Can altruism lead to a willingness to take risks?

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ABSTRACT

I study attitudes towards risk taking in cases where a person relates to others positively, namely altruistically. This study is needed because it is unclear how altruism influences the inclination of an altruistic person to take risks. Will this person's risk-taking behavior differ if the utility of another person does not enter his utility function? Does being altruistic cause a person to become more reluctant to take risks because a risky undertaking turning sour will also damage his ability to make altruistic transfers? Or does altruism induce a person to resort to risky behavior because the reward for a successful outcome is amplified by the outcome facilitating a bigger transfer to the beneficiary of the altruistic act? Specifically, holding constant other variables, I ask: is an altruistic person more risk averse or less risk averse than a comparable person who is not altruistic? In response to this question, using a simple model in which preferences are represented by a logarithmic utility function, I show that an altruistic person who is an active donor (benefactor) is less risk averse than a comparable person who is not altruistic: altruism is a cause of greater willingness to take risks. The finding that the altruism trait causes greater willingness to take risks has not previously been noted in the existing literature.

1. Introduction

It is a core tenet of research in sociology that to a large extent the wellbeing of a person is governed by interpersonal relations and social ties. This is quite different from a perspective in economics according to which a "pure" core concept is the anonymous marketplace, value is measured by prices, the identities of the people who are involved in an exchange do not matter, and transactions are not governed by interpersonal relations. Sociologists, and in particular social psychologists, have long recognized that the value that a person attaches to the level of his wealth (income, consumption) is influenced by the levels of wealth of other individuals with whom the person naturally compares himself (the person's reference group). A simple formal way of incorporating this perspective is to expand the utility of the reference person into an additively separable function, where the added social ties component is accorded a weight that reflects its importance.

In recent work, a setting was studied in which the social ties component enters the function negatively: low relative wealth, low rank, and low status affect wellbeing adversely. In particular, in Stark (2020) the interest was in identifying the attitude of people towards risk taking under the assumption that risk-taking behavior is conditioned by social preferences. To account for this, relative wealth was incorporated as a variable: a person's own wealth matters, but so does a comparison of a person's wealth to the wealth of others who are positioned higher up in the wealth distribution. In the formation of risk-taking preferences, relating to others counts. I studied the relative risk aversion of a person whose wellbeing is influenced by his relative wealth, and by how concerned he is about having low relative wealth. Holding constant the person's absolute wealth, two results were obtained. First, if the person's level of concern about low relative wealth does not change, the person becomes more risk averse when he rises in the wealth hierarchy. Second, if the person's level of concern about low relative wealth increases when he rises in the wealth hierarchy and if this intensification is strong enough, then the person becomes less risk averse: the person's desire to advance further in the wealth hierarchy is more important to him than the possibility of missing out on a higher rank.

Thus, I connected economics with sociology, linking an interest in economics in characterizing individuals' attitudes towards risk taking with a perspective in sociology of relating the attributes of individuals to the nature of their social links with other individuals. Missing from that inquiry was a study of the attitude towards risk taking in cases in which a person relates to others *positively*, namely altruistically. This theme is taken up in the current paper.

The need to conduct an inquiry, and for that matter a formal inquiry, into how preferences that are altruistic influence attitudes towards risk taking arises not merely because altruism is common and plays an important role in the affairs of individuals, families, and groups of various types, but also because it is unclear how altruism influences the inclination of an altruistic person to take risks. Will this person's risk-taking behavior differ if the utility of another person does not enter his utility function? Does being altruistic *cause* a person to become more reluctant to take risks because a risky undertaking turning sour will also damage his ability to make altruistic transfers? Or does altruism induce a person to resort to risky behavior because the reward for a successful outcome is amplified by the outcome facilitating a bigger transfer to the beneficiary of the altruistic act? Specifically, holding constant other variables, I ask: is an altruistic person more risk averse or less risk averse than a comparable person who is not altruistic?[1] In response to this question, using a simple model in which preferences are represented by a logarithmic utility function, I show that an altruistic person who is an active

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[1] To the best of my knowledge, texts on altruism spanning from the collection of studies in Phelps (1975) to Bourlès et al. (2021) did not address this question. When altruism and risk-taking behavior were linked, the context was the perception of the recipients of the altruistic transfers that altruism provides them with a form of insurance.

donor (benefactor) is less risk averse than a comparable person who is not altruistic: altruism is a cause of greater willingness to take risks.

Somewhat surprisingly, while they were interested in the sources, evolution, and expressions of altruism, and while they were aware of the importance and roles of altruism in human affairs, sociologists did not attend to the way in which the trait of altruism shapes or conditions the trait of risk aversion. A review of sociological writings on altruism takes us back more than 30 years to a study in which exposure to risk was referred to as a repercussion of altruistic donations of a kidney and bone-marrow (Simmons, 1991). Interestingly, because the risk to a kidney donor is greater than the risk to a bone-marrow donor, it would appear that holding all else constant, the critical level of the intensity of altruism of a kidney donor is higher than the critical level of the intensity of altruism of a bone-marrow donor. However, that the risk taking involved in such altruistic acts is an *inherent derivative* of the altruism trait itself was neither acknowledged nor demonstrated.

2. Characterizing the relative risk aversion of an altruistic person

Suppose that altruistic person i derives utility from his wealth $w_i > 0$, and from the utility of person j. By $\alpha_i \in (0, 1)$ I denote the intensity of person i's altruism. The complementary weight, $(1 - \alpha_i)$, is accorded to the utility that person i obtains from his own wealth. Person i can transfer t_i part of his wealth to person j, such that $0 \leq t_i < w_i$. By $w_j > 0$ I denote the pre-transfer wealth of person j. Following Bernheim & Stark (1988) and Stark (1999a), I let the utility function of altruistic person i take the form

$$u_i(w_i, w_j, t_i, \alpha_i) = (1 - \alpha_i) \ln(w_i - t_i) + \alpha_i \ln(w_j + t_i), \tag{1}$$

where $\ln(w_i - t_i)$ is the utility of person i from his net wealth, and $\ln(w_j + t_i)$ is the utility of person j from his net wealth. Altruistic person i will transfer part of his wealth to person j as long as doing so will increase person i's utility. The optimal level of person i's utility is given by

$$u_i^*(w_i, w_j, \alpha_i) \equiv \max_{t_i \in [0, w_i)} u_i(w_i, w_j, t_i, \alpha_i).$$

The utility function of person k who is not altruistic (na), namely of a person for whom $\alpha_k = 0$, is $u_k^{na}(w_k) \equiv u_k(w_k, w_j, 0, 0) = \ln w_k$.

As a first step, I determine the optimal level of the transfer t_i. The derivative of $u_i(w_i, w_j, t_i, \alpha_i)$ in (1) with respect to t_i is

$$\frac{\partial u_i(w_i, w_j, t_i, \alpha_i)}{\partial t_i} = -\frac{1 - \alpha_i}{w_i - t_i} + \frac{\alpha_i}{w_j + t_i}.$$

From this derivative it follows that $\dfrac{\partial u_i(w_i, w_j, t_i, \alpha_i)}{\partial t_i} = 0$ for $t_i = \bar{t}_i$, where

$\bar{t}_i = \alpha_i w_i - (1 - \alpha_i)w_j$. As $\dfrac{\partial^2 u(w_i, w_j, t_i, \alpha_i)}{\partial t_i^2} = -\dfrac{1 - \alpha_i}{(w_i - t_i)^2} - \dfrac{\alpha_i}{(w_j + t_i)^2} < 0$,

the second order condition for a maximum of $u_i(w_i, w_j, t_i, \alpha_i)$ with respect to t_i holds.

Two observations can now be made. First, the assumption that it is not the case that the entire wealth of person i is transferred ($t_i < w_i$) is satisfied by $\bar{t}_i$ because $\bar{t}_i = \alpha_i w_i - (1 - \alpha_i)w_j < \alpha_i w_i < w_i$. Second, $\bar{t}_i > 0$ if $\alpha_i > \dfrac{w_j}{w_i + w_j} \equiv \bar{\alpha}_i$: for a transfer to be made, the intensity of altruism has to be higher than some critical level. In combination, these two observations inform us that if the intensity of altruism is higher than $\bar{\alpha}_i$, then a transfer is made of an amount that is smaller than the entire wealth of person i.

Thus, t_i^*, the optimal transfer that person i chooses to make to person j, where this transfer is treated as a function of α_i, is

$$t_i^*(\alpha_i) = \begin{cases} \alpha_i w_i - (1 - \alpha_i)w_j & \text{if } \alpha_i > \frac{w_j}{w_i + w_j} \\ 0 & \text{otherwise} \end{cases} \tag{2}$$

namely a transfer is made when the intensity of the altruistic feelings of person i is higher than the share of the wealth of person j in the aggregate wealth.

Three immediate implications follow from the first line of (2). First, $\dfrac{dt_i^*(\alpha_i)}{d\alpha_i} = w_i + w_j > 0$ for any $\alpha_i > \bar{\alpha}_i$, namely when the intensity of the altruistic feelings of person i is higher, the optimal transfer that this person makes is bigger. Second, $\dfrac{dt_i^*(\alpha_i)}{dw_i} > 0$, namely the optimal transfer responds positively to an increase in the altruistic person's own wealth. And third, $\dfrac{dt_i^*(\alpha_i)}{dw_j} < 0$, namely the optimal transfer of the altruistic person responds negatively to an increase in the wealth of the beneficiary.

From inserting the first line of (2) into (1), I get

$$u_i(w_i, w_j, t_i^*(\alpha_i), \alpha_i) = (1 - \alpha_i) \ln[(1 - \alpha_i)(w_i + w_j)] + \alpha_i \ln[\alpha_i(w_i + w_j)]. \tag{3}$$

Following Pratt (1964) and Arrow (1965), the coefficient of relative risk aversion (RRA) of person i is defined as

$$RRA_i \equiv -\frac{du_i'(w_i)}{u_i'(w_i)} \bigg/ \frac{dw_i}{w_i} = \frac{-w_i u_i''(w_i)}{u_i'(w_i)}.$$

In my setting, it follows from (3) that

$$RRA_i = \frac{-w_i \frac{\partial^2 u_i(w_i,w_j,t_i^*(\alpha_i),\alpha_i)}{\partial w_i^2}}{\frac{\partial u_i(w_i,w_j,t_i^*(\alpha_i),\alpha_i)}{\partial w_i}} = -w_i \frac{-\frac{1}{(w_i+w_j)^2}}{\frac{1}{w_i+w_j}} = \frac{w_i}{w_i + w_j} < 1. \qquad (4)$$

I now formulate my claim.

Claim 1. Under the condition that altruistic person i engages optimally in a wealth transfer to person j, namely under the condition that $\alpha_i > \bar{\alpha}_i$, person i is *less* risk averse than a person who is not altruistic.

Proof. The utility function of a person who is not altruistic is $u_i^{na}(w_i) = \ln w_i$. Denoted by RRA_i^{na}, the relative risk aversion of this person is, quite obviously, $RRA_i^{na} = 1$. Because, in light of (4), $RRA_i < RRA_i^{na} = 1$, I conclude that altruistic person i who engages optimally in a wealth transfer to person j is less risk averse than a comparable person who is not altruistic. Q.E.D.

3. Discussion

The inference obtained in this paper is not contingent on resorting to the relative risk aversion measure: using absolute risk aversion instead will yield the same inferences. Following Pratt (1964) and Arrow (1965), the coefficient of absolute risk aversion of person i, ARA_i, is defined as

$$ARA_i \equiv -\frac{u_i''(w_i)}{u_i'(w_i)}.$$

Then, in the setting of Claim 1, the absolute risk aversion of altruistic person i is $ARA_i = \dfrac{1}{w_i + w_j}$; the absolute risk aversion of a person who is not altruistic is $ARA_i^{na} = \dfrac{1}{w_i}$; thus, $ARA_i < ARA_i^{na}$.

In interpreting the result reported in this paper, three remarks come to mind.

Remark 1. In order to obtain a complete verdict on the finding that altruism lowers risk aversion, it is not enough to show that an altruistic person who is an active donor (benefactor) is less risk averse than a comparable person who is not an active donor. It is also necessary to show that the beneficiary of an altruistic transfer is less risk averse than a comparable person who is not a beneficiary of an altruistic transfer. There is an obvious presumption that the beneficiary of an altruistic transfer will be less averse to risks because the

altruistic channel operates like an insurance arrangement. Still, although a presumption can guide formal inquiry, it cannot substitute for such inquiry. A supplementary analysis will thus be undertaken in follow-up research.

Remark 2. The result reported in this paper is obtained on the basis of a logarithmic characterization of the altruistic person's utility. This representation can be supplemented by the use of more general utility functions such as a constant relative risk aversion (CRRA) utility function. This extension will also be undertaken in follow-up research.

Pending these two inquiries, preliminary drafts suggest robustness on both counts.

Remark 3. In this paper, the altruistic trait, expressed by $\alpha_i \in (0, 1)$, is taken as given. While the intriguing subject of where this trait comes from is not addressed in the current paper, it was taken up in several preceding papers. I refer here to just two examples. In "How altruism can prevail in an evolutionary environment" (Bergstrom & Stark, 1993), the starting conjecture is that a plausible evolutionary argument for selfishness would assert that if natural selection favors those who receive high payoffs, and if altruists get lower payoffs than selfish individuals, then evolution will tend to eliminate altruists. Bergstrom and Stark show that, paradoxically, evolution can sustain cooperative behavior between relatives or neighbors even in single-shot prisoner's dilemma models, where cooperation benefits one's opponent at a cost to oneself. Bergstrom and Stark identify altruism with playing "cooperate" in prisoner's dilemma. Most human interactions occur in environments that are more conducive to cooperation than prisoner's dilemma games. Bergstrom and Stark have chosen the case of prisoner's dilemma in order to show that evolution can select for altruism even in a very hostile environment. In "Siblings, strangers, and the surge of altruism" (Stark, 1999b), an example is provided to illustrate how evolution can select for altruism. I show that evolution can sustain altruistic behavior even in a single-shot prisoner's dilemma model in which altruism benefits one's opponent at a cost to oneself, and conditions are derived under which altruism persists and flourishes to the extent that the entire population will consist of altruists. The case presented is of interest also because it goes beyond the earlier case in which one's opponent was exclusively a sibling (Bergstrom & Stark, 1993; Stark, 1999a). Siblings are more likely to be similar in their behavior than random pairs of individuals. Therefore, an altruist matched with a sibling is more likely to have an altruistic counterpart than an altruist who is matched with a randomly selected individual. This is shown to favor the evolution of altruism. I show that even if an altruist is not necessarily matched with a sibling, altruism can surge. For detailed analyses of these two settings, readers of the current paper are referred to the Bergstrom & Stark (1993) and Stark (1999b) papers.

4. Conclusion

There are many good reasons to want to instill altruism. Altruistic transfers can contribute to social welfare by compensating for a variety of inequalities and misallocations. The lower risk aversion of an altruistic person (as compared to the risk aversion of a person who is not altruistic) identified in this paper might encourage him to pursue risky ventures which could contribute to economic growth and social welfare. That altruism confers this double benefit is revealing, and has not previously been noted in the existing literature.

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Disclosure statement

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