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Binmore, Boundedly Rational

Abstract: It is argued that a truly Humean approach to social interaction and to normative reflection on how we should interact needs to get even closer to the facts than the Binmore program suggests. In view of the facts Binmore's normative conclusions on bargaining as well as on the nature of the equilibria of the game of life both seem precarious.

0. Introduction and Overview

Ken Binmore's work forms an impressive case in point of how fruitful it can be to pursue the projects of the British Moralists (see Raphael 1969) and in particular of David Hume with modern decision and game theoretic means.[1] We both are admirers of this effort and of the critical spirit of Binmore's work on modern political and ethical theory. But as we shall sum up in our conclusions (3.), we do believe that there are serious alternatives to his bargaining theory, which may be closer to the real world of human bargaining than his (1.), and severe criticisms of his over-optimistic—if not rather naïve—view of the equilibria that might emerge in a real world great society rather than a small one (2.).

1. Nash, Proportional Bargaining and Aspiration Balancing

Binmore accepts the Nash bargaining solution as a normative standard. He defends the normative concept in terms of the Rubinstein non-cooperative bargaining mechanism which he regards as the most convincing 'behavioral foundation'. We do not deny that the Rubinstein model provides an elegant mechanism whose outcome is in fact that bargaining solution in the limit. We have some reservations, though, with respect to an underlying real world process. As far as the latter is concerned the Zeuthen-Harsanyi approach seems to have some clear advantages. It is a stepwise non-strategic process with a clear criterion

[1] Before Binmore started to work in the field in 1984, Michael Taylor had published *Anarchy and Co-operation* in 1976. In Binmore's as in other works by game theorists a reference to Michael Taylor's seminal political theory work is conspicuously missing. It strongly influenced one of the authors of the present comment in his pedestrian efforts to bring to bear Hume, game theory and evolutionary biology on moral theory and the theory of the state in the early eighties (two thirds of it published as Kliemt 1985 and 1986) though in that effort evolutionary game theory and thus a major element of the more recent efforts of the kind was missing.

specifying who has to make the next concession. The size of the concession is undetermined though it may be necessary to make a concession of a certain size in order that the other player be induced to make the next concession.

The idea of taking turns in inducing another individual to make concessions seems rather realistic, even if it may be unrealistic to assume that actors themselves would make complicated calculations of risks mirroring the fact that the Zeuthen-Harsanyi criterion is based on risk dominance. Yet risk obviously does play a role in real negotiations, in particular the risk of the other ending negotiations. The process converges to the Nash bargaining solution without assuming extreme forms of rationality as necessary for justifying backward induction in the Rubinstein model.

Whereas Zeuthen and Harsanyi do not contest the Nash bargaining solution as a normative concept and thus are on Binmore's side in this regard, Raiffa's, Kalai-Smorodinsky's and Gauthier's proportionality approaches challenge the Nash bargaining solution as a normative concept as well. Here all concessions are measured relative to the ideal gain for every player. The solution forms the maximum of equal relative gains for all players. Quite in line with the original Nash program this solution, like the Nash bargaining solution, can be realised as the solution of a non-cooperative game. It is less well known, that in addition there is a process of alternating concessions which—like the Zeuthen-Harsanyi process leading to the Nash bargaining solution—leads to the Kalai-Smorodinsky solution (see for details Ahlert in: Gaertner/Klemisch-Ahlert 1992). Who is to make the next concession is determined by comparing proposals with the ideal claims. Whenever there are two proposals on the table the player who has made the relatively lower concession has to make the next proposal. As can be proved such processes converge to the Kalai-Smorodinsky solution. With this support Gauthier's original idea of a bargaining process seems much more respectable than Binmore with his fixation on non-cooperative game theory and mechanism design is willing to concede.

In any event the step towards a truly behavioral theory must be taken. It must be taken in particular by those who like Binmore support a Humean approach to social theory. In the process we need to cast our arguments in real rather than in utility terms. Aspiration levels are directly linked to observables (like money, commodities etc.) rather than to utility. Real subjects do have aspiration levels in a conscious way. They are able and often willing to reveal them as well as to justify them in bargaining processes.

Axioms that characterise in terms of aspiration levels who is to make the next concession can be formed (see Ahlert 2004). These axioms of boundedly rational behavior imply formally the aspiration balancing principle which is well known from a host of experiments. From an empirical point of view this is very satisfactory. From a normative point of view it is satisfactory as well that the process so characterized converges to an agreement within a well-defined solution set (corresponding to the point solutions in the Nash or the Kalai-Smorodinsky approaches).

The analysis of many experiments in bilateral negotiations by Bartos and Tietz (1983), Klemisch-Ahlert (1996) and Tietz and Werner (1982) leads to a

basic structure of aspiration levels of a negotiating person j may be summed up in the following way:

Pj is the planned goal,

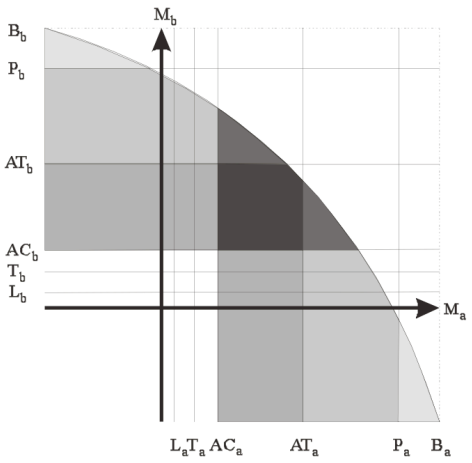
AT$_j$ is the agreement seen as attainable,

ACj is the lowest acceptable agreement,

Tj is the planned threat to break off negotiation

Lj is the planned break off of negotiation.

The following graph should be more or less self-explanatory. The three areas shaded in the two darkest shades of grey represent the solution set.



The axioms which mirror experimentally observed behavior at the same time represent principles of weighing risks that are broadly analogous to the risk dominance principles involved in Zeuthen-Harsanyi. They are also akin to the equitable relative concessions in the Gauthier approach. In our view the preceding shows how realistic theories of rational behavior should be related to 'moderately' normative concepts. The Humean theorist has to keep close to the empirical facts and theories. He therefore needs to be more sceptical than Binmore and other good game theorists about features of models that can be justified only on a priori grounds or in terms of theoretical elegance.

2. Small is Beautiful and Big May be Bad

2.1 Humean Themes and Human Nature

Human beings are adapted to life in small groups. Their natural inclinations, dispositions or, in more traditional terms, 'natural virtues' are fine-tuned to

this environment (see on the Humean natural virtues Mackie 1980). This is the setting in which human natural dispositions evolved along with human nature itself. The fact that human kind contrary to its social (small group) nature has been living in large groups ever since the invention of agriculture raises fundamental questions. It becomes puzzling how organizing social interaction in large groups became viable at all within the constraints of human nature. In short, how is it possible that beings naturally adapted to live in small groups can live together in large numbers?

As David Hume was well aware ordered large-scale interaction is artificial in some sense of that term. Since we cannot change our nature that makes us prefer the near to them more remote along the social as well as the time dimension we must have found some artificial trick to counter this preference and to live despite of it in large groups taking into account long time horizons.

It is not by accident, though going notoriously unnoticed, that in Hume's theory of government in the *Treatise* (see Treatise III) Hume put together the following three elements: first, the human natural proclivity to have an 'undue' regard for what is closer in time or is closer socially as compared to the more remote, second, the large numbers' public goods provision problem, and, third, mechanisms of artificially rendering the more remote general (more public) a more direct (more private) interest of a smaller as opposed to a larger number of individuals.

Hume comes back to the distinction between small and large groups time and again while Binmore more or less downplays the problem of organizing the many. Once co-operation is explained in principle for the small group it seems only a kind of natural extension to go to the larger group context. He seems to believe that one can extend the solution to the large group by means of expanding circles (a la Singer). Of course, Ken Binmore is aware of the N-person prisoner's dilemma for N>>0 and other game structures—who should be aware of this problem if not he—but like most formally oriented game theorists he nevertheless does not believe that it brings something qualitatively different into play. But it does.

Looking at the world we immediately notice that the problem of organizing the many has been solved by human kind. But decision theoretical accounts of real world solutions of the problem tend to miss the boat almost entirely since the Folk theorem as such does not distinguish between small and large groups. Whether the interaction is one among $n = 3$ or $n = 3.000.000$ does not make a difference in logic. But if we take seriously the information conditions along with 'the veil of individual insignificance' the Folk theorem is not *realistically* applicable to the interaction of a large group as a whole. If we want to avoid a misapplication we must not characterize large numbers' interactions in terms adequate only for small numbers' interactions.

To put it slightly otherwise if we intend to bring a realistic variant of the Folk theorem to bear on the phenomenon of ordered large numbers' interaction then the large numbers' must be 'reduced' to the phenomenon of small numbers' interactions in stable small groups. However, if this reduction is performed properly it will become obvious that large numbers' interactions can and in

all likelihood will have qualitatively different properties than small numbers' interactions (even though created by small groups). The implication of this is that the effects of the natural fairness norms etc. are not the same as in small groups. What in the small group naturally would have benign consequences or would impose constraints on interaction preventing the worst outcomes may be rather worthless in the larger context.

2.2 From Small to Tall

There is no ordered large scale interaction in the world that is not ordered by some stable small group structure. The mass demonstration is organized by a group of organizers interacting in small groups, the legal system is orgnized by a legal staff, the large army is organized by groups of officers locked in repeated face to face interactions etc. There is no counter example to this thesis. In all the permanently interacting small groups all the elements of Binmore's analysis will be operative. But this does not imply that the internal properties of the small group structures organizing the larger interaction will carry over to that larger interaction itself.

For example, if Binmore points out that primitive societies were and still are characterized by flat hierarchies, he is obviously right. The egalitarian properties of the groups corresponding to the original hunter gatherer adaptation of human kind may be explained along the game theoretic lines he envisions. But it is as obvious that the properties of the small group life so explained as a matter of fact do not carry over to the life in large groups.

It may well be that the natural whisper in us will make us desire to live in communities of the primitive and small kind and that such prevalent desires may have some causal influence on the emerging social structure. All the internal equilibria in the smaller groups in a larger society may tend to have the properties that equilibria in the original human adaptation had, but that does not as such say anything about the between group equilibria in the large group context.

In a context in which the individual as matter of fact is insignificant it has no strategic effect on others. If two individuals who interact with each other do not belong to the same stable sub-group interaction their strategic influence on each other may be nil. Very trivially for the individuals concerned the equilibria that might emerge can have properties completely different from those in small group interactions.

But if that is so then what may be relevant to a social contract in a small society of the kind envisioned in the conjectural natural history laid out by Binmore can be completely irrelevant for the large group context. There are simply no (normative) conclusions that could be supported by way of Binmore's story. Ignoring all the arguments against social contract theory that have been accumulated through the ages we may for the sake of the argument perhaps want to follow Binmore in his effort to frame what is not the result of a contract of any kind 'as if' it were. We may even accept that modern philosophical terminology speaks of a social contract theory even if the idea of a contract is flatly denied

and some other form of agreement taken as basic.[2] We accept for the sake of the argument that non-contractual, incremental agreement as observed in the emergence of conventions warrants the use of the term "social contract". But even then the contractual nature of the conventions as guiding local behavior in the smaller substructures of permanent interaction in the larger game of life does not carry over to the larger context. For individuals the larger context can be and is one of power and submission rather than of free choices and agreements even though the small groups organizing the larger game all may internally follow the precepts described.

As far as he infers any normative conclusion about how the larger game should be organized from how the smaller ones naturally are orgainzed Binmore is on very fragile ground. He can, of course, draw some conclusions concerning the natural inclinations to applaud or criticize measures that individuals may utter as bystanders of interaction. But Binmore has no good reason to present those natural inclinations as adequate to evaluate interaction in a great as opposed to a small society. Even if all small group interactions would have certain kinds of contractual properties, the larger one need not have them. Moreover, there is absolutely no reason to believe that transferring what is good for the small group context to the larger context will do more good than bad. Large societies are of a different social and often rahter evil nature than small ones. The potentially benign nature of small group equilibria does not carry over to the larger interactions organized by small groups. Once the division of labor is extended to the enforcement of norms there is no guarantee that he internal co-operative nature of small group interaction will carry over to the larger context.

3. Conclusions

Binmore is right in claiming that human individuals will look at the large numbers interaction in the same terms as at small numbers interactions. He is justified in emphasizing the fact that our view of social interaction, our social perceptions have naturally evolved in small group contexts and therefore will send messages to our consciousness which are suited to the small group context. However, that does not amount to justifying the assumption that the equilibria so perceived have the same properties as those emergent in small group.

The bargainging theory suffers as any bargaining theory from the same deficiency. But as we must frankly admit there is no way to avoid this. At least the empirically founded alternatives that we were suggesting are no better than Binmore's in that regard. To put our own criticisms into perspective let us state by way of a final remark that Binmore's is a major contribution to a modern Humean social theory that deserves much more careful study than it yet receives in particular by the philosophers.

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[2] Insisting that the name contract be used modern contractarians are a bit like modern theologians who after depriving God of all his properties insist that the name be used.

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