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Oded Stark
University of Bonn, University of Warsaw, and IZA

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IZA – Institute of Labor Economics

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

ABSTRACT

Risk-laden Migration as a Response to Relative Deprivation: A Hypothesis

Received migration research has it that higher relative deprivation strengthens the incentive for people to migrate, and that migration is often a risky enterprise. Relative deprivation has been seen as a push factor in migration, and the level of risk involved in migration has been understood to reduce its attraction. Here we show a positive relationship between the level of relative deprivation experienced at origin and willingness to undertake risk-laden migration: we show that higher relative deprivation is matched by riskier acceptable migration options. In expanding the range of acceptable risk-laden migration options, relative deprivation experienced at origin acts also as a pull factor for migration.

JEL Classification: D81, D91, F22, J61

Keywords: social preferences, relative deprivation, risk-laden migration

Corresponding author:
Oded Stark
ZEF, University of Bonn
Genscherallee 3
D-53113 Bonn
Germany

E-mail: ostark@uni-bonn.de

1. Introduction

In this paper we integrate two strands of research that hitherto were studied separately: migration and relative deprivation, and migration and risk.

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, and 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. This body of work establishes that controlling for other variables, people who experience a high level of relative deprivation are more inclined to migrate than comparable people who experience low-level relative deprivation. In a way, this line of work reinforces and deepens the notion that poverty is a trigger for migration; absolute poverty is a cause, but so is relative poverty, conceptualized by relative deprivation.

Relative deprivation can be defined and measured in several ways. A common guiding principle is to relate a person's income (or, for that matter, a person's wealth, consumption, and so on) to the incomes of others in the person's comparison group / reference group. One such measure - we refer to this measure as the base measure - is obtained by aggregating the income excesses experienced by a person, and dividing this sum (normalizing) by the number of people in the group. An equivalent measure - we refer to this measure as the equivalent measure - is obtained by multiplying and dividing the base measure by the number of "richer" persons. Then, the equivalent measure is expressed as the fraction of the wealthier persons multiplied by their mean excess income. For example, if incomes are 1, 2, and 3, and we take the income of a person to also be the person's name, then by the base measure the relative deprivation of person 1 is $(1+2)/3=1$, and by the equivalent measure the relative deprivation of person 1 is $\frac{2}{3}\cdot\frac{1+2}{2}=1$. Another way of measuring relative deprivation is as the distance below the mean income, in which case relative deprivation is the higher of this distance and zero, where the latter holds when a person's income is equal to or is higher than the mean income. In the example with incomes 1, 2, and 3, the mean income is 2, so the relative deprivation of person 1 is $2-1=1$, whereas the relative deprivation of person 2 is zero and so is the relative deprivation of person 3. Because the mean (if it exists and is finite) is the first-order statistic to characterize a distribution, and because people will instinctively

find it natural to calculate the mean as a benchmark against which to measure what they have and how they fare, we use this measure in this paper.[1]

Both 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). This is not to deny that a branch of research on migration and risk has 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), 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 paper is different in that the unit of analysis is an individual.

A simple way of modeling the risk that a migrating person faces is to postulate that with probability $0 < p < 1$ the person will find work at his destination, in which case his income there will be some $x_i > 0$, and that with probability $1 - p$ the person will fail to find work at his destination, in which case his income there will be nil. What is important for the purpose of this paper is to acknowledge that landing remunerative employment upon migration is subject to uncertainty rather than to study the range of reasons for that occurrence.

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

[1] Detailed derivations of indices of relative deprivation and attributes of these indices are provided, among others, in Stark (2013), and in Stark et al. (2017).

2. An integrated model of relative deprivation and risk-laden migration

Consider person i, $i \in \{1,2,...,n\}$, who is a member of a population that consists of n persons whose incomes are $0 < y_1 < y_2 < \ldots < y_n$. Person i derives pleasure from income, and displeasure from relative deprivation. The person'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, $\overline{y}$, person i experiences relative deprivation, $RD(y_i,\overline{y})$, if $y_i < \overline{y}$. As already stated in the preceding section, in this paper we measure this relative deprivation by the distance from below the mean income: $RD(y_i,\overline{y}) = \max\{\overline{y} - y_i, 0\}$, as is done, for example, in Stark (2013) and Stark (2017). The person's utility depends on income, and on relative deprivation. We thus set the utility function of person i to take the form

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

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

$$U_i(y_i,\overline{y}) = (1-\alpha_i) f(y_i) - \alpha_i(\overline{y} - y_i). \tag{1'}$$

The coefficients $\alpha_i \in (0,1)$ and $(1-\alpha_i) \in (0,1)$ in (1), are the weights that person 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).[2] 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 person i, namely the domain in which person i's relative deprivation is formed, is the population at the person's location. Person i considers migrating, aware that migration poses a risk. As already introduced, to model this risk we proceed as follows.

With probability $p \in (0,1)$, person i will find work at his destination, in which case his income there will be x_i. With probability $1-p$, person i will fail to find work at his

[2] This 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.

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 $\overline{x}$. We assume that $\overline{x}$ is given; the arrival of person *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 person *i* experiences relative deprivation at origin, namely that $y_i < \overline{y}$.

Second, on migrating, person *i* 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 person *i* finds rewarding employment at his destination, he will be subject there to relative deprivation, namely $x_i < \overline{x}$. The assumptions that person *i* experiences relative deprivation both at origin and at destination, namely that $y_i < \overline{y}$ and that $x_i < \overline{x}$, respectively, render it unnecessary to consider migration aimed at replacing relative deprivation at origin with no relative deprivation at destination. Had we taken such an alternative route, then that would have brought us to the relative deprivation - relative deprivation domain, which is not where we want to be in this paper. We hasten to add that exposure to relative deprivation at destination may not necessarily be exogenous; for example, migrants can take steps that limit this exposure even when doing so comes at a price. Fan and Stark (2007) present a model where, to an extent, the reference groups of migrants are chosen endogenously. The core idea is that migrants use the intensity of their assimilation as a means of limiting their exposure to comparisons with the native population which brings in its wake relative deprivation: the less effort a migrant exerts in assimilating into the mainstream culture, the closer he is in social space to his fellow migrants, and the farther away he is from the natives. Put somewhat differently, when interpersonal comparisons affect migrants' wellbeing and when a less intensive assimilation results in migrants' comparing themselves more to fellow migrants and less to the richer natives, then the effort exerted to assimilate is muted, and relative deprivation is lowered. In Section 3 we revisit the issue of relative deprivation experienced at destination, showing that the result obtained in this section holds true under alternative configurations of the experience of relative deprivation.

The expected utility of person *i* upon migration is

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

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

Setting the direct cost of migration at zero, person *i* will seek to migrate if $\mathbf{E}\left(U_i(X,\overline{x})\right) > U_i(y_i,\overline{y})$.

We denote the difference between the expected utility if migrating, (2), and the utility at origin, (1'), by $F(y_i,\overline{y},x_i,p)$. The function $F(\cdot)$ takes the form

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

Drawing on (3), we ask whether upon an increase in relative deprivation at origin person *i* will be indifferent between staying at origin and undertaking a *riskier* risk-laden migration.

We thus consider a setting in which

$$F(y_i,\overline{y},x_i,p) = 0, \tag{4}$$

namely a setting in which, to begin with, person *i* is indifferent between staying at origin and undertaking a risk-laden migration. Keeping $\overline{x}$ and y_i constant, we are interested in signing the relationship $\frac{dp}{d\overline{y}}$, 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.

Claim 1. Let person *i* be indifferent between migrating and staying at origin, namely let $F(y_i,\overline{y},x_i,p) = 0$. Then, upon an increase in relative deprivation experienced at origin, person *i* 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 $F(y_i, \overline{y}, x_i, p) = 0$, we get

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

Q.E.D.

The intuition underlying Claim 1 is as follows. To begin with, person *i* who experiences relative deprivation as determined by his income at origin, y_i, and by the mean income at origin, $\overline{y}$, is indifferent between staying at origin and migrating. Migration is characterized by risk (finding employment is not certain). When the mean income at origin increases whereas person *i*'s income at origin remains unchanged, person *i* is subject to greater relative deprivation. The level of *p* which keeps him on the indifference curve $F(y_i, \overline{y}, x_i, p) = 0$ 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. Measures of robustness

The results reported in Section 2 are not contingent on the assumptions that person *i* experiences relative deprivation whether employed or unemployed at destination, and that person *i*'s utility function depends linearly on relative deprivation. In the two subsections that follow we investigate how relaxing these assumptions affects Claim 1.

3.1 At destination person *i* experiences relative deprivation only when unemployed

The results reported in Claim 1 will hold also if $x_i \geq \overline{x}$, namely if at destination person *i* experiences relative deprivation only when unemployed. This constellation can be supported by the argument that, whereas successful integration into the labor market at destination could result in obtaining roughly the mean income there, failure to find work means no earnings combined with the frustration of observing the incomes of native workers and of employed fellow migrants. In this case, the expected utility of person *i* upon migration is

$$\mathbf{E}\left(U_i(X,\overline{x})\right) = -(1-p)\alpha_i\overline{x} + p(1-\alpha_i)f(x_i)\,, \tag{6}$$

and then, using (1') and (6), an expression equivalent to (3) of the difference between the expected utility upon migration and the utility at origin is

$$\begin{aligned} F(y_i,\overline{y},x_i,p) &= \mathbf{E}\left(U_i(X,\overline{x})\right) - U_i(y_i,\overline{y}) \\ &= (1-\alpha_i)\left(pf(x_i) - f(y_i)\right) - \alpha_i[(1-p)\overline{x} - \overline{y}] - \alpha_i y_i. \end{aligned} \tag{7}$$

Analogously to the proof of Claim 1, we can apply the implicit function theorem to (7) in order to calculate the derivative $\frac{dp}{d\overline{y}}$:

$$\frac{dp}{d\overline{y}} = -\frac{\frac{\partial F(y_i,\overline{y},x_i,p)}{\partial \overline{y}}}{\frac{\partial F(y_i,\overline{y},x_i,p)}{\partial p}} = -\frac{\alpha_i}{(1-\alpha_i)f(x_i) + \alpha_i\overline{x}} < 0\,. \tag{8}$$

As in Claim 1, a higher relative deprivation experienced at origin is matched by riskier acceptable migration options.

We conclude that even if relative deprivation at destination is experienced only with some degree of probability (namely only in the event of failing to secure rewarding employment), the person's migration-related risk-taking perceptions will still be conditioned by his relative deprivation at origin.

3.2 In the utility representation, relative deprivation is entered non-linearly

The result reported in Claim 1 will hold if in the utility representation, relative deprivation will be entered non-linearly, namely if instead of (1') we will have that

$$U_i(y_i,\overline{y}) = (1-\alpha_i)f(y_i) - \alpha_i(\overline{y} - y_i)^{\gamma}\,, \tag{9}$$

and instead of (2) we will have that

$$\mathbf{E}\left(U_i(X,\overline{x})\right) = -(1-p)\alpha_i\overline{x}^{\gamma} + p\left[(1-\alpha_i)f(x_i) - \alpha_i(\overline{x} - x_i)^{\gamma}\right] \tag{10}$$

for any $\gamma \geq 1$.[3] Then, instead of the function $F(\cdot)$ in (3), we will have the function

[3] We can thus think of (1') and of (2), respectively, as a special case of (9) and (10) where $\gamma = 1$.

$$F(y_i,\overline{y},x_i,p)=\mathbf{E}\left(U_i(X,\overline{x})\right)-U_i(y_i,\overline{y})$$
$$=(1-\alpha_i)\left(pf(x_i)-f(y_i)\right)-\alpha_i\left((1-p)\overline{x}^{\gamma}+p\left(\overline{x}-x_i\right)^{\gamma}-(\overline{y}-y_i)^{\gamma}\right) \quad (11)$$

Analogously to the protocol followed in the proof of Claim 1, we can apply the implicit function theorem to (11) in order to obtain the derivative $\frac{dp}{d\overline{y}}$:

$$\frac{dp}{d\overline{y}}=-\frac{\frac{\partial F(y_i,\overline{y},x_i,p)}{\partial\overline{y}}}{\frac{\partial F(y_i,\overline{y},x_i,p)}{\partial p}}=-\frac{\alpha_i\gamma(\overline{y}-y_i)^{\gamma-1}}{(1-\alpha_i)f(x_i)+\alpha_i\left(\overline{x}^{\gamma}-\left(\overline{x}-x_i\right)^{\gamma}\right)}<0. \quad (12)$$

3.3 An alternative way of expressing relative deprivation

We first present formally the base measure of relative deprivation. We develop the measure and we then show that use of the resulting measure will yield the same results that were obtained when we used the distance below the mean measure.

Let the constellation of the incomes of a population of n persons be given by $y_1<y_2<\ldots<y_n$. We express the distress that arises from falling behind others in the income hierarchy by means of the following measure of relative deprivation, where RD_i denotes the relative deprivation of person i:

$$RD_i\equiv\frac{1}{n}\sum_{k=i+1}^{n}\left(y_k-y_i\right) \text{ for } i=1,\ 2,\ \ldots,\ n-1$$

$$RD_n\equiv 0.$$

A rationale for, background of, and applications for this measure are provided in Stark (2013).

The relative deprivation index can be rewritten in a slightly different form. Multiplying and dividing the index by $n-i$, we obtain:

$$RD_i=\frac{n-i}{n}\left[\frac{1}{n-i}\sum_{k=i+1}^{n}(y_k-y_i)\right]=(n-i)\frac{1}{n}\left(\frac{\sum_{k=i+1}^{n}y_k}{n-i}-y_i\right)=(n-i)\left[\frac{1}{n}\left(\tilde{y}_i-y_i\right)\right],$$

where $\tilde{y}_i\equiv\frac{1}{n-i}\sum_{k=i+1}^{n}y_k$ is the average income of persons whose incomes are higher than the income of person i (these are the persons who are positioned to the right of person i, namely

higher up, in the income distribution). We can think of $(n-i)\left[\frac{1}{n}(\tilde{y}_i - y_i)\right]$ as a novel way of measuring RD_i, viewing it as the product of a pure rank impact term $(n-i)$ and a cardinal impact term $\frac{1}{n}(\tilde{y}_i - y_i)$. The term $n-i$ expresses the rank distance of person *i* from the top rank, where "distance" is measured by the number of ranks higher up. Seen this way, the standard cardinal measure of relative deprivation has a pure rank preferences component embedded in it, and a cardinal preferences component. This is revealing in the sense that the distress from trailing behind others can be decomposed into the distress from occupying a rank other than the top rank, measured by $n-i$, and the distress arising from a positive magnitude of the income differences between the higher incomes of others and one's own income.

In the model of Section 2 we can replace an increase in the average income at origin, $\overline{y}$, with an increase in the average income of the persons whose incomes are higher than the income of person *i*, $\tilde{y}_i$. Because the modeled increase of relative deprivation at origin is marginal, the rank $n-i$ is not affected; the increase in relative deprivation arises because $\tilde{y}_i$ becomes higher. Thus, the results reported in Section 2 and in the preceding two subsections of Section 3 will continue to hold if $\overline{y}$ were to be replaced by $\tilde{y}_i$.

4. Conclusions

What we showed in this paper does not follow from simple intuition. We might think that when an individual experiences greater relative deprivation, he will seek to compensate for that by subjecting himself to a migration project that is less risky. We showed otherwise: movement along an indifference curve (equations (5), (8), and (12)) bundles greater relative deprivation with willingness to accept a riskier risk-laden migration.

As is standard in the exposition of any new model, concentration on a core link can come at the expense of omitting related variables, in this case the cost of migration. However, in the model presented in this paper adding this cost will have no bearing on the postulated link: although equation (3) will then need to be modified so that the expected utility from migration will be lowered by the cost of migration, represented, say, by some parameter

$c > 0$, in formulating (8) nothing will change because upon the consequent differentiation, c will be washed out.

The systematic and predictable manner in which the level of risk in admissible migration options relates to the level of relative deprivation experienced at origin deserves empirical attention. In migration research, the distance covered in migration is often taken as a measure of the level of risk in migration, such that a longer distance represents a greater risk. The result reported in the preceding sections suggests that as a consequence of higher relative deprivation at origin, migration farther afield will be observed to occur more commonly. In the development economics literature, there is interest in understanding why there are occasions in which some persons in a given source area resort to internal migration while others resort to international migration, as well as in finding out which characteristics account for the variation in the choice of the type of migration destination.[4] Suppose that international migration is considered to be riskier than internal migration, and suppose that relative deprivation increases throughout the origin population. Then, the line of demarcation between the subset of persons who resort to international migration and the subset of persons who resort to internal migration will shift such that more persons will be included in the first subset, fewer in the second.

[4] Early writings on this duality include Stark (1978), and Stark and Taylor (1991).

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