nonmetropolitan areas (Snyder et al. 2004; Brown & Snyder 2006; McLaughlin et al. 1993), and then investigated effects of moving events on union formation (Guzzo 2006). We found that there are significant differences in union formation patterns across residences. Those in nonmetropolitan areas are more likely than their metropolitan counterparts to be involved in either cohabitation or marriage at younger ages; stated differently, metropolitan young adults tend to delay their union formation. Given that family formation behaviors are significantly related to other life course events such as education and employment, additional research needs to investigate causes and effects of the difference in union formation on later life to better understand recent family changes. In addition, differences also appear in migration and residential mobility experiences; those in nonmetropolitan areas tend to change their residence frequently and earlier than their metropolitan counterparts. Prior studies have found that migration and residential mobility are motivated by better opportunities with regard to education and occupations in other places (Massey et al. 1993). Therefore, the different patterns in mobility across residences in our findings reflect that there are fewer resources to achieve career goals in nonmetropolitan areas. Moreover, studies have pointed out that frequent migration and residential mobility have contributed to negative health outcomes such as depression (McCollum 1990; Magdol 2002). Those in nonmetropolitan areas who are more likely to experience the moving events might be more likely at risk of deterioration of their health. More studies are needed to understand how the migration and residential mobility are linked to movers' mental health.

Consistent with previous research, our multivariate model reveals that completing education and being employed significantly increase the likelihood of union formation compared to remaining single. Moreover, the employment status does not differentiate relative risks of marriage versus cohabitation. Therefore, our finding supports that cohabitation has become

prevalent as a first union formation among young people (Landale et al. 2010). Given diverse meanings of cohabitation emerged in recent years (Smock 2000), we need more detailed information about cohabitation among young people in the NLSY97 (e.g., duration, having kids), which will contribute to ongoing debates on family diversity. Regarding characteristics of residence, there are no strong determinants in union formation although few have revealed statistical significance. Further studies should be followed to investigate the plausible association of migration and residential mobility in terms of young adult's marriage market choices since the degree to which quantity and quality of marriage markets influences the likelihood of union formation is highly dependent on the level of aggregation as well as the estimation technique (Blau et al. 2000; Brien 1997).

Our time varying migration and residential mobility variables suggest that migration increases the likelihoods of marriage and cohabitation when they are compared with remaining single. However, residential mobility is negatively related to the odds of marriage but positively linked to cohabitation. Migration, which is long-distance mobility, often involves a job transfer or getting a new job (Schachter 2001), whereas residential mobility, which is short-distance mobility, occurs due to housing-related issues such as searching for better house or apartment (Schachter 2001). The job related issues are one of the significant life course transitions which require huge changes in life, and thus those who are engaged to their partner are more likely to decide to marry or cohabit when they move to another county. On the other hand, residential mobility is more likely to be related to change their apartment for renters, which might indicate their instable economic status. They are less likely to marry compared to cohabitation because marriage is still considered a relationship for people after building up economic stability (Cherlin 2004). The significance of migration also suggests that some movers might be motivated in part by unfavorable local marriage markets or perhaps that migration motivated by improved educational or employment opportunities results in better marriage market conditions that increase the odds of forming a union (Lewis & Oppenheimer 2000). More research with information on partner relationships and changes in marriage markets will provide a refined picture of the roles of migration and residential mobility in union formation. Finally, those living in metropolitan areas are less likely to either marry or cohabit compared to remaining single. However, if they change their residence either across their county or within a same county, the odds of union formation increases compared to those in metropolitan areas who have not moved.

It may suggest that moving expands movers' mate opportunities in marriage markets as well as education or occupational markets (Massey et al. 1993; Cadwallader 1992). However, it is also possible that a selection bias contributes to the difference; for example, the movers in metropolitan areas can be more likely to be engaged to their partner. More research is needed in order to explicate the role of residence in relationships between migration and residential mobility and union formation.

In this study, we create individual migration history variables based on their county and state FIPS codes in the NLSY97 geocode file. The data generated here is more reliable information than other sources relying on self-reported retrospective responses (e.g., the National Survey of Families and Household, Guzzo 2006) in that memory for specific date of events tends to be influenced by other milestone events, which is usually considered less accurate (Tourangeau et al. 2000). In addition, we separate a long-distance migration event from a short-distance residential mobility, and then find that young adults in nonmetropolitan areas are more likely to experience migration events while their metropolitan counterparts tend to move within a same county (i.e., residential mobility). Although the difference appears to affect transition to union formation, additional research is needed because the sample is still too young to complete their family formation behaviors. Whether the effects of moving differed by residence continue to influence family formation behaviors is a subject for future research.

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