THE INFLUENCE OF FAMILY AND FRIENDS
ON GEOGRAPHIC LABOR MOBILITY IN A
LESS-DEVELOPED COUNTRY:
THE CASE OF INDIA

by

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I. Introduction

Family and friends who have previously migrated from one place to another, say from region i to region j , may provide persons in their former locality (region i) with an important source of information concerning their present location (region j). This information may in turn increase the propensity of potential migrants in region i to move to region j rather than to some other region. The greater the number of persons who have migrated from region i to region j in the past, the greater will be the quantity of information sent from j back to i , and hence, *ceteris paribus*, the greater is likely to be the current flow of migrants from i to j .¹

The informational aspects of relatives and friends are not the only important factor associated with the potential migrant's decision regarding his destination. The potential migrant in region i may reason that should he move to region j , the relatives and/or friends he has there will provide him with food and shelter until he can obtain a job. In countries where extended-family relationships are important, this may be a critical element in the potential migrant's decision concerning his destination.

It should also be recognized that relatives and friends with similar backgrounds may help make the social transition easier for the recent migrant. There are two factors that may be of particular importance here. Where the migrant is not well-educated, he is likely in a less-developed country to be bound to a relatively strong extent by tradition and family ties, which may result in relatively high propensities for less-educated persons to move to localities to which natives of their region previously migrated. In India 66 percent of the male population was reported to be illiterate in 1960, and thus special importance may be attached to this factor.

Migrants are likely to have a strong preference for moving to regions at which they are able to communicate with the local population. Thus, relatives and friends who have previously migrated from his home region, and who therefore speak a language understandable to him, may help make the social transition easier for the recent migrant. This factor may be of particular importance in India, where 14 major languages are spoken. It is possible for persons who speak one of the languages to communicate with persons who speak certain of the others, but in most cases it is with some difficulty. Even persons who speak the same language sometimes have trouble communicating because of differences in local dialects. Thus, it appears that aside from informational aspects, the presence in region j of relatives and friends from region i may in itself encourage potential migrants in i to move to j .

Nelson [13, pp. 49-50] has suggested that since the distribution of relatives and friends is a function of past migration, it is a function of all the variables that entered into the determination of past migration. It follows that the parameter estimates of most variables (in a multiple regression model) would tend to blur the true direct relationship between these variables and current migration. The reason is that the variables also influence migration indirectly through their past effect on the spatial allocation of migrants.

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Recent studies by Beals, Levy, and Moses [1], Greenwood [6], [7], [9], Levy and Wadycki [10], and Sahota [14] have examined the determinants of internal labor mobility in less-developed countries. These studies have employed data that is at least roughly similar to that available in the United States Census of Population: 1960, and they are thus in somewhat the same vein as several earlier studies dealing with internal labor migration in the United States.² What is unique about the present study is that it contains a "migrant stock" variable in an attempt to estimate the impact that cumulative past migration has had on the parameter estimates of current migration in India. (Migrant stock is the number of persons born in region i and living in region j at the beginning of the period over which migration is being studied.)

Previous studies, such as Greenwood [5], [8] and Nelson [13], that have used a concept similar to the migrant stock concept, have been concerned with labor mobility in the United States. Among the less developed countries India is one of few having census data suitable to the testing of the model formulated in this study, which model is based upon the migrant stock concept. Migration data in the Census of India: 1961 [2] is given by region of birth and length of duration in region of destination, e.g., by duration less than one year, 1 to 5 years, 5 years and over.³ It is therefore possible to examine migration "flows" over relatively short periods of time, and to relate them to the migrant stock at some earlier time.

2. The Model

The spatial unit employed in this study is the state, of which there are 15 in India. With the inclusion of Delhi, which is treated as a separate entity, the number of "regions" employed in the study is 16. Each of the 16 regions is treated as an origin, and gross migration from each of these regions to each of the other 15 is analyzed. This procedure results in observations on 240 (16×15) migration flows. Stepwise multiple regression analysis is used on the data, and two relationships are estimated, one excluding the migrant stock variable and one including it. The estimated relationships are of the following forms:

$$M_{ij} = f(D_{ij}, P_i, P_j, Y_i, Y_j, E_i, E_j, U_i, U_j, \text{random errors}) \quad (1)$$

and
$$M_{ij} = g(D_{ij}, P_i, P_j, Y_i, Y_j, E_i, E_j, U_i, U_j, MS_{ij}, \text{random errors}) \quad (2)$$

where M_{ij} = Number of males who were born in state i and had been living in state j for 5 years or less, as of March 1, 1961;⁴

D_{ij} = Rail distance in kilometers between representative cities in states i and j ;⁵

$P_i(P_j)$ = Male population of state i (j), 1961;

$Y_i(Y_j)$ = Average annual income of workers in industrial establishments in state i (j), 1961;⁶

$E_i(E_j)$ = Percent of males in state i (j) who were literate, 1961;

$U_i(U_j)$ = Percent of the male population of state i (j) that resided in urban areas of i (j), 1961;

MS_{ij} = Number of males who were born in state i and had been living in state j for more than 5 years, as of March 1, 1961.

Since information relating to the characteristics of the migrants themselves is not available, each of the independent variables employed in this study is of necessity an aggregate proxy variable.

Let us next formalize the relationship between the regression that does not employ the migrant stock as an independent variable (relationship

(1)) and the regression that does employ it (relationship (2)).⁷ For purposes of simplicity suppose that the estimated relationship corresponding to (2) is of the form

$$M^t = \beta_0 + \beta_1 D + \beta_2 X_2^t + \beta_3 MS^{t-1} \quad (3)$$

where M^t refers to M_{ij} during period t , D is D_{ij} , X_2^t can be either P_i , P_j , Y_i , Y_j , E_i , E_j , U_i , or U_j in period t , and MS^{t-1} is MS at the end of period $(t-1)$. Separate X 's could be introduced for each of terms P_i through U_j above.

It is now possible to use a distributed-lag argument to express migrant stock in periods $(t-1)$ and $(t-2)$, respectively, as

$$MS^{t-1} = b_0 + b_1 D + b_2 X_2^{t-1} + b_2 \lambda X_2^{t-2} + b_2 \lambda^2 X_2^{t-3} + \dots \quad (4)$$

$$\text{and} \quad MS^{t-2} = b_0 + b_1 D + b_2 X_2^{t-2} + b_2 \lambda X_2^{t-3} + b_2 \lambda^2 X_2^{t-4} + \dots \quad (5)$$

where λ is a constant such that $0 \leq \lambda \leq 1$.

Both equations (4) and (5) suggest that migrant stock in any given period is a function both of variables defined for the current period and of discounted variables defined for previous periods. Multiplying (5) by λ and subtracting the result from (4) yields

$$MS^{t-1} - \lambda MS^{t-2} = b_0 - \lambda b_0 + b_1 D - b_1 \lambda D + b_2 X_2^{t-1} \quad (6)$$

Thus,

$$MS^{t-1} = (1-\lambda) b_0 + (1-\lambda) b_1 D + b_2 X_2^{t-1} + \lambda MS^{t-2} \quad (7)$$

The argument presented here is essentially that cumulative migration at any given point in time, say to the end of period $(t-1)$, is a function of migration in the last period $(t-1)$, as well as migration in earlier periods. Migration in each period is in turn a function of variables defined for that period, as well as a function of lagged variables whose influence is transmitted via the migrant stock. Substitution of (7) into equation (3) yields

$$M^t = \beta' + [\beta_1 + \beta_3 b_1 (1-\lambda)] D + \beta_2 X_2^t + \beta_3 b_2 X_2^{t-1} + \lambda \beta_3 MS^{t-2} \quad (8)$$

where $\beta' = \beta_0 + \beta_3 (1-\lambda) b_0$. It is now possible to follow the same procedure to obtain an expression for MS^{t-2} as a function of past variables. However, to do this would increase the complexity of the notation without altering the substance of the argument. Therefore, assume that $MS^{t-2} = 0$, i.e., assume that migration from i to j began just one period ago.

If there exists some relationship between X_2^{t-1} and X_2^t , then equation (8) can be further simplified. While this relationship is subject to empirical estimation, relevant time series data of sufficient length rarely exist for less-developed countries. Thus, for present purposes let us assume that the relationship between X_2^{t-1} and X_2^t reflects a simple linear time trend:

$$X_2^{t-1} = \delta X_2^t, \text{ where } \delta > 0. \quad (9)$$

Substitution of X_2^{t-1} for X_2^{t-1} in equation (8) yields

$$M^t = \beta' + [\beta_1 + \beta_3 b_1 (1-\lambda)] D + (\beta_2 + \beta_3 b_2 \delta) X_2^t \quad (10)$$

We can now regard equation (3) as the relationship that is estimated when the migrant stock variable is included and equation (10) as a crude representation of the relationship that is estimated when the migrant stock variable is excluded.

Earlier it was argued that migrants can be expected to move to localities to which natives of their home previously migrated. If this argument is valid, then the sign associated with the migrant stock variable (i.e., the sign of β_3) should be positive. The results of this study strongly confirm this hypothesis. Note that when the migrant stock variable is not contained in the estimated relationship, $(\beta_2 + \beta_3 b_2 \delta)$ is the coefficient of X_2^t ; when the migrant stock variable is contained in the estimated relationship, β_2 is the coefficient of X_2^t . Since δ is presumably positive, and since β_3 was found to be positive also, $(\beta_2 + \beta_3 b_2 \delta)$ can be greater than, equal to, or less than β_2 , depending upon the sign and magnitude of b_2 , which indicates the direction and magnitude of the relationship between X_2 in the past and past migration. If the direction of the relationship between X_2 in the past and past migration is the same as that between X_2 currently and current migration, then b_2 and β_2 will have the same sign, and $(\beta_2 + \beta_3 b_2 \delta)$ will tend to be greater in absolute value than β_2 . If this argument is valid, the introduction of the migrant stock variable will tend to reduce the absolute value of the parameter estimate of X_2^t .

3. The Empirical Results

Parameters were estimated by least squares and log-linear relationships were fitted. It should be noted that the coefficients estimated in log-linear relationships can be interpreted as elasticities. Table 1 contains estimates of both the relationship that excludes the migrant stock variable and that includes it. In the relationship that does not employ MS_{ij} , the coefficient of every variable has the expected sign and all variables except U_i and significant at better than the one-percent level. In the relationship that does employ MS_{ij} , two variables (E_i and U_i) fail to differ significantly from zero, and another variable (Y_{ij}) is significant but has the "wrong" sign. The introduction of the migrant stock variable into the estimated relationship results in a dramatic increase in the proportion of explained variance (R^2) from .71 to .94, though the R^2 is reasonably high even when the migrant stock variable is not employed. Note also that, as predicted, the parameter estimates of most variables decrease in absolute value with the introduction of the migrant stock variable. The only exception is U_i . Let us now turn to a more detailed discussion of the relative size of the parameter estimates and of the a priori considerations for the inclusion of the variables in the model estimated.

Regression 1.2 indicates that the coefficient of the migrant stock variable is positive and highly significant. Moreover, in terms of its contribution to R^2 , migrant stock is the single most important variable in regression 1.2. A one-percent increase in MS_{ij} results in a 0.754-percent increase in current migration between i and j .¹¹ Only one elasticity in regression 1.2 (that of Y_{ij} , which has the wrong sign) has a higher absolute value than that of MS_{ij} .¹² Thus, the results of this study suggest that migrations in India have a strong tendency to move to localities to which natives of their home previously migrated.

It is interesting to note that the coefficient of the migrant stock variable for India is somewhat higher than the parameter estimate of a similar variable for United States (0.754 compared to 0.521).¹⁰ Since the models for the two countries are almost identical, the differences may be due primarily to differences in educational levels between the two countries and to differences in linguistic variations within the countries. *Ceteris paribus*, the lower educational levels and greater linguistic heterogeneity in India may result in family and friends being more critical in the potential migrant's decision regarding a destination in India than in the United States. Moreover, in advanced economies there are more sources of information about alternative destinations than are likely to exist in less-developed nations, where family and friends are probably the major, if not the only source of information for most persons.

Most previous migration studies have found distance to be the single most important determinant of the spatial allocation of migrants.⁹ This

Table 1. GROSS INTERSTATE MIGRATION OF MALES IN INDIA, 1955-1960: LOGARITHMIC REGRESSION COEFFICIENTS (b) and t-RATIOS (t)

Independent variables		(1.1)	(1.1) ^a	(1.2)	(1.2) ^a
D _{ij} : Distance ij	b : t :	-2.009 (16.268)	(1)	-0.193 (2.344)	(7)
P _i : Population i		1.029 (10.839)	(2)	0.143 (2.758)	(6)
P _j : Population j		0.751 (7.909)	(3)	0.118 (2.481)	(8)
Y _i : Income i		-1.333 (4.743)	(7)	-0.434 (3.335)	(4)
Y _j : Income j		0.932 (3.317)	(4)	-0.774 (5.574)	(2)
E _i : Education i		0.903 (3.307)	(6)	0.325 (2.613)	(5)
E _j : Education j		1.044 (3.825)	(5)	0.046 (0.359)	(9)
U _i : Urbanization i		0.433 (2.839)	(8)	-0.007 (0.093)	(10)
U _j : Urbanization j		0.164 (1.073)	(9)	0.339 (4.917)	(3)
MS _{ij} : Migrant Stock ij		---- ----		0.754 (30.041)	(1)
R ²		.71		.94	

^aIndicates order of importance in terms of addition to R².

is not surprising since distance serves as a proxy for both the transportation and the psychic costs associated with migration. The greater the distance from region i to region j , the greater the transportation cost involved in the move, including both out-of-pocket expenses and opportunity costs. The psychic costs associated with moving away from one's family and friends will typically increase with increased distance from a person's home. Moreover, uncertainty is also likely to increase with increased distance. *Ceteris paribus*, the greater the distance from region i to region j , the less the migration.

The distance elasticity is negative and highly significant in regression 1.1, and distance is the variable that contributes most to R^2 in the absence of the migrant stock variable. As expected, the introduction of the migrant stock variable into the estimated relationship results in a decrease in the absolute value of the distance elasticity, though the coefficient remains negative and significant. Thus, the results of this study indicate that either transportation costs or the non-economic variables for which distance is a proxy, or both, act as important deterrents to migration in India. The results also suggest that distance entered into the determination of past migration, and that in the absence of the migrant stock variable, much of migrant stock's influence may be transmitted through the distance variable. (Note that with the introduction of MS_{ij} , distance drops from being the first to being the seventh most-important variable in terms of addition to R^2 .)

Population is another variable that is likely to be an important determinant of migration in India. *Ceteris paribus*, the greater the population of region i , the greater the number of persons who are likely to have any given reason to migrate from i . Population of the destination region may serve as a proxy for labor market size. If migrants are attracted to areas that have large labor markets, then they may be attracted to areas with large populations, *ceteris paribus*. Moreover, in the absence of the migrant stock variable the population variables may be especially important in picking up some effects otherwise associated with migrant stock. The greater the population of either region i or region j , the greater is likely to be the number of persons who have migrated from i to j in the past. Hence the greater will be the current flow of information between i and j , and thus the larger the expected flow of migrants. It is expected, then, that migration will be directly related to both origin and destination population size.¹⁰

In regression 1.1 both population variables are positive and highly significant, and P_i and P_j rank second and third, respectively, in importance in terms of addition to R^2 . The introduction of the migrant stock variable results in appreciable declines in both population elasticities, though each remains positive and significant. These results indicate that both recent and past migrants have tended to migrate from regions with large populations to regions with sizeable labor markets. The magnitude of the decline in the population elasticities coupled with the substantial decrease of the importance of these variables in contributing to R^2 suggests that the population variables, in addition to the distance variable, may be particularly important in picking up effects associated with migrant stock when MS_{ij} is not explicitly introduced into the estimated relationship.

If, *ceteris paribus*, persons are being attracted to relatively high-income regions, then the sign associated with the destination-income variable should be positive. If, on the other hand, persons tend to migrate from relatively low-income regions, then the sign associated with the origin-income variable should be negative. In regression 1.1 both income variables have the expected sign and are highly significant. Destination income variables have the expected sign and are highly significant. Destination income ranks fourth in importance in terms of addition to R^2 .

The introduction of the migrant stock variable reduces the absolute value of both income variables, as expected. However, while the coefficient of Y_i remains negative and significant, the magnitude of the decrease of the coefficient of Y_i is so great that the sign of Y_i becomes negative. The estimate of Y_i remains significant, and in regression 1.2 Y_i is the second-most important variable in terms of its contribution to R^2 . In a sense, the predictive implications of the model have been borne out too well in that the coefficient of Y_i has declines "too much". This nega-

tive coefficient of Y_i is not intuitively appealing since it suggests that the current effects of income are such as to attract migrants to low-income regions. No fully satisfying explanation for this observed phenomenon is apparent.

A number of personal characteristics, such as age and level of education, may exert a considerable influence on the individual's decision to migrate. Among these personal characteristics education is usually regarded to be quite important. The more educated an individual, the greater are likely to be his employment opportunities and his employment information. It is also probable that more education reduces the importance of tradition and family ties, and in this way further tends to reduce immobility. Increased awareness of the social and cultural aspects of other regions is also likely to result from more education. Hence, the greater the percentage of educated persons in a region, ceteris paribus, the greater the expected migration from that region.

There is no strong a priori reason to suppose that the sign associated with the destination education variable should be positive or negative, though the arguments in favor of a positive sign appear to this investigator to be somewhat stronger. In spite of the possibility that they may be unable to compete effectively for the jobs available in places that display relatively high levels of educational attainment, poorly educated persons may be attracted to such regions in hopes of improving either their own or their childrens' education, and thereby bettering their prospects. Of course, if certain regions have high levels of educational achievement because of the location in them of colleges and universities, then these same regions are going to attract the relatively well-educated individual who is seeking a college education. The occupational structure of such localities is also likely to be such that the demand for educated persons is relatively great. Moreover, the existence of certain cultural and social amenities in places that reflect high educational levels is likely in itself to be attractive to the well-educated person. However, it should not be overlooked that the value of the marginal product, and hence the return, may be relatively high for the educated person in regions where average educational levels are low.¹¹

In regression 1.1 both education variables are positive and highly significant, which suggests that the cumulative effects of both origin and destination education variables have been positive. The introduction of the migrant stock variable reduces the parameter estimates of both variables. However, while the coefficient of E_i remains positive and significant, that of E_j fails the test of significance. It thus appears that the direct or current effects of increased education are such as to increase mobility.

It is generally thought that the degree of urbanization of the destination is an important determinant of migration in both less-developed and advanced societies, and several previous studies have confirmed this impression.¹² It is therefore somewhat surprising that in regression 1.1 the parameter estimate of U_j is not significantly different from zero. This does not mean, however, that in India migrants are not going and/or have not gone to cities, for what evidence is available suggest that migrants in India are being attracted to urban areas. Persons move to cities for a variety of reasons, including the availability of job opportunities, the possibility of earning relatively high incomes, the opportunity to gain an education, and the enjoyment of the social and cultural aspects of city life. In the model employed in this study, the former three variables may be accounted for by the destination population, income, and education variables. Thus the coefficient of U_j may reflect the influence of the social and cultural aspects of city life.

Note that while destination urbanization is not significant in regression 1.1, in 1.2 it is positive and highly significant, which is an indication that the current effects of urbanization (or perhaps of the social and cultural aspects of city life) are important. The reason for the increase in the coefficient of U_j when MS_{ij} is included in the estimated relationship is not immediately apparent.¹³ If the relationship between MS_{ij} and U_j were negative, while that between M_{ij} and U_j were positive, then it could be argued that there occurred a "structural" change in the determinants of

migration, and this could result in $\beta_2 > (\beta_2 + \beta_3 b_2 \delta)$. However, the simple correlation coefficients deny this possibility since both that between MS_{ij} and U_i and that between M_{ij} and U_i are positive.

Finally, regression 1.1 indicates that the cumulative effects of origin urbanization are significant determinant of migration in India, while regression 1.2 suggests that the direct effects of this variable are not significantly different from zero. Perhaps the reason that U_i is positive and significant in regression 1.1 is that transportation links between urban areas are relatively good, which has over time resulted in an increased flow of commodities, information, and persons between cities.

4. Summary

It has been argued that past migration influences current migration through the information that past migrants send back to their former locality. Moreover, for reasons apart from information, present migrants may have a tendency to move to the same places to which their family and friends have previously migrated. The failure to account for the current influence of past migration on the potential migrant's decision regarding a destination obscures (typically in an upward direction) the true direct effect of certain variables on the decision to migrate. Thus, this study employs a migrant stock variable in an attempt to determine the impact that past migration has had on current population movements in India.

It has been found that recent migrants do indeed have a strong tendency to migrate to localities to which natives of their region previously migrated. The failure to include the migrant stock variable in the estimated relationship causes the true direct effect of almost all variables to be overstated, and the inclusion of the migrant stock variable in the estimated relationship results in an appreciable increase in R^2 (from .71 to .94). It appears that in the absence of the migrant stock variable the distance and population variables may be particularly important in picking up the effects of migrant stock.

FOOTNOTES

¹While the possibility surely exists that some of the information sent from j back to i is of the sort that would discourage persons from migrating from i to j (e.g. that employment opportunities are limited in j relative to i), it is also likely that the potential transmitters of such information would themselves have tended to heed their own advice and have moved back to i or moved to some third region k in which prevailing conditions were deemed more favorable than in either i or j . Hence, while it is recognized that all news need not be good news, past migrants, by presumably choosing destinations that are best for them, are likely to have distributed themselves in such a way as to insure that the majority of the news they send back home is favorable from their own point of view and probably favorable from the point of view of the recipients of the information as well.

²See, for example, Galloway, Gilbert, and Smith [4], Lowry [11], Nelson [13], and Sjaastad [15].

³Because it is a measure of those persons born in i and living in j for a given period of time, the migration data do not rule out the possibility that migrants had moved from i to k and then within the given time period moved from k to j . In this sense the migration measure employed here may be somewhat less than ideal.

⁴The migration data are contained in the Census of India: 1961. [2].

⁵The list of cities between which the rail distances are measured, as well as the matrix of rail distances, is found in Manne [12].

⁶The source of the wage data is Central Statistical Organization [3]. Average annual income is calculated by dividing the value of wages, salaries, and benefits paid during the year by the average number of workers employed during the year.

⁷For a further discussion of this model see Greenwood [5] and [8].

⁸See Greenwood [5].

⁹For example, Beals, Levy, and Moses [1], Greenwood [6], [9], Sahota [14], and Sjaastad [15].

¹⁰The use of M_{ij} as the dependent variable rather than the use of a migration rate such as M_{ij}/P_i does not effect the parameter estimates of any variable except that of P_i , which is 1.000 greater than it would be if the rate were employed.

¹¹Studies concerned with Ghana, Egypt, and Brazil all found that migrants are attracted to regions in which the level of educational attainment is relatively great. See, respectively, Beals, Levy, and Moses [1], Greenwood [9], and Sahota [14].

¹²See, for example, Beals, Levy, and Moses [1], Greenwood [5], [9], and Sahota [14].

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