On Inequity Aversion

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Abstract

In close interaction, group allocations are often fair due to our desire to be treated fairly and to act fairly. When this desire conflicts with other strong motivations a typical reaction is to trade off fairness against these other concerns. Inequ(al)ity aversion allows capturing such trade off considerations in various ways (Bolton, 1991, Bolton and Ockenfels, 1998 and 2000, Fehr and Schmidt, 1999, are examples).

Such trade off analysis measures how far one deviates from fairness what requires a unique fairness benchmark. More often than not there exist, however, multiple standards. In our view, this should not discourage using inequ(al)ity aversion altogether but limit it to where its prerequisites are granted.

1. Introduction

In close interaction being found out as acting unfairly may result in exclusion and in a socially deprived life. Unfair, e.g. much too thrifty people have few friends what can be also demonstrated in experiments allowing for exclusion (Güth, Levati, Sutter and van der Heijden, 2005). What is seen as (un)fair in allocation behavior has been extensively discussed in social psychology and led to the development of equity theory (Homans, 1961, Walster and Walster, 1975).
Equity theory informs us how to allocate fairly if this is our only, or at least our dominating concern. (Experimental) Evidence for dominance of equity concerns is provided by many studies, e.g. of reward allocation like equal piece-rate wages in firms or reward allocation experiments[1] (Mikula, 1973 and Shapiro, 1975).

In many situations, we are not solely interested in fairness but have many other concerns suggesting other than fair behavior. Most importantly, we are nearly always[2] interested in our own material well-being. In such situations, one may still behave fairly, e.g. by proposing an equal split in an ultimatum experiment[3], but may also trade off fairness against a personal material advantage, e.g. by offering only a third rather than half of the pie in an ultimatum experiment. It is an important achievement of equity theory to provide utility models capturing such trade-off considerations (Bolton, 1961, Bolton and Ockenfels, 1999, Fehr and Schmidt, 1999).
What has been neglected, however, when propagating inequ(al)ity aversion theories is that equity benchmarks are often ambiguous. As a result, such theories are often not at all in line with observed behavior: in reward allocation experi-

[1] After producing jointly a monetary reward $p(>0)$ one of the contributors can freely distribute the reward being aware how much each party has contributed.
[2] An exception are so-called low-cost situations where the material loss of ethical, e.g. fair behavior is too small to induce violations of stronger moral obligations (see Brennan and Lomasky, 1985 and Kliemt, 1986).
[3] Here the so-called pie $p(>0)$ can be freely distributed by the proposer among two parties. If the responder accepts, this is realized, otherwise, both parties (proposer and responder) earn nothing (Güth, Schmittberger and Schwarze, 1982).

ments with allocator a and recipient r, the positive contributions c_a, resp. c_r, generate the joint monetary reward U according to $p = \alpha(c_a + c_r)$ with $\alpha > 0$ which allocator a can freely distribute among the two being aware of the individual contributions. Here the observed allocations of p are nearly without exception the proportional (monetary reward) allocations (u_a, u_r) with $u_a, u_r > 0$ and

$$(+)\ \frac{u_a}{u_r} = \frac{c_a}{c_r} \text{ and } u_a + u_r = p.$$

Since, when the allocator a distributes p, the (costs of the) contributions are sunk, the situation is actually a dictator experiment[4] with a monetary pie p for which inequity aversion theory measures deviations from fairness via the distance from the equal split. Thus, when c_a / c_r differs considerably from ½, its prediction is simply wrong, simply because condition (+) recommends proportional distributions than equal ones.

One may, of course, distinguish between inequality aversion, one suffers from unequal (net) rewards, and inequity aversion where one suffers when deviating from the basic rule (+) of equity theory (Homans, 1961). This is neglected here since, up to now, all versions of inequ(al)ity aversion theory are in fact inequality aversion theories and since, to the best of our knowledge, all applications are based on equality rather than equity benchmarks (or implicitly assuming that the two coincide). Even more importantly, inequ(al)ity aversion theorists neither consider the ambiguity of equity standards nor how equity-averse people will react to it. Given this state of the art, it seems justified to consider inequity theory as it presents itself, namely as interpreting equity as meaning equality of monetary rewards.

[4] The monetary pie, which allocator/dictator a can distribute, is like manna from heaven. (Ultimatum and dictator) Experiments where this is avoided rely on advance production (e.g. Gantner, Güth and Königstein, 2001).

We first introduce the basic idea of inequity aversion (section 2) and its trade-off interpretation (section 3) and then discuss some aspects like the lumpiness of moral, e.g. equity concerns (section 4), the ambiguity of standards (section 5) and its prerequisites (section 6). The final remarks in section 7 state that inequity aversion can account for allocation behavior in certain situations but should be restricted to where its more or less implicit assumptions are granted.

2. The basic idea of inequity aversion

Let $N = \{1,...,n\}$ with $n \geq 2$ denote the set of individuals who have to allocate some costs, some rewards or both among themselves. Assuming that individual burden, success or the net of both can be measured unambiguously by some number u_i for all i in N allows describing the basic idea of inequality aversion by an overall individual evaluation function

$$U_i(\cdot) = f\left(u_i, \left(\left|u_j - u_k\right|_{\substack{j,k \in N \\ j \neq k}}\right)\right)$$

which depends positively on u_i, negatively on at least some of the discrepancies $\left|u_j - u_k\right|$ in success (and not at all on the remaining ones). Thus for given u_i, e.g. monetary success of individual i, the situation which i prefers best is the one of equality in success where $\left(\left|u_j - u_k\right|_{\substack{j,k \in N \\ j \neq k}}\right)$ is the 0-vector.

One can specify such overall evaluation functions U_i in various ways, e.g. by assuming that one is more annoyed by an own disadvantage $\left|u_i - u_k\right| > 0$ than by the same disadvantage $\left|u_j - u_k\right|$ of some $j(\neq i)$ and that one suffers considerably less from $u_i - u_k > 0$ than from the reversed discrepancy $u_k - u_i$ of the same size (see Bolton, 1991, Bolton and Ockenfels, 1999, Fehr and Schmidt, 1999, for some specifications). One usually will try to find a specification which can account for many stylized facts of empirically observed behavior without having to

adjust the functional specification or its parameter calibration when applying the theory to a new allocation problem (see Shaked, 2005, and Fehr and Schmidt, 2005). Since our discussion is devoted to the more or less implicit assumptions of the basic approach and is rather unrelated to how the functional form $U_i(\cdot)$ is specified, we will not engage in the discussion which specification of inequality aversion predicts best.

3. The trade-off interpretation

Why do we enjoy a given own success u_i best when

$$(*) u_j = u_k \text{ for all } j,k \in N \text{ with } j \neq k,$$

i.e., when all are equally successful? In our view, the answer is given by equity theory (Homans, 1961). In any joint venture, where the individual contributions cannot be clearly ranked (in a reward allocation experiment the contributions c_a and c_r could be (nearly) equal), the personal contribution standard (Güth, 1988 and 1994) can be expressed via

$$(!) c_j = c_k = 1 \text{ for all } j,k \in N \text{ with } j \neq k$$

what suggests that only (*) is fair. Thus earning u_i in a situation satisfying (*) involves no moral or emotional costs since all others fare equally well as required by (+) when (!) holds.

Equity theory predicts for certain situations that people will be fair, i.e. allocate so that condition (*) is satisfied. Ultimatum experiments (see Camerer, 2003, for a more recent survey) illustrate that this is often true (usually, the mode is the equal split) but also that it does not apply generally (many proposers offer less than half of the pie but still an essential share). Actually, it seems clear that most participants of ultimatum experiments

- accept that an equal split would be fair or the obvious allocation
- are aware that offering less will upset the responder and

- that by meagre offers one can earn more but risks to lose everything.

Often proposer participants shy away from evaluating the prospects of meagre offers and propose the equal split whereas others try to find out how far they can decrease the offer without causing own remorse or annoying the responder too much. These kinds of trade-off analyses are the basis of inequity aversion theories which formally capture how a higher own success can be compensated by more own remorse due to discrepancies in success, i.e. violations of (*).

Note that one does not need own remorse to refrain as a proposer from meagre offers since one may feel more restrained by (fear of) the responder's anger than by own remorse. In many applications, the problem in applying inequity aversion – as by the way when applying risk aversion – is to justify whatever common knowledge assumption about i's beliefs concerning $U_j(\cdot)$ for $j \neq i;\ i, j \in N,$ one imposes. Only when one individual is solely responsible for allocating like in reward allocation/dictator experiments, this problem does not show up. How ever such assumptions are justified, our main conclusion is that inequity aversion theories

- are inspired by and based on equity theory
- consider situations where equity concerns are partly conflicting with other strong concerns like achieving a high own success u_i and
- capture how individuals trade off own success u_i against success discrepancies.

4. Lumpiness of equity concerns

Although the basic formulation $U_i(\cdot)$ of inequity aversion does not require this, the usual practise in economics, to assume continuous trade-off relationships, has been imposed (Bolton and Ockenfels, 1999, Fehr and Schmidt, 1999) when specifying the tradeoffs between own success u_i and the inequity measures

$|u_j - u_k|$ for $j,k \in N$ and $i \neq j$. What this implies is that for any small gain in success u_i, we are willing to sacrifice condition (*) for some small inequity ($|u_j - u_k|$ small for some pairs $j,k \in N$ with $j \neq k$).

It is definitely convenient when trying to explore the implications of inequity aversion analytically to rely on continuity, e.g. when proving the existence of a solution, or even on differentiability, e.g. when deriving the solution. And that may, for certain purposes, even justify the assumption of a continuous trade-off relationship. Empirically this, however, seems false as experimentally demonstrated (Güth, Huck and Müller, 2001) and more philosophically substantiated by Khalil (2004). The reason is that any intentional (and avoidable) deviation from equity is irritating and that it needs quite some "bribe" to compensate for such irritation. For the trade-off relationship $U_i(\cdot)$ = constant between u_i and inequity this means that an intentional and avoidable deviation from condition (*) can be only compensated by a considerable increase of u_i. We refer, as does Khalil (2004), to this as the lumpiness of inequity aversion which questions the continuity of the trade-off relation between own success and inequity (measures).

5. Ambiguity of standards

Unlike implicitly assumed by theories of inequity aversion, equity theory does not offer unique benchmarks. Most importantly, condition (*) is just one equity standard, namely the personal one where individual contributions are either equal or differ only inessentially, i.e., when condition (!) is justified.

Reward allocation (experiments) with c_a / c_r differing essentially from 1 and with costly contributions prove that theories of inequity aversion simply fail by not paying attention that the contribution standard (+) often suggests to violate (*). The modal findings of such experiments are in perfect congruence with the basic rule

(+) of equity theory. Rare deviations occur when (+) favors the allocator and the (costs of) contributions are minor so that the allocator does not mind to share the total reward p equally.

Similar evidence is provided by Roth and Malouf (1979) who explore experimentally bargaining for the chances (probability) to obtain the own higher rather than the own lower reward (using the so-called binary lottery-reward scheme). If monetary rewards are private information, participants mainly agree on equal winning probabilities whereas, when monetary rewards are commonly known, they predominantly try to guarantee equal monetary expectations. Thus what one considers as fair depends on information.

In ultimatum experiments where only proposers know the size of the pie (see Camerer, 2003, for a survey), fairness is also ambiguous. As an example, consider the special case where the pie p can be either small $\left(p = \underline{p}\right)$ or large $\left(p = \overline{p}\right)$ with $0 < \underline{p} < \overline{p}$. Most proposers with $p = \overline{p}$ want to appear as fair by offering just $\underline{p}/2$ instead of $\overline{p}/2$ (see Güth, Huck and Ockenfels, 1996, who explore a slightly more complex ultimatum game with three players). Actually, according to the data of this study, fair offers were never rejected although posterior beliefs[5] for $p = \overline{p}$ after being offered a fair share of $\underline{p}$ should have been with 6/7 close to 1, based on the prior probability of 2/3 for $p = \overline{p}$.

This ambiguity of fairness standards has been known for a long time among equity theorists. In economics, Selten (1978) has early on discussed the problem

[5] Güth, Huck and Ockenfels (1996, p. 597) report that 15 of 20 (combining 1st and 2nd round proposers) with $p = \overline{p}$ "pretend fairness" and that only 2 of 8 proposers with $p = \underline{p}$ offer similar amounts. Thus the posterior probability for $p = \overline{p}$ when facing an in view of $p = \underline{p}$ fair offer is $\left(\frac{2}{3}\cdot\frac{3}{4}\right)/\left(\frac{2}{3}\cdot\frac{3}{4}+\frac{1}{3}\cdot\frac{1}{4}\right) = 6/7.$

and recommended to restrict equity theory to situations where the fairness standards are unique. Güth (1988 and 1994) views equity theory as applicable even when fairness standards are ambiguous but can be ranked according to superiority. In the Roth and Malouf (1979) – scenario one, for instance, would consider monetary expectations as superior over winning probabilities. In the ultimatum experiments with only the proposer knowing whether $p = \underline{p}$ or $p = \overline{p}$, one similarly would argue that fair sharing of p for both $p \in \left\{ \underline{p}, \overline{p} \right\}$ is not likely when its information requirement (the common knowledge of p) is not met and that most responders will only punish revealed unfairness, i.e., offers which are unfair in view of $p = \underline{p}$.

For inequity aversion theories this has the consequence that they should

- either restrict themselves to where the personal fairness standard (*) is obvious or at least the most likely accepted equity benchmark or
- allow themselves some ambiguity, e.g. in the form of inequity aversion against deviations from other fairness standards than (*).

6. Prerequisites

In view of what has been elaborated above, it seems that, like equity theory (see for this (Güth,1988 and 1994), also theories of inequity aversion would better (have) restrict(ed) themselves to situations where its prerequisites like the unambiguous equity standards (*) or (!) are granted or at least predominant. As universal theories, they are simply false as shown by piece-rate wage incomes of workers with different output levels and, experimentally, by reward allocation studies. In situations with private information, where what others earn can only be probabilistically assessed, neither equity theory nor theories of inequity aversion seem to have much appeal. In so-called fair division experiments where, unlike in auction games, the price of the auctioned off commodity is shared equally among the bidders and where values are private information and inde-

pendent, Güth, Königstein, Ivanova-Stenzel and Strobel (2003) did not detect any attempt to play fair.

The prerequisites of equity theory (Güth, 1988 and 1994) could be a promising starting point when trying to elaborate the prerequisites of a specific theory of inequity aversion and thereby to restrict its range of application. Whoever tries to develop a more or less novel theory of inequity aversion should state clearly where it should be applied with some chances of success. Here, we only wanted to demonstrate that there are obvious prerequisites for inequity aversion and that, where these are not granted, we hardly will even care about "inequities" and even less likely engage in trade-off considerations. One such prerequisite, not mentioned so far, is that own success $\left(u_i\right)$ and inequity $\left(\left|u_j - u_k\right|; j,k \in N, j \neq i\right)$ are the only or the only dominant concerns. Behavior can be influenced by many more aspects like other motivations (to behave like others, not to disappoint others' expectations etc.) and emotions, e.g. when anger about somebody else inspires punishment considerations rather than concerns about inequity.

Our scientific reward system – we usually like to cite studies with extreme claims like that of offering a universal theory – may be partly responsible that even top journals do not require authors to abstain from too far reaching claims. We rather should encourage and celebrate "small theories" for subclasses of allocation problems with much better chances to be confirmed.

7. Final remarks

Theories of inequity aversion like Bolton (1991), Bolton and Ockenfels (1998 and 2000) and Fehr and Schmidt (1999) have received a lot of attention in the recent literature and inspired many applications. As risk aversion they are, furthermore, often used to account for empirical findings of systematic deviations from (risk

neutral) opportunism (in the sense of $U_i -$ and not $u_i -$ maximization). But as risk aversion, inequity aversion is

- highly idiosyncratic and
- hardly ever commonly known[6].

This alone suggests that inequity aversion theories mostly do not capture the cognitive process of generating allocation choices even when accounting for allocation outcomes[7].

More importantly, it has been argued above that the equity benchmark (*) is often not at all what people perceive as fair but only one of several candidates, namely the one to which Güth (1988 and 1994) refers as the personal equity standard. Even when the equity benchmark (*) is the only prevailing one or at least the predominant one, there are other important prerequisites for theories of inequity aversion like observability of u_i. Claiming them to hold universally simply renders those theories false since they systematically do not capture the fairness concerns which we entertain in many situations, at the workplace, on markets and in other situations of close social interaction.

[6] Due to the binary lottery – payment scheme, normatively Roth and Malouf (1979) have experimentally induced common knowledge of risk neutrality. One may also induce some (lower bound of) inequity aversion by (mutual) payoff sharing, e.g. Güth, Levati and von Wangenheim (2005).

[7] Whether people actually engage in trade-off analysis, suggested by inequity aversion theories, and expect others to do so, is not at all validated. So far the justification could be simply that these theories do a good job in organizing data, i.e. approximate well in outcome space (see Roth, 2003). Whether this also captures the mental ways of generating allocation choices by people is quite a different topic (see Brandstätter, Güth and Kliemt, 2003).

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