Inequity Aversion May Increase Inequity in Majoritarian Bargaining

Maria Montero*

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Abstract

Inequity aversion models have been used to explain equitable payoff divisions in bargaining games. I show that inequity aversion can actually *increase* the asymmetry of payoff division in majoritarian bargaining games.

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*School of Economics, University of Nottingham; maria.montero@nottingham.ac.uk.

1 Introduction

Game theory usually assumes that players care only about their own material payoffs. This hypothesis is clearly refuted by the experimental evidence in the ultimatum and related games (see Camerer (2003) for a recent survey). Inequity aversion theories have been developed in order to account for the stylized facts observed in the laboratory (see Fehr and Schmidt (1999) and Bolton and Ockenfels (2000)). This paper provides a simple example that shows that inequity aversion may actually lead to more asymmetric divisions in a particular majoritarian bargaining game due to Baron and Ferejohn (1989).

2 The model

There are $n \geq 3$ identical players bargaining over how to divide a dollar; q out of n votes are needed to pass a proposal, with $\frac{n}{2} < q < n$. The players have Fehr-Schmidt preferences, that is, given a division $x = (x_1, ..., x_n)$ of the dollar, player i's utility is

$$u_i(x) = x_i - \alpha_i \frac{1}{n-1} \sum_{j \neq i} \max(x_j - x_i, 0) - \beta_i \frac{1}{n-1} \sum_{j \neq i} \max(x_i - x_j, 0)$$

where $0 \leq \beta_i < 1$ and $\beta_i \leq \alpha_i$. Assume moreover that $\beta_i = 0$ for all i, and $\alpha_i = \alpha_j = \alpha$ for all i, j. Thus, all players are identical and they are averse to disadvantageous inequality, but not to advantageous inequality. Preferences are complete information.

Bargaining proceeds as follows. A player is randomly selected to be the proposer (each player selected with probability $\frac{1}{n}$). This player proposes a vector $x \in \mathbb{R}^n$, with $x_i \geq 0$ for all i and $\sum_{i \in N} x_i \leq 1$, where x_i is player i's share of the dollar. The remaining players in N accept or reject the proposal sequentially in some predetermined order. If at least $q-1$ players accept, the proposal is passed and x is implemented. If less than $q-1$ players accept, a new proposer is selected, again each player with probability $\frac{1}{n}$.

Baron and Ferejohn (1989) show that there is a multiplicity of subgame perfect equilibria in this game. Because of this, they restrict the analysis to stationary subgame perfect equilibria (SSPE). These are subgame perfect equilibria in which the players' strategies do not condition on elements of history other than the current proposal.

Using arguments parallel to those of Baron and Ferejohn (1989), it is easy to see that all SSPE have the property of immediate agreement. This is because, even though there is no discounting in the model, there is pressure to reach an agreement because of the risk of being excluded. In a symmetric equilibrium, the proposer offers $y > 0$ to $q-1$ other players, and 0 to the rest. Because players are not averse to advantageous inequality, there is no reason to offer a positive amount to more than $q-1$ others. Because of a standard subgame perfection argument, the equilibrium value of y must be such that responders are indifferent between accepting and rejecting the proposal. Moreover, in order for symmetry of equilibrium to be preserved, each player must receive proposals with the same probability, $\frac{q-1}{n}$ (for example, each proposer proposes to each of the other players with equal probability).

The indifference condition determines a unique equilibrium value of y

$$y - \frac{\alpha\,[1-qy]}{n-1} = \frac{1-(q-1)y}{n} + \frac{q-1}{n}\left[y - \frac{\alpha\,[1-qy]}{n-1}\right] + \frac{n-q}{n}\left[-\frac{\alpha}{n-1}\right] \tag{1}$$

This equation assumes that the equilibrium payoff of the proposer, $1-(q-1)y$, is greater than the equilibrium payoff of the responder, y. This will be shown to be the case.

The solution to this equation is

$$y = \frac{n-1+\alpha}{\alpha q(n-q+1)+n(n-1)}$$

When $\alpha = 0$ we are back in the original Baron-Ferejohn model, in which $y = \frac{1}{n}$ and the proposer's payoff is $\frac{n-(q-1)}{n}$. For $\alpha > 0$ we have $y < \frac{1}{n}$. This means that the difference in payoff between proposer and responder is greater than in the original model. In the original model this difference is $\frac{n-q}{n} > 0$. Thus, the assumption used for equation (1) is satisfied.

The equilibrium value of y is decreasing in α. The limit of y when α tends to infinity is $\frac{1}{q(n-q+1)}$. For example, if $n = 5$ and $q = 3$ the share of the responder could be as low as $\frac{1}{9}$ rather than $\frac{1}{5}$.

The reason for this unintuitive result is that responders dislike the fact that the proposer is getting more than them, but they also dislike the possibility of being left our altogether if they reject the proposal. In turns out that the second effect is stronger, so that players are willing to settle for less rather than endure the possibility of being excluded in the future.

3 Concluding remarks

It is well known that introducing competition in bargaining may make players behave as if they were selfish even if many of them are inequity averse (see Roth et al. (1991) for experimental evidence on the ultimatum game with proposer competition, Fischbacher et al. (2003) for responder competition, and Fehr and Schmidt (1999) and Bolton and Ockenfels (2000) for a theoretical analysis). Also, Bolton and Ockenfels (1998) and Okada and Riedl (2005) show that inequity aversion is compatible with excluding one player from the coalition that forms. This paper goes a step further: not only inequity aversion is compatible with one player being excluded (a natural result when players are not superiority averse) but it may actually lead to *more* inequitable divisions *inside the coalition that forms*. The fact that players dislike getting less than others does not trigger rejection of unfair proposals; on the contrary, players are more willing to accept such proposals rather than risk being left out altogether.

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