Occupational Mobility and the Distribution of Occupational Success Among Young Men

By Robert E. Hall and Richard A. Kasten*

Interpretation of the distribution of occupational success depends crucially on an understanding of the process of mobility. If the holders of low-paying jobs this year are just as likely as anyone else to hold good jobs next year, then the lower tail of the earnings distribution is not a matter of great social concern. Further, if the distribution of success is primarily determined by a random process, the prospects for a significant reduction in the inequality of earnings are unfavorable. On the other hand, high mobility in the short run may conceal systematic stratification of the labor force—it may be that the same individuals spend most of their time in the worst jobs. If so, luck and random events may play a small role in the distribution of well being, inequality may be a major issue, and the elimination of stratification may hold out the promise of an important reduction in inequality.

Simple tabulation of distributions of success and of mobility among categories of success cannot answer the basic question of the role of stratification. In this paper, we develop a model and statistical method for studying mobility and relating it to characteristics upon which stratification may be based. Our study rests on annual interviews conducted from 1966 through 1969 with about 3,000 white males born between 1942 and 1952.[1] We find that mobility is closely related to personal characteristics, especially intelligence and education. Men with high *IQ*s and extensive education are more likely to move to high-paying jobs and are more likely to remain in them. Nevertheless, random events dominate the distribution of occupational success in the short run. Our results strongly support the finding of Christopher Jencks and his collaborators that redistribution of the determinants of earnings would do almost nothing to reduce the observed inequality of annual earnings.

I. The Model

Our concern is with the distribution of occupational success, not just with its expectation, so we are obligated to formulate a model that is explicitly probabilistic. Our first step is to make occupational success a discrete measure taking on only five alternative values (construction of the measure is described in the next section). The distribution of success is the fraction of the labor force in each of the five categories. The process of occupational mobility is portrayed within the model in a set of three probability distributions. The first is the simple binary probability that a worker will change jobs in a given month; this probability depends on his age, intelligence, and education. The second is the five-way distribution of the category of the new job for job-changers, which depends on personal characteristics and on the category of the previous job. The third probability applies to workers

* Dept. of Economics, Massachusetts Institute of Technology and the Dept. of Health, Education and Welfare, respectively.

[1] In this paper we concentrate on whites. In an earlier paper (see list of references), we studied black-white differences in the same framework.

who have remained on the same job for at least 12 months and gives the distribution among job categories as the result of promotion or demotion within the same firm. Again, this distribution depends on personal characteristics and on the previous occupational category. The model also treats education as an endogenous variable. Each year, there is a probability that an individual will return to school in September. This probability depends on personal characteristics, especially *IQ*, and is much higher for those individuals who were in school the previous year. For those who leave school and enter the labor market, there is a probability distribution for the occupational category of the first job. The five major probabilities of the model will be called the "change job," "new job," "promotion," "return to school," and "first job" equations.

The model is sufficiently general to encompass the two extreme views that mobility is a purely random process, on the one hand, and that stratification is absolute, on the other hand. Pure randomness would reveal itself as identical probability distributions for all individuals, independent of intelligence, family background, or other immutable characteristics. Absolute stratification would show up as probability distributions that made unambiguous predictions of different careers for differently endowed individuals, making the observed distribution of mobility entirely the result of the distribution of endowments. Between the two extremes, the more sensitive are the probabilities to the personal characteristics, the more evidence there is of stratification.[2]

[2] Econometrically, the dependence of the probability on personal characteristics and other determinants is indexed within our model by the parameters of a logit function:

$$p_i(x_t) = \frac{e^{x_t\beta^i}}{\sum_{j=1}^{N} e^{x_t\beta^j}}$$

$p_i(x_t)$ is the probability of the *i*th alternative, as follows:

change job:
- $i=1$ no change
- $i=2$ change

return to school:
- $i=1$ return
- $i=2$ enter labor market

new job, promotion, first job:
- $i=1,\dots,5$ for 5 occupational categories;

x_t is a vector of immutable personal characteristics (family background and *IQ*), human capital (education and experience measured by time on the job) and market effects (captured by a set of dummy variables for years). Each alternative has a vector of parameters, β^i, which determine the influence of the variables, x_t, on the probability that i will occur. We normalize the βs by setting the vector β^1 to zero, so each of the other β^i's controls the probability of the other alternatives relative to the probability of the first. In presenting the results, we focus on the p_i values implied by our estimates of the βs rather than on the βs themselves. Estimation of the βs was carried out by conventional techniques of maximum likelihood.

II. Data

Our data are taken from the National Longitudinal Survey of Work Experience (the Parnes data) for young men. From the annual surveys, we reconstructed a monthly chronology of activities of the members of the sample.[3] We created the five occupational categories by the following procedure. First we imputed earnings to each 3-digit occupation as the average annual earnings of individuals holding those occupations for 50 or more weeks in 1959. We then defined five categories, chosen so that our sample was roughly evenly distributed among them. These are

category 5: more than $5900
category 4: $5100 to $5900
category 3: $4600 to $5100
category 2: $3700 to $4600
category 1: $3700 or less.

After detailed study, we found this approach to occupational classification superior to its two main competitors: the Duncan-Blau socioeconomic score (*SES*),

[3] An appendix describing the data in more detail is available from the first author.

which attempts to take account of the nonmonetary rewards to occupations, and the actual earnings reported in the survey. The *SES* has a pronounced bias against blue-collar jobs which is particularly inappropriate for our sample. Actual earnings are reported for most but not all of the jobs held by members of the sample. However, among young workers, an important component of the return to labor in some jobs is the accumulation of training on the job (see Jacob Mincer). We concluded that the earnings of workers of all ages holding a given occupation is a better measure of the economic value of the occupation than is the reported wage of a young worker.

III. Properties of the Individual Components of the Model

A. Education

The typical young man remains in school until the end of the school year and then takes a job at the beginning of the summer. At the end of the summer he faces the central decision whether to remain at work full time or to return to school. The probability of returning to school is the determinant within our model of the amount of education received by each individual and is a function of *IQ*, family background, age, and grade last completed, as well as other variables of lesser importance. The combined influence of age and last grade make the model predict the appropriate distribution of total grades completed, especially the large fraction that completes exactly 12 grades. For the questions addressed by this paper, the important variables here are *IQ* and family background (measured by the father's *SES*). Both have the expected effect—more favorably endowed individuals tend to continue longer in school. *IQ* is the stronger of the two influences. Individuals who are 10 points above the average *IQ* of 100 have a 64 percent probability of going on to college after high school, against 53 percent if *IQ* is 100. By contrast, individuals whose fathers have *SES*s 32 points above the average of 36 have only a 59 percent probability of college, against the same 53 percent if *SES* is 36. The two variables have comparable effects at other stages in the educational process. Since education and the time of entrance into the labor market have profound effects on occupational success, the impact of these two variables on the decision to continue in school is a major stratifying influence.

B. First Job

The occupation of the first job has a central role in our analysis. Some young men remain in their first job throughout the span of our study, and for those who do change occupations, the earlier occupation has a strong influence on the new occupation. The first job marks the transition between the accumulation of general human capital at school and the accumulation of occupation-specific human capital on the job. The latter process is one of the major explanations of the persistent effect of the early occupation on the subsequent career.

It is impossible to separate the effects of age and education on the first job, since at the time most men are six years older than the grade they complete. The combined influence of the two is dramatic and shows clearly that the process that assigns men to first jobs is far from random. High-school dropouts who enter the labor market at age 16 typically find poor jobs—44 percent in the lowest category and another 24 percent in the second category. Only 13 percent find first jobs in the top two categories. At the other extreme, college graduates entering at age 22 go overwhelmingly into the top of the occupational structure—58 percent into category 5 and another 19 percent into category 4.

Only 18 percent of them fall into the two lowest categories. High school graduates are between the two extremes, distributed by category as follows: 1. 33 percent, 2. 24 percent, 3. 17 percent, 4. 18 percent, and 5. 8 percent.

Apart from their indirect effects through education, intelligence and family background make roughly equal direct contributions to the level of the first occupation. For high school graduates, an individual with an *IQ* of 115 has a 30 percent probability of taking a job in category 1 and a 10 percent probability in category 5, against 33 percent and 8 percent respectively for those with the average *IQ* of 100. Individuals whose fathers have an *SES* of 68 had only a 26 percent probability in category 1 and 9 percent in category 5, against 33 percent and 8 percent for those whose fathers have the average *SES* of 36. Not surprisingly, having a well-placed father seems to help most in keeping the son out of the worst jobs.

C. Promotion

In the Parnes data, occupation is reported annually for young men who do not change employers. About one-quarter of the workers change occupations, and of these, two-thirds are promotions (movements into higher occupational categories) and the rest demotions. For high school graduates with average endowments (*IQ* of 100 and father's *SES* of 36), the model implies the matrix among occupational categories shown in Table 1. Particularly noteworthy is the high probability of promotion out of the two lowest categories. Workers who are able to remain with the same employer move rapidly out of the worst jobs. The lower tail of the distribution of workers among occupational categories does not represent workers who are permanently trapped in poor jobs within the same firm. The mobility process for young workers has a pronounced upward bias; almost all the upper right-hand elements of the transition matrix are larger than the corresponding lower left-hand elements.

TABLE 1—MATRIX OF OCCUPATION CATEGORIES FOR HIGH SCHOOL GRADUATES WITH AVERAGE ENDOWMENTS WHO DO NOT CHANGE EMPLOYERS

Category Last Year	Category this Year				
	1	2	3	4	5
1	.50	.18	.16	.08	.07
2	.02	.65	.09	.15	.09
3	.01	.07	.73	.11	.08
4	.00	.08	.07	.76	.08
5	.02	.06	.07	.12	.73

Endowments and education have small but important influences on advancement within the firm. High-school graduates previously in category 3 have a 19 percent probability of promotion to categories 4 or 5, while the same probability for workers with two more years of education is 20 percent. A 15-point increment in *IQ* raises the probability for the high school graduate from 19 percent to 23 percent. Father's *SES* has no systematic effect on promotion or demotion. The effects of education and *IQ* cumulate year after year in the process as long as the worker remains with the same firm, so their long-run effects are much larger than is suggested by the small shifts in the transition matrix they induce.

D. Job Changes

About 6 percent of the working members of our sample lose or leave their jobs each month (the data do not permit us to distinguish the two sources of changes). Virtually all of them find new jobs within a month or two, often with an intervening spell of unemployment. The rate of turnover is an important determinant of the dispersion of occupational success, as

TABLE 2—MATRIX OF OCCUPATION CATEGORIES FOR HIGH SCHOOL GRADUATES WITH AVERAGE ENDOWMENTS WHO CHANGE JOBS

Category of Old Job	Category of New Job				
	1	2	3	4	5
1	.19	.26	.21	.21	.13
2	.07	.46	.14	.22	.11
3	.06	.18	.47	.18	.11
4	.05	.17	.16	.52	.09
5	.06	.20	.14	.18	.43

large upward and downward occupational movements are much more likely to occur when workers move between employers. Endowments and education seem to have almost no direct effect on the turnover rate. Turnover is highest among young workers, falling from 9 percent per month at age 16 to 4 percent per month at age 24. Workers are much more likely to leave or lose jobs in the lowest category (8 percent per month) than in the highest category (5 percent per month); the percent falls smoothly between the two.

E. New Jobs

Most job changers improve their occupational category, or at least remain in the same category. The transition matrix for changers is shown in Table 2. Again, it is noteworthy that few workers remain in the worst jobs—those in the lowest category have both the highest probability of changing jobs and the highest probability of moving upward as a result of the change. The general bias of mobility through job changes is upward, but not as strongly as in the case of movements within the firm. Movements through the labor market are clearly riskier than movements within the firm.

Endowments and education have substantially more effect on the distribution of job changers among occupational categories than in the promotion equation. A high-school graduate has a probability of 20 percent of advancing from a category 3 job to categories 4 or 5, but this probability rises to 36 percent for an otherwise identical worker with 14 years of education. Fifteen extra points of *IQ* raises the same probability from 29 percent to 33 percent, and 32 extra points of father's *SES* raises it from 29 percent to 31 percent. Since job changes frequently involve dissipation of occupation- and firm-specific human capital, it is not surprising that the general determinants of success matter more in this equation and the category of the previous job matters less, relative to the promotion equation.

IV. Properties of the Complete Model

When the probabilities described in the previous section are permitted to interact with one another, they imply a distribution of individuals across occupational categories at any given time. Within a group that is homogeneous with respect to

TABLE 3—DISTRIBUTION AMONG JOB CATEGORIES BY IQ, FATHER'S *SES* AND EDUCATION

	Job Category				
	1	2	3	4	5
IQ (full effects)					
90	.11	.14	.22	.26	.28
100	.10	.13	.17	.25	.35
110	.10	.11	.13	.25	.42
IQ (holding grades at 12)					
100	.11	.14	.18	.27	.29
110	.10	.14	.15	.28	.33
Father's *SES* (full effects)					
16	.13	.13	.18	.27	.30
36	.10	.13	.17	.25	.35
60	.08	.12	.18	.22	.41
Grades completed					
10	.11	.15	.24	.30	.20
12	.11	.14	.18	.27	.29
14	.10	.12	.14	.21	.43

the fundamental determinants of success (*IQ* and family background), those who are in the lowest category are the victims of an unfavorable random event. Some have just passed through the labor market and have taken a poor job; if they remain with their new employers, they are likely to move to better jobs fairly soon. Others may have left school unexpectedly early, in which case the model predicts that they are more likely to remain in the lower categories throughout their careers. The distributions of workers among categories induced by the complete model are shown in Table 3. The first three rows, labeled "*IQ* (full effects)," shows the distribution among occupations of a group of 24 year old men whose fathers all had the average *SES*, 36. All three distributions have a great deal of dispersion. Both the short-run randomness embodied in the mobility equations of the model and the long-run randomness in the educational process contribute to this dispersion. Bright individuals are almost as likely to be found in the worst jobs as a result of bad luck as are those with below average intelligence. On the other hand, a higher *IQ* substantially improves a worker's chances of landing a top job. Underlying the randomness in the assignment of workers to occupations is an important tendency favoring the more intelligent.

The next two rows of Table 3 show that most of the systematic effect of *IQ* operates through the educational process. When the probability distribution is computed conditional on exactly 12 years of school, the upward shift in the distribution for brighter individuals is much weaker. The next part of the table shows the full effects of family background, measured by the father's *SES*. The sons of well-placed fathers are at a substantial advantage in the labor market, though they are subject to the same random processes as everyone else. They are both less likely to be at the bottom of the occupational structure (this is the influence of the first job equation) and more likely to be at the top, when compared to otherwise identical men with less successful fathers. Finally, the last three rows of Table 3 show the major role of education in stratification at the upper occupational levels. Within the group of workers with average *IQ* and father's *SES*, those who obtain more education are much more likely to be in the best jobs. However, well-educated men face almost the same probability of holding the worst kind of job as do high school dropouts.

TABLE 4—ESTIMATED EFFECTS OF REDISTRIBUTING INDIVIDUAL CHARACTERISTICS ON THE DISTRIBUTION AMONG JOB CATEGORIES

	Job Categories				
	1	2	3	4	5
Characteristics distributed as in sample	.12	.13	.18	.22	.35
IQ held constant at 100	.11	.14	.16	.26	.33
Father's *SES* held constant at 36	.10	.13	.18	.22	.37
Grades completed held constant at 12	.11	.14	.20	.24	.31
All three held constant	.11	.14	.18	.27	.29

Table 3 shows that the determinants of occupational success matter a great deal. Men with high *IQ*s, with successful fathers, and with college educations are very clearly separated from those with less favorable backgrounds by their much higher probability of holding top jobs. The hypothesis that the underlying determinants of success are unimportant compared to the random influences is refuted by these results. Nonetheless, it is true that redistribution of the determinants of success would do almost nothing to reduce the unequal distribution of success. This controversial proposition, which has been advocated by Christopher Jencks and his associates, is illustrated in Table 4.[4] In the first line, we show the distribution of the members of the sample predicted by the model, using the actual dates of birth, *IQ*s, and fathers' *SES*s (this distribution matches the actual distribution of the sample quite closely). In the second line, we show the hypothetical distribution within the sample if all its members had the average *IQ*. The next two rows repeat the exercise for father's *SES* and years of education separately, and the last line considers the result of making the sample homogeneous with respect to all characteristics except age. In all cases the results are striking. The model predicts that 25 percent of the sample will hold jobs in the two lowest categories. The only redistributional experiment that reduces this figure at all is the one that makes fathers' *SES* uniform. The only noticeable impact of redistribution is to shift workers from the fifth to the fourth categories.

[4] Our model describes the labor market only from the point of view of the worker, and does not deal with changes in wages caused by changes in supply. Our results on the impact of redistribution of endowments are strictly applicable only if the job categories are close substitutes on the demand side. Any lack of substitutability among the categories would make the impact of redistribution even smaller. Our results give an upper bound to the potential effect of redistribution.

Our findings can be summarized in two simple propositions:

(1) Intelligence, family background, and education matter a great deal. The occupational success of the entire labor force could be improved materially by increasing its endowments of any or all of the three.

(2) Redistribution of endowments would have almost no effect on the distribution of success. The favorable effects for the fraction of the labor force with below-average endowments would be largely offset by the unfavorable effects on those above the average.

REFERENCES

R. E. Hall and R. A. Kasten, "The Relative Occupational Success of Blacks and Whites," *Brookings Papers*, 1973, *3*, 781–95.

C. Jencks, *Inequality: A Reassessment of the Effect of Family and Schooling in America*, New York 1972.

J. Mincer, *Schooling, Experience, and Earnings*, New York 1974.

Reprinted from

THE AMERICAN ECONOMIC REVIEW