A SYNTHETIC COHORT ANALYSIS OF OCCUPATIONAL ACHIEVEMENT AND MIGRATION

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Introduction

The American Occupational Structure [1], aside from an enormous contribution to the general study of stratification, replaces previous scanty research on migration and stratification with comprehensive, systematic analysis. The major concern, unresolved by earlier work, is whether the migration process selects largely higher status persons or rather confers advantages to migrants which are separate from whatever advantages or handicaps they initially possessed. These matters are discussed, as is the effect of place of origin on status in the place of destination. The analysis initially shows that greater mobility from father's status among migrants appears due to superior origins rather than mobility per se. Second, comparing migrants who moved between communities of the same size with non-migrants who remained in such communities, superior occupational status of migrants is largely, although not entirely, due to superior education and status of first job. The residual differences may be explained by other background factors; or by variations in the occupational structure which were not controlled by holding community size constant. However, it is also plausible to interpret this residual as the effect of migration on occupational status, above and beyond the advantages originally possessed by migrants, regardless of an invariant occupational structure, i.e., given migrants and non-migrants with the same backgrounds, if migrants moved to a community with a similar occupational structure, they would do better than those they left behind.

When migration between places of different size (with a likely change in the occupational structure) is also considered, (1) migrants do better than those they left behind, regardless of where they move--with one exception, men who move from a rural, non-farm community to a farm community; (2) migrants do better or worse than non-migrants at their place of destination, depending on whether the migrants had urban or rural origins. These patterns occur without controlling for background differences between migrants and non-migrants. When education and first job are controlled, the magnitude of the differences drops but is not eliminated, and the pattern described above remains unchanged. Thus, while most of the migrant/non-migrant status difference is due to selectivity, some of it can be interpreted as due to migration per se. If so, dim prospects can be left behind via migration, and opportunities at the destination can be turned to the advantage of most migrants regardless of the initial advantages or handicaps with which the migrants began.

While Blau and Duncan's findings permit interpretation of an independent effect of migration, their analysis did not specifically allow for such an effect since it assumed that the relationships between father's occupation, son's education, first job, and 1962 occupation were the same, but that migrants differed from non-migrants with regard to the means of these variables. Second, their analysis did not go beyond the effect of migration on status at an unspecified point in a career--for instance, to life-long effects.

However, the life-time pattern of occupational achievement needs to be known first. The literature on occupational achievement over time, when cross-sectionally defined regression and correlation coefficients are compared, indicates no observable trends [7]. Given the obvious problems inherent in cross-sectional comparisons, it is unfortunate that stratification studies of real cohorts are largely non-existent. A minor exception, the panel data available from the 1957 Princeton Fertility Study, is unfortunately limited in important respects as to make any conclusions questionable. (Cf. [7]for discussion of these points; also [3,4] for a discussion of limitations in the data.)

A less suitable alternative to following real cohorts is to use a synthetic cohort approach. The most familiar use of the synthetic cohort approach is that of the life table, where experience at a given age (e.g., 60) is the cumulative product of all prior ages (e.g., 20, 30, 40, etc.). The approach taken in the synthetic cohort study of occupational achievement does not combine all previous experiences, only father's status, son's education, and one or more prior occupations. Further, the synthetic cohort is not one hypothetical cohort followed over time (as in the life table) but rather a number of age groups assumed to be a single group observed at regular intervals over time. Duncan [2, p. 14] describes this process in terms of four age cohorts as follows:

> "Suppose we thought of the four sets of data as pertaining to a single cohort, studied at four successive points in time, at decade intervals. Then, all the data should fit into a single causal or processual sequence."

Last, this approach estimates the relationships between background variables and occupational achievement by means of regression analysis. While the synthetic cohort approach suffers from methodological limitations, it does permit provisional findings which can be tested.

Blau and Duncan [1, pp. 177-188], find that for age cohorts in the 1962 OCG study, (1) the direct effects of father's status and

son's education are considerably weakened as time passes while (2) prior occupation becomes more influential for subsequent occupation with the passage of time.[1] Further, since the cumulative effect of earlier occupational status is incorporated into the model, the proportion of explained variance increases with time, and thus implies greater determination of status later in a career than earlier. Similar results were found in a synthetic cohort model based on Chicago data from the Six City Survey [2, pp. 13-14]. The major difference between the two sets of findings is that the importance of prior occupational status increases at a fairly steady rate in the OCG data, while the Chicago data for cohorts 35 to 44 and older show a sharp jump in the importance of occupation ten years earlier.

However, the adequacy of the Blau-Duncan causal chain model is questionable. (Featherman [3] indicates that the correlations could not be reproduced using this model). A major limitation of the Blau-Duncan and Duncan synthetic cohort models may lie in their simplicity. Insofar as they consider only one occupation prior to the occupation of interest, they neglect the fuller aspects of work history. Occupational shifts are especially common during the early phases of a career. Interests or skills developed during youth may be acted upon later in life if initial job preferences ultimately prove less desirable than initially hoped or if preferable alternatives appear. Thus, a simple causal chain model, such as that used by Duncan may be too rigid a representation of occupational achievement processes since it fails to allow for either flux in careers indicated by high rates of job shifts between occupational and industrial groupings [9,10,5], or for correlations of about .22, .72, and .90 between occupations held five years apart for men 25-34, 35-44, and 45-64, respectively [8].

The models developed in this paper are distinguished from previous work in that: (1) the effects of two prior occupations rather than only one on occupational attainment are investigated; (2) life-time career patterns are represented rather than occupational status at any single age; (3) the models are constructed for migrants and non-migrants separately, in order to determine if the relationships represented by the models differ according to migrant status.

Data

The data for this study are taken from the Six City Survey of Labor Mobility, conducted in 1951 [9]. Complete work histories for the period 1940 to 1951 were obtained from all members in the sampled households who were employed at least one month in 1951. Altogether, over thirteen thousand sample cases of men and women were collected in New Haven, Philadelphia, Chicago, St. Paul, San Francisco, and Los Angeles. The subsample considered here comprises 6820 non-veteran males of non-farm origins between 25 and 64 years of age as of 1951. Data were collected on age as of 1951, respondent's reported occupation as of January 1940, December 1944, and December 1949, educational attainment, and length of residence in city of current residence. Status of father and son was measured with prestige scores assigned to each occupational title represented in our sample.[2] Migrant status was assigned to persons who had moved into one of the six cities since 1949, and non-migrant to those not moving since 1940. All analysis was done within age groups (since geographical mobility is highly dependent on age) and for groups of both migrants and non-migrants.

The migrants and the non-migrants were subdivided into two overlapping sets of age cohorts. The first set included all persons in each of the following age intervals as of January 1951: 25 to 34, 35 to 44, 45 to 54, and 55 to 64. The second set included those within each of the following age intervals, as of January: 30 to 39, 40 to 49, 50 to 59 (the cohort aged 60 to 69 was dropped due to the small case base). These seven age breaks match the points in the life cycle of the synthetic cohort model to be introduced below.

The cohorts overlap (i.e., some of those 25 to 34 are also present in the 30 to 39 cohort), and this overlapping membership is true for all age cohorts. The rationale for overlapping the age-cohorts lies in the larger case base which is thereby available for each age cohort. As a result, some of the correlations are not independent of each other; however, these correlations are averaged together to arrive at an estimate of a single correlation. Otherwise, all correlations are independent of each other.

Table 1 presents the age of each cohort at the initial date of the survey (January 1951) and at each of the earlier dates for which occupation was reported. These ages are approximate insofar as the time points are not separated by the same length of time. Because this difference in interval length is unlikely to confound results to any significant extent, it has been ignored, and the length of time periods between observations presumed equal. For notational convenience, it is assumed that age in 1949 is the same as age in 1951, and that ages in 1944 and in 1940 are, respectively, five years and ten years younger. This alteration has no analytic effect or meaning.

The Synthetic Cohort Model

In a simulated cohort model, people born at different times are presumed to have the same experiences at similar ages. That such an assumption is reasonable with regard to occupational achievement is suggested by the absence of time trends in cross-sectional comparisons of stratification measures published thus far (see literature review in [7]). However, including migration may not satisfy the synthetic cohort assumption as easily. Migration is selective by age. Presumably, those who migrate

at age fifty are different from those who migrate at age thirty, and the life-time patterns of younger migrants may not recapitulate those of older migrants. If so, then, to an unknown extent an assumption of the synthetic cohort model will be violated. Even given this possible violation, however, something may still be learned from a necessarily hypothetical model which permits interpretations verifiable later with real cohorts. The purposes of this paper, therefore, are primarily illustrative and methodological rather than substantive with respect to the effects of migration.

Following Duncan [2], the sets of data specific to the seven age cohorts have been treated as if they were a single cohort studied at seven successive points in time. The synthetic cohort begins with men aged 25 to 34 and follows them throughout their work careers, observing their occupational status at five-year intervals. If X_i represents occupational status at some given age, then X_1 is the initial point of observation of occupational status for men 25 to 34, X_2 the occupational status of this group five years later, when they are 30 to 39. Likewise,

X_3 = occupational status at 35 to 44,
X_4 = occupational status at 40 to 49,
X_5 = occupational status at 45 to 54,
X_6 = occupational status at 50 to 59,
X_7 = occupational status at 55 to 64.

Figure 1 (consider only the schematic diagram, ignoring the values for the moment) represents this model where X_i is occupation at five-year intervals of age and E = educational attainment.[3] Occupational attainment at any age (X_i) is treated as a function of both education (E) and occupational attainment at two younger ages, five years and ten years younger (X_{i-1}, X_{i-2}, respectively).

This formal model can be represented as:

$$X_i = b^*X_{i-1} + c^*X_{i-2} + d^*E + e' \qquad (1)$$

Thus, for example, $X_5 = b^*X_4 + c^*X_3 + d^*E + e'$. Equation (1) is estimated for each X_i by means of least squares regression analysis, where all variables are standardized (with mean zero and unit variance), b^*, c^*, d^* are standardized regression coefficients, and e' is an error term.

All of the age cohorts in Figure 1 are shown in Table 1. Since occupational status observed at each age in Figure 1 is a function of occupational status observed five years and ten years younger (as well as of education--which is ignored for the moment, to simplify discussion), the correlations used to estimate equation (1) are those between occupations held at earlier dates by a given real cohort, when the cohort was five and ten years younger. For example, examining Table 1 for those 35 to 44 in 1951, a correlation between occupations held in 1949 and 1944 is also a correlation between occupations held at ages 35 to 44 and 30 to 39. Equivalent procedures were used to extract correlations between education and occupation.

One final comment is necessary. In some instances, using the method just described, more than one correlation coefficient for pairs of occupations observed at different ages may be obtained, e.g. the correlation between occupations held by those 25 to 34 and 30 to 39 can be found in two different places--referring back to Table 1: (1) for those 30 to 39 in 1951, observed at 1949 and 1944, and (2) for those 35 to 44 in 1951 observed at 1940 and 1944. For cases in which two correlations were available, the assumption was made that the two observations were sampling variations around some true correlation; to remove these variations, the correlations were averaged.

Findings

The estimates from equation (1) are presented as path diagrams, in Figures 1 and 2, for migrants and non-migrants, respectively. The regression coefficients b^*, c^*, d^* are the values near the straight connected lines leading to any X. Thus, in Figure 1, $X_5 = .448X_4 + .274X_3 + .161E$.

One clear finding is that occupational level at any age is most strongly affected by occupation held five years earlier, a lesser net effect is contributed by the occupation held ten years earlier, and the least net effect is contributed by education. The sizes of the residuals are large, a suggestion that factors other than those considered here affect occupational status.

Perhaps more important, a comparison of the values in Figure 1 with those on Figure 2 suggests that migrants differ from non-migrants in two respects. First compare the effect of education on occupational attainment at any age (excluding the observation on occupational attainment at ages 55 to 64, X_7, where the regression coefficient is negative; the assumption in this case is that the effect of education is not really negative, but that it ceases to be important). For three out of four comparisons of the regression coefficients for education and occupational status from 35 to 44 (X_3) to 50 to 59 (X_6), the net effect of educational attainment is higher for migrants than non-migrants. The only exception to this finding is for occupational level attained at ages 40 to 49 (X_4). Further, the correlation between education and occupational attainment at ages 25 to 34 (X_1) and 30 to 39 (X_2) is higher for migrants than for non-migrants. Comparison of these regression coefficients not only indicates migrants differ from non-migrants at any age, but how they differ over time. The size of the coefficients for non-migrants roughly declines, moving from X_3 to X_7, suggesting that education becomes less important for occupational attainment over their lifetimes. By contrast, the coefficients for migrants show a slight curvilinearity, suggesting that among older men who migrate, education

retains importance for occupational success.

What of the effects of prior occupations? Of the ten regression coefficients in Figures 1 and 2 connecting current occupation with previous occupations, seven are higher for non-migrants than for migrants. The correlation between occupational attainment at ages 25 to 34 (X_1) and at ages 30 to 39 (X_2) is higher for non-migrants than migrants. Thus, for non-migrants current job is more dependent on jobs held in the past than for migrants. Non-migrants appear to put down roots not only where they live but in their careers.

Interestingly enough, as they age, non-migrants' current occupation seems to rely increasingly more on a recent occupation than on an earlier occupation. This finding becomes apparent from a comparison of the steady increase in the influence of occupation five years earlier, while the importance of occupation ten years earlier first rises and then declines with increasing age of the cohort.

By contrast, migrants as they age appear to experience no increasing dependency of current occupation on past occupation. If anything, the dependency is lessened for occupation held five years earlier: the net coefficients first increase and then decrease with age. The effect of occupation held ten years earlier is fairly stable (.23 - .27), with one exception (.47 between X_5 and X_7). These patterns over time add support to the assertion of basic differences between migrants and non-migrants at any single point in time: the careers of migrants appear to be less rooted than those of non-migrants in earlier occupations.

This difference is also suggested by the patterns the residuals take. At every point in the life cycle, the residuals are larger for migrants than non-migrants, an indication that the force of outside factors not included in the model is more substantial for migrants than for non-migrants. In addition, the residuals suggest that the life-cycle pattern differs for migrants and non-migrants. For migrants, the size of the residuals forms a fairly stable pattern, although it undergoes some variation in moving from age groups 35 to 44 (X_6) to 55 to 64 (X_7). For non-migrants the residuals decline steadily with increasing age, suggesting that exogeneous factors become less important with increasing age and that, if anything, one's past career becomes more important to one's future career. In these data migrants at older ages seem able to escape their occupational histories almost as well as younger migrants; the same cannot be said for non-migrants.

In sum, the findings suggest that migration affects the process of occupational achievement with respect to: (1) the magnitude of the relationships among education, earlier jobs, and current occupation at any single age, and (2) the patterns the achievement process takes over the cohorts' career histories.

With regard to the first finding, for both migrants and non-migrants, at any age in a career history, occupations held in the past continue to exert an influence on current occupation, but migration appears to weaken this relationship. On the other hand, the impact of education is generally greater for migrants than non-migrants at any age.

The synthetic cohort result as such--the pattern these relationships assume as the cohort moves through its life cycle--appears to depend on migrant status. Education steadily becomes less important over the life-time of non-migrants, but for migrants, the influence of education first declines and then increases at later ages. The effect of occupation held five years earlier becomes steadily more important for non-migrants as they age. Migration weakens this influence.

The results presented above suggest the following interpretations. Migrants seem better able to escape the confines of their previous occupations than non-migrants. The model also suggests the means by which they escape--education. The inevitability of career histories can be altered. Once having pursued one line of work, overcoming the limitation on options which accompanies the choice of any particular line of work seems to be aided by migration to a new labor market where one can make a new career choice, different from past job experience. To do so, however, the migrant must rely more heavily on his educational attainment.

Such a reliance is likely to be true from the employer's perspective also. The applicant with a work history specific to a particular community can readily be checked out by a prospective new employer. Hence, the applicant's educational attainment might be disregarded, given the availability of other, possibly more relevant, information from prior employers. If an applicant is new to the labor market, however, the retrieval of information from a past employer may be more difficult, and an employer is more likely to rely on a standard means of evaluation such as education.

Summary

The analysis reported above has provided hypotheses on the relationship of migration and occupational achievement which can be checked when data on real cohorts become available in the future. While the synthetic cohort approach may have some drawbacks with respect to migration, the provisional findings are of intrinsic interest in their own right and worth repetition. Migration appears to weaken the dependency of current occupation on past occupations and to enhance the usefulness of educational attainment for current occupational status at any age. Over a life-time, the importance of education wanes while that of earlier occupation increases for non-migrants' current occupation. Migration allows escape from occupational experiences which cumulate over the life cycle and become more important with age, but this escape depends on assets provided by education.

Footnotes

[1] Featherman's [3, p. 123] real cohort data from the Princeton Survey, despite its limitations, show "a similarity between the synthetic OCG model and the model for the Princeton subset."

[2] A study conducted in 1964 by the National Opinion Research Center on the prestige accorded to occupations has produced a score for each detailed Census occupational title. These Census titles were used to classify occupation in the Six City Study. The NORC study was conducted under the direction of Robert W. Hodge; the major report of the study will be published in a forthcoming volume. Hodge, Siegel, and Rossi [6] have shown that occupational prestige scores and ratings are stable for at least fifty years. Thus, 1964-specific scores can be assigned to occupations held in 1949 or 1940 without concern for the instability of scores over time.

[3] The conventions of such a schematic diagram are that a value associated with: (1) a curved line is a correlation coefficient; (2) a straight connected line is a regression coefficient, in standardized form; and (3) the straight unconnected line leading away from the diagram is a residual. Cf. Duncan [2] for further clarification.

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TABLE 1. -- Age of observed cohorts adjusted for notational convenience

Actual Age January 1951	Assumed Age		
	December 1949	December 1944	December 1940
	First Set of Age Cohorts		
25-34	25-34	20-29	15-24
35-44	35-44	30-39	25-34
45-54	45-54	40-49	35-44
55-64	55-64	50-59	45-54
	Second Set of Age Cohorts		
30-39	30-39	25-34	20-29
40-49	40-49	35-44	30-39
50-59	50-59	45-54	40-49
60-69	60-69	55-64	50-59

E = Educational status
X_1 = Occupational status at 25-34
X_2 = Occupational status at 30-39
X_3 = Occupational status at 35-44
X_4 = Occupational status at 40-49
X_5 = Occupational status at 45-54
X_6 = Occupational status at 50-59
X_7 = Occupational status at 55-64

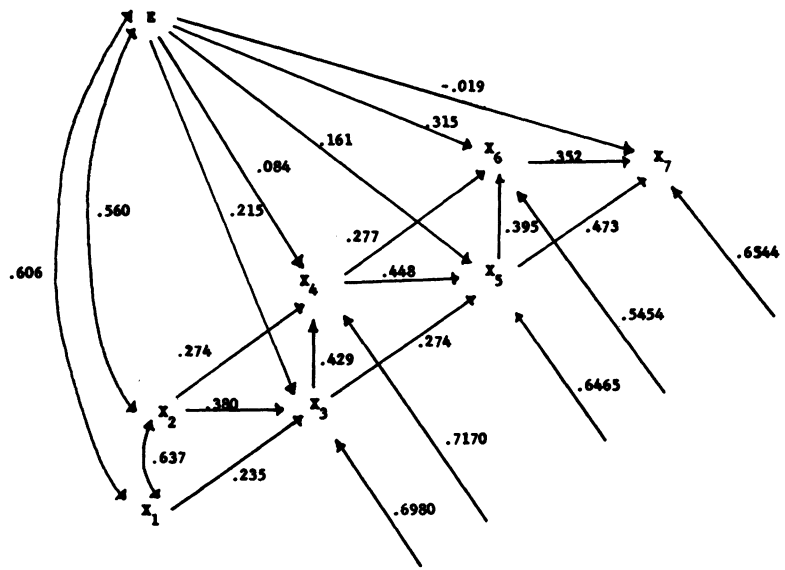

Fig. 1--Path analysis of intragenerational occupational achievement for migrants

E = Educational status
X_1 = Occupational status at 25-34
X_2 = Occupational status at 30-39
X_3 = Occupational status at 35-44
X_4 = Occupational status at 40-49
X_5 = Occupational status at 45-54
X_6 = Occupational status at 50-59
X_7 = Occupational status at 55-64

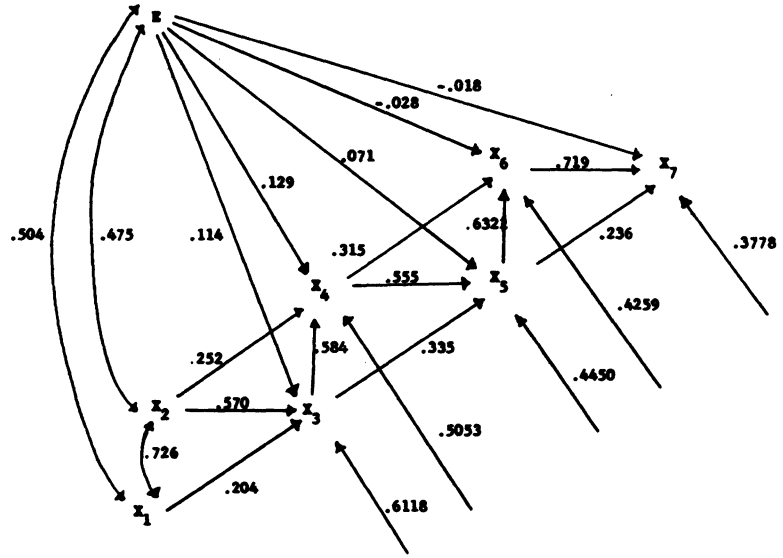

Fig. 2--Path analysis of intragenerational occupational achievement for non-migrants