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MIGRATION AS INVESTMENT: EMPIRICAL TESTS OF THE HUMAN INVESTMENT APPROACH TO GEOGRAPHICAL MOBILITY

Samuel Bowles

THE hypothesis that geographical mobility of workers is primarily a response to economic incentives arising from disequilibria across spatially separated labor markets has received considerable attention in the theoretical literature on investment in human beings.¹ In this paper I outline a simple model of migration as an economic process, and provide an empirical test of the model using data on net migration out of the United States South.²

To preview the main results, the model of migration as a response to economic incentive is supported. Specifically, the results suggest that the present value of the expected income gain from moving out of the South is positively related to the probability of moving and provides a better explanation of migration than the more conventional income measure based on regional differences in current incomes. Further, the level of schooling appears to increase the effect of income gain on the probability of moving, and age appears to reduce it. Significant racial differences in the main determinants of net migration are apparent.³

I An Economic Model of Migration

Our basic hypothesis is that individuals move in response to economic and other incentives, and that the decision process concerning migration may be viewed fruitfully as a comparison

of the present value of the benefits and costs of moving. The benefits of moving may include higher income in the destination, or a more pleasant social or physical environment. The costs include the direct expenses involved in moving, plus the psychic costs involved in breaking old ties. Assuming that risk aversion is a general phenomenon, further costs arise from the fact that one's future situation may be less certain for those who move than for those who do not. Given the fact that information concerning opportunities in distant regions is often difficult to obtain, we may expect that those having it available will respond to the relative benefits of moving more than those with little or no access to it.

A number of specific hypotheses may be derived from the above model of migration. Considering a single individual, the variable to be explained, migration, is dichotomous; either you move or you stay. However, because we cannot fully specify all of the dimensions of the benefits and costs of moving, we present the following hypotheses in terms of a continuous variable, the probability of migrating, or what is equivalent, the migration *rate* from a particular population subgroup.⁴

As we concentrate here on *net* migration rates, we seek to identify only the influences on migration which affect the direction of movement.⁵ Thus, for example, we assume that although education is positively associated with the probability of moving and age is negatively associated with moving, the effects of age and schooling are equally strong for migration in any direction. Where influences on the probability of migration, such as age and schooling,

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¹ See, in particular, Sjaastad [20] and Bowman and Myers [2].

² The only other empirical test of the human investment view of migration of which I am aware is the essay by Schwartz [19].

³ The use of these results in the discussion of current policy problems relating to migration must be viewed with some circumspection; the data used here are at least ten years old and there is some evidence that patterns of migration have changed considerably over the past decade.

⁴ The migration rate is the percentage of people who move in a given time period, divided by the population of the subgroup from which the migrants were drawn.

⁵ Net out-migration is gross out-migration minus gross in-migration. The net out-migration rate for a population subgroup is net out-migration divided by the size of the population subgroup in the South.

work with equal force in both directions they exert no influence on net out-migration, and accordingly, they do not appear in the net migration equation.⁶

The present value of expected future income in the location of destination is probably the best single measure of the gross economic benefits of migrating. The present value of expected future income in the place of origin represents the economic benefits foregone by moving. Thus we expect that the migration rate will be positively associated with the present value of the stream of income differences between the origin and destination, summed over the expected working life of the prospective immigrant.⁷ This is our first hypothesis.

Although the vision of the Southern worker thumbing through his present value tables is the stock-in-trade of those skeptical of this approach to migration, the theory does not require such precise calculation on the part of individuals. In many race-age-schooling subgroups, those who move may expect to reap gains in lifetime income which constitute a sizeable fraction of what their total lifetime income would have been had they remained in the South. In the presence of these large potential gains, it is plausible to expect that rough information concerning the relevant benefits and costs would be widely available and understood by a significant portion of Southern workers.

Access to information concerning future in-

⁶ This point may be clarified if we view the equation predicting net out-migration from the South as a gross out-migration equation minus a gross in-migration equation. If the possibility of moving from region i to region j (M_{ij}) can be expressed as a function of age (A), years of schooling (S), and a measure of the expected net income benefits of moving (Y_{ij}):

$$M_{ij} = a_0 + a_1A + a_2S + a_3Y_{ij},$$

then net migration NM_{ij} from region i to region j may be written

$$NM_{ij} = M_{ij} - M_{ji} = a_3(Y_{ij} - Y_{ji}).$$

Note that because the age and education variables are assumed to affect the level but not the direction of migration, they do not appear directly in this simple net migration function. (They will be introduced later as interaction terms.) Note further that if we assume that Y_{ij} and Y_{ji} are opposite in sign and approximately equal in magnitude we can rewrite the above net migration equation as

$$NM_{ij} = 2a_3Y_{ij}.$$

⁷ The direct cost of moving is such a small fraction of the differences between the present value of lifetime earnings in the North and the South that it probably can safely be ignored for the purposes at hand.

comes in distant regions is unevenly distributed among the population. Those with more education may be expected to have greater access to such information. Moreover, the subjective valuation of higher income as a benefit differs among individuals; some place greater value on the things that money cannot buy. It can be argued that *ceteris paribus*, the process of schooling increases the responsiveness of individuals to economic incentives.⁸ For both of these reasons, I formulate the second hypothesis as: the effect on the migration rate of the present value of the expected income gain associated with moving is a positive function of the level of schooling.

The migrant worker arrives at his destination with no on-the-job experience in the particular workplace where he finds employment. Furthermore, he is very likely to change his occupation in the process of moving, and thus to begin his work with no relevant on-the-job experience at all. If a worker in the youngest age group moves, we assume that he may expect to be treated like similar workers in the region of destination and can reasonably expect a time profile of earnings more or less like that which is characteristic of workers of his race and education in the region of destination. However, a middle-aged or older worker, who in the process of moving is deprived of much of the value of his previous on-the-job experience, can expect to have earnings below otherwise similar workers in the place of destination.⁹ Thus for older workers the time profile of lifetime earnings in the destination probably overstates the actual expected income gain from moving.

⁸ The argument is spelled out in some detail in Gintis [9].

⁹ Evidence on this score is contradictory. The view taken here is in part substantiated by an extension of the work of Hanoch reported in Schwartz [19]. There exists further evidence that in their destination, migrants earn less than workers there with similar characteristics. Michelson found earnings differences between migrant and nonmigrant for one of the four age/race categories used in his earnings functions [16]. See also Lansing and Morgan [14]. However, unpublished preliminary work by Peter Doeringer, Penny Feldman, David Gordon, and Michael Reich on Boston workers seeking employment through job centers, suggests higher earnings for migrants compared to nonmigrants of similar schooling, age, race, sex, and marital status.

Knowledge of what the migrant earned (or would have earned) in his place of origin, compared with others having similar characteristics, is of course equally germane. I know of no evidence on this question.

The expected income gain, even if accurately estimated, may be an overstatement of the economic benefits of moving for older workers. Death may cut short the expected stream of earnings before the planned retirement age, or good health may extend retirement beyond the date originally planned.¹⁰ While the uncertainty imposed by the variability of mortality and health as the worker approaches old age count for little in the evaluation of benefits from the standpoint of a young prospective migrant, they may weigh heavily on older workers.¹¹ If we assume that most individuals are risk averse, the greater variation of returns to human investments as a person grows older should reduce the subjective economic benefit associated with a given expected return.

Both the greater variability of returns to migration at a late age, and the probable overstatement of expected returns among older workers lead to the same conclusion: we expect that the effect on the migration rate of the present value of the expected lifetime income gain from moving is greater for younger workers. This is our third hypothesis.

The social environment of regions may have an influence on the movement of workers. If we assume that individuals have a preference for *states* of income distribution, quite apart from their own preferences for income, and if the very poor are more likely to have egalitarian preferences, we would expect *ceteris paribus*, a higher net out-migration rate among the very poor.¹² Further (and more concrete-

ly), regional differences in welfare programs provide an additional incentive for the poor to leave the South. Higher welfare payments, and more adequate coverage in most Northern states present a means of receiving income above and beyond that captured in our income term, and (for some) establish a floor on the total income received, thus reducing the degree of uncertainty facing the poor. Our fourth hypothesis is that out-migration rates for the very poor are higher than would be predicted by our measure of the income gain from moving.

Our study concentrates on migration out of the South. Because black workers apparently expect to find a less racist environment in the North, our fifth hypothesis is that blacks migrate out more than whites, quite apart from the relative income gains from moving.

It is possible that blacks and whites respond to the income incentive to move in quite different ways. This would be the case, for example, if there existed racial differences in the information flows, or the rate of time preference, or risk aversion. We might expect to find socially induced differences in subjective attitudes such as risk aversion and time preference arising from the differences in the objective social and economic environment of blacks and whites or of rich and poor. There is scattered evidence that blacks are both more risk averse and have higher rates of time preference than whites.¹³ Although the psychological studies yielding this evidence are based on experiments and game situations with samples and stakes quite unlike those being studied here, the results are plausible, and are consistent with a considerable amount of observed market behavior. Both a higher rate of time preference and a greater degree of risk aversion act to reduce the effect of the estimated income gain on the probability of migrating. Thus our sixth hypothesis is that blacks exhibit a lower responsiveness to the expected income gain from moving.

¹⁰ For a demonstration of the positive relation between age and the coefficient of variation of returns to a human capital investment, see Zucker [24].

¹¹ If we use a measure of the *relative* uncertainty of the returns from migration, such as the coefficient of variation of the expected returns to migrating, uncertainty will increase with age as long as the variance of the expected annual increment in earnings due to migration increases with age. If we use an *absolute* measure of uncertainty, such as the variance of expected lifetime increment in income due to migrating, then it may be objected that the uncertainty of returns to human investment is greater for younger workers merely because the relevant time streams extend longer into the future. Whichever measure of uncertainty is used, however, it seems reasonable to treat uncertainties in the near future as likely to be weighed more heavily than those occurring at a later date. Thus even if the absolute measure is used, uncertainty (discounted) may be greater for older workers. Whether this is true, of course, will depend on the individual's rate of time preference.

¹² The direction of this effect is based on the significantly greater income inequality in the South compared to the

North. See Al-Samarrie and Miller [1]. To state this point solely in terms of income distribution is probably overly restrictive, but to introduce more general notions involving the comparative importance of social stratification, hierarchy, or class in Southern and non-Southern society would greatly exceed my empirical and conceptual capabilities.

¹³ Lefcourt [15], Rosen [18], and Kogan and Wallach [13].

The data used in this study preclude the testing of a number of other plausible hypotheses. Because the income data available are simply classified as South and non-South, all the hypotheses developed here relate to the effect of personal characteristics and the associated income gains upon the probability of migrating between one "point" (South) and another (non-South). Thus I have been unable to test hypotheses concerning geographical variation in migration rates, the effect of unemployment in regions of origin and destination, the distance between origin and destination, levels of previous migration, and a host of other possible influences on migration.¹⁴

II An Empirical Test of the Model

The basic hypotheses are tested by estimating the following equation for whites and blacks separately. The signs of the coefficients for both races as suggested by the first four hypotheses appear in parentheses.

$$NM = b_0 + b_1Y + b_2AY + b_3SY + b_4P \quad (1)$$

(>0) (<0) (>0) (>0)

where

NM = the number of net out-migrants with a given set of age, schooling, and other characteristics divided by the total population in the region of origin with those characteristics, or the net migration rate for that population subgroup;

Y = the logarithm of expected increase in the present value of lifetime income associated with out-migration for the population subgroup in question, in thousands of dollars;

A = the age which defines the population subgroup;

S = the number of years of schooling which defines the population subgroup;

P = a measure of the extent of poverty, the fraction of male workers in the population subgroup in the South that earned less than \$1,000 in 1959.

¹⁴ For empirical tests of these and other hypotheses, see Kain and Persky [12] and Greenwood [10]. Because of the extreme multicollinearity among A , S , Y , and the interaction terms, I was unable to test the hypothesis that Y is simply serving as a proxy for A and S . In any case, for reasons partially outlined at the outset of this section, I can conceive of no compelling behavioral model in which A or S would directly affect the *net* migration rate.

The fifth and sixth hypotheses concern racial differences in the migration equation. The fifth hypothesis is that for given values of the variables, S , Y , A , and P , the level of net out-migration for blacks will exceed that for whites. The sixth hypothesis concerns the responsiveness of each race to the expected income gain from moving, or the term $\partial NM / \partial Y = b_1 + b_2A + b_3S$. Specifically, it is hypothesized that:

$$\frac{\partial NM}{\partial Y} (\text{black}) < \frac{\partial NM}{\partial Y} (\text{white}).$$

The migration rates used in this study are based on United States Census data on mobility between census divisions for the period 1955–1960.¹⁵ Migration is here defined as movement from any one of the three Southern census regions to any of the non-Southern census regions. The migration rates refer to total movement over the five-year period, 1955–1960. My observations are for males in 96 population subgroups, classed by eight age categories, six schooling categories, and race.¹⁶ Migration rates for each of the three Southern regions are included as separate observations. Thus I seek to explain the variability of migration rates from the South to the non-South among race-schooling-and-age groups.

The estimation of the income gains associated with moving provided the greatest empirical difficulties. The figures used here assume a working life extending to age 65 and are based on the mean earnings for each population subgroup in the South and non-South.¹⁷ The present value of the expected stream of earnings extending over the remainder of the working life of the subgroup in question was computed, using a variety of assumptions concerning the subjective rate of time preference and the appropriate upward adjustment of the income streams to take account of future productivity growth. The adjustment for future growth should reflect productivity increases not due to increases in schooling, as the adjustment must

¹⁵ The migration rates are based on unpublished tables, kindly made available to me by Rashi Fein. Further description of the data may be found in Fein [7].

¹⁶ The race variable refers to white and non-white. As the vast majority of non-whites are black, I have characterized the racial division simply as black-white.

¹⁷ Although I have used the term "income gain" throughout, the basic data refer to labor earnings and self-employed income only.

be applied to a given educational distribution. Thus a rate of about one per cent per annum seems reasonable.¹⁸ A variety of rates of time preference were used: one per cent, six per cent, and eleven per cent. In conjunction with the one per cent productivity adjustment, the six per cent rate of time preference gave clearly superior results in the estimation of equation (1).¹⁹ Only these results are presented below.²⁰

The method of estimating the present value of the expected income gain from moving is based on the supposition that income differences between Northern and Southern workers with identical race, age, and years of schooling are explained solely by the disequilibrium in the labor market arising from the spacial separation of the markets and the associated restriction of labor movement. A significant problem arises due to the noncomparability of years of schooling between the non-South and the South. There is ample evidence that, at least as far as cognitive development is concerned, achievement levels are lower in Southern than in Northern schools for both blacks and whites.²¹ Although the relation between cognitive development in school and later earnings is not well understood,²² we may infer from the above that a given level of Southern education is less productive than a similar level in the North, and thus that our estimates of the expected income gains from moving out of the South may be somewhat overstated.

The years of schooling and the age variables

¹⁸ This is based on the historical evidence presented in Denison [5].

¹⁹ The present values in this case were computed from the 1959 earnings cross section, using a five per cent discount rate. This is approximately equal to an upward adjustment of one per cent in the income stream accompanied by a six per cent rate of discount. The estimates of the present value of the income gain from moving are presented in the appendix.

²⁰ In virtually all regressions the logarithm of the present value of the expected income gain from moving (in thousands of dollars) yielded more significant estimates than the expected mean gain, or the expected income gain and its square. Other less successful equations included those in which the income gain variable was expressed as a percentage of discounted expected lifetime earnings in the South, and others in which the explanatory variables of age, income gain, and schooling entered only in multiplicative form. Only the equations using the logarithm of the income gain are presented here.

²¹ See, for example, Coleman, et al. [4].

²² For a discussion of these issues, see Weiss [22] and Gintis [9].

are the mid-point of the years of schooling and ages included in each particular population subgroup.²³

The estimated equations for blacks and whites, with *t* statistics in parentheses are ²⁴

$$\begin{aligned}
 NM(\text{black}) = & .0364 + .01586Y \\
 & (1.48) \quad (3.22) \\
 & - .001184Y + .00201SY \\
 & (-11.57) \quad (5.72) \\
 & + .17529P \quad (2) \\
 & (3.77)
 \end{aligned}$$

standard error of estimate: .0221

$|X'X|$: .14

coefficient of determination

(corrected) R_c^2 : .64

$$\begin{aligned}
 NM(\text{white}) = & -.0348 + .03124Y \\
 & (-4.45) \quad (5.88) \\
 & - .000824Y + .00113SY \\
 & (-6.69) \quad (2.55) \\
 & + .20295P \quad (3) \\
 & (2.79)
 \end{aligned}$$

standard error of estimate: .0251

$|X'X|$: .08

coefficient of determination

(corrected) R_c^2 : .33

For both races the estimates are highly significant and are consistent with the model of migration outlined above. The hypothesized model, using expected lifetime benefits of moving as the main explanatory variable, appears to be a better predictor of migration than the more conventional model using current North-South income differentials.²⁵

²³ The basic data used in the analysis — the expected income gain associated with moving by race, age, and years of schooling — are presented in a mimeographed appendix which will be made available on request to interested readers, along with the means, standard deviations, and zero-order correlation matrix for all the variables used in the regression analysis below.

²⁴ The determinant of the normalized $X'X$ matrix is presented as evidence on the degree of multicollinearity. See Farrar and Glauber [6].

²⁵ Equations (2) and (3) were estimated using the logarithms of the current income differences rather than the logarithms of the net present value of moving. For both whites and blacks, the sign of the income term is negative (for whites significantly so), and in both cases the explained variance is less. When the North-South income difference (rather than its logarithm) is used, the sign of the income term is correct for whites, but incorrect for blacks. In both cases the explained variance is less than that reported in equations (2) and (3). The zero order correlation between the net migration rate and the current North-South income differentials is $-.11$ for whites and $-.43$ for blacks. The analogous correlations between net migration rate and the log of the net present value of moving are 0.37 and 0.50 respectively.

Equations (2) and (3) give evidence of racial differences in both the level of net migration and the relation between the income incentive to move and the rate of net migration. To test whether the racial differences in equations (2) and (3) are statistically significant, I estimated a pooled equation for both races together, using a dummy variable R_1 (white = 1, black = 0) to allow for differences in the level of net out-migration. The resulting equation with t -statistics in parentheses is:

$$\begin{aligned}
 NM(\text{pooled}) = & - .0220 + .02863Y \\
 & (-2.04) \quad (8.47) \\
 & - .00091AY + .00164SY \\
 & (-12.76) \quad (5.91) \\
 & + .18664P - .00905R \quad (4) \\
 & (4.82) \quad (-1.69) \\
 & \text{standard error of estimate: } .0244 \\
 & |X'X| : .04 \\
 & \text{coefficient of determination} \\
 & (\text{corrected}) R_c^2 : .58
 \end{aligned}$$

Using the pooled and the separate racial equations (equations (2), (3), and (4)) I have tested the hypothesis that the sub-samples are drawn from the same underlying population except for a racial difference in the *level* of net migration, as reflected in the constants in these equations. The hypothesis of racial similarity is strongly rejected.²⁶

Two basic racial differences in the migration equations are observable. First, the predicted level of black out-migration is greater than that for whites, as was suggested by our fifth hypothesis. This is true if we set the income gain and poverty variables at zero and compare the constants in the equation,²⁷ or if we insert the black means of the independent variables into the white equations and compare the resulting predicted level of white out-migration with the actual level of black out-migration, or vice versa.²⁸

²⁶ See Chow [3]. The similarity hypothesis was rejected at the 0.99 level of significance.

²⁷ Note, however, that it is white in-migration, not autonomous black out-migration, which explains the difference. The constant in the black equation is insignificantly different from zero. The white constant is negative and highly significant.

²⁸ Whereas the actual mean white net migration rate is $-.0026$, ascribing white characteristics to blacks (using the white means in the black equation) yields a predicted black net migration rate of 0.0238 . Likewise, ascribing black characteristics to whites yields a predicted white migration rate of 0.0223 , compared to the actual black rate of 0.0306 .

Second, the direct effect of the income gain on the migration rate is considerably less for blacks than for whites; the income-age and income-schooling interactions effects are less for whites than for blacks. From equations (2) and (3), we can see some indication of the magnitude of the effect on the probability of migration of an increase in the expected value of moving. By evaluating the derivative of net migration with respect to Y , the logarithm of the expected income gain, and transforming the income variable from the logarithm back into the raw expected income gain from moving, we generate the estimates in table 1. It is clear from the table that blacks are considerably less responsive than whites to the income gain from moving, thus confirming our sixth hypothesis.

TABLE 1. — THE EFFECT ON NET MIGRATION RATES OF A THOUSAND DOLLAR INCREASE IN THE PRESENT VALUE OF THE EXPECTED INCOME GAIN ASSOCIATION WITH MOVING OUT OF THE SOUTH *

Years of Schooling		Age	
		27	42
8	White	.00145	.00056
	Black	.00000	— .00096
12	White	.00299	.00777
	Black	.00034	— .00049
16	White	.00306	.00106
	Black	.00062	— .00006

* Calculated from equations (2) and (3) as $(b_1 + b_2A + b_3S)/I$, where I is the present value of the expected income gain from moving.

III Conclusion

The human investment approach to migration has some plausibility on common-sense grounds — it is founded on a plausible behavioral model — and the empirical results presented here further support it.

The results indicate that the pattern of geographical mobility of workers may be explained as if individuals considered the benefits and costs of moving in the context of a general investment problem. Higher net out-migration rates are found for those population subgroups which stand to gain the most from moving, as well as for blacks and for the very poor.

The results of this study suggest two parting conjectures concerning the distribution of income. The first relates to the fact that the derivative of the net migration rate with respect to the present value of the income gain from

moving is a positive function of years of schooling. This result suggests that part of the monetary return to schooling arises because people with more education adapt more successfully to economic disequilibria. (Thus we conclude that studies of the monetary returns to schooling which hold constant the region of employment are likely to underestimate the full impact of schooling upon earnings.) The insufficiency of an equilibrium framework for the analysis of the returns to schooling indicated by this spatial case is suggested in other works related to the theory of the firm and to the diffusion of technological progress.²⁹

The second conjecture concerns the fact that blacks appear to be less responsive to the income gain from moving than whites. This finding is consistent with the notion that the stability of an unequal income distribution may be explained in part by socially generated attitudes — risk aversion and high rates of time preference, for example — which inhibit black people from taking advantage of those avenues for higher incomes, such as education and geographical mobility, ordinarily used by whites from upper and middle income backgrounds.

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²⁹ See particularly Welch [23] and Nelson and Phelps [17].