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Migration history, migration behavior and selectivity

Adrian J. Bailey

Department of Geography, Dartmouth College, 6017 Sherman Fairchild Hall, Hanover, NH 03755-3571, USA

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Abstract. A series of proportional hazards models are used to study the relationship between migration history and migration behavior for a sample of young adults from the National Longitudinal Survey of Youth. The results support the argument that migration is a selective process. College educated young adults have a greater hazard rate of making an initial migration but a lower hazard rate of re-migration, suggesting they have less need of corrective geographic behavior. Individuals who have moved two or more times are less responsive to national unemployment conditions than first time migrants. Migration is related to the timing of unemployment within a sojourn. The findings suggest that migrant stock is an important determinant of how labor markets function.

1. Introduction

In a paper recently published in this journal Greenwood et al. note that "far too little past research has attempted to capture migration history" (Greenwood, Mueser, Plane and Schlottmann 1991: 245). Along with other proximate determinants of migration (notably age and education) migration history is thought to have a systematic effect upon migration behavior (Sandefur and Scott 1981). We know, for example, that those who have moved before are much more likely to move again (DaVanzo 1983; Bailey 1989).

There are two explanations for this phenomenon. The first holds that migration is a learned strategy. Migration history sensitizes individuals to spatial and temporal fluctuations in opportunities and they learn to respond efficiently to labor market signals. This explanation implies that labor markets in regions with a high proportion of in-migrants operate more efficiently than labor markets in regions with few in-migrants.

The alternative explanation says that migration is a selective process. The most successful migrants are the least likely to re-migrate. The pool of individuals who have multiple migration experiences will be increasingly composed of unsuccessful migrants with each additional migration event. According to this scenario regions with a large stock of what Morrison has termed "chronic migrants" will have inefficient labor markets (Morrison 1967).

An understanding of the relationship between migration history and migration behavior can therefore enhance our knowledge of how regional labor markets operate. This paper uses longitudinal data to explore the migration decisions of a national sample of young adults. Longitudinal data are crucial in two ways. First, migration history can only be identified with micro-level information on lifetime spells of residence, or sojourns. Second, because migration occurs when sojourns end, a model of migration behavior is most simply expressed as a model of the variation in the durations of a set of sojourns.

The paper draws data from the ongoing National Longitudinal Survey of Youth (NLSY) sample. Asides from the 1968 Coleman-Rossi Life History Survey the NLSY is the only national sample that contains complete residence histories. Between 1978 and 1982 over 10000 young adults were asked to record the duration and location of each place of residence in addition to other labor market and life-cycle events and characteristics (CHRR 1988). The richness of the data-set makes it possible to capture the impact of migration history by including a variety of control variables in models of migration behavior.

Young adults are the focus of this paper. These individuals are making their first independent migration decisions so the true role of migration history can be isolated. Also, the operation of migration as a mechanism of labor market equilibrium is largely contingent on the migration decisions of young adults. Between 1975 and 1980, for example, some 40% of all inter-county moves made in the US were made by persons who were aged between 15 and 24 in 1975 (US Department of Commerce 1985).

The paper is organized as follows. The second section develops the two explanations of the migration history effect. Section three describes the steps taken to operationalize the data and the modelling framework. Section four presents the results and the paper concludes with a synthesis and discussion.

2. Migration history and migration behavior among young adults

Young adults migrate to find and keep work (Black 1983). Based on national data collected for the period of this study for young adults under the age of 25 who had completed inter-state moves, Long (1988: 239) reports that the single most important reason given for migration was labor related (46.3%). Other reasons included attending school (15.4%), enrolling in the armed forces (6.9%), to be close to relatives (4.2%), and miscellaneous (27.3%). Young adults are especially prone and sensitive to unemployment (Freeman and Wise 1982; Rees 1986). The logic of human capital theory, which regards migration as an investment in the individual's future productivity, and job search theory, which sees migration as a way of extending the geographic range of job search, can be usefully combined to derive a basic model of the migration behavior of young adults (Sjaastad 1962; Stigler 1961; Schaeffer 1985).

Individuals only move when their expected benefits (appropriately discounted) exceed probable costs. Benefits of continued residence include being employed or otherwise engaged in some productive activity (like going to college), accessing information about local opportunities (for example about new jobs or cheap housing), and maintaining local social networks. Becoming unemployed represents a disbenefit to current residence. In addition to the direct costs of migration, the decision to leave incurs costs which arise from foregone earnings and experience, and which arise from losses of location-specific information and social ties (Allen 1979; DaVanzo 1981; Goss 1988).

When an individual makes their first migration decision they do so in the absence of any relevant prior experience. Estimates of potential costs and benefits have a high variance around their unobserved means. Migration history reduces these variances and subsequent sojourns are initiated with a higher chance that costs and benefits have been accurately formulated. Subsequent sojourns should thus be more successful. For economically motivated young adults the learned strategy model of migration suggests that those with a migration history will factor current disbenefits – like unemployment experiences – into the migration decision more effectively than those without a migration history.

This scenario is tempered by the selectivity argument (Becker 1975; Greenwood et al. 1991). Given a population which is composed of individuals with different migration skills, and assuming constant exogenous conditions, those individuals who possess a critical skill mix ("positively selected") will benefit more from a first migration than individuals without this skill mix ("negatively selected"). Precisely because the former group benefit from migration they have less need to re-migrate. Those who do re-migrate may be making corrective moves. The set of people making second (and subsequent) moves will be increasingly composed of negatively selected migrants. This argument also applies when the constant exogenous conditions assumption is relaxed.

These ideas are investigated by estimating a series of models which write the hazard rate of migration as a function of independent variables. The hazard rate describes the instantaneous rate of experiencing an event (migration) at some time (t). As the hazard of migration increases, the expected duration of the sojourn decreases; conversely, as the hazard decreases, the expected duration of the sojourn increases. Thus, in a longitudinal context, the impact of independent variables upon migration can be interpreted using either outcome.

The selection of independent variables is guided by the logic of human capital and job search models. Gender (male), race (white), marital status (single), and college education will increase the hazard rate of migration and shorten the sojourn (Ravenstein 1885; Mincer 1978; Bartel 1979). However, tied individuals may migrate in a way which does not respond to the strict job search or human capital calculus because of their goal of maximizing household, rather than individual utility (McCollum 1990). A proxy variable for wives/non-wives is used to test this idea.

Unemployment represents a disbenefit to continued local residence because it reduces the current income stream and the rate of acquisition of job skills, thereby undermining the long-term participation of young adults in the labor market (Freeman and Wise 1982). Migration helps individuals find jobs by increasing the range of available job opportunities. Intuitively, this implies a negative relationship between being unemployed and the length of a sojourn. However, three factors suggest that being unemployed may lead to longer sojourns. First, migration is a costly strategy which demands resources that may be unavailable to the unemployed. Second, for those spells initiated by in-migration, there may be a tendency for an individual to prolong local search in an effort to locate a job offer which can re-capture some of the short-term losses associated with migration and subsequent unemployment. Third, it is not uncommon for the unemployed to remain in a labor market awaiting re-hiring (Feldstein 1978). An attempt is made to unravel these effects by considering the timing of unemployment within the sojourn. Sojourns which begin with unemployment will be shorter than sojourns that do not begin with unemployment. Likewise, sojourns which end with unemployment are hypothesized to be shorter than sojourns which do not end with unemployment. However, the magnitude of the parameter which describes the positive relationship between unemployment and the hazard of migration will be greater for sojourns ending in unemployment than sojourns beginning with unemployment.

Exogenous conditions also affect the rate of migration and two surrogates for labor market conditions are used. Residence in an urban county is used as a surrogate for the density of job opportunities and information about these job opportunities. Those searching for jobs in urban labor markets are assumed to have better information about a larger number of local employment opportunities and, ceteris paribus, have less need to migrate to find work. Job searchers are sensitive to national labor market conditions when they are searching for jobs and tend to postpone migration when national unemployment rates are high (Clark 1983). In addition, interaction terms are constructed between the variable which marks unemployment status at the start (end) of the sojourn and the prevailing national rate of unemployment among young adults at the start (end) of the sojourn.

These variables are profiled in Tables 1 and 2. Together they form the basis of an initial model of the hazard rate of migration. An additional variable – representing prior migration – is appended to the initial model to confirm the role of migration history. Next, the exact nature of this relationship between migration history and the hazard of migration is investigated by estimating disag-

Table 1. Qualitative variable summary

Variable	Proportion of		
	Sojourn 1	Sojourn 2	Sojourn 3
Gender (female)	0.482	0.439	0.356
Race (white)	0.553	0.627	0.651
Married (Y)	0.040	0.142	0.169
Wife (Y)	0.032	0.102	0.102
College (Y)	0.009	0.046	0.044
Urban location (Y)	0.728	0.704	0.694
Unemployed at sojourn start (Y)	0.104	0.090	0.082
Unemployed at sojourn end (Y)	0.061	0.047	0.061

Table 2. Quantitative variable summary

Variable	Mean for		
	Sojourn 1	Sojourn 2	Sojourn 3
Unemployment rate at sojourn start if unemployed[a]	143.4	148.3	149.1
Unemployment rate at sojourn end if unemployed[b]	170.9	169.4	166.1

[a] Derived as follows. The dummy variable for unemployment status in the first two months of a sojourn is multiplied by the national unemployment rate for 15 – 24 year-olds which prevailed during the first month of the sojourn. The result is postmultiplied by ten. The reported means refer only to those who were unemployed at the start of the sojourn
[b] Derived as follows. The dummy variable for unemployment status in the last two months of a sojourn is multiplied by the national unemployment rate for 15 – 24 year-olds which prevailed during the last month of the sojourn. The result is postmultiplied by ten. The reported means refer only to those who were unemployed at the end of the sojourn

gregated models for first, second, and third and subsequent sojourns. As suggested above, the selectivity effect implies that the group of individuals choosing to end their (n+1) sojourn stand to benefit less from re-migration than the group of individuals who chose to end their (n)th sojourn. In general, selectivity implies that the hypothesized relationship between parameter estimates and the hazard of migration or sojourn length will weaken, or even reverse, over migration history. For example, the positive association between being male and the hazard rate of migration may diminish across the first, second, and third sojourns. Also, unemployment during the first sojourn could prompt a positively selected migrant to move sooner and extend their second sojourn. Those unemployed during their second sojourn would wait longer to migrate. In time, migration history may thus have the effect of changing the relationship between unemployment and migration behavior. Finally, the estimation of disaggregated models enables learning effects to be detected.

3. Methodology

The NLSY randomly sampled 12686 young men and women who were aged between 14 and 21 on January 1, 1979. Individuals are included in the NLSY sample if they lived within the fifty states, except for military personnel on overseas assignment and those individuals residing in a penal or mental institution on a permanent basis. A total of 8966 variables were collected for this sample, including a complete longitudinal record of county or SMSA of residence from 1978 to 1982 (CHRR 1988).

In this study a labor market is defined as an SMSA or rural county. Starting with the week of January 1 – January 7, 1978 as week number 1, the beginning and ending dates of the sojourns were recorded as week numbers, yielding sojourn durations in weeks. A migration event occurs when an individual terminates a residential sojourn in one labor market and moves to another labor market.

This analysis attempts to focus on those decisions which can reasonably be attributed to the young adult. This is especially important in the context of migration where family decisions may be taken on behalf of minors. It is assumed that an individual becomes an autonomous decision-maker when he or she leaves high school. Departure from high school is defined as either the time of graduation, or the time of the last recorded drop-out. A number of individuals leave high school before January 1, 1978 or after December 31, 1981 and these individuals are stricken from the analysis.

It is also assumed that the "migration" typical of college students returning home and military enrollers cycling between bases are not subject to the same forces as migration events common to members of the work-force. Those currently defined as college students or military enrollers are also excluded from analysis. The remaining individuals begin their first sojourn by leaving high school, college, or the armed forces, end their last sojourn due to right censoring in week 208 (December 24 – December 31, 1981), and are subject to the risk of migration any time in between. Following this logic a total of 9615 residential sojourns for 6463 young adults are distinguished.

The maximum length of a sojourn is therefore 208 weeks (four years). This analysis does not observe the termination events for sojourns that extend beyond 208 weeks. It is possible, then, that the data under-represent long-term sojourns and over-represent short-term sojourns. However, the vast majority of completed sojourns are short-term and terminate in under two years: 54% of all completed sojourns last less than 20 weeks, 93% last less than 104 weeks, and under 2% end between the 182nd and 208th week. This is consistent with the high rates of mobility for young adults. Further, there is no evidence to suggest that the termination events of long-term sojourns are different from the termination events of short-term sojourns. Indeed, Long (1988: 239) reports that the cohort of individuals in their late 20s and early 30s (the cohort who are ending long-term sojourns) terminate these sojourns for the same reasons (labor related) as those in their early 20s.

The variation in the lengths of sojourns is represented here with the hazard rate. It is possible to describe the distribution of time to a migration event by selecting available statistical distributions (Lawless 1982). These parametric models require that the choice of distribution be guided by theoretical precedent. Semi-parametric approaches avoid this requirement and are favored here.

The Cox proportional hazards model factors the hazard into two components: a set of independent variables which describes the process (X), and an unobserved baseline hazard function which describes the effect of time on the hazard rate:

$$h(t;X) = h_0(t)\exp(\beta X) \tag{1}$$

where $h(t)$ represents the hazard rate at time $t, h_0(t)$ represents the baseline hazard, and β is a vector of parameter coefficients. This particular model assumes that the ratio of hazards for two individuals will remain constant over different values of t. Normal equations are obtained from an expression for the probability of an event occurring to a given individual at a given time and solved using the Newton-Raphson algorithm. Using partial likelihood the resulting parameter estimates are assumed to be asymptotically normal (Cox 1975).

A total of five hazard models are estimated. First, all sojourns are pooled and written as a function of all variables except migration history ($n = 9615$). Second, migration history is appended ($n = 9615$). This model is referred to as the standard model. Disaggregation by sojourn will remove any specification bias caused by treating migration history as a dummy variable (Hunt and Kau 1985). Hazard models are thus estimated for the set of initial sojourns (no migration history, $n = 6463$), the set of second sojourns (one prior move, $n = 1669$), and the set of third and subsequent sojourns (two or more prior moves, $n = 1483$). Sample size restricts disaggregation to these models.

4. Results

The first aggregated hazard model, with no term for migration history, adequately explains the variation in the set of duration data (Table 3, first numeric column).

Table 3. Aggregated hazard model estimates

Variable	No history	Standard
Migration history (Y)	–	1.0724 (27.515)
Gender (female)	0.3184* (−7.953)	−0.2192* (−5.437)
Race (white)	0.2605* (6.679)	0.2032* (5.202)
Married (Y)	0.3146* (2.884)	−0.6096 (−0.633)
Wife (Y)	−0.1111 (−0.805)	−0.0877 (−0.635)
College (Y)	0.3356* (2.939)	−0.0583 (−0.507)
Urban location (Y)	0.1754* (−4.389)	−0.1582* (−3.956)
Unemployed at sojourn start (Y)	−1.5113 (−1.753)	−0.6099 (−0.747)
Unemployment rate at sojourn start if unemployed	0.0099 (1.635)	0.0038 (0.658)
Unemployed at sojourn end (Y)	5.9531* (9.090)	5.7276* (8.711)
Unemployment rate at sojourn end if unemployed	−0.0340* (−8.435)	−0.0325* (−8.025)
Number of sojourns	9615	9615
Percent censored	69.5	69.5
Log likelihood	−25328.3	−24967.5
Global chi-square	307.95	1151.50
Probability value	0.0000	0.0000

T-values are shown in parentheses and * denotes significance at $p \leq 0.05$

The log likelihood value is −25328.3 and the deviance 307.95. This value of the deviance is greater than the critical chi-squared value, and it has an associated probability level of less than 0.00005. As with all the estimated models, the proportionality assumption was not violated and there was no significant clustering of right-censored sojourns. Thus we can be confident that no major assumptions are violated.

The directions of the parameter estimates generally confirm theoretical expectations. A negative parameter indicates that a variable is associated with longer sojourns, and a reduced hazard rate of migration. A positive parameter is associated with a shorter sojourn, and a greater hazard rate of migration. Thus, migration occurs significantly more quickly: for males; for whites; for those married; for the college educated; for those living in rural counties; for those unemployed at the end of a sojourn. Migration is delayed by the unemployed when national unemployment rates are high. Only the direction of the marriage parameter is unexpected. Being unemployed at the start of the sojourn has no significant influence upon migration.

The addition to this model of a term for migration history also leads to a model which fits the data (Table 3, right hand column). However, an analysis of deviance test yields a scaled deviance value of 360.8 which, with one degree of freedom, indicates that the model formulations are not equivalent. The parameter estimate for the migration history term is in the anticipated direction and highly significant. Young adults with a migration history move sooner than young adults with no migration history. Of particular concern, however, is the insignificance of the term for education. This is perhaps an indication that there is some interrelation between education, migration history, and migration behavior. The disaggregated models confirm this suspicion.

In the final stage of the analysis the standard model was disaggregated into three models, for first, second, and subsequent sojourns. To assess the equivalence between the standard model and the disaggregated models a test of homogeneity is used (Trivedi and Alexander 1989: 399). The total log likelihood of the three disaggregated models is 22079.7. The log likelihood of the standard model is −25311.9. The difference in log likelihoods has a highly significant chi-squared statistic and so the two approaches are not equivalent. Again, however, each of the single models adequately explains the variation in the duration data. As is implied by the homogeneity test, several parameters are now estimated with different signs. Each model is discussed in turn (estimates are summarized in Table 4).

The decision to end the first sojourn is made in the absence of migration history. Many of the parameter estimates for this model mimic those of the standard model which is to be expected as first sojourns comprise some 67.2% of all sojourns. Thus, whites, males, and rural residents all migrate sooner than respective reference groups. High national unemployment again retards migration among those unemployed at the end of a sojourn.

A 1% increase in the national unemployment rate for 15−24 year olds decreases the rate at which unemployed individuals move by 31.7% [1]. The an-

[1] This is calculated as follows. Unemployment rates are used with one implied decimal so the actual parameter estimate is −0.381. The effect of the parameter upon the hazard rate is given by exponentiating this estimate (exp (−0.381)).

Table 4. Disaggregated hazard model estimates

Variable	Standard	Sojourn 1	Sojourn 2	Sojourn 3+
Gender (female)	−0.2192* (−5.437)	−0.2381* (−4.441)	−0.2534* (−3.283)	−0.1235 (−1.226)
Race (white)	0.2032* (5.202)	0.3026* (5.587)	0.0712 (0.972)	0.1063 (1.120)
Married (Y)	−0.6096 (−0.633)	0.3791 (1.714)	−0.2625 (−1.364)	−0.0193 (−0.114)
Wife (Y)	−0.0877 (−0.635)	−0.3471 (−1.303)	−0.0755 (−0.316)	−0.1096 (−0.463)
College (Y)	−0.0583 (−0.507)	0.4921* (2.387)	−0.0921 (−0.559)	−0.5412* (−2.126)
Urban location (Y)	−0.1582* (−3.956)	−0.2521* (−4.551)	0.0066 (0.086)	−0.1227 (−1.380)
Unemployed at sojourn start (Y)	−0.6099 (−0.747)	−0.7134 (−0.639)	1.0616 (0.616)	−1.3997 (−0.759)
Unemployment rate at sojourn start if unemployed	0.0038 (0.658)	0.0047 (0.582)	−0.0079 (−0.663)	0.0094 (0.747)
Unemployed at sojourn end (Y)	5.7276* (8.711)	6.5325* (6.924)	6.2180* (4.747)	3.8754* (3.128)
Unemployment rate at sojourn end if unemployed	−0.0325* (−8.025)	−0.0381* (−6.544)	−0.0353* (−4.439)	−0.0197* (−2.583)
Number of Sojourns	9615	6463	1669	1483
Percent censored	69.5	76.7	50.2	60.1
Log Likelihood	−24967.5	−12415.4	−5669.9	−3994.4
Global Chi-Square	1151.5	161.1	59.7	55.3
Probability value	0.0000	0.0000	0.0000	0.0000

T-values are shown in parentheses and * denotes significance at $p \leqslant 0.05$

ticipated influence of college education is now confirmed. The college educated make their first migration sooner than those without college education.

Individuals immersed in second sojourns have moved once and are contemplating their second move. Hence, their migration decision will take some account of the success or failure of the original migration decision. The parameter estimates for the second sojourn reveal important behavioral departures. Second sojourns are shortest for whites and for those unemployed at the end of the sojourn. Re-migration is postponed by the unemployed when national conditions are poor. However, these migrants react less sharply to national conditions than the first time migrants. A 1% increase in the national unemployment rate for 15–24 year olds now decreases the rate at which unemployed individuals move by 29.8%. Further, the level of education is not systematically related to migration behavior (the negative parameter is insignificant). College educated and non-college educated persons are equally likely to migrate a second time.

The final model of migration behavior for third and subsequent sojourns shows further behavioral changes. Individuals have now moved at least twice. Only their own unemployment at the end of the sojourn prompts an additional move. The response of these unemployed migrants to national conditions, while remaining significant, is again sluggish: a 1% increase in the national unemployment rate for 15–24 year olds now decreases the rate at which unemployed individuals move by 17.9%. This means that the effect of two prior moves is to reduce by one half the responsiveness of migration to a 1% change in unemployment rates. Consistent with this finding is the significant but negative relationship between education and migration. The college educated delay migration; by implication those without college education are re-migrating first. This is the reverse of the initial migration decision.

5. Synthesis and conclusion

This longitudinal analysis of the relationship between migration history and migration behavior among a national sample of young adults can be summarized in six points. First, consistent with past research, migration history is associated with higher rates of re-migration. Second, representing this effect of migration history with a single dichotomous variable is less instructive than estimating separate models for successive migration decisions. This is particularly evident in that, third, the college educated are quicker to make their first move but slower to make their third or additional moves. The disaggregated models also showed that fourth, the degree to which being unemployed encourages migration declined as an individual's migration history increased. Fifth, high national unemployment rates always retarded the migration of the unemployed, but this effect also diminished with increased migration history. Sixth, being unemployed at the end of a sojourn has a stronger impact upon the hazard of migration than being unemployed at the start of the sojourn. The timing of unemployment within the sojourn has a critical influence upon migration behavior.

These findings are emblematic of the selective nature of migration. The college educated react quickly and efficiently to changing conditions during their first sojourn. Although they are as likely as the non-college educated to make one corrective move their proclivity to extend third and later sojourns suggests they make early migration decisions that require less corrective geographic behavior. Education can be regarded as a surrogate for the mix of skills which enables some migrants to be more successful than others. The reduced impact of both personal unemployment experience and national unemployment conditions upon migration behavior is further evidence that a history of migration serves to negatively select young adults. In the aggregate, these findings suggest that the labor market of a region with a high proportion of individuals with extensive migration history will operate less efficiently than the labor market of a region with fewer in-migrants. At a micro-scale migration benefits individuals differentially (Ihlanfeldt and Sjoquist 1991; Loveridge and Mok 1979).

These findings also suggest that the relationship between unemployment experience and migration is complex. Further analyses are needed to establish the conditions under which the jobless search non-locally and consider migrating, and the relative importance of cost constraints and perceptions about being re-hired. Because the timing of unemployment within the sojourn is crucial these analyses are likely to be longitudinal (Shumway 1994; Odland and Shumway 1993; Bailey 1994).

This paper increases our understanding of migration history and contributes to the growing literature that examines how migrant stock impacts regional dynamics (see Kau and Sirmans 1976; Odland and Bailey 1990). Thus, it should better enable us to capture spatial relations between states (Cushing 1986: 67). Additional work can extend the current analysis to other population cohorts and assess the degree to which the migration history effects seen above can be further understood by considering the spatial direction of repeat migration (Morrison and DaVanzo 1986).

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