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THE ROLE OF EDUCATION: MOBILITY INCREASING OR MOBILITY IMPEDING?

Axel Borsch-Supan

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ABSTRACT

This paper studies the influence of education on labor and geographic mobility. Mobility is an important equilibrating factor in a changing economy. Therefore, any factor that induces mobility also alleviates the symptoms of disequilibrium, and any factor that inhibits mobility also impedes economic adjustments. Does the high level of education in modern industrial societies help or hurt economic transitions?

Economic theory provides conflicting arguments. On the one side, the theory of firm-specific capital predicts that education increases job duration and therefore inhibits job mobility (Jovanovic, 1979). On the other side, education should increase mobility in markets with imperfect information because better educated persons should be better able to collect and process information, reducing search and transctions costs.

In a PSID subsample consisting of 736 individuals, we observed labor and geographic mobility from 1968 to 1982 and related it to the level of education at 1968. It appears that labor and geographic mobility are governed by quite different behavioral mechanism. Education strongly affects future labor and geographic mobility, but in opposite ways. A high level of education inhibits labor mobility, but increases geographic mobility.

Axel Börsch-Supan
John F. Kennedy School of Government
Harvard University
Cambridge, Mass. 02138

1. Introduction

This paper studies the influence of education on labor and geographic mobility. Mobility is an important equilibrating factor in a changing economy.[1] Therefore, any factor that induces mobility also alleviates the symptoms that accompany a state of disequilibrium in the economy, such as the current high rate of unemployment in the United States and in Western Europe. By the same token, any factor that inhibits mobility also impedes economic adjustments. What role does the high level of education in modern industrial societies play? Does it help or hurt economic transitions?

There are many notions of mobility. Labor mobility is understood to include three kinds of job changes: job changes within the same industry and occupation (such as promotions), the change from one occupation to another occupation (occupational mobility), and the change from a job in one industry to a new job in another industry (sectoral mobility). Similarly, geographic mobility can be categorized into intraurban mobility, moves between different communities within the same region, and interregional migration.

Relative to other markets (for instance, financial markets), both the labor market and the housing market are characterized by the overwhelming importance of market frictions. As opposed to financial markets, imperfect information, product heterogeneity, specific and immobile capital, and idiosyncratic relationships in labor and housing markets imply very high transactions costs and make adjustments of labor supply and housing consumption very costly. Therefore, labor and housing markets tend to be sluggish and exhibit long lasting deviations from market equilibrium. The same factors and sometimes government intervention and other institutional arrangements make for sticky wages and rents. Once in disequilibrium, labor mobility is a crucial mechanisms to change the qualitative nature of labor supply, i.e., the composition of skills available in the labor market, just as geographic mobility is the almost exclusive mechanism by which housing demand is changed.[2]

Labor and geographic mobility are closely tied together if not only by the fact that the distribution of industries is historically distributed, such that the decline of an industrial sector almost always implies the decline of an entire geographic region. Typical examples are the Pittsburgh region in the United States or the Ruhrgebiet in West Germany. On the household level, commuting distance and neighborhood choice link housing and job decisions within an urban area. Important job events such as becoming unemployed for an extended duration may precipitate migration with consequential housing adjustments. The reverse dependency may occur when a household migrates because of local amenities such as climate and the searches for a new job at the new place.[3]

Studying the determinants of labor and geographic mobility is important because of the implications on labor market policies. The current persistent unemployment in the United States and in Western Europe (on an even more pronounced scale) is concentrated in certain industries and occupations. In the short run, government subsidies may save jobs in declining industries by creating demand or reducing cost. However in the long run, unemployment is likely to persist unless there is considerable sectoral and occupational mobility. Long run economic policy must create incentives to encourage labor mobility, the only mechanism of qualitative change in labor market supply.

The very same argument holds for geographic mobility. As was argued above, unemployment tends to be regionally distributed, and, unless firms move to regions of high unemployment and unless new jobs are created and also accepted by the existing labor force, regional unemployment is only alleviated if workers migrate from depressed regions. On a smaller scale, a new job may be found within a region, but only with a greatly increased commuting distance. It therefore eventually force the worker to move into a different neighborhood.

The lack of willingness to move and migrate in many European countries is often considered an aggravating factor which contributes to the persistence of unemployment in Western Europe. This is contrasted to the more footloose American society where labor supply moved away from the North East in the sixties and seventies and now returns back to the North East during its current upswing. An interesting case study is Pittsburgh, Pennsylvania. The recent impressive renaissance of Pittsburgh is the consequence of a combination of outmigration (Pittsburgh lost one third of her population from 1960 to 1980[4]) and a drastic change of the industrial base made possible by a degree of sectoral mobility that is unparalleled in Europe (41.7 percent of all employees that worked in the primary metal industry in 1972 had changed to a different industry in 1982[5]).

Modern industrial societies are characterized by a high level of education and professional qualification. The central question of this paper is whether education increases or impedes geographic and labor mobility. Does the high level of general education and the still rising level of professional skills in our society lock workers in specific tasks at specific locations such that economic transitions are increasingly painful? Or does it provide for better processing of information, hence more flexibility that makes transitions easier in a changing economy? Economic theory provides conflicting arguments. On the one side, the theory of firm-specific capital predicts that education increases job duration and therefore inhibits job mobility (Jovanovic, 1979). Directly or indirectly, better education creates skills that may become increasingly specific to a firm, an occupation, or an industry. The more of such specific skills are acquired, the more a worker becomes tied to a firm, an occupation, or an industry.

On the other side, education should increase mobility in markets with imperfect information. Educated persons should be better able to collect and process information and are more efficient searchers, hence have lower transactions costs, and may therefore move and change jobs more easily (Greenwood, 1975). Also, educated workers should have an comparative advantage with respect to learning and implementing new technologies (Bartel and Lichtenberg, 1987). A common pattern among very highly educated and experienced workers is to carry out innovative tasks ("missions") until the task becomes routine, somebody less qualified takes over, and the highly qualified person takes on the next mission (Nelson and Phelps, 1966). Finally, more educated workers are likely to have faster careers and will change jobs more often as an institutional requirement to step up on the career ladder.

Task of this paper is to let empirical evidence sort out which mechanisms prevail -- those that make education induce mobility or those that make education inhibit mobility. We will follow 783 American workers from 1968 to 1982, recording all their moves and job changes in this 15 year time span. The sample is drawn from the Panel Study of Income Dynamics. We will relate the frequency of moves and job changes to several measures of education, correcting for other determinants of labor and geographic mobility such as demographic variables, income, and wealth.

The paper proceeds in four steps. First, we briefly describe the econometric methodology. Second, we describe the data and collect the most important stylized facts about education and mobility. Third, we present Poisson regression results that indicate the role of education conditional on demographic characteristics, income, and wealth. Finally, we interpret these results in the light of economic theory and draw policy conclusions.

2. Econometric Methodology

A central methodological problem in empirical mobility analysis is the handling of the time dimension. The most common procedure is to relate the probability of moving, migrating, or changing jobs within a given time interval to an array of explanatory variables.[6] These studies fail to account for repeat mobility and the sample selection problem introduced by frequent and less frequent movers. Some studies employ continuous time duration models that overcome these problems, however, their computational effort is magnificent, particularly so, if the analysis describes more than one state.[7]

The primary question of this paper is whether a person with a given level of education is more or less likely to move, to migrate, or to change jobs in the future. Therefore, the appropriate experiment is to collect a cross-section of persons with different levels of education at a given time and then observe their mobility behavior as life continues, holding all other characteristics constant. We then ask ourselves, how the number of moves or job changes in their life times is related to their initial levels of education. This view of mobility is quite different from those models of mobility that compare the economic benefits and costs of a specific move or job change. For the question at hand, we are not interested in the returns from making such a change per se. We also abstract from the choice of geographic destination or target job, the "pull-factors" (Greenwood, 1975). Rather, our goal is a predictive model that discriminates among more or less mobile individuals by their level of education and other characteristics. The Poisson regression technique is a well-suited model to do so.

The probability of the number of moves (job changes, etc.) made by an individual can approximately be described by a Poisson distribution:

$$\text{Prob(individual moves k times)} = \exp(-\lambda) \cdot \lambda^k / k! \qquad (1)$$

where the parameter λ denotes the expected number of moves.[8] The expected number of moves will not be a constant across individuals. This is the place to test our hypothesis: does this expected number vary by the level of education as well as by other demographic and economic attributes of individuals? We postulate that the expected number of moves (job changes, etc.) by individual n can be expressed as[9]

$$\lambda_n = \exp\left(\sum_{k=1}^{K} \beta_k \cdot x_{nk} \right) \qquad (2)$$

where x_{nk} denotes attribute k of individual n. These attributes include basic demographics, income, wealth, and various measures of education which will be specified in more detail in Section 3. The parameters β_k measure the relative effects of attributes x_{nk} on the expected number of moves. They will be estimated by maximum likelihood. The corresponding loglikelihood function is

$$\log\mathcal{L} = \sum_{n=1}^{N} \left[\sum_{k=1}^{K} \beta_k \cdot x_{nk} \cdot m_n - \exp\left(\sum_{k=1}^{K} \beta_k \cdot x_{nk} \right) - \log(m_n!) \right] \qquad (3)$$

where m_n denotes the number of moves (job changes, etc.) by individual n.

The likelihood function (3) is concave and can quickly be maximized by Newton-Raphson iteration. Its inverse second derivatives yield the standard errors of the coefficients β_k.[10]

3. Data Description and Basic Statistics

The 1982 Panel Study of Income Dynamics (PSID) includes about 3600 families that represent a random sample of the United States population in 1982.[11] For each family, data is available on a yearly basis from 1968 to 1982. Among all families, we selected those in which the head stayed the same and was in the labor force throughout the entire period from 1968 to 1982.[12] The resulting sample of household heads includes 736 individuals.

Because of the relatively long duration of the panel -- 15 years -- these data provide a unique basis for an empirical analysis of the questions posed above. These data help to alleviate a common problem in empirical mobility analysis, namely, that job or geographic mobility is a relatively rare event. The data record all job and locational changes from 1968 to 1982, old and new occupation and industry in case of a job change, and old and new county and distance to city center in case of a geographic move.

We consider nine different variables that indicate the various aspects of mobility. In order to measure labor mobility, we count the number of job changes (NJOB), the number of changes of occupation (NOCCUP) and the number of changes of industry (NINDUS).[13] Geographic mobility is measured by the number of intercounty moves (NCOUNTY), the number of intercity moves (NCITIES), and the number of interstate moves (NSTATES).[14] Finally, we count the number of times in which an individual changed city <u>and</u> job during the same 12-month period (NCITJOB). Similarly, we counted the number of combined city and occupation changes (NCITOCC) and of combined city and industry changes (NCITIND).[15] Table A-1 in the Appendix lists the observed numbers of events indicating considerable geographic and labor mobility in the United States.

A wide array of demographic and economic characteristics of the family are reported in the PSID which will serve as explanatory variables. Table A-2 displays the most important background variables and their relation to mobility. Mobility is highest among male, white, young individuals with low income and no children. It decreases sharply with age and number of children.

In addition, several measures of education and professional qualification are recorded for each family member. They will be used as indicator variables and for the construction of a simple index of education:

NRDWRIT	(index=0)	person is not able to read or write,
GRADE-5	(index=1)	5 or less grades of high school completed,
GRADE-8	(index=2)	6 to 8 grades of high school completed,
GRADE11	(index=3)	9 to 11 grades of high school completed,
GRADE12	(index=4)	12 grades of high school completed,
PRACTTR	(index=5)	12 grades high school plus practical training,
COLLEGE	(index=6)	attended college without degree,
COLL.BA	(index=7)	attended college with degree (BA or equivalent),
UNIV.MA	(index=8)	attended university with advanced degree (MA,Ph.D.).

We also record previous work experience and the score of a simple IQ-test.

Table 1 cross-tabulates the nine different mobility measures by level of education. Clearly, the level of education has quite different implications on the different kinds of mobility: education appears to substantially impede labor mobility, but it appears to increase geographic mobility and -- to a lesser extent -- combined mobility.

TABLE 1: Average Number of Changes 1968 to 1982 by Level of Education:

	Labor Mobility			Geographic Mobility			Combined Mobility		
	NJOBS	NOCCUP	NINDUS	NCOUNTY	NCITIES	NSTATES	NCITJOB	NCITOCC	NCITIND
GRADE-8	1.400	2.859	1.105	0.153	0.094	0.071	0.059	0.035	0.018
GRADE11	1.739	2.613	1.378	0.396	0.297	0.198	0.135	0.081	0.036
GRADE12	1.456	2.438	1.150	0.356	0.287	0.231	0.150	0.087	0.081
PRACTTR	1.524	2.500	1.202	0.405	0.333	0.214	0.143	0.059	0.036
COLLEGE	1.674	2.371	1.227	0.386	0.295	0.220	0.167	0.136	0.068
COLL.BA	1.053	1.415	0.957	0.606	0.468	0.287	0.234	0.106	0.064
UNIV.MA	1.057	1.143	0.671	0.629	0.557	0.471	0.371	0.157	0.057

Source: Crosstabulation from PSID subsample.

4. Poisson Regression Results

The entries in Table 1 must be interpreted with care because they are confounded by other demographic and economic attributes. Education is highly positively correlated with income and wealth, and negatively correlated with age, household size, and minority status. Table 1 may indicate these factors rather than a direct effect of education. To separate the direct effect of education from the indirect effect through other demographic and economic attributes, we apply the Poisson regression model delineated in Section 2 to the nine dependent variables introduced in the preceding section. Full regression results are reported in the Appendix, Tables A-3 and A-4. Table 2 summarizes the effect that the index of education (Section 3) has on mobility.

Two conclusions emerge from Table 2. Even after correcting for other demographic and economic factors, a high level of education emerges as a substantial deterrent to labor mobility. On the other hand, more education appears to increase geographic mobility and combined mobility.

TABLE 2: Poisson Regression Coefficients (Index of Level of Education):

	Labor Mobility			Geographic Mobility			Combined Mobility		
	NJOBS	NOCCUP	NINDUS	NCOUNTY	NCITIES	NSTATES	NCITJOB	NCITOCC	NCITIND
EDUCLEV	-0.0794	-0.1064	-0.0732	0.0678	0.0699	0.0818	0.1180	0.1326	-0.0337
	(-3.8)	(-6.6)	(-3.2)	(1.7)	(1.6)	(1.6)	(1.9)	(1.6)	(-0.3)

Note: The entries in Table 2 are the linear weights of the index of education in the logarithm of the expected number of job changes and moves, equation (2). The t-statistics in parentheses indicate their statistical significance. A negative weight with a t-statistic large in absolute value represents a statistically significant reduction of mobility.

These conclusions from Table 2 are confirmed by a more careful analysis in which the simple index of education is replaced by a set of dummy variables that indicate which level of education has been achieved. Table 3 summarizes the coefficients pertaining to education and professional qualification:

TABLE 3: Poisson Regression Coefficients (Education and Qualification):

	Labor Mobility			Geographic Mobility			Combined Mobility		
	NJOBS	NOCCUP	NINDUS	NCOUNTY	NCITIES	NSTATES	NCITJOB	NCITOCC	NCITIND
GRADE11	0.0753	-0.1067	<u>0.2375</u>	<u>0.8251</u>	<u>1.0264</u>	<u>0.9443</u>	0.7129	0.7344	0.8681
GRADE12	-<u>0.2241</u>	-<u>0.1908</u>	-<u>0.0125</u>	0.4613	<u>0.7054</u>	<u>0.8500</u>	0.5554	0.6525	1.3872
PRACTTR	-0.1741	-0.0885	0.0775	0.4725	<u>0.7375</u>	0.6677	0.3431	0.2555	0.5405
COLLEGE	-0.1235	-<u>0.1783</u>	0.0300	0.1249	0.3387	0.4216	0.2774	0.8941	0.7868
COLL.BA	-<u>0.5077</u>	-<u>0.6767</u>	-0.2364	<u>0.7225</u>	<u>0.8939</u>	<u>0.7476</u>	0.6940	0.7967	0.7365
UNIV.MA	-<u>0.3948</u>	-<u>0.8851</u>	-<u>0.6416</u>	<u>1.0252</u>	<u>1.2027</u>	<u>1.3462</u>	<u>1.2720</u>	<u>1.2404</u>	0.7736
WORKEXP	-<u>0.2844</u>	0.0838	-0.1084	-0.1362	-0.1644	-<u>0.4697</u>	-<u>0.6687</u>	0.7368	0.5360
IQSCORE	0.4719	-<u>0.4927</u>	-0.1546	0.8016	<u>1.2441</u>	1.0860	0.8211	-0.9104	<u>4.2380</u>

Note: The entries in Table 3, Rows 1-6, represent the additional effect of the indicated level of education on mobility relative to individuals with less than eight years of high school completed. Underlined entires indicate an effect significantly different from zero (90% confidence). For complete results, see Appendix, Table A-4.

The detailed results now quite clearly establish the patterns already detected in Tables 1 and 2. Labor mobility and geographic mobility are affected by education in exactly the opposite way. Individuals with a high level of education are less likely to change jobs but are more inclined to move geographically. These opposing effects are particularly pronounced among academically trained individuals but also precisely measurable among the large number of individuals with completed high school and no additional education.

Table 4 translates the regression coefficients of Table 3 into the expected number of job changes, moves, and combined changes. The entries are computed by evaluating equation (2) using the estimated coefficients of Table A-4 and the means of all background variables.

TABLE 4: Predicted Number of Changes 1968 to 1982 by Level of Education:

	Labor Mobility			Geographic Mobility			Combined Mobility		
	NJOBS	NOCCUP	NINDUS	NCOUNTY	NCITIES	NSTATES	NCITJOB	NCITOCC	NCITIND
GRADE-8	1.573	2.798	1.108	0.169	0.105	0.076	0.060	0.021	0.010
GRADE11	1.696	2.515	1.406	0.386	0.292	0.196	0.122	0.043	0.024
GRADE12	1.257	2.312	1.095	0.268	0.212	0.178	0.104	0.040	0.041
PRACTTR	1.322	2.561	1.198	0.271	0.219	0.149	0.084	0.027	0.018
COLLEGE	1.390	2.341	1.142	0.191	0.147	0.116	0.079	0.051	0.022
COLL.BA	0.947	1.422	0.875	0.348	0.256	0.161	0.120	0.046	0.021
UNIV.MA	1.060	1.155	0.584	0.471	0.348	0.293	0.214	0.072	0.022

Note: Predictions based on Poisson regression results, Appendix, Table A-4. Other attributes of individuals are evaluated at their sample means.

A higher level of education virtually always strongly reduces labor mobility. The effect of education on the expected number of changes is quite large: 50 percent more job changes and 2 to 2.5 times as many occupation and industry changes are predicted for the highest as compared to the lowest level of education. Note that in comparison to the simple cross-tabulation in Table 1, these predicted differences are smaller because of the confounding effects in Table 1 of other variables that are correlated with education and have their own effect on mobility. Therefore, the magnitudes of the pure effects of education on labor mobility are particularly impressive.

The reverse relation between education and mobility is true for geographic mobility, although the picture is a little more complicated. Very high levels of education (college or university degrees) substantially increase the likelihood of migration, but there is also an above average willingness to move among those individuals that a high school education completed after ninth to eleventh grade. Geographic mobility is lowest among individuals with very little education (eight or less high school grades) or an aborted college education. As was the case in labor mobility, the differences in geographic mobility among education levels are very pronounced: an individual with college education is predicted to move roughly three times as often than a person with high school education aborted at or before the eighth grade.

What is the interpretation of these results? How do they relate to economic theory? The labor mobility impeding role of education is consistent with the theory of firm-specific capital. A worker is more likely to accumulate skills and knowledge that are specific to a firm, a job, or an industry if he or she has a high level of education. Note that this effect is measured net of age and work experience -- it is solely the effect of education at the beginning of the observation period in 1968. Not surprisingly in light of the theory of firm-specific capital, work experience itself has a mobility deterring effect. If statistically significant, its effect is strongly negative (second to last row in Table 3, labelled WORKEXP).

The geographic mobility increasing role of very high levels of education is consistent with the theory of search and transactions costs that decrease with a higher level of education because more educated individuals are likely to accumulate more information and process information more efficiently. Note that this effect is measured net of other demographic factors and income that may affect transactions costs. Intellectual ability, though quite coarsely measured by the score of a simple sentence completion word test, appears to increase mobility in most cases (last row in Table 3, labelled IQSCORE).[16]

Is there a contradiction? After all, most geographic mobility occurs in conjunction with labor mobility. The apparent contradiction is resolved by looking at the absolute frequency of changes, Table 3. Job changes occur substantially more often than geographical moves. Except for transfers, geographic moves are indeed combined with a change of job. However, most job changes take place without geographic mobility. We conclude that job changes, including change of occupation or even industry, need to overcome on average a lower threshold of transactions costs than geographic changes. This lower threshold is higher for educated individuals as compared to individuals with lower levels of education because they accumulated more firm-specific capital. However, an even higher threshold has to be overcome for geographic mobility. This second threshold now varies inversely with education. Once job ties are severed, distance of move is a matter of information, courage, and the willingness to accept a new environment -- properties which are positively correlated with a high level of education.

Added evidence for this two-threshold explanation comes from the horizontal pattern of coefficients in Table 3. First, education matters more for larger geographic distance. In most education categories, the coefficients are largest for interstate and smallest for intercounty mobility.[17] This pattern in geographical mobility confirms the role of geographic distance in transactions costs. Second, industry changes -- which are presumably the most incisive labor market change -- exhibit much smaller negative (if not positive) coefficients than occupation or general job changes. This appears to indicate that the higher the threshold is that has to be overcome to precipitate a move or a job change, the more important is the role of information processing and other factors that correlate positively with education.

Finally, it follows that combined labor and geographic mobility, characterized by a very high threshold, should be affected positively by education and intellectual qualification. The three left-most columns of Table 3 confirm this conclusion, though with little precision due to the relatively infrequent occurrence of such changes.

5. Summary and Conclusions

In a sample consisting of 736 individuals, we observed labor and geographic mobility from 1968 to 1982 and related it to the level of education at 1968. Education affects future labor and geographic mobility in opposite ways. A high level of education inhibits labor mobility, but increases geographic mobility. The empirical results confirm the theory of firm-specific capital in labor relations (better education implies more specific skills which in turn imply longer job durations), but the role of informational transactions costs in geographic mobility (better education provides for more information which lowers psychic and monetary transactions costs). The opposing effects of a high level of education are only an apparent contradiction because labor mobility as a much more frequent event may very well be governed by different behavioral mechanisms than the relatively infrequent event of a geographic move.

The results suggest that it is not easy to design a policy that relieves regional unemployment through increased mobility induced by better education. Geographic mobility will be encouraged by a very high level of general education. However, there appears to be a well pronounced trough in geographic mobility for persons with a medium level of education. Moreover, increasing the general level of education will decrease labor mobility. In order to encourage labor mobility away from declining industries and occupations, it appears that specific training rather than just general education is required -- training that teaches those new skills that are associated with stable or rising industries and occupations.

FOOTNOTES

1. Extended from Sjaastad (1962).
2. Renovations and alterations are relatively infrequent other means.
3. The relation between labor and geographic mobility is studied by Gallaway (1969), Bartel (1979), Linneman and Graves (1983), and Börsch-Supan (1986).
4. 1980 Census of Population, Area Series.
5. 1972 and 1982 Census of Manufacturing, Area Series.
6. The time interval is usually a year. Examples abound. Most closely related to the question at hand are Bartel (1979) and Linneman and Graves (1983). Greenwood (1975) provides a useful summary of the migration literature.
7. See Heckman and Borjas (1980) on employment durations.
8. λ is also the variance of the Poisson distribution. This restricts the possible spread of the predicted data, given the mean. In this and most other applications, the data exhibits more variation than implicit in the Poisson assumption.
9. Linearity is chosen for simplicity. The exponentiation ensures a nonnegative number of events.
10. See Maddala (1983) for a description of the Poisson regression model and some applications.
11. The PSID includes an additional 2400 mostly low income families sampled non-randomly.
12. In addition, a few observations were excluded because of missing data. There is a potential sample selection problem because the frequency of a head change may be correlated with he frequency of job and residency changes. In addition, sample truncation occurs because the 15 year interval is long, but less than an adults active work life. Both biases lead to an underestimation of actual mobility.
13. Job changes include change of employer as well as change of position. Depending on year of survey, occupation and industry are identified by a PSID-specific 1-, 2-, or 3-digit code, roughly comparable to the SIC code. An occupation or industry change is recorded whenever the first digit changed. The data quality of labor mobility, industry and occupation is not completely satisfactory. In particular, some occupation changes are not reported as job changes.
14. The sequence of mobility variables is strictly increasing in geographic distance. Intercity moves are moves that cross a county border (if rural) or a Standard Metropolitan Statistical Area (SMSA) border (if urban). SMSAs are represented by the counties they are part of according to the 1982 City and County Data Book.
15. The combined mobility measures suffer from the imprecision with which dates of job and residency changes are reported.
16. See the 1972 PSID variable descriptions.
17. The reader may be reminded that these coefficients measure the effect of these education levels vis-a-vis individuals with incomplete high school.

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APPENDIX: TABLE A-1: Observed Number of Changes 1968 to 1982:

CHANGES	0	1	2	3	4	5	6	7	8	9	10	11	12
Labor Mobility:													
NJOBS	294	178	117	56	38	21	16	3	10	0	1	1	1
NOCCUP	238	85	120	98	73	45	31	36	5	5			
NINDUS	402	96	103	57	46	22	7	2	1				
Geographic Mobility:													
NCOUNTY	561	100	46	17	7	3	1	1					
NCITIES	595	81	38	13	5	3	1						
NSTATES	624	70	29	9	3	1							
Combined Mobility:													
NCITJOB	640	73	17	5	1								
NCITOCC	678	47	10	1									
NCITIND	703	27	5	1									

Source: Crosstabulation from PSID subsample. Sample Size = 736.

TABLE A-2: Observed Number of Changes 1968 to 1982 by Independent Variables:

	Labor Mobility			Geographic Mobility			Combined Mobility		
	NJOBS	NOCCUP	NINDUS	NCOUNTY	NCITIES	NSTATES	NCITJOB	NCITOCC	NCITIND
MALE	1.455	2.313	1.170	0.406	0.322	0.237	0.169	0.100	0.057
FEMALE	1.342	1.157	0.368	0.421	0.315	0.157	0.210	0.000	0.000
WHITE	1.465	2.223	1.144	0.433	0.341	0.247	0.181	0.100	0.057
BLKHISP	1.263	2.614	0.947	0.105	0.087	0.070	0.052	0.035	0.017
KIDS=0	1.616	2.163	1.163	0.666	0.490	0.320	0.270	0.144	0.069
KIDS=1	1.722	2.215	1.159	0.375	0.312	0.229	0.173	0.097	0.055
KIDS=2	1.502	2.310	1.165	0.404	0.336	0.264	0.202	0.062	0.062
KIDS>2	1.133	2.291	1.058	0.258	0.204	0.154	0.079	0.087	0.037
AGE<25	2.800	2.733	1.466	0.840	0.680	0.413	0.320	0.173	0.080
AGE<35	1.692	2.318	1.090	0.543	0.421	0.318	0.240	0.114	0.082
AGE<45	1.112	2.112	1.097	0.271	0.210	0.155	0.108	0.068	0.032
AGE>45	0.916	2.152	1.076	0.183	0.160	0.129	0.084	0.068	0.030
INC<60	1.866	2.666	1.158	0.400	0.316	0.225	0.158	0.091	0.050
INC<90	1.686	2.372	1.279	0.431	0.348	0.215	0.196	0.083	0.073
INC<150	1.237	2.101	1.000	0.377	0.279	0.220	0.122	0.087	0.021
INC>150	1.150	2.015	1.150	0.444	0.381	0.301	0.254	0.134	0.103
NRDWRIT	1.000	4.666	2.333	0.000	0.000	0.000	0.000	0.000	0.000
GRADE 5	2.461	3.153	0.923	0.076	0.076	0.000	0.076	0.000	0.000
GRADE 8	1.217	2.724	1.087	0.173	0.101	0.087	0.058	0.043	0.014
GRADE11	1.738	2.612	1.378	0.396	0.297	0.198	0.135	0.081	0.036
GRADE12	1.456	2.437	1.150	0.356	0.287	0.231	0.150	0.087	0.081
PRACTTR	1.523	2.500	1.202	0.404	0.333	0.214	0.142	0.059	0.035
COLLEGE	1.674	2.371	1.227	0.386	0.295	0.219	0.166	0.136	0.068
COLL.BA	1.053	1.414	0.957	0.606	0.468	0.287	0.234	0.106	0.063
UNIV.MA	1.057	1.142	0.671	0.628	0.557	0.471	0.371	0.157	0.057

Source: Crosstabulation from PSID subsample.

TABLE A-3: Poisson Regression Coefficients (Index of Education Level):

	Labor Mobility			Geographic Mobility			Combined Mobility		
	NJOBS	NOCCUP	NINDUS	NCOUNTY	NCITIES	NSTATES	NCITJOB	NCITOCC	NCITIND
ONE	1.4506	2.1461	0.9586	0.2648	-0.8179	-1.8970	-2.6871	0.0186	-2.6407
	(4.4)	(8.0)	(2.5)	(0.4)	(-1.2)	(-2.3)	(-2.9)	(0.0)	(-1.5)
STATES	0.0850	0.0138	0.1390	0.3060	0.4008	0.4156	0.4195	0.4635	0.3702
	(3.0)	(0.6)	(4.5)	(6.1)	(7.0)	(6.2)	(5.3)	(4.4)	(2.7)
ADULTS	0.1090	-0.0222	-0.1328	0.3131	0.3057	0.3356	0.5731	0.3930	0.1240
	(1.5)	(-0.4)	(-1.6)	(2.2)	(1.8)	(1.8)	(2.9)	(1.5)	(0.3)
KIDS	-0.0250	0.0005	-0.0137	-0.0216	-0.0739	-0.0361	-0.1360	-0.0549	0.0207
	(-1.1)	(3.0)	(-0.6)	(-0.5)	(-1.4)	(-0.6)	(-1.8)	(-0.6)	(0.2)
FEMALE	-0.2029	-0.6975	-1.4257	-0.7219	-0.4153	-0.8900	-0.1137	-10.2677	-8.4490
	(-1.0)	(-3.5)	(-4.5)	(-2.4)	(-1.1)	(-1.8)	(-0.2)	(-0.1)	(-0.2)
MARRIED	-0.1610	-0.1106	-0.1888	-1.3282	-0.8752	-0.8858	-0.7211	-0.8922	-0.8717
	(-1.0)	(-0.8)	(-1.1)	(-5.9)	(-3.2)	(-2.8)	(-1.8)	(-1.8)	(-1.3)
BLKHISP	-0.1642	0.1227	-0.1658	-1.3418	-1.2491	-1.1862	-1.2489	-1.0053	-0.6574
	(-1.3)	(1.4)	(-1.1)	(-3.2)	(-2.7)	(-2.3)	(-2.1)	(-1.4)	(-0.6)
AGE	-0.1984	-0.1924	-0.0210	-0.5771	-0.5787	-0.2271	-0.1838	-1.4040	-1.3317
	(-1.9)	(-2.1)	(-0.2)	(-2.8)	(-2.4)	(-0.8)	(-0.7)	(-2.8)	(-1.9)
NONLINC	-0.5127	2.6569	0.1935	3.0111	-0.5270	0.8821	3.0991	3.4145	7.8737
	(-0.4)	(3.0)	(0.1)	(1.5)	(-0.2)	(0.3)	(1.0)	(0.9)	(1.9)
LABINC	-1.4536	0.0545	-0.3802	1.4608	2.1298	1.6137	1.7480	2.9553	0.8511
	(-1.7)	(9.7)	(-0.5)	(1.1)	(1.6)	(1.0)	(0.9)	(1.3)	(0.2)
IQSCORE	0.5025	-0.3826	-0.1041	0.6726	1.1397	0.9267	0.6469	-0.9811	4.2027
	(1.6)	(-1.6)	(-0.3)	(1.1)	(1.6)	(1.1)	(0.6)	(-0.8)	(2.2)
WORKEXP	-0.2839	0.1103	-0.0498	-0.1845	-0.2030	-0.5102	-0.7067	0.7630	0.6080
	(-2.6)	(1.2)	(-0.4)	(-0.9)	(-0.8)	(-1.8)	(-2.4)	(1.6)	(0.9)
EDUCLEV	-0.0794	-0.1064	-0.0732	0.0678	0.0699	0.0818	0.1180	0.1326	-0.0337
	(-3.8)	(-6.6)	(-3.2)	(1.7)	(1.6)	(1.6)	(1.9)	(1.6)	(-0.3)
LIK	-572.8	-249.8	-694.2	-468.3	-419.4	-362.8	-292.7	-207.7	-139.3
LIKO	-736.0	-736.0	-736.0	-736.0	-736.0	-736.0	-736.0	-736.0	-736.0

Note: T-statistics for effect significantly different from zero in parentheses. See equation (1) for definition of coefficients.

TABLE A-4: Poisson Regression Coefficients (Levels of Education):

	Labor Mobility			Geographic Mobility			Combined Mobility		
	NJOBS	NOCCUP	NINDUS	NCOUNTY	NCITIES	NSTATES	NCITJOB	NCITOCC	NCITIND
ONE	1.2630	1.8161	0.4324	0.3331	-0.9660	-2.0454	-2.4249	-0.1303	-4.0234
	(3.7)	(6.5)	(1.1)	(0.5)	(-1.2)	(-2.2)	(-2.3)	(-0.1)	(-1.9)
STATES	0.0823	0.0192	0.1486	0.3146	0.4095	0.4216	0.4230	0.4635	0.3829
	(2.9)	(0.8)	(4.8)	(6.2)	(7.1)	(6.2)	(5.3)	(4.3)	(2.8)
ADULTS	0.0841	-0.0483	-0.1671	0.3283	0.3272	0.3696	0.5972	0.4254	0.1977
	(1.1)	(-0.9)	(-2.0)	(2.3)	(2.0)	(2.0)	(3.0)	(1.6)	(0.5)
KIDS	-0.0251	0.0040	-0.0198	-0.0251	-0.0790	-0.0340	-0.1304	-0.0607	0.0270
	(-1.1)	(0.3)	(-0.9)	(-0.5)	(-1.5)	(-0.6)	(-1.7)	(-0.6)	(0.2)
FEMALE	-0.2147	-0.7086	-1.4892	-0.8581	-0.5652	-0.9851	-0.2071	-10.2300	-8.3388
	(-1.0)	(-3.5)	(-4.6)	(-2.8)	(-1.6)	(-2.0)	(-0.4)	(-0.1)	(-0.2)
MARRIED	-0.1255	-0.0512	-0.1284	-1.5582	-1.1194	-1.1615	-0.9827	-0.9477	-1.0211
	(-0.8)	(-0.4)	(-0.7)	(-6.7)	(-4.0)	(-3.5)	(-2.4)	(-1.8)	(-1.5)
BLKHISP	-0.1530	0.1670	-0.1191	-1.3903	-1.2967	-1.2766	-1.3443	-1.0553	-0.6778
	(-1.2)	(1.8)	(-0.8)	(-3.3)	(-2.8)	(-2.5)	(-2.2)	(-1.4)	(-0.7)
AGE	-0.1907	-0.1490	0.0697	-0.6437	-0.6270	-0.2798	-0.2450	-1.3784	-1.2263
	(-1.7)	(-1.6)	(0.5)	(-3.1)	(-2.6)	(-1.0)	(-0.8)	(-2.7)	(-1.8)
NONLINC	-0.4559	2.6392	-0.1123	3.4745	-0.1529	1.5769	3.8107	3.2832	7.5478
	(-0.4)	(3.1)	(-8.3)	(1.6)	(-5.9)	(0.6)	(1.2)	(0.9)	(1.8)
LABINC	-1.4632	0.2305	-0.0817	1.0199	1.7112	1.2204	1.2285	3.0176	0.8505
	(-1.7)	(0.4)	(-0.1)	(0.7)	(1.2)	(0.7)	(0.6)	(1.3)	(0.2)
GRADE11	0.0753	-0.1067	0.2375	0.8251	1.0264	0.9443	0.7129	0.7344	0.8681
	(0.6)	(-1.2)	(1.8)	(2.6)	(2.6)	(2.0)	(1.3)	(1.1)	(0.8)
GRADE12	-0.2241	-0.1908	-0.0125	0.4613	0.7054	0.8500	0.5554	0.6525	1.3872
	(-1.9)	(-2.2)	(-9.5)	(1.5)	(1.8)	(1.9)	(1.1)	(1.0)	(1.3)
PRACTTR	-0.1741	-0.0885	0.0775	0.4725	0.7375	0.6677	0.3431	0.2555	0.5405
	(-1.3)	(-0.9)	(0.5)	(1.4)	(1.8)	(1.4)	(0.6)	(0.3)	(0.5)
COLLEGE	-0.1235	-0.1783	0.0300	0.1249	0.3387	0.4216	0.2774	0.8941	0.7868
	(-1.0)	(-1.9)	(0.2)	(0.4)	(0.8)	(0.9)	(0.5)	(1.4)	(0.7)
COLL.BA	-0.5077	-0.6767	-0.2364	0.7225	0.8939	0.7476	0.6940	0.7967	0.7365
	(-3.4)	(-5.7)	(-1.5)	(2.2)	(2.2)	(1.6)	(1.3)	(1.1)	(0.7)
UNIV.MA	-0.3948	-0.8851	-0.6416	1.0252	1.2027	1.3462	1.2720	1.2404	0.7736
	(-2.4)	(-6.2)	(-3.3)	(3.0)	(2.9)	(2.8)	(2.4)	(1.8)	(0.7)
IQSCORE	0.4719	-0.4927	-0.1546	0.8016	1.2441	1.0860	0.8211	-0.9104	4.2380
	(1.5)	(-2.1)	(-0.4)	(1.2)	(1.7)	(1.3)	(0.8)	(-0.7)	(2.2)
WORKEXP	-0.2844	0.0838	-0.1084	-0.1362	-0.1644	-0.4697	-0.6687	0.7368	0.5360
	(-2.6)	(0.9)	(-0.8)	(-0.7)	(-0.7)	(-1.6)	(-2.2)	(1.5)	(0.8)
LIK	-568.2	-236.9	-685.3	-457.0	-410.3	-355.9	-288.0	-206.4	-137.2
LIKO	-737.0	-737.0	-737.0	-737.0	-737.0	-737.0	-736.0	-736.0	-736.0

Note: T-statistics for effect significantly different from zero in parentheses. See equation (1) for definition of coefficients.