PLACE-TO-PLACE MIGRATION: SOME NEW EVIDENCE

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Introduction

THIS paper presents new evidence on the determinants of place-to-place migration in the United States. For understanding the causes of differential migration rates into and out of labor markets, knowledge of place-to-place migration functions is of interest for a number of reasons. Given a thorough understanding of gross place-to-place flows, one can proceed to calculate net flows; the reverse, of course, is not possible. There are also other advantages of place-to-place studies: parallelism to microeconomic behavior, opportunity to investigate specific origin-destination match-ups, recognition of the number and location of alternative opportunities for persons residing in different origins, and exploration of possible asymmetries.

Following a large body of economic literature, the analytical approach adopted regards migration as a form of human investment. Economic variables used in the empirical work exhibit effects in the hypothesized direction and explain up to two-thirds of the variance in intermetropolitan migration rates. However, this high degree of explanatory power is achieved only for certain functional specifications involving particular independent variables. Thus, the empirical results confirm the usefulness of the human investment approach to place-to-place migration, but they show too that the economic factors used as explanatory variables must be carefully specified and measured.[1]

Section I of the paper sets out the model, justifying the particular specifications used. Section II presents the empirical results. The economic variables included in the model that are found to be systematically related to migration rates are real income, measures of turnover in the labor market, and actual and average distance. Also significant in a number of the regressions are the amount and availability of non-work income, specifically welfare and unemployment insurance benefits. When the functional specification permits the effects of origin and destination conditions to differ, a persistent asymmetry is found, whereby destination economic conditions exhibit the hypothesized effects more often than do origin conditions. Conclusions are found in section III.

I. Model Specification[2]

Let i represent the place of origin, j the place of destination, j' another possible destination, M_{ij} the rate of migration between i and j, C_{ij} the cost of moving between i and j, and E_i and E_j vectors denoting the economic attractiveness of i and j, respectively. The basic place-to-place migration model is

$$M_{ij} = f(E_i, E_j, C_{ij}), f_1 < 0, f_2 > 0, f_3 < 0, \quad (1)$$

or, if third alternatives are to be considered,

$$M_{ij} = f(E_i, E_j, C_{ij}, E_{j'}, C_{ij'}),$$
$$f_1 < 0, f_2 > 0, f_3 < 0, f_4 < 0, f_5 > 0. \quad (2)$$

For the empirical testing of (1) or (2), we must decide on (a) the migration flow to be examined (M); (b) the unit of analysis (i, j); (c) the nature of the migration function (f); and (d) the specific independent variables included in E_i, E_j, and C_{ij}.

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[1] For a similar conclusion for net migration, see Fields (1976).

[2] Space limitations preclude the treatment of specification issues in greater depth in this paper. Interested readers are referred to Fields (forthcoming).

The Migration Flow to Be Examined

The human investment model posits that migration occurs in response to differential opportunities for earning income in the labor market. It is desirable, therefore, to take the labor force as a reference group and to use as our dependent variable the rate of migration among labor force participants. One procedure is to determine the number of migrants and population-at-risk based on the prime age civilian labor force.[3] Unfortunately, for place-to-place migration, the existing data sets do not permit this type of disaggregation, and gross population movements must therefore be used. The data base in this study is the 1970 Census. The dependent variable is the number of persons who moved from i to j between 1965 and 1970, expressed per 1,000 persons at i in 1965. As a partial standardization for non-labor market movers, the number of college students and military personnel in origin and destination (expressed as a percentage of the relevant populations) are included on the right-hand side of (1).

Choice of Labor Market Unit

Most place-to-place migration studies have looked at the flows of persons between large geographic aggregates such as the 9 Census regions or the 48 contiguous states. This study instead uses the Standard Metropolitan Statistical Area (SMSA) as the labor market unit. This is because in the economic model the key determinants of migration are the labor market conditions prevailing in origin and destination. While labor market conditions are by no means uniform within SMSAs, SMSAs are the closest thing we have to homogeneous labor markets with adequate data on labor market conditions.[4]

This study explores the determinants of migration flows out of 20 of the largest SMSAs to each of the other 19. The reason for the limitation to 20 is that, as described below, cost-of-living series are available only for these cities and therefore these are the only ones for which real income can be used as an explanatory variable.[5]

Functional Form of the Migration Function f

Various functional forms of the place-to-place migration function have been proposed in the literature. Among them are linear or double logarithmic specifications of models which may be linear in the variables or in their differences or ratios.

The regressions in section II make use of models that are linear in the logarithms of the variables. The most convincing rationale for log-log estimation is the recognition that the migration decision is inherently a choice between a finite number of mutually exclusive discrete alternatives. As such, it is amenable to analysis by the polytomous logistic model, developed in economics by McFadden (1974) and applied to the migration decision by Schultz (1977).

The logistic model holds that an individual's decision to locate (or relocate) in place j given that he now lives in i depends on a linear combination Z_{ij} of origin and destination conditions in the following specific way:

$$P_{ij} = \frac{e^{Z_{ij}}}{\sum_j e^{Z_{ij}}} \tag{3a}$$

where

$$\sum_j P_{ij} = 1 \tag{3b}$$

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[3] I did this in my previous study of net migration. See Fields (1976). A similar procedure was utilized independently by Greenwood (1975b) in an analysis of gross in and out migration rates.

[4] I am familiar with only two studies of place-to-place migration for U.S. SMSAs: Lowry (1966) and Greenwood and Sweetland (1972). Both are based on 1955–60 migration flows, which the empirical work below updates by a decade. Their work is also open to doubt on econometric grounds. Both studies used the number of migrants (or its logarithm) as a dependent variable and origin population as an explanatory variable. The authors justified this procedure by the claim that there is no particular reason to presuppose that migration increases in proportion to population size. Whether this claim is correct or not, the effect of explaining number of migrants by population-at-risk, among other things, is to inflate artificially the apparent explanatory power of the regression.

[5] As is the practice in intermetropolitan migration studies, movements into (out of) the sample cities from (to) other cities and non-metropolitan areas are ignored. Neglect of other origins and destinations may introduce biases into the estimated regression coefficients. For example, higher unemployment in Detroit might induce recent in-migrants to return to their homes in Kentucky and Alabama rather than to leave for Chicago or Cleveland. The only satisfactory way to treat this problem is to expand the universe to include the rest of the country as potential origins and destinations—a large undertaking well beyond the scope of an intermetropolitan migration study.

for all i. For a variety of reasons noted by Schultz,[6] Z_{ij} is thought to be a linear function in the *logarithms* of the origin and destination conditions X_i and X_j and the distance D between i and j:

$$Z_{ij} = \alpha + \sum_m \beta_m \ln X_{mi} + \sum_m \gamma_m \ln X_{mj} + \delta \ln D_{ij}. \quad (4)$$

Combining (3) and (4), we obtain the general form

$$\ln (P_{ij}/P_{ii}) = \tilde{\alpha} + \sum_m \tilde{\beta} \ln X_{mi} + \sum_m \tilde{\gamma} \ln X_{mj} + \tilde{\delta} \ln D, \quad (5)$$

the tildes ($\tilde{}$) indicating transformations of the respective coefficients of (3) and (4). Since the variation in P_{ij} is undoubtedly much greater than the variation in P_{ii}, we might regard P_{ii} as roughly constant across labor markets. Under this assumption, equation (5) provides a rigorous justification for logarithmic estimation of the function

$$\ln M_{ij} = f(\ln X_i, \ln X_j, \ln D_{ij}) \quad (6)$$

under the maintained assumption that (4) is a suitable representation of the way in which conditions in origin and destination are evaluated.

Models like (6) allow for asymmetries between origin and destination effects. This is important, because the existing literature establishes a persistent pattern of asymmetries: economic conditions in the destination consistently out-perform those in the origin.[7] This kind of asymmetry is encountered as well in the empirical results below.

[6] They are (1) The expected wage hypothesis posits multiplicative interactions between wage rates and employment rates, which are easily specified logarithmically; (2) The ratio of expected incomes approximates the rate of return to migration in the case where opportunity costs are the most important costs of migrating; (3) Specified in this way, the logistic model is comparable to non-logistic models in double-logarithmic form; (4) In empirical research on migration in Venezuela, the logarithmic form of Z_{ij} explained a larger share of the variance than other forms.

[7] I am using the term "out-perform" in the crude sense of higher regression coefficients and t-statistics. Among the studies reporting this particular type of asymmetry are Nelson (1959), Perloff et al. (1960), Lowry (1966), O'Neill (1970), and DaVanzo (1975).

In contrast to potentially asymmetrical models like (6), some researchers have estimated models in which origin and destination effects are restricted to be equal to one another (so-called "symmetrical" models). In the ratio model, this means that an $x\%$ increase in economic conditions in j has the same effect on migration as an $x\%$ decrease in economic conditions in i; in the difference model, the restriction is in terms of absolute rather than percentage changes. Empirical results comparing the unrestricted and restricted models are presented below.[8]

Choice of the Independent Variables

The principal independent variables in the place-to-place migration model are those that pertain to labor market opportunities. On the benefit side, we wish to consider the income the migrant might expect to receive under various circumstances. The income variable should measure the rewards a migrant anticipates if he finds a job (usually a full-time, full-year job). This should be modified by the probability of being employed in such a job. Each of these should reflect both current and future labor market conditions. We also want to take account of differences among alternative labor markets in the event that a job is not found and the migrant is thereby forced to rely on unemployment compensation or welfare. On the cost side, the usual proxy is distance between origin and destination, although distance captures many other effects too. Proximity of third alternatives is also of interest. For purposes of standardization, the numbers of military personnel and college students are included as well.

The migration behavior under examination is the flow between 1965 and 1970, the data being drawn from the 1970 Census. In order to minimize the risk of simultaneous equations bias owing to the fact that migration influences contemporaneous economic conditions as well as being influenced by them, all independent variables are dated 1965, the base year of the migration flow.[9]

[8] Place-to-place studies that have used the symmetrical model report substantial explanatory power. Among them are Lowry (1966), Gallaway et al. (1967), Greenwood (1969), Fabricant (1970), and DaVanzo (1972).

[9] For an empirical demonstration of the importance of using beginning-of-period rather than end-of-period values in migration research, see Greenwood (1975b).

Income

We wish our income variable to represent the income a migrant might expect to receive if he works for a full year. This may be approximated by the real median income in the SMSA of those who worked 50–52 weeks. Income data on full-year workers are available by SMSA only from the 1960 and 1970 Censuses for the preceding year. The best possible data for 1959 pertain to median income, and for 1969 to median earnings, both unadjusted for intermetropolitan cost-of-living differences. To obtain estimates of real incomes in 1965, I calculated 1959 and 1969 real incomes by deflating the nominal medians by the Bureau of Labor Statistics' (BLS) Intermediate Budget and the Consumer Price Index for that city in the appropriate year, then took a simple arithmetic average, and then divided by 12 to achieve comparability with other variables, which are measured monthly.[10] The use of cost-of-living adjusted income is justified by my earlier finding (Fields, 1976) that the use of undeflated rather than real incomes gave markedly inferior results in empirical research on net migration.

Employment Opportunities

The simplest way of introducing employment opportunities into the human investment model of migration is to include the unemployment rate (U) as a separate independent variable. A large number of studies have done this with a remarkable lack of success. Some (e.g., Rogers, 1967; Greenwood, 1969; and Wadycki, 1974) found higher migration rates into *high* unemployment areas, while others (e.g., Gallaway et al., 1967; Fabricant, 1970; Courchene, 1970; and Miller, 1972) found the unemployment rate to be statistically *insignificant* as an explanatory variable. In only a few studies has high unemployment in an area been found to be an important deterrent to migration, but often, only for certain population subgroups (Lowry, 1966; Sommers and Suits, 1973; Cebula, Kohn, and Gallaway, 1973–74). Thus, Greenwood (1975a, p. 411) concludes: "One of the most perplexing problems confronting migration scholars is the lack of significance of local unemployment rates in explaining migration."

The empirical difficulty with the unemployment rate may well have a conceptual underpinning. A priori, we might suppose that unemployment rates are *not* very satisfactory measures of economic opportunity for potential migrants, who have a number of reasons for being more concerned with the *probabilities of acquiring and retaining employment* than with the average employment rate among *all* workers in that market.[11] The probabilities of acquiring and retaining employment may be calculated from labor turnover data. Thus, it would be expected that labor turnover variables would play an important part in the explanation of migration.

Labor turnover indices by SMSA are regularly published in two forms. The more aggregative measures are monthly rates of total accessions to jobs and separations from jobs. These in turn are disaggregated into monthly rates of new hires (NH), quits (Q) and layoffs (L)—the variables used here. Although this information is collected only from manufacturing establishments, this is apparently not a serious problem. In my past research (Fields, 1976), I found that these measures perform much better than the SMSA unemployment rate, which is of course based on all employees.

[10] The BLS publishes three series of budgets to permit inter-city comparisons of the cost of maintaining given standards of living for a family of four. The Intermediate Budgets for 1967 were selected for use here as most representative of the median family. These were in turn adjusted by the consumer price index for 1959 and 1969 to yield indices of relative living costs in different cities in the two years. These indices vary substantially, with the largest in 1959 being 16% greater than the smallest in that year, and in 1969 20% greater. These variations are substantial as compared with the range of values for nominal median incomes, which amounted to 25% in both years.

[11] The most important factor casting doubt on the usefulness of the unemployment rate as an index of the tightness or looseness of labor market conditions is the fact that the unemployment rate pertains to the *entire stock* of workers and jobs, in particular including those experienced workers who are secure in their present positions and those jobs which are already filled; migrants, however, are presumably more concerned about *turnover* in the labor market and would give greater weight to the rates at which hiring for new jobs is taking place, currently-employed workers are losing or leaving their jobs, and the like. Research in other areas of labor economics indicates that disaggregation of labor market information into component flows is helpful in understanding the unemployment experiences of different labor force subgroups at different points in time; similar gains in understanding might therefore be expected by treating migration in terms of labor turnover. For further discussion of these points, see Fields (1976).

Expected Income

There is a well-established precedent for working with functional forms in which the variables describing income and the probability of employment are entered linearly. This empirical specification, while straightforward statistically, cannot be readily derived or interpreted behaviorally. Possibly, migration is better explained by a model that postulates that people behave as if they calculate the expected probabilities of being employed in each future time period in a more sophisticated way. One specific way of projecting future employment probabilities is to regard the labor market as having two states—employment and unemployment—with individuals facing a matrix of probabilities of remaining in or moving between the two states. Let $P_{ij}(t)$ be the probability of moving from state i to state j during time t. Under the simplifying assumption that individuals behave as if the transition probabilities comprising $P(t)$ are constant over time and equal to their current values, results from Markov chains may be used to derive an expression for the present discounted value of expected future income:

$$PV = [(1 + r)/r]W\,[P_{ue}/(r + P_{ue} + P_{eu})], \quad (7)$$

e and u denoting the states of employment and unemployment respectively, r being a discount rate, and W the wage while working.[12] The transition probabilities P_{ue} and P_{eu} may be approximated from turnover data as $P_{ue} = NH/U$ and $P_{eu} = L/(1 - U)$.[13] Present values may then be expressed in terms of real income (*REALY65*) and labor turnover variables as

$$PV = [(1 + r)/r]\,REALY65\,[(NH/U)/(r + NH/U + L/(1 - U))]. \quad (8)$$

Income Maintenance Programs

The maintained assumption of the human investment approach to migration is that potential migrants are interested in maximizing (or at least improving) their expected incomes. The variables considered so far attempt to measure the expected economic returns from *working*. In addition, for many workers, an important component of expected income is the size of the payment they would receive if they were *not working*, e.g., if they should lose their present jobs or their search for a new job proves unsuccessful. The amount and availability of welfare benefits and unemployment compensation are considered below. For each, the hypothesis is that the migration rate is positively related to the level of these variables in the destination, negatively related to their value in the origin.

Welfare Payments

Several studies have examined the role of welfare payments in determining migration flows. All take as their measure the amount of AFDC (Aid to Families with Dependent Children) payments per recipient. Kaun (1970) and Cebula and Shaffer (1975) found higher migration rates into areas with higher welfare payments, but numerically the effects were not large. Glantz (1973) and DaVanzo (1972) both reported statistically significant effects for some of the groups examined but not all; like Kaun, they found that where the effects were significant, they were small. The welfare variables in the studies by Gallaway et al. (1967), Cebula, Kohn, and Gallaway (1973–74) and Sommers and Suits (1973) were positive but insignificant. Finally, Pack (1973) reported that higher welfare payments were *negatively* associated with in-migration rates. In short, the level of welfare payments has *not* been shown in past studies to play a *major* role in determining migration flows. Still, the effects may be non-trivial.

To allow for the possibility that the *amount of welfare benefits* may influence migration, the empirical work below follows the lead of these earlier studies by including the average AFDC benefit per recipient in origin and destination as an explanatory variable. In parallel with the specification of the income variables, however, the nominal AFDC benefit amount is adjusted for cost-of-living differences (*REALAFDC*).

It would seem that the *availability of welfare benefits* should enter in as well as the amount. The measure of availability used is the number of AFDC recipients as a fraction of the number of poor persons in the SMSA (*AFDC%POOR*), thus approximating the conditional probability of receiving benefits given one is poor. The numerator is the number of AFDC recipients in

[12] For the derivation of equation (7), see Fields (1976), equations (7)–(9).

[13] For the justification for these expressions, see Fields (1976), equations (11)–(12).

1966.[14] The denominator is estimated for 1965 taking the means of values from the 1960 and 1970 Censuses. The welfare variables are included as separate independent variables in an ordinary least squares regression.[15]

Unemployment Insurance

Turning now to unemployment insurance (UI) benefits, much attention has recently been devoted to ascertaining the extent to which the UI program creates "adverse incentives," prolonging the very unemployment that UI is intended to ease.[16] UI benefits compensate covered workers for a large fraction of the income lost during a spell of unemployment, thus affecting expected income in a given location rather substantially. Therefore, higher benefit amounts and greater availability of benefits should enter into potential migrants' decisions. Despite the potential importance of UI for migration behavior, to my knowledge, no previous study has attempted to estimate the magnitude of these effects.

Consider first *UI benefit amount*. This represents what an average worker would gain during a week of unemployment, or alternatively, what he would lose should his benefits terminate for whatever reason (such as moving from one state to another and coming under a new jurisdiction where his UI claim might not be honored). I would regard as the preferred measure the benefit-wage ratio (*UIBENWG*), i.e., average UI benefit per recipient as a fraction of average earnings of covered workers. The main advantage of this variable is its incorporation of the opportunity cost aspect. Another advantage of the benefit-wage ratio is that it is a pure number and does not require deflation.

For *UI benefit availability,* the ideal variable approximates the likelihood of receiving benefits conditional on being unemployed. The preferred measure of receipt of benefits is the number of weeks of unemployment compensated by UI (*UIWEEKS*). This measure incorporates information on the length of payments as well as the probability of payments commencing. The base for the probability of receiving benefits should measure the likelihood of unemployment; for this purpose, the best available proxy is the average number of insured unemployment (*INSUNEM*). The UI availability measure is then

$$UIPROBWKS = \frac{UIWEEKS}{INSUNEM}.$$

For each of the welfare and UI variables, the hypothesis is that *MIGIJ* is positively-related to the value of those variables in the destination, negatively-related to their value in the origin.

Distance[17]

There are many reasons to think that the distance between a given origin and a given destination (*DIJ*) would have a negative effect on the rate of migration between the two places. Among the reasons are monetary cost, psychic cost, information, and number of intervening opportunities.

Considerations of intervening opportunities and third alternatives suggest that the deterrent effect of distance on migration depends on labor market conditions elsewhere. One way of specifying this is to include measures of economic opportunity in the best possible destination within a radius of *DIJ*; see Wadycki (1974). An alternative procedure, adopted below, is to introduce another variable measuring the average distance between origin i and all other destinations $j' \neq j$ (*ADIJ*). It is as far between Dallas and Houston as between Washington and New York, but once we recognize the greater number of nearby third alternatives along the eastern seaboard than in the southwest, we are led to expect more Dallas-Houston migration than Washington-New York migration for any given differential in opportunities. I hypothesize, therefore, that the rate of migration is positively

[14] As far as I know, 1965 data are not published.

[15] To justify this procedure, it must be assumed that the amount and availability of welfare benefits are determined neither by migration flows nor by other independent variables. If these assumptions do not hold, the estimated coefficients on the welfare variables are subject to bias. The severity of this bias could be approximated by estimating an expanded model incorporating a theory of welfare benefits. This is beyond the scope of the present endeavor.

[16] Much of the discussion of this question was stimulated by the provocative writings of Feldstein, e.g., (1973). This literature is reviewed in Fields (1977) and Hamermesh (1977).

[17] Major studies analyzing the effect of distance on migration are those of Nelson (1959), Schwartz (1973), and Miller (1972). Distance effects are surveyed in the work of Shaw (1975) and Greenwood (1975a).

related to the average distance between the origin and all other destinations.[18]

Non-Labor Market Movers

As a partial standardization for non-labor market movers, the number of college students and military personnel in i and j are included on the right-hand side of the place-to-place migration functions. Figures on college enrollments and military personnel were derived as averages from the 1960 and 1970 Censuses (since I could not find SMSA-specific measures for 1965) and these were divided by 1965 population to yield the two quasi-explanatory variables *PCTCOLL* and *PCTARMY*.[19] This procedure gives the best possible approximation to the ideal—number of labor force migrants as a percentage of base-year labor force.

Population

Many migration studies have included a population variable and found it to be an apparently significant determinant of migration rates. Notwithstanding these results, population is not included as an explanatory variable in the regressions below, the reason being its presumed endogeneity. Today's population is in large part determined by past migration flows. Like today's migration decisions, past periods' migration decisions were themselves determined by past economic conditions. Since, in a particular labor market, current economic conditions tend to be highly correlated with previous periods' conditions (see Mincer, 1966; Hall, 1970, etc.), ordinary least squares estimation of a migration model including population as an exogenous explanatory variable would produce inconsistent regression coefficients.[20] By excluding population and the determinants of previous migration flows, we are estimating a reduced form, the estimated coefficients of which are consistent (provided, of course, that the model is otherwise correctly specified).[21]

II. Empirical Results

The empirical results are reported in table 1.[22] The principal result, as expected, is that the findings are broadly supportive of the human investment view of migration. Most, but not all, of the variables exhibit the hypothesized effects. Also, the variables in table 1 together explain a substantial share of the variance in migration rates. A second general finding is the appearance of a systematic asymmetry between origin and destination conditions. The coefficient on each origin variable is markedly smaller (in absolute value) than the coefficient on the corresponding destination variable. This imbalance is reflected in tests of statistical significance. The only economic variables exhibiting statistically significant effects in the hypothesized direction are those measuring destination conditions and distance. In light of previous research, the observed patterns of asymmetry are not entirely surprising. They do run counter, though, to the naive expectation that the influence of origin and destination conditions would be approximately equal in magnitude although opposite in sign. Specific regression results follow.

Column (1) considers the key economic variables—real income and employment probability. In the first regression, the unemployment rate is used, as in most prior research. The results are mixed. As expected, we find that destinations with higher real incomes (*REALY65*) attract migrants at a higher rate than places where

[18] In the regressions below, *DIJ* and *ADIJ* are entered as separate independent variables. In further research, it would be interesting to explore whether they interact with each other or with some of the other independent variables.

[19] Given the non-linear nature of the Vietnam buildup and college expansions, these approximations may not be entirely satisfactory.

[20] The migration function estimated below is part of a larger system of equations:

$$MIGIJ_{65-70} = \alpha_{65} + \sum_i \beta_{65}{}^i E_{65}{}^i + POP_{65} + \epsilon_{65},$$

$$MIGIJ_{60-65} = \alpha_{60} + \sum_i \beta_{60}{}^i E_{60}{}^i + POP_{60} + \epsilon_{60},$$

$$MIGIJ_{55-60} = \alpha_{55} + \sum_i \beta_{55}{}^i E_{55}{}^i + POP_{55} + \epsilon_{55}, \text{ etc.}$$

Once we recognize that $POP_t = POP_{t-1} + MIG_{t-1} + NAT_{t-1}$, where NAT = natural population growth, the correlation between ϵ_t, ϵ_{t-1}, ϵ_{t-2}, . . . becomes evident, necessitating simultaneous equations estimation of the full system or reduced form estimation of the 1965–70 migration equation. The regressions reported in section III are the reduced form estimates.

[21] For further discussion of the relationship between population and migration in place-to-place functions, see Schultz (1977).

[22] A glossary giving the precise definitions of the explanatory variables and their sources is omitted because of space limitations. It may be obtained from the author upon request.

TABLE 1.—REGRESSION RESULTS FOR PLACE-TO-PLACE MIGRATION FUNCTIONS, DOUBLE LOGARITHMIC SPECIFICATIONS

		(1) Unemployment Model	(2) Turnover Model, Adjusted for LF Composition	(3) Markov Present Value Model	(4) Turnover Model, Not Adjusted for LF Composition	(5) Ratio Model
INCOME	*REALY65I*	1.460 (0.891)	0.678 (0.687)		0.432 (0.730)	1.190 (0.642)
	REALY65J	5.431 (0.867)	2.85 (0.687)		2.903 (0.730)	
	PRVI			1.158 (0.280)		
	PRVJ			2.736 (0.280)		
EMPLOYMENT PROBABILITY	*UI*	−0.052 (0.337)				
	UJ	1.125 (0.205)				
	NHI		1.08 (0.593)		0.929 (0.566)	2.947 (0.467)
	NHJ		6.84 (0.500)		5.810 (0.511)	
	QI		−0.728 (0.558)		−0.555 (0.493)	−1.862 (0.419)
	QJ		−5.19 (0.485)		−3.594 (0.465)	
	LI		−0.494 (0.106)		−0.505 (0.113)	−0.247 (0.099)
	LJ		−1.06 (0.106)		−0.965 (0.112)	
WELFARE (*AFDC*)	*REALAFDCI*	−0.399 (0.387)	−0.259 (0.356)	−0.784 (0.370)	−0.009 (0.277)	−0.160 (0.243)
	REALAFDCJ	0.497 (0.384)	0.814 (0.356)	−0.762 (0.369)	−0.377 (0.277)	
	AFDC%POORI	0.156 (0.194)	0.398 (0.169)	0.460 (0.176)	0.332 (0.136)	0.141 (0.119)
	AFDC%POORJ	−0.326 (0.176)	0.100 (0.164)	0.720 (0.176)	0.697 (0.135)	
UNEMPLOYMENT INSURANCE	*UIBENWGI*	0.360 (0.519)	0.860 (0.441)	0.666 (0.484)	0.858 (0.473)	0.921 (0.417)
	UIBENWGJ	−0.089 (0.509)	2.28 (0.441)	0.118 (0.474)	2.624 (0.473)	
	UIPROBWKSI	−1.066 (0.745)	−2.19 (0.816)	−0.006 (0.738)	−1.966 (0.734)	1.690 (0.630)
	UIPROBWKSJ	−0.780 (0.744)	−3.05 (0.816)	1.976 (0.727)	0.707 (0.700)	

TABLE 1.—(Continued)

		(1) Unemployment Model	(2) Turnover Model, Adjusted for LF Composition	(3) Markov Present Value Model	(4) Turnover Model, Not Adjusted for LF Composition	(5) Ratio Model
ACTUAL AND AVERAGE DISTANCE	*DIJ*	−0.777	−0.879	−0.713	−0.804	−0.601
		(0.062)	(0.047)	(0.054)	(0.049)	(0.056)
	ADIJ	0.582	0.782	0.222	0.857	1.600
		(0.460)	(0.276)	(0.254)	(0.241)	(0.278)
COLLEGE ENROLLMENTS	*PCTCOLLI*	0.701	0.506	0.535		
		(0.343)	(0.238)	(0.274)		
	PCTCOLLJ	1.144	0.455	0.478		
		(0.263)	(0.211)	(0.249)		
MILITARY PERSONNEL	*PCTARMYI*	0.021	−0.013	−0.046		
		(0.049)	(0.047)	(0.048)		
	PCTARMYJ	0.322	0.300	0.124		
		(0.046)	(0.045)	(0.048)		
	CONSTANT	−24.126	5.442	−43.379	−12.910	−7.550
	R^2	0.442	0.661	0.498	0.601	0.332

Notes: All variables expressed logarithmically. Standard errors are in parentheses. Suffix *I* denotes origin, suffix *J* destination. n = 380.

incomes are lower. However, as observed by others, we find higher rates of migration into *high* unemployment areas, contrary to the hypothesized effect.

Regression (2) tests the hypothesis that the poor performance of the unemployment rate is because of inattention to job turnover considerations. Indeed, as hypothesized, destinations with higher rates of new hires and lower rates of quits and layoffs attract more migrants than do places with less favorable labor market conditions. This finding for place-to-place migration reinforces a principal conclusion from my earlier paper based on net migration: that the probabilities of obtaining and keeping a job are in fact major influences on labor market behavior. This was not detected in previous studies, all of which used the unemployment rate as an (inverse) index of job opportunities. It is interesting to note that the sign on each income and labor turnover variable at origin is the same as on the corresponding destination variable (although statistically insignificant) and is therefore counter to hypothesis. This pattern is consistent with widespread return or repeat migration.

Rather than the regression in column (2) where (the logarithms of) income and employment probabilities are entered linearly, migration functions may be based on present values of expected future lifetime incomes as given by (8). The results are displayed in column (3). The present value of expected income calculated from a Markovian model of job turnover is found to perform very well, yielding a t-statistic of 10 at destination. However, compared to the more general linear specification in column (2), the overall explanatory power is notably (and statistically significantly) inferior. This result differs from my earlier finding (Fields, 1976, table 1) for net migration, in which the two formulations were found to be comparable in explanatory power. Further research is needed to discover the cause for this divergence.

Continuing with the non-Markovian turnover model (column (2)), let us consider now other variables besides the income and employment probability measures. The actual distance between origin and destination (*DIJ*) is negatively-related to the migration flow between them, hardly a new or surprising result. Of greater novelty is the finding for the average distance variable (*ADIJ*), i.e., the average distance between origin i and the other cities in the sample excluding the particular destination j. This variable has the expected positive effect. The results are consistent with the view that the deterrent

effect of distance is in part a reflection of the number of intervening opportunities and alternative destinations, possibly weighted by proximity. On this view, the farther are other relevant opportunities, the more migration between two places a given distance apart, *ceteris paribus*. This is, in fact, what the regression results show.

In contrast to the other economic variables, the income maintenance variables are on the whole not very strong. Consider first unemployment insurance (*UI*). In regression (2), the UI benefit amount variable (*UIBENWG*) exhibits a statistically significant positive effect, as hypothesized, at destination but not the expected negative effect at origin. On the other hand, the UI availability variable (*UIPROBWKS*) is negative and significant at origin, as expected, but the result is significantly "wrong" at destination. In other regressions, the estimated effects are very different, both in sign and in magnitude. We may conclude, therefore, that UI payment amounts and availability have some effect on migration but the results raise as many questions as answers.

Turning to welfare payments, the amount of AFDC payments (*REALAFDC*) has the expected statistically significant positive effect in regression (2), though not in other regressions. Thus, there is only meager support for the view that higher welfare benefits attract migrants. A more persistent effect is the finding that a higher percentage of welfare recipients leads to greater out-migration. Taken together, these results suggest that welfare benefits influence migration in two somewhat offsetting ways. On the one hand, low income workers may be moving to locations where benefits are higher and easier to obtain. On the other hand, there also seems to be significant "flight from blight" on the part of the non-poor. Clearly, we need additional investigation of the relative importance of these two influences on overall migration flows.

The empirical research also includes variables used to standardize for the civilian labor force: importance of military personnel (*PCTARMY*) and college students (*PCTCOLL*). These variables are included in the expectation that cities with higher concentrations of military personnel and college students have greater population turnover and hence more migration both in and out, more or less independently of local labor market conditions. The empirical results generally support this view. As hypothesized, the estimated effects of the armed forces and college enrollment variables are positive at both origin and destination, often significantly so. The inference from these findings is that standardization for *labor force* migrants is desirable.

Up to now, we have considered only unrestricted specifications that allow us to examine the patterns of asymmetries in origin and destination effects. It is interesting to explore how well a symmetrical model performs on the same data. Regression (4) in table 1 presents the same asymmetrical model as in column (2) except that (4) excludes *PCTARMY* and *PCTCOLL*, since it is the *level* of these variables and *not* their ratio or difference that is thought to influence migration rates. Column (5) gives the results for a ratio model.[23] Note the following findings:

(i) The variables for income, new hire rate, quit rate, layoff rate, actual distance, average distance, and unemployment insurance amount and availability exhibit the hypothesized effects. All are statistically significant by conventional standards.

(ii) The welfare variables perform weakly. Neither the amount nor the availability variable is significantly different from zero.

(iii) The overall explanatory power of the symmetrical ratio model (R^2 = .33) is considerably lower than the unrestricted asymmetrical model containing the same variables (R^2 = .60).

Based on these results, I would conclude that the asymmetrical model dominates the symmetrical model. This is in part a statistical consequence, since the asymmetrical form permits greater flexibility than the restricted form. However, the restricted form is not entirely without economic content, since individuals might reasonably be thought to behave as if they are responding to ratios. Given the large difference in explanatory power between the two models, though, it would seem preferable in future research to use unrestricted asymmetrical models as in regression (2) rather than restricted models

[23] The difference model could not be estimated in double logarithmic specification since some differences are negative and the logarithms of negative numbers are undefined.

as in regression (5). Had we followed the practice of some researchers and estimated only a difference or ratio model, we would not have witnessed much of the explanatory power of the economic model of place-to-place migration.

III. Conclusion

This paper has explored the modeling of migration behavior from an economic perspective. Following a large body of economic literature, the analytical approach adopted regards migration as a form of human investment. The empirical results confirm the usefulness of the human investment approach, but they show that the economic factors used as explanatory variables must be carefully specified and measured. The regressions explain up to two-thirds of the variance in intermetropolitan migration rates. This high degree of explanatory power is achieved by using a double logarithmic specification with origin and destination variables entered separately. This specification substantially outperforms a symmetrical specification based on ratios of labor market conditions in origin and destination. The economic variables included in the model and found to be systematically related to migration rates are real income; measures of turnover in the labor market; and actual and average distance. A persistent asymmetry in the effects of these factors is found, whereby destination economic conditions exhibit the hypothesized effects more often than do origin conditions. Also significant in a number of the regressions are the amount and availability of welfare and unemployment insurance benefits. In addition, the percentages of college students and military personnel are included as standardization variables and are found to play a significant role.

The most important facet of migration research for labor market policy is the demonstrated importance of labor market conditions in influencing the allocation of the labor force among alternative geographic areas. Of the factors determining migration behavior, this research suggests that perhaps the most important variable is the availability of jobs (as measured by the rates of new hires, quits, and layoffs). Workers move to where the jobs are. Workers are also found to respond to improved earnings opportunities. We therefore have reason to believe that the availability of additional well-paying jobs will result in a larger supply of workers in areas where those jobs are created. In light of the current administration's plans to create public sector jobs and to grant wage subsidies to private industry to create employment for as many as half a million workers, this is an important thing to know.

Another policy concern is the impact of nonlabor income on the labor market. In regard to unemployment insurance (UI) some writers have argued that UI creates adverse incentives and distributional anomalies. The results presented here show that the amount and availability of UI benefits have some effect on the geographic mobility of labor, but these effects are not large. I suspect (but it is only a suspicion) that the positive effect of UI in promoting labor market adjustment by facilitating more extensive job search, both in time and space, is probably much greater than the negative effect brought about by the diversion of workers from areas of relatively high labor demand to areas with relatively high benefits. A related issue is the possibility of deleterious effects of the welfare system on labor force allocation. No consistent aggregate effect of welfare on migration is found. However, underlying the aggregate data may be important compositional changes, with central cities possibly gaining welfare recipients and losing workers in the middle and upper income classes. Future research using more disaggregated data is needed to test this speculation.

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