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Relative Deprivation and Migration

Theory, Evidence, and Policy Implications

Oded Stark
and
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Evidence on migration in Mexico shows that people in households relatively deprived in that village are more likely to migrate abroad than are people in households that are better situated in that village.

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This paper — a joint product of the Welfare and Human Resources Division, Population and Human Resources Department and the Agricultural Policies Division, Agriculture and Rural Development Department — is part of a larger effort in PRE to identify factors underlying rural change and rural economic performance. Copies are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Maria Paz Felix, room S9-109, extension 33724 (42 pages).

Stark and Taylor examine the importance of absolute income and relative deprivation incentives for internal and international migration in developing country households.

Empirical results, based on Mexican villag data, support the hypothesis that households' relative deprivation in the village reference group is significant in explaining migration by household members to destinations where a reference group substitution is unlikely and the returns to migration are high.

Independent of relative deprivation, village households wisely pair their members with the labor markets in which the returns to their human capital are likely to be greatest. The results suggest that a specific type of migration constitutes a response to a specific configuration of variables, and the role of relative deprivation appears to differ for internal and international migration.

Taking relative deprivation into account when studying migration is shown to have important implications for development policy. For example, economic development that does not redress intravillage income inequalities may become associated with *more* migration.

Relative Deprivation and Migration: Theory, Evidence, and Policy Implications

by
Oded Stark
and
J. Edward Taylor

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Almost without exception, economic studies of labor migration in less developed countries (LDCs) focus on the potential contributions that migration may make to the absolute income of the relevant migration unit (the individual, the family, or the household). In contrast, Stark (1984) has hypothesized that rural-to-urban migration might be undertaken primarily to improve an individual's or a household's comparative income position with respect to that of other individuals or households in the relevant reference group (for example, the village).

In a recent study Stark and Taylor (1989) found empirical evidence that the initial relative deprivation of households in their village reference group plays a significant role in migration from Mexico to the United States. Controlling for initial absolute income and the expected income gains from migration, these authors showed that the propensity of households to participate in international migration is directly related to the households' initial relative deprivation.

In this paper we expand this earlier work by addressing the role of absolute income versus relative deprivation incentives for internal and international migration in LDC households, taking into account continuities across some labor markets and discontinuities across others. The rationale for the analysis is threefold. First, there are fairly strong reasons to expect that the role of relative deprivation will differ between international migration and migration within a country, as we explain below. Second, sharp discontinuities in the returns to human capital between home- and host-country labor markets may affect the ability of households that differ in their human capital endowments to achieve gains in their income positions through

international migration. Third, a relative deprivation approach to migration has important implications for development policy. For example, the effects of rural development policies on rural out-migration, as predicted by an expected income model, may be precisely opposite to those predicted by a relative deprivation model.

In Section I of the paper we outline the absolute income and relative deprivation models of migration and present an illustration of their divergent policy implications. We also consider the likely case in which the decision to migrate and the choice of migrant destination are influenced by both absolute income and relative deprivation objectives. In this case, income remittances from household members who migrate have a dual impact on the household's well-being: first, by contributing to its absolute income; second, by improving its income position relative to that of other village households. An attempt is made to identify distinct empirical implications of these two motives for migrating. In Section II, a migration decision model is estimated and is used to explore absolute and relative income motives for internal and international migration in a sample of rural Mexican households, as well as the extent to which the degree of discontinuity in labor markets shapes the choice of migrant destination.

I. ABSOLUTE AND RELATIVE INCOME HYPOTHESES OF MIGRATION

Empirical economic studies of migration are based on the general assumption that individuals migrate to maximize expected utility EU, which is typically defined on income Y at the end of the relevant time period:

$$EU = EU(Y), \tag{1}$$

where $U'(Y) > 0$. Let Y_1 denote income associated with migration, net of any implied moving costs, and let Y_0 denote income in the absence of migration. The absolute income hypothesis then states simply that a person will migrate if $EU(Y_1) > EU(Y_0)$. That is, an individual's labor is allocated to the labor market associated with the highest level of expected utility. A clearer picture of the economic determinants of migration can be gained when expected utility is replaced by its Taylor-series approximation around the expected income EY (David 1974):

$$EU(Y) = U(EY) + 0.5U''(EY)s^2, \tag{2}$$

where s^2 is the variance of income Y and $U''(EY)$ is the second derivative of utility evaluated at expected income EY. If decision-makers are risk neutral - that is, if $U''(EY)$ is zero - equation (2) reduces to the expected income hypothesis (see, for example, Todaro 1969), which states that labor will be allocated to the destination that maximizes expected income. In contrast, if the migration decision-maker is risk averse - that is, $U''(EY) < 0$ - then migration decisions are influenced by both the mean and the variability of income associated with alternative locations, as well as by the decision-maker's aversion to risk. In the case of risk aversion, the absolute income model predicts that an individual will migrate if the corresponding expected income gain outweighs any increase in income risk that may be associated with migration (Stark and Levhari 1982).[1] Several studies provide empirical

support for an absolute income motive for migration, with regard to both expected income (Y. 1977; Todaro 1980) and risk (Lucas and Stark 1985; Taylor 1986; Rosenzweig and Stark 1989).

A. A RELATIVE DEPRIVATION HYPOTHESIS

In earlier papers (Stark 1984; Stark and Taylor 1989) it was hypothesized that household members undertake migration not necessarily to increase the household's absolute income but rather to improve the household's position (in terms of relative deprivation) with respect to a specific reference group. The case studied in those papers is of individuals who engage in migration to improve the income position of their households relative to that of all other households in the village.

Consider two villages of households whose incomes are as follows: A_1 = (20,30,40,50,60) and A_2 = (20,37,38,39,40,41,42,43,60). These two income distributions share the same average income (40), and both cover the same income range (20,60). However, whereas the five household incomes in A_1 are uniformly distributed over this range, seven of the nine incomes in A_2 are concentrated around the mean.

Suppose that by reallocating some of its labor to migration the household earning the average income in each village can enjoy a 20 percent (8-unit) increase in absolute income. For the household in A_2, this absolute income gain translates into a relative income gain of three ranks, enabling that household to move to within one rank of the top of its village income distribution. In contrast, the same absolute income gain leaves the A_1 household's rank unchanged. Assume that the nature of the reallocation is

such that when a household member is assigned to a different sector, the household together with that member continue to consider A_i as the relevant reference distribution. (This assumption is discussed below in the context of international and internal migration.) If household utility is a function not only of absolute income but also of ranking in relation to other households in the village, then we would intuitively expect that the average household in A_2 will have a stronger motivation to participate in migration than the average household in A_1. That is, a given absolute income gain associated with an improvement in rank is worth more than an identical income gain without an improvement in rank.

Consider now the poorest households in A_1 and in A_2. Suppose that each of these households can reap a 60 percent (12-unit) gain from migration by one of its members. This gain will not cause a rank change for the household in A_2, but the household in A_1 could escape from the very bottom of its village's income distribution through migration. Other things being equal, a given absolute income gain may be considered more valuable in the latter situation than in the former.

The two examples above have in common a correlation between rank within an income distribution and absolute income. However, we can easily consider rank gains that are not associated with income gains, or rank losses that are not associated with income losses. Consider two village household income distributions given by B_1 = (30,35,40,45,50) and B_2 = (30,32,34, 47,62). For the household with income equal to 35, relocation from B_1 to B_2 would result in a rank gain that is not associated with an absolute income change. Intuition alone, however, may not provide clear-cut guidance on

whether to expect this move to take place. Even though the change implies a higher rank in a new reference group having the same average income (after 35 is added to B_2, the average income in B_2 is 40), in a cardinal sense the new position may be perceived as inferior (if judged, for example, by the distance from the highest-income household: 62-35 > 50-35). An ambiguity arises in this case because the simple rank measure is not sufficiently sensitive to all rank-related information. Hence there is a need to adopt a more complete measure of income ranking and relative deprivation. We shall draw here on an axiomatic foundation for an index of relative deprivation reported in related papers (Stark and Yitzhaki 1988; Stark and Taylor 1989).

Let RD^i denote household i's relative deprivation. Assume a continuous income distribution. Each income unit can then be represented by an income range $[x,x+\Delta x]$, where $\Delta x \to 0$. Let $F(x)$ be the cumulative distribution of income in a village. Then $1-F(x)$ is the percentage of households whose income is higher than x. Hence $1-F(x)$ represents the percentage of households that have incomes sufficient to obtain the commodities represented by the income range $[x,x+\Delta x]$. By hypothesis, the feeling of deprivation is an increasing function of the percentage of households with incomes larger than x. Let $g[1-F(x)]$ be the deprivation from not having $[x,x+\Delta x]$, where $g(0) = 0$ and $g' > 0$. A household with income x is deprived of all units of income above x. Thus, we can write the relative deprivation of household i, whose income is y_i, as

$$RD^i = \int_{y^i}^{y^h} g\left[1-F(x)\right]dx, \tag{3}$$

where y^h denotes the highest village income. To simplify the discussion, we shall assume a simple form of $g[1-F(x)] = 1-F(x)$. Subject to some algebraic manipulations, the expression on the right-hand side of equation (3) can be decomposed into the product of the mean excess income of households richer than the household with income y^i and the proportion of households in the village that are richer than the household with income y^i. (For these procedures and an analysis of the more general form $g(\cdot)$, see Stark and Yitzhaki 1988.) This interpretation nicely captures the point that, if all rankings are left intact, any increase in the income of a household richer than household i will increase the relative deprivation of household i, whereas any rank gain by household i (resulting in a decline of the proportion of households richer than i) will reduce the relative deprivation of household i. Given this interpretation, in the example above of household income distributions B_1 and B_2, the ambiguity associated with the relocation of the household with an income of 35 is not only better understood but is also resolved because the two effects are duly weighted (resulting, in the case of the example, in an increase of relative deprivation from 6.0 to 6.5).

The relative deprivation hypothesis is that migration will be observed if $EU(RD_1^i) > EU(RD_0^i)$, where RD_1 is the relative deprivation associated with migration and RD_0 is the relative deprivation in the absence of migration. Thus individuals or households below the upper end of the income distribution may decide to engage in migration on the assumption that they will thereby succeed in improving their positions in the village by securing an income higher than their initial income.

To illustrate some of the new policy implications of the relative

deprivation approach to migration, we consider an extreme example. In a country consisting of a village and a town, the income of every village household is 100; in the town, it is 200. As the result of a certain development policy, the income of half the village households rises to 150. What are the likely migration implications? In a world motivated solely by income differentials, the incentives for village-to-town migration will have declined unequivocally: the propensity to migrate of those earning 150 has declined, whereas that of those earning 100 remains as before. In a world motivated solely by relative deprivation, the prediction is exactly the opposite. If the village is the relevant reference group for village households, before the change no household had any inducement to migrate, since the relative deprivation of each and every household was nil. After the change, however, half of the village households - those which now experience relative deprivation (at the level of 25 units of income) - will have an incentive to migrate, whereas the incentive to migrate of the others (whose income is 150) will remain at zero.

When a household's utility is a function of both absolute income and relative deprivation arising from intra-group income comparisons, the effect of a policy change on the propensity to migrate from the village cannot be pre-signed because there are conflicting effects: the lower inducement to migrate of the households whose absolute incomes rise has to be weighed against the new inducement to migrate on the part of households whose relative incomes fall. The received theory, however, will admit only the former inducement and is completely blind to the latter. The relative deprivation theory of migration and the received theory of migration based on absolute

income differentials generate conflicting predictions.

Suppose that a development agency is not indifferent to the migration implications of its policies and wishes to induce less migration, more migration, or keep migration at its existing level. If the relative deprivation theory of migration obtains, a new policy instrument is identified, and the policy mix will thereby change. For example, in an effort to stem rural-to-urban migration, equalization of the rural income distribution could be combined with, reinforced by, or substituted for the narrowing of town-village income differentials.

B. AN INTEGRATED APPROACH

In real life it is likely that migration decisions are influenced by both absolute and relative income considerations. In this case utility is of the form

$$U = U(Y, RD), \tag{4}$$

where $\partial U/\partial Y > 0$ and $\partial U/\partial RD < 0$. The net utility gain from migration is given by the differential

$$\Delta_1 = U(Y_1, RD_1) - U(Y_0, RD_0). \tag{5}$$

This can be expressed as a function of Y_0, RD_0, and the net household income gain from migration (which we shall denote W) by replacing RD_1 with its Taylor-series approximation around Y_0:

$$\Delta_1 = U[Y_0 + W, RD_0 + RD_0'W] - U[Y_0, RD_0] \quad (6)$$
$$= \Theta(Y_0, RD_0, W),$$

where RD_0' is the change in relative deprivation brought about by a small change in income at income level Y_0.

Assume for a moment that the relative deprivation function is stable in the face of migration by one or more household members - that is, the household including its migrants continues to view the village as its relevant reference group. In this case, any variable that enhances the net returns W from migration can increase the household's incentive to participate in migration in two ways: first, by increasing absolute income $Y_1 = Y_0 + W$; second, by decreasing relative deprivation, since by construction $RD_0' < 0$. On the basis of this consideration, the effect of a household's income and relative deprivation levels in the absence of migration on its propensity to participate in migration is generally predictable. At low levels of income, incentives to engage in potentially income-enhancing migration may be strong. On the absolute income side, low village incomes presumably imply large income disparities between migration work and village work, and hence large potential net gains from migration. Low village incomes are also associated with high degrees of relative deprivation as defined in equation (3), and hence the incentive to reduce relative deprivation through migration may also be large for low-income households. Thus, other things being equal, both the absolute and relative income hypotheses would predict a greater desire to engage in migration among households or individuals at the lower end

of the village income spectrum.

However, in the absence of smoothly functioning credit markets that give explicit preference to the poor - a condition characteristic of village economies in LDCs - households or individuals at very low levels of absolute income may be unable to engage in migration if migration is costly and the initial risks associated with it are high.[2] In addition, at incomes very near or below subsistence, relative income considerations are not likely to matter as much as concerns for mere survival. Thus, we would expect a small increase in income (and a small decrease in relative deprivation) to have a positive effect on migration from households at the very bottom of the village income distribution - owing, first, to a loosening of capital constraints on migration and, second, to the increasing importance of relative deprivation considerations in these households' labor allocations. At higher income levels, in contrast, both the relative and absolute income hypotheses predict that increases in income will reduce the likelihood that households or individuals will engage in migration. It is therefore impossible on purely theoretical grounds to separate the effect of absolute income incentives from the effect of relative income incentives for migration, since, when credit markets are highly imperfect, absolute and relative income effects of changes in village incomes tend to move in tandem. Note that migration studies that ignore relative income effects may place undue significance on absolute income motives for migration.

C. REFERENCE GROUP SUBSTITUTION, LABOR MARKET DISCONTINUITIES, AND DESTINATION CHOICE

In a relative deprivation model of migration there is a risk that, through a reference group substitution of the host community for the village community, households may fail to decrease their relative deprivation - even if their relative incomes in terms of the village income distribution improve. That is, the household's relative deprivation function may not be stable in the face of migration by one or more household members. The household's well-being is an increasing function of the well-being of all its members, regardless of their location. Migration may be associated with a rise in a household's relative deprivation if the host community becomes the relevant reference group for either the migrant or, perhaps less likely, the household members who remain in the village.

In a recent study it was argued that international migration, to an entirely different social and cultural milieu, can carry with it built-in protection against such reference group substitution and can ensure that the original reference group continues to be the relevant one for the migrant and his or her household (Stark and Taylor 1989). By locating themselves in a host community distinct from their own, migrants are less likely to orient themselves to the host community than if they were to locate themselves in a "neighboring" host community. For a comparison with the host community to occur, some "minimal similarity" between the migrant and that community must be perceived. This becomes more likely when direct social interaction or sustained social relations persist. In some cases, the host community may be intentionally selected to ensure estrangement, detachment, and social

distance. Migrants may wish to guard against becoming oriented to the host community for fear that the secondary negative effects of a changing reference group might outweigh the primary positive effect of improving their position in relation to the original reference group. Thus international migration can enable households to exploit cultural and social discontinuity across international frontiers, capture this discontinuity, and transform international dissimilarities into a source of advantage. This consideration applies in particular to repetitive or temporary migration rather than to permanent, once-and-for-all migration; in the recent study cited, migration was by and large of the former type.[3]

Indeed, households may behave strategically to preempt reference group substitution associated with migration of a long duration by given (that is, the same) household members. Household members might be shuffled between destination and home, replacing each other as migrants. Note that, by construction, the analysis in the present paper is of a short-run nature. Reference group association and household attachment could become endogenous processes conditional on relative performance in a set of reference groups. Households and individuals may substitute one reference group for another to suppress the dissatisfaction arising from a high level of a group-specific relative deprivation. Such a substitution typically involves locational <u>and</u> mental migration and is bound to be time consuming.

In contrast with international migration, migration within a country is more likely to generate alienation and increased relative deprivation through a smooth reference group substitution, particularly when the country is socially and culturally homogeneous. These considerations suggest that the

role of relative deprivation in internal migration may be quite different from the role of relative deprivation in international migration, owing to social and cultural discontinuities across international borders.

Indeed, the full logic of this argument could lead to a puzzling neutrality result. Consider a household that experiences intra-village relative deprivation while, at the same time, facing a positive urban-to-rural income differential for one of its members. Should that household member engage in rural-to-urban migration, his increased alienation arising from a reference group substitution could offset any absolute income gain. The village household may recognize that the migrant member would need to "tax" his higher urban income to compensate for a rising relative deprivation, thereby leaving little for urban-to-rural remittances. In this case, a relatively deprived household would not engage in internal migration via one of its members, even though the associated expected absolute income differential is positive. Consequently, neither the estimated coefficient for relative deprivation nor that for absolute income may appear significant in an econometric migration model.

Discontinuities in labor markets across international frontiers may, however, temper the role of relative deprivation in migration decisions. Paramount among these are sharp differences in the returns to human capital. Education, skills, and work experience in the home country may enhance the returns to internal migration. But it is less clear to what degree these human capital assets are internationally transferable. When international migration takes the form of illegal entry into the host country, as is frequently the case with migration from rural Mexico to the United States, the

returns to human capital in host-country labor markets may be minimal (Taylor 1987).

Empirical work is therefore needed to pursue further an analysis of explanations for internal and international migration motivated by absolute versus relative income considerations. By including both absolute income and relative deprivation variables in a single household model of internal and international migration decisions, it is possible to isolate empirically the differential influence of relative deprivation on these two types of migration, provided that not all migration decision units are drawn from the same reference group. Estimated absolute household income if a household member does not migrate can be used to control for the effects of both the motivations to migrate and the capital constraints associated with absolute income in the migration equation. Controlling for the initial absolute income of households and for their human capital, the integrated model would predict that the initial relative deprivation of households will have a positive influence on the propensity to send migrants to destinations where the potential returns to migration are large enough to alter significantly the relative income positions in the village, and where the risk of reference group substitution is small.

II. EVIDENCE FROM MEXICO

A. DATA

Data from a survey of rural Mexican households were used to test for the effects of absolute income and relative deprivation on migration both to Mexican destinations and to the United States. The sample consists of 61

randomly selected households surveyed in the Pátzcuaro region of the state of Michoacán, Mexico, during the winter of 1983. From these households we obtained data on 423 adults who were 13 years of age or older. Data were collected for a set of characteristics - of both the individuals themselves and their households - that are likely to influence the returns to households from migration versus nonmigration work by household members. Data were also collected on the allocation of each individual's labor to migration and nonmigration activities and on each individual's income contribution to the household during 1982. The latter include, for nonmigrants, contributions of income from household farm production (farming, handicrafts, fishing, livestock, commerce, and the like), village wage work, and rental income.[4] Income contributions in the form of remittances from household members who migrated, either within Mexico or to the United States, are all net of reverse (household-to-migrant) flows and of direct migration costs. A "migrant" is defined as an individual who left the village at any time during 1982 for the purpose of working. The shortest term of migration in the sample was approximately three weeks. Nonmigrants include individuals who remained in the village throughout the year, as well as a small group of secondary and post-secondary students who studied outside the village but did not participate in migrant labor activities. (The empirical results are not significantly altered if students are excluded entirely from the sample.)

Selected characteristics of the households of nonmigrants, internal migrants, and Mexico-to-U.S. migrants, together with individual characteristics of the migrant and nonmigrant subsamples, are summarized in Table 1. (In no case in the sample was a person both an internal and a

Mexico-to-U.S. migrant in 1982.) Distinct patterns characterize the households of the three labor groups. Families of nonmigrants, on average, are relatively small, with 7.8 adult members (13 years or older) compared with 8.5 and 9.1, respectively, for internal migrant and Mexico-to-U.S. migrant families. Nonmigrant households have less land and fewer physical assets overall than do migrant households. They are likely to have internal migration networks, or family contacts at internal migrant destinations, but are far less likely to have networks to the U.S. Fewer than half of the nonmigrants are male (43 percent). On average, nonmigrants are somewhat older than migrants (33 years, compared with 28-29 years for the two migrant groups), have little schooling (3.9 years), and have little past internal and Mexico-to-U.S. migration experience (0.32 years and 0.76 years, respectively).

Internal migrants are distinguished from the other two labor groups by their high schooling levels (6.5 years) and their past internal migration experience (4.8 years). Eighty percent of all internal migrants come from households with family contacts at internal migrant destinations. Overwhelmingly, internal migrants from the households in this sample migrate to Mexico City. The main exceptions are some villagers with secondary or post-secondary schooling who migrate into government teaching jobs scattered around rural Mexico. Mexico-to-U.S. migrants are predominantly male (63 percent) and uneducated (4.1 years) but have considerable past U.S. migration experience (4.9 years). Their households are above average in terms of adult family size (9.1), landholdings (7.1 hectares), physical capital wealth ($3,500 in 1982 dollars), and the probability of having family contacts in the United States (0.89).

More than a third of all individuals in the sample were labor migrants during 1982. In no case, however, did an entire household leave the village. Thus the households covered by the sample remained as stable and meaningful entities in their respective villages while individual household members participated in labor migration, typically remitting part of their earnings to the household. Each observation in the sample represents a separate allocation of household labor time.[5]

B. ESTIMATION

A procedure to test the relative deprivation hypothesis presented earlier in this paper requires, as indicated by equation (6), estimation of the effects on households' internal and Mexican-to-U.S. migration decisions of initial absolute income, initial relative deprivation, and factors expected to influence the net returns to households from undertaking migration.

A multinomial logit procedure was used to estimate the probabilities that an individual participated in internal migration or Mexico-to-U.S. migration work during 1982, versus the alternative of engaging exclusively in activities other than labor migration.

Let X_d be a vector of characteristics of the household member and his or her household that are likely to influence the net income gain to the household from allocating the member's time to migrant destination d, such that this gain can be represented as $W_d = f_d(X_d)$. Thus the household's income if the member migrates to destination d can be written as $Y_d = Y_0 + W_d = Y_0 + f_d(X_d)$, where Y_0 is the household's income in the absence of migration by the member. For d=1 (internal migration) and d=2 (Mexico-to-U.S.

migration), the vector X_d includes the household member's sex, age, education, status as household head or not, and migration work experience. These variables can influence household members' earnings as migrants in different labor markets as well as migrants' motivations to remit part of these earnings to the household. The vector X_d, d=1,2 also includes household migration networks or contacts with relatives at prospective migrant destinations, which can reduce the costs and risks associated with labor migration (especially those of illegal Mexico-to-U.S. migration), and household wealth, which can affect the household's willingness to participate in risky migration activities and its ability to secure financing for these activities. The net gains from migration are also a function of the income household members would contribute to the household as nonmigrants. Thus X_d also contains variables that affect the returns to the member's labor in the village. These include the individual characteristics mentioned above plus household adult labor available to assume household-farm duties, and household landholdings, which may be an indication of the demand for labor on the household farm, especially where limited land rental markets exist, as in ejido (land-reform) areas of Mexico. Assuming that households allocate their members' time so as to maximize utility, the member will be observed as a migrant worker at destination d* with a probability of

$$P(d^*) = \text{Prob}\left[U(Y_{d^*},RD_{d^*})>U(Y_0,RD_0) \text{ and } U(Y_{d^*},RD_{d^*})>U(Y_{d'},RD_{d'})\right],$$

where d' denotes the "migration route not taken."

Replacing $U(Y_{d*}, RD_{d*})$ and $U(Y_{d'}, RD_{d'})$ by their Taylor-series approximations around Y_0, as in equation (6), we obtain

$$P(d*) = \text{Prob}[\Delta_{d*,0}>0 \text{ and } \Delta_{d*,d'}>0],$$

where

$$\Delta_{d*,0} = U[Y_0+ W_{d*}, RD_0+ RD_0'W_{d*}] - U(Y_0, RD_0)$$

and

$$\Delta_{d*,d'} = U[Y_0+ W_{d*},RD_0+ RD_0'W_{d*}] - U[Y_0+ W_{d'}, RD_0+ RD_0'W_{d'}].$$

Substituting $f_d(X_d)$ for W_d, $d=d*,d'$, the probability that the member is assigned to migrant destination d* becomes

$$P(d*) = \phi(Y_0, RD_0, X),$$

where X is a vector containing the variables in X_{d*} and $X_{d'}$.

Let Z denote a 1xK vector whose components, z_k, are the explanatory variables $\hat{Y}_0$, $\hat{RD}_0$, and X (where $\hat{Y}_0$ is the household's estimated income if the household member does not migrate and $\hat{RD}_0$ is the household's estimated level of relative deprivation associated with this income). The logit equations are given by

$$P(d^*) = \exp(Z\beta_{d^*}) / \left[1 + \sum_{d=1}^{2} \exp(Z\beta_d)\right] \tag{7}$$

for migration types $d^*=1$ (internal migration) and $d^*=2$ (Mexico-to-U.S. migration), where β_d is a Kx1 vector whose components $b_{d,k}$ are the coefficients on characteristic k that correspond to migrant labor destination d. The logit reference category is nonmigration. The logit probability of nonmigration is $P(0) = 1/\left[1 + \sum_{d=1}^{2} \exp(Z\beta_d)\right]$.

Instrumental-variable techniques were used to obtain estimates of household income in the absence of migration by a nousehold member and of the level of relative deprivation associated with different income levels. These techniques are described in the Appendix. The household sample was drawn from two villages. Thus, two similar absolute incomes do not necessarily imply similar levels of relative deprivation, and absolute income and relative deprivation can be treated as independent.[6] These absolute income and relative deprivation variables, together with a quadratic transformation of each, are the basis for testing the relative and absolute income hypotheses empirically. The quadratic variables are included in the empirical analysis to capture potential nonlinearities created by credit constraints (in the case of absolute income) and subsistence concerns (in the case of relative deprivation), as discussed previously. Definitions of the variables used in the logit analysis appear in Table 2.

Strong dissimilarities between labor markets imply substantial differences in the returns to human capital for migrant workers. Although migration to a foreign labor market tends to minimize the added relative deprivation to which the household is exposed, there is evidence that returns

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Strong dissimilarities between labor markets imply substantial differences in the returns to human capital for migrant workers. Although migration to a foreign labor market tends to minimize the added relative deprivation to which the household is exposed, there is evidence that returns

that he or she did not participate in any form of labor migration.

When interpreting these results, note that an insignificant coefficient with respect to a specific migration category does not imply that the corresponding variable does not affect the probability that an individual will be observed in that category. By equation (7), each probability depends on all the coefficients in the table. A variable that has a significant effect on one migration probability has at least an indirect effect on the other probabilities, since by construction the probabilities of the three destination choices must sum to unity.

In Section I we argued that absolute income may have a positive effect on migration from poor village households when migration is costly, credit markets are imperfect, and households therefore must self-finance migration costs. Our empirical findings confirm this expectation. The logit estimation yields a positive coefficient on absolute income and a negative coefficient on absolute income-squared for Mexico-to-U.S. migration, both significant at below the 0.10 level. U.S. migration costs for the households in our sample include the costs of hiring coyotes, or smugglers, to assist with a risky, illegal border crossing. These costs averaged US$350 per migrant in 1982, representing a large "sunk-cost" relative to average village incomes. By comparison, internal migration entails low costs and little risk. The negative coefficient on income-squared indicates that the probability of Mexico-to-U.S. migration declines at the highest income levels.

Where all other variables in Table 3 and also the effect of absolute income on international migration are controlled for, income does not have a significant direct effect on internal migration. It does, however, have a

negative indirect effect on internal migration through its positive effect on international migration.

Like absolute income, relative deprivation (RD in Table 3) has a significant impact on migration to U.S. destinations but does not have a significant (direct) effect on internal migration. With everything else in the logit equation held constant, relatively deprived households are more likely to participate in Mexico-to-U.S. migration than are less relatively deprived households. The coefficient on RD of 0.57 for Mexico-to-U.S. migration is significant at below the 0.05 level, indicating an important role for relative income motives in Mexico-to-U.S. migration.

The influence of relative deprivation on international migration is not the same at all points in the village income spectrum. Relative income motives for Mexico-to-U.S. migration are lower in the most relatively deprived households. The negative coefficient on the square of relative deprivation (RDSQ) is significant at the 0.05 level for Mexico-to-U.S. migration. This result is consistent with the hypothesis, put forward in Section I, that subsistence concerns tend to dampen relative income considerations in the poorest village households.[7]

The findings suggest that the income neutrality result of relative deprivation theory, posited in Section I.C above, may hold in the case of internal migration for the households in this sample. If the perceived risk of a reference group substitution through internal migration is high, then internal migration ceases to be an effective means for achieving relative deprivation gains for households in the village. If the household perceives that the cost of reducing the migrant's sense of relative deprivation in the

city is high, then internal migration may also cease to be viewed as an effective device for village households to achieve absolute income gains, even if there is a positive urban-rural income differential. This interesting possibility is ruled out by conventional, absolute-income models of migration.

The remaining variables in the decision model are included for their hypothesized influence on the returns to migration versus nonmigration activities and on the motivation of household members to contribute all or part of their earnings to their respective households. We would expect migrating household members to be those whose attributes are most likely to be associated with high differentials in returns to the household from migration versus nonmigration activities. In addition, certain household characteristics are likely to have an important effect on both the probability of migration and the choice of migrant destination.

The logit analysis reveals striking differences between migrants and nonmigrants as well as between the two groups of migrants. On average, migrants tend to be male, 20-30 years of age, not heads of households, and to possess past migration experience. However, two of these variables affect the migration categories in very different ways. Although males are significantly more likely than females to participate in Mexico-to-U.S. migration, sex plays an insignificant role in explaining internal migration. Household heads, in contrast, are very unlikely to engage in international migration but are no less likely to be internal migrants than are those who are not heads of households. The latter result no doubt reflects differences in opportunity costs between internal and international migration for household heads. For heads of households, administrative responsibilities on the family farm and

other obligations in the village generally preclude migration to the United States, which typically entails a large commitment of both time and capital. Household members' schooling (ED) has a significant positive effect on the probability of internal migration but is negatively related to Mexico-to-U.S. migration. Not surprisingly, better-educated villagers are much more likely to migrate to destinations in Mexico, where returns to schooling are likely to be high, than to low-skill undocumented immigrant labor markets in the United States.

Household members' experience as migrants in the U.S. and experience as migrants in Mexico have a positive association with the probability of migration to both destinations. However, the estimated coefficient on U.S. migration experience in the U.S. migration equation (0.487, significant at below the 0.05 level) is more than three times the coefficient on U.S. experience in the Mexico migration equation (0.141, significant at the 0.10 level). Similarly, although experience as an internal migrant is positively related to both types of migration, it has a larger and more significant effect on internal migration than on international migration. On the one hand, these findings suggest that migration experience has a general positive effect on migration propensities and that some migration work experience may be transferable across migrant destinations. On the other hand, they indicate that destination-specific migration experience plays a powerful role in shaping migration decisions. These general and destination-specific migration experience effects are analogous to the differential effects of general training and firm-specific training in employment and earnings studies.

Several other variables in Table 3 stand out as significantly

influencing migration decisions. Mexico-to-U.S. migrants tend to originate from households with other adult members in the village (ADULTS in the table) who can assume the household farm duties of those who migrate. In addition, households with kinship networks in place in the United States (USNET) are significantly more likely to send additional members to the United States. The particularly large and significant coefficient on USNET for the Mexico-to-U.S. migration category reflects the important role that kinship contacts play in international migration where risks are highest, labor market information is most costly and scarce, and the penalty for failure (that is, lost time and capital) is most severe. Internal migration networks (MEXNET), in contrast, do not significantly affect internal migration. This reflects the relative ease with which individuals in this sample can migrate and re-migrate internally (that is, take corrective action in case of a failure).

III. CONCLUSIONS

The findings from Mexico reported in this paper provide evidence that, if absolute income is controlled for, relatively deprived households are more likely to engage in international migration than are households more favorably situated in their village's income distribution. In contrast, the findings suggest an interesting "income neutrality" result, unique to relative deprivation theory, in the case of internal migration. The perceived risk of a reference group substitution through internal migration is likely to be high. In this case, rural-to-urban migration may cease to be an effective vehicle for achieving either relative or absolute income gains for village

households. This possibility is ruled out by conventional, absolute income models of migration. The empirical finding that both relative deprivation and absolute income are significant in explaining international migration but have no significant (direct) effects on internal migration from the households in our sample is consistent with this "income neutrality" hypothesis. The results for Mexico-to-U.S. migration support the relative deprivation hypothesis in the case where a reference group substitution is less likely.

Choice of migrant destination is also influenced by the differential returns to human capital in internal and foreign labor markets. Our econometric results suggest that, independent of relative deprivation considerations, households wisely pair their members with the labor markets in which the returns to their human capital are likely to be greatest.

This analysis leads to several new policy implications. Contrary to the assumption that all types of migration can be attributed to the same explanatory variables, our results suggest that (at least in the context studied) a specific type of migration constitutes a response to a specific configuration of variables. Thus a distribution-neutral development policy that shifts a village income distribution to the right would reduce the incentive to engage in internal migration for all but the richest households (that is, in the present case, by relieving credit constraints on international migration). Conversely a distribution-biased policy leading to a more equal income distribution (for example, provision of stronger support for the poorest households) could tip a migration balance from international migration to internal migration.

The possibility that different variables may be the cause of

different types of migration could lead to the paradoxical result that interference - say, to stem migration - will result in its rise. Raising the incomes of highly relatively deprived households in a poor village may reduce these households' relative deprivation incentive to engage in international migration but, in the presence of imperfect credit markets, may also unleash their hitherto constrained propensity to engage in such migration.

Finally, if the disutility from relative deprivation and the migration response to it are an increasing function of own (absolute) income, a "relative deprivation paradox of migration" may operate: economic development that does not redress intra-village income inequalities (that is, a distribution-neutral rise in income) will be associated with more international migration.

APPENDIX

Estimation of equation (7) in the text requires measures, for each household member j, of the predicted household income in the absence of migration by the household member (Y_0^j) and of the level of relative deprivation associated with this predicted income (RD_0^j). In this Appendix we outline the method used to obtain, first, an instrument ($\hat{Y}_0^j$) for household income in the absence of migration by person j and, second, an instrument ($\hat{RD}_0^j$) for relative deprivation associated with this income.

Household Income without Migration by Person j.

A household's predicted income in the absence of migration by household member j ($\hat{Y}_0^j$) is the sum of predicted income from other sources ($\hat{Y}^{-j}$) and the expected contribution by the household member as a nonmigrant ($\hat{W}_0^j$). Estimates of household income (from sources other than person j) were obtained by regressing observed 1982 income from sources other than person j on household assets at the start of 1982. The estimated equation is

$$\hat{Y}^{-j} = \underset{(4.94)}{1376.8} + \underset{(5.59)}{0.29A} + \underset{(8.87)}{821.92TED} - \underset{(-1.98)}{96.29NADS}$$

$$+ \underset{(2.81)}{558.08USNET} - \underset{(-1.85)}{397.96MEXNET} \qquad (A.1)$$

$R^2 = 0.28$
$N = 423,$

where A is the value of households' primary physical capital assets (land and animals) in thousands of U.S. dollars; NADS and TED are human capital assets (the number of adults in the household and the number of household members with post-primary schooling, respectively); and MEXMIG and USMIG denote migration capital (the number of household members who participated in internal migration and in Mexico-to-U.S. migration, respectively, in the year before 1982). Numbers in parentheses are t-statistics. Migration capital is included in equation (A.1) for its impact on contributions to household income by family members other than member j.

Household member j's predicted contribution to household income as a nonmigrant was estimated by regressing observed 1982 contributions by nonmigrants on a set of personal and household variables likely to influence earnings in the village as well as the willingness of nonmigrants' to share these earnings with the household. Contributions by nonmigrants were observed only for individuals who did not migrate during the year. An inverse Mills ratio (LAMBDA) was included in the equation for contributions by nonmigrants to adjust for potential sample-selection bias (Heckman 1979; Green 1981). It was obtained from a reduced-form probit for nonmigration by using the explanatory variables in equation (A.1) and the household and individual characteristics variables in Table 1. The estimated equation for contributions by nonmigrants is

$$\hat{W}_0^j = \underset{(0.90)}{-0.63} + \underset{(6.29)}{1.87}SEX + \underset{(2.29)}{0.11}AGE - \underset{(-2.39)}{0.001}AGESQ + \underset{(3.86)}{2.08}HEAD$$

$$+ \underset{(1.87)}{0.21}MEXEX + \underset{(3.47)}{0.22}USEX - \underset{(-2.19)}{1.30}LAMBDA \qquad (A.2)$$

$R^2 = 0.44$
$N = 273,$

where the numbers in parentheses are t-statistics. The variables as they appear in equation (A.2), with the exception of LAMBDA, are defined in Table 2. The instrument for household income in the absence of migration is given by $\hat{Y}_0^j = \hat{Y}^{-j} + \hat{W}_0^j$.

Relative Deprivation without Migration by Person j.

Estimation of a household's relative deprivation in the absence of migration by person j (RD_0^j) is complicated by the fact that relative deprivation is a function not only of the income of person j's household but also of the incomes of all other households in person j's village (equation (3)). We constructed an instrument for RD_0^j by first estimating the income $(\hat{Y})$ of each household in the village sample and then using this estimated income distribution to estimate the level of a household's relative deprivation associated with nonmigration by person j.

Estimates of total household income $(\hat{Y})$ were obtained by regressing observed 1982 total household income on household holdings of income-producing assets at the start of the year and then using the estimated equation to predict 1982 income for each household represented in the sample. The estimated income equation is

$$LN(\hat{Y}) = \underset{(27.2)}{7.17} + \underset{(2.19)}{0.13A} + \underset{(2.53)}{0.26TED} - \underset{(-1.19)}{0.07NADS}$$

$$+ \underset{(2.26)}{0.59USMIG} - \underset{(-0.32)}{0.08MEXMIG} \qquad (A.3)$$

$R^2 = 0.32$
$N = 61.$

Variables are as defined for equation (A.1). Numbers in parentheses are t-statistics.

Using the discrete form of equation (3), we can easily calculate households' predicted relative deprivation without migration by person j, from $\hat{Y}_0^j$ and the predicted total incomes ($\hat{Y}$s) of all other households in the corresponding village:

$$\hat{RD}_0^j = \sum_{\hat{Y}_0^j}^{\hat{Y}^h} [1-F(x)]\Delta x, \qquad (A.4)$$

where $\hat{Y}^h$ is the highest predicted total household income in the village and, for a given income x_i, $\Delta x_i = x_{i+1} - x_i$.

NOTES

1. Stark and Levhari (1982) suggest theoretical conditions under which migration can represent a risk-reducing strategy for rural households in LDCs. In this case, migration can be an optimal strategy even if expected income as a result of migration is not greater than expected rural income. For additional analysis, see Katz and Stark (1986); for empirical support, see Lucas and Stark (1985) and Rosenzweig and Stark (1989).

2. Borrowing against future earnings expected to arise from present investment in human capital is difficult even in developed countries, although the difficulty is eased somewhat by the availability of physical (nonhuman capital) assets that act as collateral. Such perfection of credit markets, limited as it is, does not typically apply to the poor in LDCs.

3. Note that there need not be a corresponding relation between absence of remittances and reference group substitution. For example, seasonal migrants who return home repeatedly may not need recourse to remittances to have their households of origin partake in the income earned at the destination of migration. Conversely, migrants who do remit may do so even though their village of origin does not constitute (part of) their reference group, as is the case when remittance flows are part of mutually beneficial, risk-sharing, implicit contractual arrangements. See Stark and Lucas (1988).

4. Income contributions from household farm work were imputed on the basis of the number of days worked on the household farm, valued at the prevailing agricultural wage in the village (this wage was substantially below

the minimum agricultural wage in Mexico). Contributions by the owner (or de facto owner in the case of ejidos, or reform-sector lands) of the household farm also include farm profits. These were calculated as the difference between the gross value of farm output, evaluated at the average farm-gate sales price in the case of subsistence farming, and all direct costs plus invisible costs. Direct costs include the cost of all material inputs, hired physical capital inputs (mechanical services, animal services, land), and hired labor inputs. Invisible costs include the cost of imputed wages of unpaid family labor. Contributions also include rental income (land rents and payments received for capital services) and income from livestock (the net additions to animal stocks as well as sales of animals and animal products) received by owners of these capital goods from other households. Income contributions by household members working in handicrafts, wood gathering, fishing, and other household farm activities were calculated in a manner analogous to contributions from farming work. Data on household members who were outside the village at the time of the survey were provided by the remaining household members. This approach could be used because the focus of the survey was on the household and its returns from different labor allocations. Data were not needed on the earnings of household members who migrated or on other details concerning the absent migrants' work away from home.

5. While the use of a household decision framework obviously overlooks any autonomy of individuals in their labor allocations, we believe that to treat each migration decision as independent of a household decision problem would entail far more severe limiting assumptions than does

simplifying the analysis to a household decision problem. As the empirical results presented later in this section demonstrate, socioeconomic characteristics of households play a significant role in addition to characteristics of individual household members in explaining migration behavior. Moreover, economic ties between migrants and their households in the village tend to be very strong here, as in other samples of rural households in LDCs. An illustration of economic ties between migrant and household is given by remittances. For all households in the present sample, migrant remittances account for an average 36.5 percent of total household income; every household that participated in labor migration received remittances; and nearly [illegible] ent of all migrants remitted.

6. The correlat[illegible] [illegible]een absolute income and relative deprivation for the sample is -0.41. This low correlation indicates sharp differences between the income distributions of the two villages.

7. Note that, even if subsistence concerns in poor households are captured by absolute income, we would nevertheless expect RD to lose its positive effect on migr[illegible] on probabilities in these households if relative income objectives are unimportant next to survival objectives. In the present sample, a marginal increase in RD ceases to have a positive effect on migration probabilities in the 14 percent of the sample that constituted the most relatively deprived households.

Table 1: Selected 1982 Household and Individual Characteristics

	Nonmigrants	Internal migrants	Mexico-to-U.S. migrants
Household characteristics			
Adult family size (13 years or older)	7.84	8.47	9.11
Landholdings (in hectares)	4.75	6.48	7.14
Percentage with family contacts (sibling, parent, sibling of parent) with internal migrant destinations	0.71	0.80	0.57
Percentage with family contacts (sibling, parent, sibling of parent) at U.S. destinations	0.50	0.44	0.89
Wealth (total 1982 U.S. dollar value of land, animals, and machinery, in thousands)	2.11	2.47	3.47
Individual characteristics			
Sex (male = 1.0)	0.43	0.49	0.63
Age	33.40	28.48	28.70
Years of schooling completed	3.93	6.50	4.06
Years of internal migration experience	0.32	4.75	0.79
Years of U.S. migration experience	0.76	0.74	4.91
Sample size	273	80	70

Table 2: Definition of Variables
(Time period: 1982)

Decision variable

d = 1 if the individual did not participate in labor migration;
2 if the individual was an internal migrant;
3 if the individual migrated to the United States

Income variables

Y = instrument for total household income without migration by household member j, in thousands (see Appendix)
YSQ = Y squared
RD = instrument for relative deprivation associated with Y, in thousands (see Appendix)
RDSQ = RD squared

Household characteristics

SIZE = household size
LAND = household landholdings (in hectares)
ADULTS = number of adult household members in the village
WEALTH = total value of household's major physical assets (land, animals, and machinery), in thousands
MEXNET = 1 if a close relative (sibling, parent, sibling of parent) of person j was residing outside the village in Mexico at the start of 1982;
0 otherwise
USNET = 1 if a close relative (sibling, parent, sibling of parent) of person j was residing in the United States at the start of 1982;
0 otherwise

Individual characteristics

SEX = 1 if male;
0 if female
AGE = age
AGESQ = age squared
ED = highest level of schooling completed
HEAD = 1 if the individual is a household head;
0 otherwise
MEXEX = years of experience as an internal migrant
USEX = years of experience as a Mexico-to-U.S. migrant

Table 3: Logit Results

Variable	Estimated coefficient: Internal migration	Estimated coefficient: Mexico-to-U.S. migration
INTERCEPT	-10.309**	-16.491**
	(2.81)	(3.77)
SIZE	0.089	0.063
	(0.13)	(0.16)
LAND	0.017	-0.067
	(0.06)	(0.06)
ADULTS	0.130	0.422**
	(0.19)	(0.23)
Y	0.440	2.501*
	(1.36)	(1.90)
YSQ	-0.074	-0.400*
	(0.21)	(0.30)
RD	0.109	0.571**
	(0.21)	(0.28)
RDSQ	0.004	-0.039**
	(0.01)	(0.02)
WEALTH	0.027	0.185
	(0.24)	(0.22)
MEXNET	0.374	-0.021
	(0.52)	(0.55)
USNET	-0.315	1.993**
	(0.56)	(0.79)
SEX	0.186	0.602*
	(0.36)	(0.43)
AGE	0.348**	0.552**
	(0.11)	(0.14)

Table 3 - Continued

Variable	Estimated coefficient: Internal migration	Estimated coefficient: Mexico-to-U.S. migration
AGESQ	-0.006**	-0.009**
	(0.002)	(0.002)
ED	0.266**	-0.129*
	(0.06)	(0.09)
HEAD	0.067	-3.129**
	(0.82)	(1.09)
MEXEX	0.467**	0.144*
	(0.08)	(0.11)
USEX	0.141*	0.487**
	(0.10)	(0.09)

Note: Log-likelihood = -194.22; * indicates significance at below the 0.10 level; ** indicates significance at below the 0.05 level; standard errors appear in parentheses.

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