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**Working Paper**

## Migration-Labor Turnover and Human Investment Theory

Center Discussion Paper, No. 209

**Provided in Cooperation with:**

Yale University, Economic Growth Center (EGC)

*Suggested Citation:* Fields, Gary S. (1974) : Migration-Labor Turnover and Human Investment Theory, Center Discussion Paper, No. 209, Yale University, Economic Growth Center, New Haven, CT

This Version is available at:

<https://hdl.handle.net/10419/160137>

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New Haven, Connecticut

CENTER DISCUSSION PAPER No. 209

MIGRATION, LABOR TURNOVER, AND HUMAN INVESTMENT THEORY

Gary S. Fields

June, 1974

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# MIGRATION, LABOR TURNOVER, AND HUMAN INVESTMENT THEORY\*

Gary S. Fields

June, 1974

The objective of this study is to clarify and quantify what labor market factors influence, to what extent and in what direction, migration into and out of geographically well-defined labor market units. Beginning with Sjaastad (1962), economists have analyzed migration as a form of human investment whereby individuals are thought to incur present costs (both monetary and psychic) in the hope of receiving higher future earnings and other benefits.<sup>1</sup> The essence of human investment theory, which is briefly summarized in Section 1, is the assignment of a primary causal role to present values of spatial differences in economic opportunity as a determinant of migration.

Despite the widespread use by economists of the human investment approach, controversy persists over the question of exactly what it is that labor is responding to. In some theories, labor responds primarily to differential incomes or wage rates, while in others differential unemployment rates are emphasized. Acknowledging the concomitance of spatial wage and unemployment disparities, Harris and Todaro (1970) have postulated that labor responds to both and thus migrates to the place where "expected income" is maximized.

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\*Financial support for this research was provided by the Economic Growth Center and the Irving Fisher Fund of the Department of Economics. I acknowledge with gratitude the invaluable research assistance provided by Julia Collins.

<sup>1</sup>Besides Sjaastad, studies which have adopted the human investment approach to migration include those of Bowles (1970), Courchene (1970), DaVanzo (1972), Gallaway et. al. (1967), Laber and Chase (1971), O'Neill (1970), Schwartz (1973), and Wertheimer (1970).

An issue of considerable importance is the translation of these general human investment notions into concrete theoretical and empirical terms. The problem centers on the multi-period investment horizon and consequently on measures of job stability and turnover when there is unemployment and uncertainty. Virtually all empirical studies to date have taken as an index of economic opportunity the unemployment rate for the area in question. This is conceptually exceptionable for reasons to be considered below, the most important of which is the fact that migrants to a labor market are presumably concerned with the probabilities of acquiring and retaining employment rather than the average unemployment rate among all workers in the market. Thus, it would be expected that labor turnover variables (such as rates of accession, separation, new hires, quits, and layoffs) would play an important part in the explanation of migration.

The major theoretical development of this paper is the integration of labor turnover considerations into the human investment theory of migration. This is done in Section 2, where several alternative theoretical specifications are set forth.

The next two sections of the paper present empirical evidence on the alternative specifications. Section 3 discusses the empirical form of the regression equations, followed in Section 4 by the regression results for net migration (NETMIG) into 20 of the largest Standard Metropolitan Statistical Areas (SMSA's) in the United States. The major empirical finding is that turnover considerations, along with real earnings, explain most of the variance in net migration rates and perform much better than

the conventionally-used unemployment rate.

The final section considers the possibility of disaggregating the net migration rate (NETMIG) into gross in (INMIG) and gross out (OUTMIG) migration rates. It is found that INMIG and OUTMIG are highly correlated with one another. The paper concludes by exploring a number of possible explanations for this finding and some implications for future research.

# 1. Migration as Human Investment

Suppose a given individual  $i$  is deciding whether to remain in his present location  $k$  or move to some other labor market  $j$ . The probability that he will migrate is some function of the present discounted value of his expected earnings at  $j$  as compared with  $k$  and the costs of making the move. Denoting these by  $PV_j^i$ ,  $PV_k^i$ , and  $C_{kj}^i$  respectively, the probability of migration from  $k$  to  $j$  is

$$(1) \Pr (MIG_{kj}^i) = f^i(PV_j^i, PV_k^i, C_{kj}^i), f_1^i > 0, f_2^i < 0, f_3^i < 0.$$

Individuals differ in respect to the economic conditions they face in different labor markets (the  $PV^i$ ), the costs of moving between the markets ( $C^i$ ), and their willingness to move in response to present value differences (the  $f^i$  function). Present value differences depend on the distribution of such factors as sex, race, age, education, skills, experience, and seniority among individuals. Direct costs differ on the basis of the distance between the markets. Migration functions differ on account of variations in psychic costs and benefits, different weights assigned to economic as opposed to non-economic considerations, and life cycle factors.

If we were to aggregate over individuals, we would likely find some who would be willing to move in one direction and some in the other. Thus, the rate of migration between  $k$  and  $j$  would be some function of the level and distribution of  $PV_s^i, C_s^i$ , and  $f_s^i$  among individuals in the two markets:

$$(2) \text{ MIG}_{kj} = f(PV_j, PV_k, C_{jk}).$$

Then aggregating over the set of  $n$  possible origins and destinations to derive total migration flows for the  $j$ 'th labor market, net migration into  $j$  ( $\text{NETMIG}_j$ ), defined as the difference between gross migration into  $j$  ( $\text{INMIG}_j$ ) and out of  $j$  ( $\text{OUTMIG}_j$ ), is

$$(3) \text{ NETMIG}_j = f(PV_j; PV_{k_1}, \dots, PV_{k_n}; C_{jk_1}, \dots, C_{jk_n}),$$

For purposes of explaining differences in migration activity among a cross section of labor markets, it is reasonable to suppose that  $PV_j$  (an index of the  $PV_j^i$ ) can be approximated by some average value, to be discussed below. The set  $PV_{k_1}, \dots, PV_{k_n}$  is the same for every  $j$  except for the fact that  $PV_j$  is excluded; hence, as a first approximation, the  $PV_k$  can be dropped from the set of factors explaining cross-sectional differences.<sup>1</sup> Turning to the set  $C_{jk_1}, \dots, C_{jk_n}$ , even if we were to suppose that the distance  $D_{jk}$  between two places can serve as a proxy for costs of migration,<sup>2</sup> there is no apparent or appealing way of summarizing

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<sup>1</sup>It should be noted that this is only a first approximation. Although the  $PV_k$  are virtually the same for all  $j$ , presumably enter in different ways according to their proximity to  $j$ . However, in the absence of suitable procedure for assigning different weights to different places, and lacking appropriate turnover data in any case, the  $PV_k$  are subsequently neglected.

<sup>2</sup>For a thorough analysis of the role of distance as a variable in migration, see Schwartz (1973).

the average distance from  $j$  to all other places by a single index  $o$  set of indices. If we then drop the set  $C_{jk_1}, \dots, C_{jk_n}$  from the list of explanatory variables, we are left with the simple estimating relationship:

$$(4) \text{NETMIG}_j = g(PV_j)$$

In a world without unemployment,  $PV$  would simply be the discounted sum of annual wages:

$$(5) \text{PV} = \sum_{t=0}^T \frac{W_t}{(1+r)^t}.$$

If we suppose that the wage will remain the same over an individual's lifetime and that his horizon is very long, the sum in (5) is equal to:

$$(6) \text{PV} = \frac{W_t}{r} \cdot 1$$

We turn now to the specification of  $PV_j$  in a world of unemployment.

## 2. Unemployment and Labor Turnover in the Human Investment Theory of Migration<sup>2</sup>

The simplest way of introducing unemployment into a human investment decision is to multiply the wage when an individual is employed by one minus the current unemployment rate

$$(7) \text{PV} = \sum_{t=0}^T \frac{W_t(1-U_t)}{(1+r)^t} = \frac{W_t(1-U_t)}{r}.$$

This procedure has been followed in the study by Laber and Chase (1971).

Several other studies have introduced the unemployment rate as a separate

<sup>1</sup>This is apparently the main explanatory variable used by Bowles (1970).

<sup>2</sup>The discussion here emphasizes the influence of labor market conditions on migration and neglects the reverse effect. For a study of the effects of migration on employment and unemployment, see Muth (1971).

variable in a multiple regression explaining migration.<sup>1</sup>

There are reasons to believe that from the perspective of potential migrants the unemployment rate provides only an imperfect index of the tightness or looseness of alternative labor markets. Most important 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. However, migrants are presumably more concerned about turnover in the labor market and would be expected to pay attention to the rates at which hiring for new jobs is taking place, currently-employed workers are quitting or being laid off from their jobs, and the like.<sup>2</sup> Furthermore, these turnover variables are likely to be more sensitive indicators of differences in labor market conditions than is the unemployment rate.<sup>3</sup> Finally, recent labor market research has found that the disaggregation of labor market information into component flows is helpful in understanding the unemployment experiences of different labor force sub-groups at different points in time.<sup>4</sup> Since migration is probably influenced in

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<sup>1</sup>See Courchene (1970), Fabricant (1970), Gallaway et. al.(1967), Greenwood (1969), Lowry (1966), and Rogers (1967).

<sup>2</sup>For an excellent discussion of turnover in labor markets, see Hall (1972).

<sup>3</sup>This point is usually made in the context of cyclical variability in labor markets but it applies equally in the cross section.

<sup>4</sup>For example, the unemployment rate of blacks is consistently double that of whites over the business cycle. Why this is has been analyzed in terms of racial differences in the duration of a spell of unemployment vs. the number of spells [see Smith and Holt (1970)], instability of workers of different races vs. the instability of the jobs available to those workers [Hall (1972)], and changing job permanence and labor force entries and exits over the cycle [Perry (1972)]. These and other studies, singly and together, suggest that the unemployment rate may be too gross a measure and additional understanding can be gained from a turnover approach.



an important way by anticipated employment and unemployment experiences, similar gains in understanding might be expected to result as well from the treatment of migration in terms of labor turnover.

For all these reasons, the unemployment rate may not be the best guide to employment conditions in alternative labor markets from the point of view of potential migrants, and measures of labor turnover would appear preferable. The types of turnover variables to be used in this study are measures of gross turnover (total accession and separation rates) and disaggregated turnover (rates of new hires, quits, and layoffs) by labor market.

One specific way of dealing with labor market accessions and separations 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. Letting  $P_{ue}$  be the probability of moving from unemployment to employment during a period given that one is unemployed at the beginning of the period (and similarly for  $P_{eu}$ ,  $P_{ee}$ , and  $P_{uu}$ ), the transition matrix may be written as

$$(8) \quad P(t) = \begin{bmatrix} P_{ee}(t) & P_{eu}(t) \\ P_{ue}(t) & P_{uu}(t) \end{bmatrix}.$$

If for analytical convenience the components of the  $P(t)$  matrix are assumed constant over time and equal to their current values, the mechanism determining the employment probability is a first order Markov process.<sup>1</sup>

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<sup>1</sup>For a brief introduction to Markov processes, see Kemeny and Snell (1962).

It can be shown [See Fields-Hosek (1973)] that

$$(9) \quad PV = \begin{bmatrix} W_e & W_u \end{bmatrix} \left[ I - \frac{1}{1+r} P^T \right]^{-1} \begin{bmatrix} E(0) \\ U(0) \end{bmatrix}$$

where  $W_e$  ( $W_u$ ) is the wage one receives if he is employed (unemployed),  $I$  is the identity matrix,  $P^T$  is the transpose of  $P$ , and  $E(0)$  and  $U(0)$  are respectively one-zero variables denoting whether the individual is employed or unemployed at time zero. If we suppose that a new migrant would be unemployed initially (i.e.,  $U(0) = 1$ ,  $E(0) = 0$ ) and there is no unemployment compensation ( $W_u = 0$ ), and if we denote the wage while employed by  $W$ , (9) may be solved to give an expected present value

$$(10) \quad PV = \frac{1+r}{r} W \left[ \frac{P_{ue}}{r + P_{ue} + P_{eu}} \right].$$

The transition probabilities  $P_{ue}$  and  $P_{eu}$  may be estimated from turnover and unemployment rates in a manner described below.

The maintained hypothesis of the Markov approach is constancy of the transition matrix. This may not be strictly correct and potential migrants may behave as if they compute expected present values from the transition probabilities in some other way. A less restrictive assumption would be that in addition to the wage the expected present value is some function of the accession and separation rates

$$(11) \quad PV = h^1(W, ACC, SEP)$$

or of disaggregated turnover variables (quits, new hires, and layoffs)

$$(12) \quad PV = h^2(W, Q, NH, L).$$

One further complication is that individuals' assessments of the attractiveness of various labor markets may depend on short run as well as long run considerations, in particular the variability of employment in the immediate past and the growth of employment in the present. These variation variables (VAR) presumably enter as arguments into a migration function as well.

Bringing these diverse elements together, we have six alternative models of the determinants of net migration.

- (13) NETMIG =
- (i)  $g(W)$  ..... Simple wage model
  - (ii)  $g(W,U)$  ..... Unemployment model
  - (iii)  $g(PV)$  ..... Markov PV model
  - (iv)  $g(W, ACC, SEP)$  .. Turnover model
  - (v)  $g(W, Q, NH, L)$  .. Disaggregated turnover model
  - (vi)  $g(W, ACC, SEP, VAR)$  ... Turnover and variation model

### 3. Empirical Specification

To test among the different models of migration, data from the 1970 Census are used to explain the rates of migration into and out of 20 of the largest SMSA's in the previous five years.<sup>1</sup> The SMSA was selected as the unit of analysis for both conceptual and practical reasons. Large labor market aggregates, such as the nine Census regions or the 48 contigu-

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<sup>1</sup>The SMSA's in the sample are Atlanta, Baltimore, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Houston, Kansas City, Los Angeles, Milwaukee, Minneapolis, New York, Philadelphia, Pittsburgh, St. Louis, Seattle, and Washington.

ous states, are unacceptably heterogeneous.<sup>1</sup> While economic conditions are by no means uniform within cities, the SMSA is the smallest unit for which suitable data series on labor market conditions (i.e., unemployment and turnover rates) are regularly published. The reason for the limitation to 20 is that cost-of-living series are available only for these cities and therefore these are the only ones for which real hourly or annual earned income can be used as an explanatory variable.<sup>2</sup>

The dependent variables (NETMIG) is the in-migration rate per 1,000 population between 1965 and 1970. The independent variables include measures of income, unemployment, turnover, and short run variations, all pertaining to a single year.<sup>3</sup> The exact definitions of the variables used in this study and their sources are given in the appendix.

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<sup>1</sup>Of the studies which have used the human investment approach to study migration, some have studied migration between one area and the rest of the country (Minnesota in the case of Sjaastad, North-South by Bowles and Wertheimer), between nine Census regions (O'Neill, DaVanzo, Schwartz), or between states or provinces (Gallaway et. al., Courchene, Laber-Chase). To my knowledge, the only study which has investigated migration involving units as small as SMSA's is that of Lowry, which suffers from questionable econometric specification.

<sup>2</sup>Cost-of-living data are also available for Honolulu, San Diego, and San Francisco. Because of its special geographic position, Honolulu was excluded from the sample. San Diego and San Francisco were excluded because labor turnover data were not available for them.

<sup>3</sup>A troublesome issue is the appropriate specification of leads, lags, and averages of annual data since the dependent variable refers to a five year flow. Preliminary experimentation with alternative complicated specifications gave results which did not surpass those obtained using simple single year values. [This was also found by Rogers (1967).] Appealing to Occam's Razor, all variables (with the exception of one of the variation variables) are taken for a single year, generally 1965.

Two alternative income variables were specified.<sup>1</sup> One, the average hourly earnings of manufacturing workers in the SMSA (RW), was available on an annual basis. The other, average annual income earned by manufacturing employees who worked 50-52 weeks per year (RMANF52) was available for 1969 only.<sup>2</sup> Both are expressed in real terms after being deflated by the Bureau of Labor Statistics' Intermediate Budget for that city in the appropriate year.<sup>3</sup>

The unemployment rate (U) pertains to the civilian labor force. Turnover and disaggregated turnover variables are available for manufacturing establishments only. Labor turnover variables include the total accession and separation rates (TA and TS respectively) expressed on a monthly basis. Disaggregated turnover variables include monthly quit (Q), new hire (NH), and layoff (L) rates. All data are for 1965.

Two sets of present value calculations were made to permit testing of the Markov model. The first set (PV1-3) was constructed assuming that  $p_{ue}$  ( $p_{eu}$ ) in equation (10) could be approximated by dividing the total

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<sup>1</sup>One is a measure of hourly earnings, the other of annual earnings. It is of some interest from both a social scientific and a policy point of view to know which factor is a more important determinant of migration.

<sup>2</sup>The selection of average annual earnings in manufacturing rather than in the entire economy is to facilitate comparisons with the hourly wage and the turnover variables, both of which are available for manufacturing only. The limitation to those who worked 50-52 weeks per year is to provide a measure of anticipated earnings if the individual is employed for a full year in particular labor market. The likelihood of being employed full year enters as a separate argument in the migration function and is derived from the unemployment rate and turnover variables by procedures described below.

<sup>3</sup>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. These were in turn adjusted by the consumer price index for 1965 and 1969 to yield indices of relative living costs in different cities in the two years.

accession (separation) rate by the unemployment (employment) rate ;<sup>1</sup> the three variables are calculated assuming monthly discount rates of 0.5%, 1.0%, and 1.5% respectively. The second set of present value variables (PV4-6) uses the same discount rates but replaces the total separation rate by  $TS - Q$  (roughly, the rate of involuntary separations) and the total accession rate by  $NH$  (a rough guide to the probability of a job searcher becoming employed).

Finally, two variation variables are included in the analysis. Employment change in the SMSA between 1969 and 1970 ( $EC6970$ ) is taken as a measure of current short run change in labor market activity.<sup>2</sup> The coefficient of variation of the unemployment rate between 1965 and 1970 ( $CVU$ ) is used as a measure of variability in economic activity over the migration period.

It is hypothesized that  $NETMIG$  depends positively on  $RW/RMANF52$ ,  $TA$ ,  $NH$ ,  $PV$ , and  $EC$ , negatively on  $U$ ,  $TS$ ,  $Q$ , and  $L$ , and ambiguously on  $CVU$ . The only hypothesis requiring comment is the ambiguity of the effect of  $CVU$ . The reason for this is that a larger value of  $CVU$  increases the risk associated with any given expected present value (thus tending to impede migration) but also increases turnover in the labor force (tending to draw more workers

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<sup>1</sup>From elementary probability theory, for two events  $A$  and  $B$ ,  $P(A \cap B) = P(B) P(A|B)$ . Letting  $A$  be the event "become employed" and  $B$  be the event "being unemployed," and dividing through by  $P(B)$ , we see that the probability of becoming employed given that one is unemployed ( $p_{ue}$  in (10)) is the probability of being unemployed and becoming employed (approximated by  $TA$ ) divided by the probability of being unemployed ( $U$ ). Q.E.D.

<sup>2</sup>There is the possibility that the coefficient on  $EC6970$  is biased upward if employment change is in fact caused by in-migration. In the absence of vacancy data by SMSA, however, there is no way to test for such a bias.

in, push more workers out, and thereby augment migration activity). Let us call these the "risk aversion effect" and the "induced turnover effect" respectively. The relative strength of these two effects is not apparent a priori.

Three additional hypotheses may be stated. First, since human investment analysis is usually expressed in terms of annual rather than hourly earnings, it might be expected that RMANF52, a measure of annual earned income, would be a more important determinant of migration than would the hourly earnings variable (RW). An additional hypothesis deriving from human investment theory is that regressions involving turnover (TA and TS) and disaggregated turnover (Q,NH,L) variables would better explain migration than regressions involving the unemployment rate. Lastly, to the extent that individuals modify their long run expectations in light of prior variability or short run changes in labor market conditions, it would be expected that the variation variables (CVU and EC) would contribute significant additional explanatory power.

#### 4. Empirical Results

The regression results are reported in Table 1. The data are strongly supportive of the hypotheses of the last section.

The first issue which we address is the appropriateness of annual vs. hourly earnings as a determinant of migration. Regression (1) indicates that hourly earnings fails as an explanatory variable. The coefficient on RW65 has the wrong sign and is not significantly different from zero. On the other hand, when annual earnings are used instead

TABLE 1. Regressions Explaining Net Migration (NETMIG)  
Into 20 SMSA's, 1965-1970

(Standard Errors in Parentheses)

Indepen- dent Variable	Unemployment & Hourly Earnings Model (1)	Unemploy- ment & Annual Earnings Model (2)	Markov Model (3)	Turnover Model (4)	Disaggre- gated Turnover Model (5)	Turnover & Variation Model (6)
RW65	-5.01 (44.10)					
RMANF52		0.044 (0.017)		.03809 (.01383)	.02785 (.01559)	.02727 (.01209)
U65	-1531.83 (1362.09)	-775.67 (1174.47)				
PV1			.00292 (.00091)			
TA65				74.20 (25.74)		75.84 (27.67)
TS65				-92.82 (29.37)		-85.95 (31.61)
NH65					19.24 (12.88)	
L65					-40.63 (16.80)	
EC6970						13.63 (4.07)
CVU						202.47 (138.72)
R <sup>2</sup>	.07	.34	.37	.59	.55	.79



[Regression (2)], the coefficient is significantly positive and the  $R^2$  jumps substantially. Thus it appears that migration depends more on differences in annual rewards when one is employed in different labor markets than on hourly differences.

Next is the question of a single year unemployment rate vs. a turnover explanation. Results for the first order Markov model are presented in Regression (3).<sup>1</sup> Although PV is highly significant by conventional criteria, the Markov formulation (equation (10)) apparently does not improve significantly on the unemployment model. However, when the turnover variables are introduced linearly rather than in the Markov formula they have the correct sign and are highly significant and the  $R^2$  again jumps. There is little difference between Regression (4), which uses total accessions and separations (TA65, TS65), and Regression (5) based on disaggregated turnover variables (NH65, L65).<sup>2</sup>

The superiority of the turnover and disaggregated turnover regression results over the previous models has two implications. First, their superiority relative to the unemployment model suggests that the turnover formulation is indeed more appropriate, confirming the applicability of the human investment view and perhaps explaining why previous migration studies which sought to explain migration by the unemployment

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<sup>1</sup>The regression are presented for PV1 only. The other five variables give very similar results and are not reported.

<sup>2</sup>The quit rate (Q65) was not statistically significant and so was dropped from the reported equation.

rate did not find statistically significant results.<sup>1</sup> Second, their superiority as compared with the Markov model indicates that, despite the not inconsiderable computational advantages of a Markov formulation of human investment decisions, a first order Markov process (i.e., constant transition probabilities in eq. (8)) does not provide a very good approximation to the way individuals behave when they consider the economic rewards of migration.

Let us now examine the importance of measures of variation in economic activity. Regression (6) presents the results of combining the turnover and variation models. We see that EC6970, the short run change in employment in the SMSA between 1969 and 1970, is as expected positive and highly significant. The coefficient of variation in the unemployment rate between 1965 and 1970, CVU, is also significantly positive, suggesting that the "induced migration effect" (greater turnover inducing more migration activity, both in and out) outweighs the "risk aversion effect" (the greater the variability in the return for a given present value, the less net in-migration). The income and turnover variables retain their significance in the presence of the variation variables. The  $R^2$  again increases substantially, indicating that nearly 80% of the variance

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<sup>1</sup>The studies by Gallaway et. al. and Courchene, using a regression framework and independent variables similar to those used here, found that the coefficient on the unemployment rate, although of the right sign, was not statistically significant. Their conclusion that unemployment is at most a minor determinant of migration is shared by Lansing and Mueller, who ran a simple correlation using micro data and found only a moderate sensitivity of migration to local labor market conditions. And Rogers actually found more migration into high unemployment areas, although the coefficient was statistically insignificant.

is explained.

The pattern established by these results is quite clear: those factors which economic theory tells us ought to be important in explaining differential migration patterns (differences in income, labor turnover, and variations in the level of economic activity) are in fact found to have the expected effects and are capable of explaining the bulk of the variance in migration rates.<sup>1</sup> This offers rather strong support for the human investment view of migration.<sup>2</sup>

##### 5. Implications for Future Research

This paper has used standard human investment theory to analyze net migration into 20 of the largest SMSA's in the United States between 1965

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<sup>1</sup>The coefficients of determination in previous studies which have used the human investment approach to migration are as follows: Gallaway et. al. (1967), .08; DaVanzo (1972), .2-.7; O'Neill (1970), up to .4; Schwartz (1973), .5+; Bowles (1970), .3-.6; Laber and Chase (1971), .4-8; and Courchene (1970), .4-.8. In both cases where an  $R^2$  comparable to the one here was found, a more complicated model was used to explain migration out of a single Canadian province. Some of the studies adopting other approaches to migration have found higher  $R^2$ s, but these studies were either rather definitional (e.g., Renshaw (1970) who found the number of previous movers to a place very important but did not try to explain why the previous movers moved) or poorly specified (e.g., Lowry (1966) who explained the number of migrants by origin population, among other things, or Blanco (1963) who apparently estimated migration as a residual from demographic magnitudes and then regressed the one on the others).

<sup>2</sup>For some time now, there has been little doubt about the primacy of economic factors in the migration decision. For instance, in 1967, Lansing and Mueller reported that 58% of a sample of migrants said they did so for purely economic reasons and another 14% partly for economic reasons. Only 23% moved for non-economic reasons and 5% gave no reason. What has not been established by previous studies is which economic reasons are important. Our results here make clear that both annual earnings and labor turnover considerations are important determinants of migration. This points up the need for careful empirical specification of the human investment model.

and 1970. Differential real income, labor market turnover, and variability in economic activity are used as explanatory variables. These three sets of factors explain nearly 80% of the variance in net migration rates. The turnover variables are found to perform much better than the SMSA unemployment rate. These findings lend considerable support to the human investment view of migration.

Having found that we can explain net migration on the basis of human investment considerations, the next question in future research might be how well these same factors do in accounting for the component flows, gross in and gross out migration. The most straightforward hypothesis would be that those factors which affect net in-migration (NETMIG) would affect gross in-migration (INMIG) in the same direction and gross out-migration (OUTMIG) in the opposite direction, e.g., higher annual income in an SMSA might be expected to lead to a larger inflow and smaller outflow of migrants.

It is readily apparent from an examination of the INMIG and OUTMIG rates for our sample cities that this "naive hypothesis" cannot possibly hold (see Table 2). Partitioning the cities into groups of either two or four, we observe an exact correspondence between the subsets. There is a very high correlation between the two series (simple correlation coefficient of +0.92, Spearman's rank correlation coefficient of +0.89). Clearly, we must go beyond the turnover variables considered in this paper to understand why it is that SMSAs with high in-migration rates would also have high out-migration rates.

Table 2. Rates of in and Out Migration Per 1,000 Population  
For 20 SMSA's, 1965-1970

Rank	City	InMigration Rate	City	OutMigration Rate
1	Dallas	284.4	Washington	204.8
2	Atlanta	266.1	Dallas	188.1
3	Washington	262.0	Atlanta	183.4
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4	Seattle	260.2	Los Angeles	171.7
5	Houston	253.1	Kansas City	171.1
6	Minneapolis	170.0	Seattle	160.5
7	Kansas City	163.7	Houston	156.8
8	Los Angeles	140.6	Minneapolis	153.5
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9	Cincinnati	107.7	Milwaukee	126.8
10	St. Louis	105.6	Cleveland	124.7
11	Baltimore	105.6	Boston	124.5
12	Boston	105.3	St Louis	120.8
13	Cleveland	94.9	Chicago	120.6
14	Milwaukee	94.0	Cincinnati	119.8
15	Detroit	85.6	Detroit	109.3
16	Chicago	84.4	Baltimore	107.8
<hr/>				
17	Philadelphia	83.8	Buffalo	99.2
18	Pittsburgh	64.3	Pittsburgh	97.8
19	Buffalo	63.5	New York	91.8
20	New York	37.5	Philadelphia	89.1

What additional factors might be involved? The migration literature suggests five possible types of explanation.

One plausible explanation for the high correlation between INMIG and OUTMIG is the possibility that this might reflect the return migration of individuals who either were disappointed by what they found when they moved, got homesick, or accomplished what they set out to achieve, and who then came back. In other words, the higher the out-migration rate from a place, the more in-migration would follow. To handle this, it is necessary to disaggregate migration flows further into new vs. return migration, possibly along the lines suggested by Vanderkamp (1971). The data requirements for this task lie outside the scope of the present research.

A second type of explanation, which also retains the essence of the human investment approach, would hold that out-migration from a place can be explained at least in part by the earnings opportunities, turnover, and variability of employment at proximate destinations rather than at the origin. In other words, migration would be viewed as asymmetrical in the sense that people are "pushed" by some things and "pulled" by others. Lansing and Mueller, for instance, see the push coming from the loss of a job in one's present location or with the movers being those who are young, highly-educated and/or small town residents. Having decided to move, the availability and terms of employment at possible destinations and the distances to those places would be the major determinants of the destination chosen. This type of approach can be handled only by analyzing place-to-place movement in cases where economic conditions at both origin and destination are known.

The other explanations rely on different factors from those considered thus far. One school of thought would hold that migration into or out of SMSAs depends on non-labor market economic conditions, for example, the benefit amount or eligibility requirements for public assistance, but there is little evidence to support this view.<sup>1</sup> A second type of explanation would give major importance to life-cycle and demographic considerations which are known to be important, e.g., if one city had more young people or a better educated labor force than another and these groups were more likely to migrate, that city would have a higher out-migration rate.<sup>2</sup> Thirdly, there is the possibility that out-migration is a function of non-economic characteristics of a place such as its climate, crime rate, etc.<sup>3</sup> The testing of these types of hypotheses requires the examination of additional variables beyond the labor turnover measures analyzed here and is beyond the scope of the present paper.

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<sup>1</sup>Gallaway et. al. (1967) and DaVanzo (1972) tested explicitly for this and found that welfare levels were insignificant. Courchene (1970), however, found that the level of unemployment compensation benefits was significant (although minor) in explaining inter-provincial migration in Canada.

<sup>2</sup>The importance of these factors has been established in many studies of migration, including those of Bowles (1970), Courchene (1970), DaVanzo (1972), Greenwood (1969), Lansing and Muellet (1967), Lowry (1966), O'Neill (1970), Schwartz (1973), Sjaastad (1962), Vanderkamp (1971), and Wertheimer (1970).

<sup>3</sup>O'Neill (1970) and Greenwood (1969) both report that climate has a statistically significant effect on migration, but in neither study are these found to be primary factors.

The attention we have paid to these additional factors should not obscure the basic finding that the use of labor turnover considerations considerably improves the goodness of fit of the human investment model of migration, explaining the bulk of the variance in net migration rates. There are lessons in this for both the adherents and the doubters of the human investment approach.

The net migration results are unlikely to come as a great surprise to those who are already sympathetic to the human investment view of the labor market decisions of individuals. Perhaps the main lesson for such believers is that general human investment notions must be translated into specific empirical form with great care, for how it is done makes a considerable difference in the explanatory power of the model.

Possibly more important though is the impact of these results on those who take a more skeptical view of the human investment approach. The advantage of the human investment viewpoint is that it provides a unified conceptual framework for analyzing a whole range of phenomena including migration. The results here compare favorably with studies adopting a more ad hoc approach. It is questionable whether much is gained by introducing a host of special additional considerations.



APPENDIX. Definition and Sources of Variables

INMIG (OUTMIG)	Actual in (out) migration to (from) the SMSA from (to) all places (SMSA's or non-metropolitan areas) per 1,000 population in 1960 five years and older.
NETMIG	INMIG - OUTMIG  [Source of migration figures: 1970 Census of Population and Housing, Subject Reports: Mobility for Metropolitan Areas, PC(2)-2C. Source of Population figures: 1970 Census of Population and Housing, Demographic Trends for Metropolitan Areas, 1960-1970, Table 4.]
U65	Average 1965 civilian unemployment rate. [Source: 1972 Manpower Report of the President]
RW65	Average hourly earnings in manufacturing in 1965 divided by BDGT65 = consumer price index in 1965 (1967 = 100.0) divided by BLS Index of Comparative Living Costs for a Family of Four on an Intermediate Budget (1967 = 100.0). [Source of average hourly earnings: Employment and Earnings, May, 1965, State and Area Hours and Earnings, Table 2. Source of consumer price index: Handbook for Labor Statistics, 1970, Table 128. Source of Intermediate budget: Handbook of Labor Statistics, 1970, Table 139.]
RMANF52	Real median total earnings of male workers in manufacturing who worked 50-52 weeks in 1969. [Source of median earnings: 1970 Census of Population and Housing, Table 188: Industry of Male E.C.L.F. by Earnings in 1969 and Race. Data are adjusted for real price differences in 1969 in same way as RW65 is adjusted].
TA65/TS65 /NH65/L65 / 65	1965 average total accession/separation/new hire/layoff/quit rates in manufacturing per 100 employees per month. [Specific definitions may be found in BLS Handbook of Methods, 1971, Bull. 1711. Source of all turnover variables: Employment and Earnings, May, 1965.]
CVU	Coefficient of variation of the unemployment rate for 1965-1970. [Source of annual unemployment rates: 1973 Manpower Report of the President, Table D-8: Total Unemployment Rates in 150 Major Labor Areas, Annual Averages, 1962-1972.]
EC6970	Percentage change in total nonagricultural employment from 1969 to 1970. [Source of annual employment: Employment and Earnings, State and Areas, 1939-1971].

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