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A unified model of relative deprivation
and risk-laden migration

By ODED STARK

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Oded Stark

1. INTRODUCTION

In this chapter we integrate two strands of research on migration that hitherto were studied independently. Theory and empirics have it that a sense of relative deprivation can be bothersome enough to induce people to resort to migration. (The earliest conceptualization of this relationship is by Stark, 1984. The earliest empirical validations are by Stark and Taylor, 1989, 1991. Follow-up empirical support is provided by, among others, Quinn, 2006; Stark et al., 2009; Czaika, 2011; Basarir, 2012; Jagger et al., 2012; Vernazza, 2013; Flippen, 2013; and Kafle et al., 2020.) Both

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research and casual observation have shown that migration can be a risky undertaking. More than 50 years ago, the risk of unemployment following migration featured prominently in the modeling of migration (Todaro, 1969). Many studies that followed emphasized that migration is risky (David, 1974; Katz and Stark, 1986; Taylor, 1986; Heitmueller, 2005; and Bryan et al., 2014 are examples of such studies). The received literature did not acknowledge, though, that experiencing relative deprivation at origin not only encourages people to want to leave; it also makes them more willing to accept the risks involved in migration. Moreover, higher relative deprivation at origin is matched by riskier acceptable migration options. Formalizing this link yields a new testable model of migration.

The migration that we consider in this chapter is an individual act. A branch of research on migration and risk has, however, taken a distinct path, viewing migration as a means of risk diversification when the unit of analysis is the family, and when migration is by a family member such that the migrant on the one hand, and the family members who stay behind on the other hand, insure each other. Indeed, at the heart of earlier research on migration and risk, in particular in studies by Stark and Levhari (1982), Stark and Bloom (1985), Katz and Stark (1986), Rosenzweig and Stark (1989), and Stark (1993), lies the perception that the very purpose of migration by a family member is to reduce the risks that family members face. The course taken in this chapter is different in that the unit of analysis is the individual.

The setting is as follows. At origin, the individual experiences relative deprivation when, on comparison with other individuals, he observes that his income is lower than a certain measure of their incomes, let's say their average income. If he migrates, the individual will have to bear the risk of ending up with poor earnings or unemployment. When we model the individual's preferences and motivation, we find that higher relative deprivation experienced at origin is matched by riskier acceptable migration options.

2. AN INTEGRATED MODEL OF RELATIVE DEPRIVATION AND RISK-LADEN MIGRATION

Consider individual i , $i \in \{1, 2, \dots, n\}$, who is a member of a population that consists of n individuals whose incomes are $0 < y_1 < y_2 < \dots < y_n$. The individual derives pleasure from income, and displeasure from relative deprivation. The individual's satisfaction from income is represented by an increasing function $f(y_i)$ defined on $[0, +\infty]$. Being aware of the mean income in his population, \bar{y} , individual i experiences relative deprivation, $RD(y_i, \bar{y})$, if $y_i < \bar{y}$. We measure this relative deprivation by the distance from below the mean income: $RD(y_i, \bar{y}) = \max\{\bar{y} - y_i, 0\}$, as is done, for

example, in Stark (2013) and Stark (2017). The individual's utility depends on income, and on relative deprivation. We thus set the utility function of the individual to take the form

$$U_i(y_i, \bar{y}) = (1 - \alpha_i)f(y_i) - \alpha_i RD(y_i, \bar{y}), \quad (1)$$

so that when the individual experiences relative deprivation, his utility function takes the form

$$U_i(y_i, \bar{y}) = (1 - \alpha_i)f(y_i) - \alpha_i(\bar{y} - y_i), \quad (1')$$

$U_i: [0, \infty) \times [0, \infty) \rightarrow \mathbf{R}$. The coefficients $\alpha_i \in (0, 1)$ and $(1 - \alpha_i) \in (0, 1)$ in (1), are the weights that individual i assigns to his distaste for relative deprivation and to his preference for income, respectively. In using in the utility function weights that add up to 1, the function has the characteristic that a weak taste for absolute wealth is correlated with a strong distaste for low relative wealth (and vice versa).¹ This assumption can be interpreted as assigning 100 percent of weight to the absolute wealth and the relative wealth components, permitting any ratio between these two terms in the preference specification.

The comparison space of the individual, namely the domain in which the individual's relative deprivation is formed, is the population at the individual's location. The individual considers migrating, aware that migration poses a risk. To model this risk, we proceed as follows.

With probability $p \in (0, 1)$, the individual will find work at his destination, in which case his income there will be x_i . With probability $1 - p$, the individual will fail to find work at his destination, in which case his income there will be 0. We thus refer to income at destination as a random variable, X , such that $P(X = x_i) = p$, and $P(X = 0) = 1 - p$.

We denote the mean income at destination by \bar{x} . We assume that \bar{x} is given; the arrival of individual i does not affect that mean income; from the perspective of the destination economy, migration is relatively small. To enable us to highlight the roles played by relative deprivation and risk in the inclination to migrate, we assume as follows.

First, that the individual experiences relative deprivation at origin, namely that $y_i < \bar{y}$.

¹This characterization will hold also if we were to make the weaker assumption that $u(x_i) = af(x_i) - bRD_i(\mathbf{x})$ where $a, b > 0$, and \mathbf{x} is the vector of incomes at destination.

Second, on migrating, the individual is in close social proximity to the native workers whose incomes are higher than his. Observing first-hand the mean income of these workers causes him to feel relative deprivation. Thus, even if the individual finds rewarding employment at his destination, he will be subject there to relative deprivation, namely $x_i < \bar{x}$. The assumptions that the individual experiences relative deprivation both at origin and at destination, namely that $y_i < \bar{y}$ and that $x_i < \bar{x}$, respectively, render it unnecessary to consider migration aimed at replacing relative deprivation at origin with no relative deprivation at destination.

The expected utility of the individual upon migration is

$$\begin{aligned} \mathbf{E}(U_i(X, \bar{x})) &= (1-p)U_i(0, \bar{x}) + pU_i(x_i, \bar{x}) \\ &= -(1-p)\alpha_i\bar{x} + p[(1-\alpha_i)f(x_i) - \alpha_i(\bar{x} - x_i)]. \end{aligned} \quad (2)$$

A feature of our measure of relative deprivation is that migration by individual i does not discourage other individuals to consider migrating because the departure of any individual whose income is lower than the mean income raises the mean income of the remaining individuals.

Setting the direct cost of migration at zero, the individual will seek to migrate if $\mathbf{E}(U_i(X, \bar{x})) > U_i(y_i, \bar{y})$.

We denote the difference between the expected utility if migrating, (2), and the utility at origin, (1'), by $F(y_i, \bar{y}, x_i, p)$, $F: [0, \infty)^3 \times (0, 1) \rightarrow \mathbf{R}$. The function $F(\cdot)$ takes the form

$$\begin{aligned} F(y_i, \bar{y}, x_i, p) &\equiv \mathbf{E}(U_i(X, \bar{x})) - U_i(y_i, \bar{y}) \\ &= (1-\alpha_i)[pf(x_i) - f(y_i)] - \alpha_i(\bar{x} - \bar{y} - px_i + y_i). \end{aligned} \quad (3)$$

Drawing on (3), we ask how the willingness of an individual to engage in risk-laden migration changes when his relative deprivation at origin changes.

Claim 1. Keeping the individual's income at origin constant, a higher relative deprivation at origin is matched by higher willingness to resort to risk-laden migration.

Proof. From (3) it follows that $\frac{\partial F(y_i, \bar{y}, x_i, p)}{\partial \bar{y}} = \alpha_i > 0$: higher relative

deprivation at origin, brought about by higher mean income there, \bar{y} , will, other things remaining unchanged, render risk-laden migration more appealing. Q.E.D.

We next consider a more stringent configuration, asking whether upon an increase in relative deprivation at origin the individual will be indifferent between staying at origin and undertaking a *riskier* risk-laden migration.

We thus consider a setting in which

$$F(y_i, \bar{y}, x_i, p) = 0, \quad (4)$$

namely a setting in which the individual is indifferent between staying at origin and undertaking a risk-laden migration. Keeping \bar{x} and y_i constant, we are interested in signing the relationship $\frac{dp}{d\bar{y}}$, that is, while satisfying (4), we seek to ascertain the impact of relative deprivation (experienced in relation to mean income at origin) on the critical value of the parameter p , bearing in mind that this parameter represents the degree of risk involved in migration.²

Claim 2. Let an individual be indifferent between migrating and staying at origin, namely let $F(y_i, \bar{y}, x_i, p) = 0$. Then, upon an increase in relative deprivation experienced at origin, the individual who previously was indifferent between staying at origin and pursuing risky migration will be indifferent between staying at origin and undertaking *riskier* risk-laden migration.

Proof. Applying the implicit function theorem to $F(y_i, \bar{y}, x_i, p) = 0$, we get

$$\frac{dp}{d\bar{y}} = - \frac{\frac{\partial F(y_i, \bar{y}, x_i, p)}{\partial \bar{y}}}{\frac{\partial F(y_i, \bar{y}, x_i, p)}{\partial p}} = - \frac{\alpha_i}{(1 - \alpha_i)f(x_i) + \alpha_i x_i} < 0. \quad (5)$$

Q.E.D.

The intuition underlying Claim 2 is as follows. To begin with, the individual who experiences relative deprivation as determined by his income at origin, y_i , and by the mean income at origin, \bar{y} , is indifferent

²One simple way of seeing this representation of the parameter p is to write the coefficient of variation $CV(X) = \frac{Std(X)}{E(X)} = \frac{\sqrt{x_i^2(p-p^2)}}{px_i} = \sqrt{\frac{1-p}{p}}$, for which $\frac{\partial CV(X)}{\partial p} = -\frac{1}{2p^2} \sqrt{\frac{p}{1-p}} < 0$.

between staying at origin and migrating. Migration is characterized by risk (finding employment is not certain). When the mean income at origin increases whereas the individual's income at origin remains unchanged, the individual is subject to greater relative deprivation. The level of p which "keeps" him on the indifference curve $F(y_i, \bar{y}, x_i, p) = 0$ then decreases. This is tantamount to an increase in the level of risk in admissible migration. In sum: experiencing higher relative deprivation at origin renders a previously unacceptable risk-laden migration acceptable.

3. CONCLUSION

In research on the causes of migration, a standard approach has been to focus on a given variable and attribute the urge to migrate to the expectation of gain in terms of this variable. An obvious example is wage earnings. In this chapter we depart from the direct link approach, exploring instead a crossover link. Another convention in migration research has been to differentiate between origin-based push causes and destination-based pull causes. In this chapter we deviate from this dichotomy, demonstrating that the line of demarcation between the two can be fuzzy rather than crisp sharp. And as we have seen, a result of these changes is the possibility of placing migration in a rich behavioral vein.

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