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## On the Economics of Others

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a little more than  $1/3$  to the payoff of the other player, the (3, 3) outcome will be reached (Stark 1989; Bergstrom, Stark 1993).

Altruism is not only a catalyst for transforming single-shot games, it also cements long-term implicit contracts. A family in a village in a poor country subsidizes the migration of a family member, trusting him or her to share, in due course, his or her earnings from work in faraway lands, with this trust premised on the migrant family member being altruistic toward his or her family (Lucas, Stark 1985; Stark, Lucas 1988; Lauby, Stark 1988; Stark 2009).

The altruism of a migrant toward the family left behind can also explain what otherwise might be expected to be the opposite. There is a widely held perception that strong ties with the country of origin, in particular with the family left behind, hinder assimilation, and that weak links are conducive to assimilation. But if a migrant derives utility from his or her family having more income, if remittances bring about this increase, and if it is necessary to assimilate in order to secure a higher income and thus be able to remit, then we can see how altruism – caring about the wellbeing of the family that stays behind – encourages assimilation; indeed, we can even anticipate that the stronger the altruism, the higher the optimal effort to assimilate (Stark, Dorn 2013).

But before we get too excited about the benefits of altruism, we also need to be mindful of drawbacks. In a way, my altruism toward you could be interpreted by you as a form of insurance and, as we all know, being insured can reduce effort. Or, in another context, my altruism toward you could render a threat of mine to punish any bad conduct by you not credible; after all, executing the punishment will hurt me because your pain from being punished translates or converts into my pain (Bernheim, Stark 1988; Stark 1993; Stark 1995).

Altruism may not also be the real reason for behavior that is seemingly motivated by altruism. Suppose that you have a dollar to give, and that there are two potential recipients: one who is poor, another who is poorer. An altruism-based prediction is that you will give the dollar to the poorer. But the opposite need not be true; namely, being observed to give the dollar to the poorer does not attest to you being altruistic; you can so donate because of “the transfer value of gratitude:” the poorer will appreciate the dollar more than will the poor and, correspondingly, his disposition to reciprocate and his intensity of gratitude will be greater. Thus, a dollar given to the poorer will “buy” you more gratitude than a dollar given to the poor. If you value this response of the recipient, you will give the dollar to the poorer, but not for any altruistic reasons (Stark, Falk 1998).

We mentioned at the outset that altruism and dissatisfaction at having less than others could interact. Consider a parent with two children who differ in their economic success. The parent contemplates possible bequests. A standard, altruism-based prediction is that more will be earmarked to the economically less successful child. But an insightful parent may think twice: ordinarily, children grow up together for a good many years, are regularly compared, are usually urged to follow (or not to follow) the example of other children in the family, and so on. Hence, in general, children constitute a natural reference group, and they tend to engage in intra-group comparisons. When one child receives a larger inheritance than the other child, the latter will experience relative deprivation; an altruistic parent may not want to cause that, in which case he will divide the bequest equally, thereby avoid engendering any sense of relative deprivation (Stark, Zhang 2002).

Now that we have alluded to this latter concept, let us run with it a little. A comparison with others, when the others fare better, is a source of dissatisfaction or stress, and it is quite natural to expect people to respond to this feeling.

Take the case of migration. A widely held perception in writings on migration is that migration takes place only if there is a wage or an earnings differential. But assume that people are averse to relative deprivation. So, let there be two regions, let the cost of moving between the two regions be nil, let the two regions be identical to each other in all relevant respects, and let the individuals' incomes be constant. This last assumption means that when an individual migrates, he takes along his income (as if he was born with that income, so to speak). The region in which an individual is, constitutes the individual's exclusive comparison group. Individuals prefer to be in the region where their relative deprivation is lower. When there is a tie, individuals stay where they are. Suppose then that there are three individuals with incomes 9.1, 9, and 2 who, to begin with, are all in region A. Now empty region B comes into being or becomes accessible. Then, individual 9.1 (the income of an individual is his name) will stay in region A because he has nothing to gain from moving to region B, but 9 and 2 will move to region B; 9 will get rid of his relative deprivation, and 2 will experience less relative deprivation when with 9 in B than with 9.1 in A. So, 2/3 of the population migrates, even though, in terms of wage or earnings, no one gains as a consequence of moving.

This simple, steady-state outcome, reached after just one period, is, of course, not the only possibility. Suppose that there are four individuals with incomes 9.1, 9, 8, and 2, and that once again, to begin with, all the individuals are in region A. Now region B comes into being. Individuals 9, 8, and 2 see the attraction of moving there, and they all do. But imagine that the extent of relative deprivation is quantified in the following manner: it is the product of the fraction of those who earn more, and of their mean excess earnings. Then, when

2 is with 8 and 9,  $\frac{2}{3}$  are high earners, with a mean excess income of  $\frac{(9 - 2) + (8 - 2)}{2}$

$= \frac{13}{2}$ , and thus his relative deprivation will be  $\frac{2}{3} \cdot \frac{13}{2} = 4\frac{1}{3}$ , whereas if 2 were to return

to A, his relative deprivation will be  $\frac{1}{2}(9.1 - 2) = \frac{7.1}{2} = 3.55$ , which is less than  $4\frac{1}{3}$ ;

hence, moving to A is what indeed he will do. But then, when 2 is back in A, 8 will want to be in A too because even though he will have a little greater distance there from the top earner 9.1 than from the top earner 9 in B, the fraction of those who earn more than he will be  $\frac{1}{3}$ , not  $\frac{1}{2}$ . But once 8 is in A, 2 will prefer to be in B with 9 rather than in A with

9.1 and 8, so he will move to B, and the process repeats itself ad infinitum; a steady state will not obtain. The elegance of this example (where 8 will always want to be where 2 is) emanates from the fact that the behavior of 8 arises not from reaping joy from having 2 to look down at, but rather from the presence of 2 reducing the agony from looking up at 9 or at 9.1 (Stark, Wang 2005).

The "marriage" of migration with relative deprivation does not end with the preceding constellation. We already mentioned assimilation. But we can say more. Imagine that in a country of destination there are two migrants who are clustered together and earn 2 each, and that there is a native who earns 7. By virtue of being close to each other, the two migrants compare themselves to each other, which yields no relative deprivation. Suppose that one of the two migrants considers assimilating, namely exerting an effort to learn the language, culture, and the native way of doing things, such that his earnings will rise to 3 (4 net of the cost of assimilation of 1), while at the same time, his comparison group will change as well, namely become that of himself and the native; moving along the assimi-

lation road is moving in social space. Then, upon assimilation, his new “package” will be income 3 with a relative deprivation of  $\frac{1}{2} \cdot (7 - 3) = 2$ . Suppose that the migrant attaches a positive weight to income, and a negative weight to relative deprivation. Then, if the latter weight is high enough, the value of his assimilation “package” will be lower than the value of his earnings cum zero relative deprivation when not assimilating. Even though assimilation confers an income gain, it will be rejected as an option because it comes along with a relative deprivation pain, and the gain may not be sufficient to compensate for the pain (Stark, Fan 2007).

Behavioral responses to the sensing of relative deprivation can prompt us to question even some of the most cherished beliefs about income inequality and social welfare. A widely used measure of income inequality is the Gini index (Gini 1912). Once again, consider a population of two individuals whose different incomes  $x_1$  and  $x_2$  are such that  $x_2 > x_1$ . It is easy to see that in this case, the Gini index,  $G(x_1, x_2)$  is:

$$G(x_1, x_2) = \frac{x_2 - x_1}{2(x_2 + x_1)}.$$

In words, the Gini index is equal to relative deprivation divided by total income. For a century now, following in the steps of Pigou (1912) and Dalton (1920), it has been maintained that a rank-preserving transfer from a richer individual to a poorer individual – in our case, a rank-preserving transfer from individual 2 to individual 1 – will reduce inequality. It is not an exaggeration to say that the Pigou-Dalton transfer principle is a cornerstone of inequality measurement theory, and that the Gini index is the most widely used measure of inequality. Yet the principle may not hold if the individuals adjust their behavior in response to the transfer. Consider the following reasoning. The poorer individual seeks income for two reasons: to obtain income “for its own sake,” and to obtain income in order to hold at bay relative deprivation. When income is taken away from the richer individual, the relative deprivation sensed by the poorer is reduced, and his incentive to work in order to maintain a “bearable level” of relative deprivation is correspondingly weakened. Add to this the additional reduction in the relative deprivation of the poorer from receiving that very income that is taken away from the richer. As to the richer individual, it is reasonable to assume that he will adjust his working time (effort) such that he will not be subjected to as great a reduction in income as has been taken away from him, yet that this adjustment will fall short of neutralizing the (negative) transfer. When between them the two individuals end up working less than before, the sum of their incomes (the denominator of the Gini coefficient) will be smaller than the corresponding pre-transfer value. If the reduction in total income in the denominator is greater than the reduction in relative deprivation in the numerator, or if the reduction in total income in the denominator coincides with the numerator remaining constant, the ratio between the numerator and the denominator will rise, not fall, and income inequality, as measured by the Gini coefficient, will increase (Sorger, Stark 2013).

Finally, it will be telling to take a look at a fascinating conjunction of social welfare maximization and relative deprivation.

Suppose, once again, that we have two individuals whose incomes are  $x_1$  and  $x_2$ , and whose utility functions are  $u_1(x_1) = \alpha_1 x_1$  and  $u_2(x_2) = \alpha_2 x_2$ , where  $0 < \alpha_1, \alpha_2 < 1$  are constants. To ease reference, we will assume that total income is normalized as one, namely that  $x_1 + x_2 = 1$ . We are interested in finding out how social planners will go about interfering with the prevailing income distribution so as to bring social welfare to a maximum. Clearly, such interference, if any, depends on the preferences of the social

planner and on the social welfare function. We will look at three social planners: a utilitarian social planner, a Bernoulli-Nash social planner, and an egalitarian social planner. The utilitarian social planner seeks to maximize the sum of the individuals' utilities; the Bernoulli-Nash social planner seeks to maximize the product of the individuals' utilities; and the egalitarian social planner wants to equalize incomes.

We look first at the protocol of the Bernoulli-Nash social planner:

$$\text{Max}(\alpha_1 x_1 \cdot \alpha_2 x_2) = \alpha_1 \alpha_2 \text{Max}(x_1 \cdot x_2) = \alpha_1 \alpha_2 \text{Max}[x_1(1 - x_1)] = \alpha_1 \alpha_2 \text{Max}(x_1 - x_1^2).$$

Because  $\frac{d(x_1 - x_1^2)}{dx_1} = 1 - 2x_1$ , then, from the first order condition of a maximum, namely from  $\alpha_1 \alpha_2 (1 - 2x_1) = 0$ , we get that  $x_1^* = \frac{1}{2}$ ; the Bernoulli-Nash social planner will divide incomes equally; this will be welcomed by the egalitarian social planner.

We next walk into the shoes of the utilitarian social planner. His protocol is:

$$\text{Max}(\alpha_1 x_1 + \alpha_2 x_2) \text{ subject to the constraint that } x_1 + x_2 = 1.$$

As long as  $\alpha_1 \neq \alpha_2$ , this social planner will give all the income to the individual whose  $\alpha_i, i = 1, 2$  is higher. And even if  $\alpha_1 = \alpha_2$ , then any distribution will be optimal. One of numerous such distributions will be equal incomes; but being one of very many, the likelihood of it occurring is essentially zero. So, here, the utilitarian social planner and the egalitarian social planner will not see eye to eye at all; they will be in conflict.

Really? What if the individuals care not only about their income but also about their relative deprivation? Quite remarkably, if the utilitarian social planner will only acknowledge this preference, then the utilitarian and the egalitarian social planners will be in perfect harmony; disagreement will vanish altogether, congruence will replace conflict.

Here is why.

Let the individuals' utility functions be  $u_i(x_1, x_2) = \alpha_i x_i - (1 - \alpha_i)RD_i$ . Because we have two individuals, then when incomes are not equal, only one individual can be relatively deprived. Without loss of generality, let this individual be individual 1, which is equivalent

to stating that  $x_1 \leq \frac{1}{2}$ . (The case in which individual 2 is relatively deprived, namely the case of  $x_2 \leq \frac{1}{2}$ , is symmetrical). This consideration implies the following utility functions:

For individual 1

$$u_1(x_1, x_2) = \alpha_1 x_1 - (1 - \alpha_1) \frac{1}{2} (x_2 - x_1)$$

or, because  $x_1 + x_2 = 1$ ,

$$u_1(x_1, x_2) = \alpha_1 x_1 - (1 - \alpha_1) \left( \frac{1}{2} - x_1 \right),$$

and for individual 2

$$u_2(x_2) = \alpha_2 x_2.$$

The marginal utility of individual 1 is then

$$\frac{\partial u_1(x_1, x_2)}{\partial x_1} = \alpha_1 - (1 - \alpha_1)(-1) = \alpha_1 + (1 - \alpha_1) = 1$$

and the marginal utility of individual 2 is then

$$\frac{\partial u_2(x_2)}{\partial x_2} = \alpha_2.$$

Because  $1 > \alpha_2$ , the utilitarian social planner will transfer income from individual 2 to individual 1 and will do so until he hits the constraint or, in other words, until he transfers as much as is allowed by the constraint  $x_1 \leq \frac{1}{2}$ ; namely, he will optimally set  $x_1^* = \frac{1}{2}$ : incomes are equalized, exactly as the egalitarian social planner wants to have it (Stark, Kobus, Jakubek 2012).

So we have seen how recognition that relative deprivation matters can reconcile opposing views, and settle disputes. We have seen that the alignment of the stance of the utilitarian social planner with that of the egalitarian social planner does not come about because the former exhibits any altruism toward the latter. Indeed, it is instructive to have in place an example as to how recognition of the distaste for relative deprivation can pacify opponents, just as altruism can.

In sum: there are many domains in which the incorporation of altruism and relative deprivation can point to novel perspectives and suggest rethinking, and possibly revising, long-held views. And, as we have seen, there are domains in which consideration of relative deprivation can substitute for the prevalence of altruism, and vice versa. Here is a fascinating sphere indeed for research on economics and social behavior.

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