Why Have Leaders at All?
Hume and Hobbes, with a Shot of Game Theory

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Abstract

The insight that much of the seeming order in society happens because of conventions and implicit social contracts leaves open the question as to why we need leaders at all? The aim of this paper is to explain why in some social contexts leaders may be needed and then analyze in some detail what consequences a leader has on the games we play and hence on social outcomes. The paper provides a formal structure for this and raises some questions which we may investigate using this structure.

Key words: leadership game, power, jigsaw focal point, Leviathan equilibrium

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1. Introduction

The title of this paper is a quote from Ken Binmore's new book **Crooked Thinking or Straight Talk? Modernizing Epicurean Scientific Philosophy.** Binmore asks the question, almost rhetorically, in the heading of a sub-section (p. 92) and, unfortunately for the reader, gives himself too little space to answer it. But this is a question that bristles through much of this book and, I believe, it is possible to give a fuller answer than the book provides. The present paper, while commenting briefly on some other themes of this book, is focused on this question.

Ken Binmore was a mathematics professor at the London School of Economics when I was a graduate student there. As a PhD student, I hit upon a theorem about cardinal utility, but thanks to my poor training in mathematics, I wrote up a proof, which was cumbersome and long. The clumsiness of my proof was obvious to my PhD adviser, Amartya Sen, who suggested I consult Binmore about it. I doubt Ken Binmore will remember this, but he quickly read the theorem, and glanced through my proof, confirmed it was right, and then suggested a new way of proving it that found its way into my PhD dissertation and was a lesson in the importance of elegance and brevity in economic theory. I owe him thanks for this, and for more. His delightful lectures in mathematics, sprinkled liberally with history, especially, ancient Greek, and eye for paradoxes sparked my own interest in logic and economic theory.

A few years later, the 'Economics' of the London School of Economics clearly had an influence on Binmore. He switched from being a pure mathematician to an economist with a focus on game theory. Reading **Crooked Thinking or Straight Talk?** and some of his other recent writings, it is clear he is in the midst of another transition—this time from economics and game theory to philosophy and ethics. In keeping with the spirit of his new book, the present paper straddles the old and new Ken Binmore.

2. Beliefs and Leaders: Hobbes and Hume

Much of the new book by Binmore and also some of his earlier writings (Binmore, 1994, 1998, 2020) have been devoted to the subject of social contracts and conventions. He cites the works of David Hume, of course, and also that of David Lewis (1969), and Thomas Schelling (1960) to point out how a convention is little more than a device for selecting an equilibrium from the possible plethora of equilibria available to society. Conventions rely on self-policing because, being a Nash equilibrium, a convention is an outcome from which no individual wants to

unilaterally deviate. The audacity of David Hume's insight, which now seems easier to grasp with the advance of modern game theory, was that, in the end, all outcomes in society are held together, to the extent they are, by virtue of the fact that they are self-enforcing. After all, in the 'game of life' (Binmore, 1995) there is no one outside of the game to do the enforcing.

Indeed, as Binmore points out in this latest book, one can take the same view of the law, as one takes of conventions. We typically think of law's authority as an imposition from the top. But once we think of the police, the bureaucrat, the judge and the prime minister as part of the game, the law is nothing but some ink on paper. And "a constitution is just words on a piece of paper" (Binmore 2020, p. 90). It cannot change the game of life. All it can do is to change our beliefs about other people's behavior and this can nudge society to move from one equilibrium to another. There is no getting away from the pre-existing collection of equilibria. As I have argued in my book, there is no escape from the republic of beliefs (Basu, 2018)[1]. In Binmore's words, "We are bound only by a thousand gossamer threads woven from our own beliefs and opinions."

This argument can be taken even further, from the social contract or convention, through the law, to the authoritarian ruler, the king, the tyrant, and the dictator. From where does he get his power? (My use of 'he' is a reflection not of my gender bias but the gender bias of dictators in history.) Seeing the terrifying power of dictators, we think of top-down authority, of guns and chains, of steel and mortar. But on further contemplation it becomes clear that, in the final analysis, the dictator-king's power comes from the gossamer threads of our beliefs about one another. In the history of philosophy and politics, one of the first observers who saw through this argument with blinding clarity was David Hume. Here is an exemplary quote (Hume, 1858, p.34 of 1987 edition): "No man would have any reason to fear the fury of a tyrant, if he had no authority over any but from fear; since, as a single man, his bodily force can reach but a small way, and all the farther power he possesses must be found on our own opinion, or on the presumed opinion of others."

This idea of the power of authority being founded on "the gossamer threads" of our beliefs and our "presumed opinion of others," can be now formalized in ways that were not available to Hume. By doing so we can show that, while most societies do have governments and rulers, we can create an analogous equilibrium without any such authority, purely by a system of people sanctioning one another. Indeed, in many ways, the power of the government and even the dictator is chimera.

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[1]See also, Sunstein (1996), Basu (2000), McAdams (2000), Posner (2000), Mailath, Morris and Postlewaite (2017), Hoff and Walsh (2019). This is not just important in abstract models but real problems of global conventions, socially responsible behavior by corporations and host of practical fields (Sacconi, 2006; Sardo and Esposito, 2019; Sarat, Douglas and Umphrey, 2011).

This can be formalized by using the idea of Nash equilibria and Schelling's (1960) idea of the 'focal point'. I try to do this in Basu (2018) and, in doing so, treat the positions taken by David Hume and Thomas Hobbes as largely orthogonal, and present my model as a defense of Hume and in opposition to Hobbes, in particular his stress of the importance of the Leviathan, the iron hand at the top. Hobbes treated the law as command from the ruler, which the citizens are "obliged to obey" (Goldsmith, 1996). Without that iron hand, society would be reduced to anarchy, and the lives of people would be "solitary, poor, nasty, brutish and short," to quote from Chapter XIII of **Leviathan**, arguably the most cited words from Hobbes. The authority of government, the king or even the tyrant is the force that can prevent such an anarchic predicament.

But does it have to be Hobbes *or* Hume? That there are some deep common premises between Hobbes and Hume is evident from occasional observations in **Leviathan**. Consider the following from Chapter XIII: "[W]hen all is reckoned together, the difference between man, and man, is not so considerable, as that one man can thereupon claim to himself any benefit, to which another may not pretend, as well as he. For as to the strength of body the weakest has strength enough to kill the strongest, either by secret machination, or by confederacy with others, that are in the same danger as himself."

The similarity of this with the quote from Hume, above, is striking. This gives rise to the question: Is it not possible to capture the ideas of both Hobbes and Hume, or at least some of their central tenets concerning power, within the same game-theoretic construct? This question arises with a certain urgency in Binmore's short section, titled "Why Have Leaders at all?"[2] It is true that in many situations, such as the ones considered in Schelling's (1960) book, the focal point arises naturally. You do not need a leader or anybody for that matter to direct us to that equilibrium. But maybe there are situations where we need a person or a leader. There is a hint of this in Binmore's observation (p. 92) that we cannot always wait for these natural processes: "On a sailing ship in a storm or in a nation at war, one can't afford to wait for due process to generate a compromise acceptable to all." A similar sentiment is expressed by Myerson (2017, P. 6) when he argues, "[A] military operation requires a leader who can command people to perform dangerous actions in battle."

Interestingly, while this is not widely referred to in the English language literature, a similar idea occurs in some of the works of Carl Schmitt (1888). As George Schwab notes, while introducing the English translation of Schmitt's work, "his (meaning Schmitt's) sovereign slumbers in normal times, but suddenly awakens when a normal situation threatens to become an exception." And

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[2]Effort to understand Hobbes in a formal game-theoretic set up is rare, but there have been some notable recent efforts (see Vandershraaf, 2019; Barrett, 2020).

in Schmitt's own opening words to his book, "Sovereign is he who decides on the exception." This is clearly the same idea of exceptional situations that arise in Binmore's storm and Myerson's battle.

Consider a strategic-form game, which has many Nash equilibria. If it is played just once, there is no reason, *a priori*, why a Nash equilibrium will occur. Different players may expect different Nash equilibria to occur and accordingly take their own decision. And these decisions taken together may not constitute an equilibrium. This problem gets averted if there happens to be a salient Nash equilibrium. Ten friends, planning to meet at an airport at a specific time the next day, who have not decided in advance where they will meet, clearly have a plethora of equivalently-placed Nash equilibria. Whichever place all 10 players choose to go to, as long as it is the same place, is a Nash equilibrium[3]. Which one will occur? Fortunately, most airports have a big banner in some visible place saying "Meeting Place." That generally acts as focal point, where everybody congregates[4].

If an airport does not have such a banner, the ten friends will presumably talk in advance and decide on where they will meet—say at the McDonald's (good for calorie replenishment). What we do not often realize is that a decision in advance is essentially a deliberate creation of a focal point. The statement, "Let us meet at the McDonald's tomorrow" creates a focal point for the game that they would play the following day, when each will have to choose a place to go and wait for the others.

If a collective decision can do it, why then do we need a leader? One situation where the need for a leader could arise is when the players do not know what game they will be playing. This happens in a war or in a storm or in a fast-moving game, like soccer. Situations develop which you did not anticipate.

Thus in a war an entire army may have to suddenly decide whether to go forward, backward, left or right, and they will win only if they can coordinate and move in the same direction. After such a situation suddenly arises, if they try to then decide on a focal action, it will be cacophony of shouting and chaos. One way of solving this is to take the idea of "focal", but apply it not to a vector of actions or an outcome, but to a person. A 'leader' is best thought of as a 'focal person' or a 'focal player'. And a focal person is someone who creates the focal point. When the leader

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[3] There are other (Pareto dominated) equilibria as well, such as when all ten of them choose different places.

[4] In the spirit of Schelling (1960), I shall refer to the focal point as a salient outcome that happens to be a Nash equilibrium. There are papers that equate it with salience without necessarily requiring it to be an equilibrium (Sugden, 1995). In such cases laboratory experiments show that the focal point can influence the outcome, even when the focal point itself is not chosen (see Morone and Morone, 2016; Umbhauer, 2019). In this paper, the focal point is a salient equilibrium, which by virtue of its salience gets selected.

or the focal person draws attention to a Nash equilibrium, by shouting "1 do this. 2 do that" or "All soldiers turn right", that "order" becomes a focal point.

In contexts where the game is likely to change rapidly and you may not even know what the game will be or the set of games from which the actual game is chosen, as happens in Bayesian games, if, naturally or through a prior decision, we have a leader, this solves a huge problem. A focal point gets created quickly. Even if everybody shouts what one should do, we all listen to the leader and do what she suggests. We do this not because of the fear of authority but because we know others will listen to the leader and then it is worthwhile for me to listen to the leader.

This conceptualization of leadership gives us an insight into the power of the leader that shows how it can, at the same time, be terrifying and fragile. As Hume had emphasized, the power of the leader does not come from the leader's muscle strength but the leader's ability to create towers of beliefs among ordinary people. From the biggest tyrants in history to the most compliant democratic ruler, the power of the leader lies in nothing but the beliefs of people, including the beliefs people have of other people's beliefs. This view is, at one level, comforting because it shows that the ultimate power, even that of the dictator, lies in the hands of ordinary citizens. But, at another level, this view of power is disturbing because it is faceless and diffused.

Formalizing this idea can give us a valuable tool. What happens when we have a leader whom 90% of the players obey and 10% do not? What happens if there are two leaders, and the players are partitioned into two sets, with players from one set listening to one leader and the players form the other set listening to the other leader? Is it always true that in the absence of a leader or a focal player the players would be in misery, with their life solitary, poor, nasty, brutish and short?

The aim of the next section is to develop these ideas formally, to accommodate the Humean and Hobbesian views of social order within the same conceptual category and to answer some of the questions raised above. In the process, I develop some new solution concepts, but that is not the central aim of this paper. I am reconciled that other concepts will emerge. The main aim of this paper is to understand the source of the power of the leader, and to show that, while the authority of the democratically-elected leader and the authority of the tyrant who grabbed the throne, have many differences, there is also a fundamental commonness.

3. Leadership Games and the Leviathan Equilibrium

Consider a strategic-form **game**, G, denoted by (N, S, p), where N = {1, 2, …, n} is the (finite) set of players, S_i is the set of strategies open to player i, for all i ∈ N, and S is the collection of all

possible n-tuples strategies, one for each player[5]. In other words, every n-tuple of strategies or choices made by the players, $(s_1, s_2, …, s_n)$, is an element of S. More formally, S is the Cartesian product of $S_1, S_2, …, S_n$. Finally, p is the vector of payoff functions for each player. It tells us the payoff each player gets from each outcome of the game. More formally, $p_i:S \rightarrow \Re$, where $\Re$ is the set of real-numbers. We shall here think of G as the 'game of life'. Basically, it describes everything that every person on earth can do and their consequences.

A **Nash equilibrium** of this game is any $s \in S$, such that no player can do better by unilaterally deviating to another strategy. This may be written formally as follows. Given any n-tuple of strategies, s*, I shall use $s*/s_i$ to denote a strategy n-tuple in which the ith element of s* has been replaced by $s_i \in S$. Hence, an n-tuple of strategies, s*, is a Nash equilibrium if and only if $p_i(s*) \geq p_i(s*/s_i)$, for all $s_i \in S_i$, for all $i \in N$.

Let us now assume that this game has a leader, $i \in N$, and the leader has a set $M \subset N$ of followers, where #M > 1, and, as a matter of semantics, I shall assume $i \in M$, that is, the followers of the leader includes the leader[6]. A 'leadership game' is the basic game of life[7] with the additional description of who the leader is and who the followers are. Hence, a **leadership game** is defined as (G, (i, M)), where G is a normal-form game, and (i, M) is the pair of leader and her followers.

The assumption that the group of followers has 2 or more members is innocuous and made for linguistic reasons. It sounds odd to speak of a *group* of one. Mathematically, there would be no problem in thinking of individuals who belong to no group as belonging to a group consisting of only that individual, who also happens to be the leader.

The 'leadership game', being new, calls for novel notation and so I invoke the opening alphabet of the Bengali script, ক, pronounced 'kaw' (rhymes with awe). Henceforth, a leadership game is denoted by:

$$ক \equiv (G, (i, M)).$$

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[5] It is best to think of the basic game, G, as truly a single-shot game and not just a strategic-form representation of an extensive-form game. This allows me a certain license with terminology which is convenient.

[6] This is akin to Amartya Sen's experience after he became Master of Trinity College, Cambridge University. The immigration officer at Heathrow airport, seeing that the address he was headed to, asked Sen if he was related to the Master of Trinity College. Sen was caught in a quandary not knowing if a person's set of relatives included the person.

[7] Since I am motivating the need for a leader by allowing for the possibility that a game may arrive that the players may not have anticipated, one may wonder in what sense is this a game of life. The notion of the game of life has problems, as I discuss below, but its unexpected arrival need not be a problem. As in Binmore's definition, we should think of this as a game that, here on, fully captures the world—all the individuals that exist are players, and each players is able to do whatever the laws of nature permit.

Without loss of generality, I shall assume $M = \{1, …, m\}$, with $m \leq n$, and $i = 1$. In other words, player 1 is the leader and the first m players from among the set of all players are her followers. I need to define one more term here for later use. A leader's **order**, x, refers to an element of the Cartesian product of the sets of strategies of each of her followers. Thus if x is the leader's order in the leadership game ॐ, then $x \in S_1 \times … \times S_m$.

What it means to be a leader and a follower and what implication a leader's order has for how the game is played will become clear eventually.

I am assuming that who becomes a leader and who the follower is exogenously given. Think, for instance, of a system where the eldest member of a ruling clan is leader or a dynastic system, where the eldest child of the leader becomes the leader after the leader's death.

What I want to speculate and theorize about now is what kind of an outcome we may expect from a leadership game. I believe that reality is riddled with a multiplicity of equilibria. In Basu and Weibull (2003) we argue that traits that are normally treated as embedded and cultural, such as punctuality, may be no more than a matter of different societies selecting different equilibria, where they behave differently. In other words, societies look more different than they *innately* are, because they settle into different equilibria (see Hoff and Stiglitz, 2001; Basu, 2018). This gives rise to the big question concerning how societies select which equilibrium they get into.

As the discussion in the previous section suggests, there should be a refinement of Nash equilibrium for a society which is a game of life but one in which there is a leader and a group of followers. The leader is conceptualized as a focal person, who directs the group in a certain direction[8]. I am beginning from a situation where the game has suddenly appeared and who the leader or focal person is has already been decided. Such a pre-decided focal 'player' (in contrast to a focal outcome) is needed because there would be little time to discuss and decide on the focal outcome of this game, after the game makes its appearance. The game is like a sudden situation we confront in a war.

The idea of equilibrium in this leadership game is best thought of broken up in two parts. First, think of the central idea of a Nash equilibrium. Any outcome from which an individual has an interest in moving unilaterally to some other strategy cannot be an equilibrium because such an

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[8] A fuller model may wish to consider not Nash equilibrium points but equilibrium sets, such as CURB sets (Basu and Weibull, 1991), since a leader or a law, generally, instead of directing players to specific behavior, state prohibitions—Don't do X and Don't to Y—of behavior. The question is whether the sets of behavior permitted while respecting the prohibitions constitute a CURB set. In discussing laws or norms, it may therefore be better to use some set-valued equilibrium instead of the usual point-valued equilibrium (see Myerson, 2006).

outcome would not persist with rational players. In Nash's conceptualization, only individual deviations are concerned because players do not have any coordination device. However, in a leadership game, we have a leader who can order her followers to move. And they will move if that is in their self-interest (we do not want to give up on the assumption of the players being rational). This means that, in a leadership game, a necessary condition for an outcome to be an equilibrium is that it is not possible for the group to, together, deviate to an m-tuple of strategies such that each member of the group is better off moving rather than not when everyone else in the group moves. If such a move by the group were available, the leader would 'order' the followers to move. I shall call a Nash equilibrium from which no such shift by the group is possible to be a **deviation-proof** Nash equilibrium[9].

It is interesting to note that when a Nash equilibrium is not deviation proof, an order to move is obeyed not because of the authority of the leader but because it is in the self-interest of the players to obey. In short, there is no exogenous authority in this conceptualization. It is a self-reinforcing authority, the enforcement arising from the beliefs and behavior of ordinary players, capturing the central idea of power as suggested by David Hume. The order simply acts like a focal *shift* for all members of M to move to.

Now we can get to the final definition of equilibrium in a leadership game. If there are several deviation-proof Nash equilibria in a game, the players have a quandary. They all want to converge to the same equilibrium. This is the classic focal point problem. If the leader's 'order' to behave in a certain way is treated as focal, all players will heed the order. So, the leader will choose an outcome from among the set of deviation-proof Nash equilibria in order to do as well as possible for herself. Hence, I shall call a deviation-proof Nash equilibrium a **Leviathan equilibrium** if there is no other deviation-proof Nash equilibrium where the leader does better.

The next three paragraphs give a formal definition of deviation-proofness and Leviathan equilibrium. This is useful to state some of the results obtained in this paper more formally, which in turn can be useful for further development of these ideas in the future.

Suppose we have a **game,** $G \equiv (N, S, p)$, and a **leadership game**, $(G, (1, M)) \equiv \text{क}$. Let @ be a function, such that, given any $s \in S$ & $any\ y \in S_1 \times \ldots \times S_m$, @$(s, y) \equiv z$ is an element of S such that $z_i = y_i$ for all $i \in M$ and $z_i = s_i$, for all $i \notin M$.

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[9] I am here starting from the collection of Nash equilibria and then locating the ones that are deviation proof. I do this as recognition of individual rationality, and not wanting to give up on that standard axiom of much of game theory. This is purely for reasons of convenience. There are attempts in the literature to explain human cooperation based on the power of the individual to curtail one's self-interest and take some kind of a moral stance, such as a Kantian ethic, which leads to what has been referred to as "Kantian optimization" by individuals (Roemer, 2019).

In words, this function @, which, I hasten to add, has nothing to do with email addresses, does the following. Presented with any $s \in S$ and a leader's order, it takes s and replaces all the strategies for members of M specified in s with the strategies specified in y. And z is the new morphed strategy n-tuple that gets created by this. Thus z is what we get if all the followers follow the leader's order.

Given the leadership game $\bar{\varpi}$, a Nash equilibrium s* $\in$ S is defined as **deviation proof** if there does not exist an order x and $z \equiv @(s^*, x)$, such that $p_i(z) > p_i(z/s_i^*)$, for all i $\in$ M. Finally, given a leadership game $\bar{\varpi}$, s* $\in$ S is a **Leviathan equilibrium** if it is a deviation-proof Nash equilibrium such that there is no other deviation-proof Nash equilibrium, which gives the leader a higher payoff.

To return to the main discussion, note that these definitions are rooted in earlier ideas that have occurred in game theory, such as those of team theory, coalition-proofness, the core and strong equilibrium and in the analysis of political coalitions (Marschak and Radner, 1972; Rubinstein, 1980; Bernheim, Peleg and Whinston, 1987; Kahn and Mookherjee, 1992) and the concept of focal point (Schelling, 1960; Mehta, Starmer and Sugden, 1994; Binmore and Samuelson, 2006; Crawford, Gneezy and Rottenstreich, 2008)[10].

It is worth pointing out what is conceptually different here. Consider for instance, the idea of a 'core' of an economy. This is basically an outcome from which no subset of individuals can collude and do better (Vind, 1964). It is a similar idea that drives the concept of strong equilibrium (Aumann, 1959). In our case, we are distinguishing between groups that can collude and the rest. It is not being presumed that whoever can do better by colluding will collude. We are drawing a distinction between, say, a large number of leaderless shepherds, grazing cattle and an invading army led by a general. The latter can always act in unison; but the former is unlikely to do so. This is a crucial distinction. For deviation proofness defined here, there must be groups who treat the announcements made by the leader not as white noise but as a focal suggestion or 'order', which helps them coordinate. As will be shown later, not only do the designation of groups matter, but who is the leader matters too.

It is useful to illustrate the above concepts by constructing some examples. This should help us understand how the conception of authority, law and leadership that emerges from the above theory, which is, in essence, Humean, is quite distinct (and more persuasive) than a lot of the conventional and more descriptive formulations.

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[10] There are also parallels in the literature on law and economics and in the idea of 'norm entrepreneurship' (Sunstein, 1996a; Posner, 2000).

Consider a game with three players, 1, 2 and 3. Each player has to choose from among strategies which (dispensing with player subscript, for simplicity) I shall refer to as A and B. Instead of describing the payoffs in words, let me show them in the payoff matrix described in Figure 1. I shall refer to the game that is described by the payoff matrix as the 'Leader's Burden'.

Figure 1: The Leader's Burden

A:

	A	B
A	8, 8, 8	0, 0, 0
B	0, 0, 0	9, 9, 0

B:

	A	B
A	0, 0, 0	0, 0, 0
B	0, 0, 0	2, 2, 2

The way to read the payoff matrix is as follows. Player 1 chooses between the *rows* A and B, player 2 chooses the *columns* A and B. And player 3 chooses between the *matrices* A and B, with the top one being called A and the lower one called B. Thus if player 1 plays A, 2 plays A and 3 plays B, they would get payoffs of 0 each, or more simply (0, 0, 0). If they played, respectively, B, B and A, they would earn (9, 9, 0). Let me stress, contrary to appearance, it is a simultaneous-move game.

It is clear that this game has two Nash equilibria, (A, A, A) and (B, B, B). Suppose that the game is now played as a leadership game, in which players 1 and 2 constitute a group, with 1 as leader. It is simple to check that this game, The Leader's Burden, has just one equilibrium, (B, B, B), that is deviation proof. It follows that this is also the unique Leviathan equilibrium[11]. This is for the obvious reason that the leader directs the outcome to a deviation-proof equilibrium that is best for the leader. In this case, the leader has no choice.

It is useful to grasp intuitively why the Nash equilibrium (A, A, A) is not deviation proof. If the game settled there, the leader would ask all her followers (herself and player 2) to deviate to B. This would clearly be what may be called a 'focal deviation'. Each person in the group would prefer to deviate if she believed the other player would deviate. Basically, when pointed to a

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[11] Of course, from (B, B, B) they could all benefit by moving to (A, A, A) but player 3 is not a part of the group that follows the leader, and the group leader's instructions do not even register on this player. Focal points are focal only to the extent that individuals treat it as such. Further, after getting to (A, A, A), we know that players 1 and 2 will both move to B. At an intuitive level it is this "counter threat" that stabilizes (B, B, B) as an equilibrium.

deviation, each player considers whether to deviate as suggested or remain where she is. The leader, by pointing to the deviation makes the deviation focal. The order by the leader creates a framing, which in turn creates the focus. The deeper foundation of what becomes focal remains a mystery. It may even have an evolutionary root (Binmore and Samuelson, 2006), but focal points play a role. We simply have to introspect to see this. One can also see in this argument the spirit of coalitions in cooperative games (Riker, 1962; Ray, 2007). The group is like a coalition, with a leader.

By this deviation players 1 and 2 would earn 9 each. Of course, society would not settle down there either, since player 3 would then deviate to B and pick up a payoff of 2 instead of 0.

It is interesting to see that there are contexts where being a leader can actually hurt. In this case suppose that, before the group consisting of 1 and 2 had a leader, the economy had settled down at (A, A, A). Each person would be earning 8. But once player 1 becomes a leader for the group (consisting of 1 and 2), the economy can no longer be at (A, A, A). It would end up at (B, B, B) with player 1 now earning 2, instead of 1. This explains why I called this game the Leader's Burden. This is contrary to what Hobbes would have had us expect. It is in fact the existence of a powerful leader that drives society to the outcome (2, 2, 2), that is, where life is solitary, poor, nasty, brutish and short.

The leader would love to give up leadership before the game began, but that is like players in a Prisoner's Dilemma trying to give up being selfish, just before playing the game. These are not endogenous matters that one can choose. They are not part of the game of life.

Could it be the case that this paradoxical result is occurring because the leader is not a leader of all individuals but a group consisting of 1 and 2? After all, Hobbes's Leviathan was meant to be absolute—a Monarch, and rule over all agents. A direct parallel of this cannot occur when there is an absolute monarch, because, a Pareto dominated Nash equilibrium will not be deviation-proof in such a leadership game. The leader will order everybody to the Pareto superior Nash equilibrium. But a different kind of problem, in some ways, even worse, can arise if there is a leader whom everybody follows.

Let me illustrate this with another game, The Monarch. Consider the two-player game described in Figure 2. This game has a unique Nash equilibrium: (B, B). With no leadership, the game would settle at (B, B) with the two players earning 7 each.

Now suppose player 1 becomes the leader of the entire. It is easy to see (B, B) is not deviation proof. If they were at (B, B), the leader would order everybody to move to (A, A) and it would be in each player's interest to 'obey' the ruler's order (the choice being between obeying and maintaining the status quo), given that the other player is obeying the order. Hence, with the only equilibrium no longer viable, this society will break down into anarchy and chaos. Contrary to Hobbes's claim, it is the arrival of a total leader that causes the breakdown. This is an important cautionary note for those who celebrate authoritarianism.

Figure 2: The Monarch

	A	B	C
A	8, 8	0, 0	1, 9
B	0, 0	7, 7	0, 0
C	9, 1	0, 0	0, 0

Digressing to a technical matter, one could argue that a far-sighted leader would not disturb the initial equilibrium, (B, B). There is indeed a literature on this (see Genicot and Ray, 2003; Ray, 2007). But the problem with this criticism is the concern about how realistic this kind of far-sightedness is. Further, this critique applies to the standard concept of Nash equilibrium as well. To see this, consider the game, Self-Control, in Figure 3.

Figure 3: Self-Control

	X	Y
T	7, 0	0, 2
M	6, 6	0, 2
D	2, 0	2, 2

The story is not important but think of player 2 as having the choice of keeping her land open (X) or gated (Y). Open is good, if player 1 also comes in and joins in using her land (M) but does not over graze it (T), in which case player 2 would prefer to keep her land enclosed. By the idea of Nash, this game can settle only at (D, Y). If player 1, the one choosing from among the rows, had far-sightedness, and this was common-knowledge, we could argue that the outcome could also settle at (M, X) and both of them would do better. But that involves invoking not just far0sightedness but also self-control and looking beyond the idea of Nash. The underlying concept of equilibrium used in this paper is that of Nash. Carrying this idea to the leadership game, described in Figure 2, makes it clear that the presence of a monarch will reduce this society to anarchy.

4. The Origins of Power, and the Importance of Who Leads

Where does the power of the leader come from? Seeing the ease with which the many are governed by the few, it is natural to think of those few who govern as being endowed with some exogenously-specified power. But once it is appreciated that the writ of authority or the law is nothing but some scribbling on paper (Binmore, 2020; Basu, 2018, Mailath, Morris and Postlewaite, 2017), it becomes clear that whatever happens via the force of authority and law

can happen through social norms, ordinary people monitoring one another or what may be referred to as "decentralized enforcement" (Hadfield and Weingast, 2010). Authority can do no more than take society to some pre-existing equilibrium. That outcome, being an equilibrium, could have occurred without the writ of the law. These broad ideas were floating around since the 18th century. One advantage that we have over the early thinker is the availability of game theory. We can give formal shape to some of the early insights of David Hume. But once one does it, and it becomes clear that ultimate power resides in ordinary people, such as Havel's (1986) greengrocer, the question arises as to whether we need leaders. Why have leaders at all?

There is a hint of an answer in the elegant analysis of Bockenforde (1975, p. 292), when he writes, "The many individuals, powerless by themselves, can become a societal power by banding together. The societal power created in this way can serve them as an instrument to realize their own freedom." He then goes on to point out (p. 292-3), "Every created organization, if it wants to be effective, is designed not only to be the instrument of its members, but to develop its own life and interests, to carve out a small professional leadership stratum from within itself, and to align—if not subordinate—the interests of the members to it." This overlaps, not totally, but considerably with the line that I have taken in this paper.

By examining this question by using elementary game theory and delving into the micro-foundations, I try to show that the power of kings, monarchs, elected rulers, and Donald Trump are not all chimera. The leader can help align and coordinate the behavior of her followers. Having a leader can make a difference, making it impossible for society to settle in certain equilibria where it could have settled if it were a leaderless society. However, the important insight that we get is that the power of authority is not an exogenous force. It arises from the beliefs and behaviors of ordinary citizens going about their daily chores. The little, innocuous decisions and beliefs of the masses can build up to endow some individuals with enormous power[12].

But, being internally constructed, they also can vanish equally quickly. This is lyrically captured in Ryszard Kapuscinski's masterly tale of the fall of Ethiopia's Haile Selassie in **The Emperor: Downfall of an Autocrat** (first published in Polish in 1978). When he ruled, Haile Selassie was the "King of Kings", the "Lion of Judah", and seemingly invincible. What Kapuscinski described was his fall and the mystery of the speed with which his legions of loyal followers vanished almost overnight, into thin air. This becomes much easier to understand once we recognize that there is nothing exogenous to the edifice of power[13].

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[12] Indeed, it is entirely possible that this *ex post* power is bestowed on someone who, without the beliefs of ordinary people, is powerless, reminding us of the power of the powerless in Havel's (1986) classic manifesto. Now that we have a formal model, we may be able to measure the power of the powerless. In the literature, cited above, on power in coalitions endowed through voting systems, we do have formal measures (Riker, 1962; Holler, 1982). There may be ways of adapting that here.

[13] This understanding is important in reality to decide both how we can bring down authoritarianism and how we can stabilize and preserve the well-ordered society. I have already referred to the former, prominently the work of Havel (1986). There is also a substantial literature on strategies for preventing the well-ordered society from being destablized (see Thrasher and Vallier, 2015; Chung, 2020).

The fragility of order--be that of an autocracy or a liberal democracy—as described by Kapuscinski was theorized with remarkable perspicacity by Bockenforde in his political writings. His observation (Bockenforde, 1967), "The Liberal secularized state is nourished by presuppositions that it cannot itself guarantee", hints at this fragility. In the words of Manent (2018, p. 74), Bockenforde's writings capture "the anxiety that the liberal democratic order suffers from a deficit of substance that might threaten its sustainability." The way Selassie's autocracy crumbled, liberal democracies are susceptible as well. The order we see is that of mutual, self-fulfilling beliefs.

Formalizing this as done in the above section is not a pointless exercise because it gives us insights that we may not have had otherwise. As we saw, having a ruler can save us from a life that is solitary and poor as Hobbes had suggested. But having a ruler can also condemn us to *being* solitary and poor, a fate that we may have escaped otherwise, as illustrated by the Monarch game.

One important insight that the use of game theory to formalize old ideas, as done above, that comes out nicely is how it matters who the leader is. This also illustrates that distinction between what is done in this paper and the early work on the core of an economy and equilibrium refinements like the strong equilibrium.

This is best explained with an example. Consider a game with ten players, with each player choosing a strategy from the set {1, 2, …, 10}. If all players choose the same integer, they all earn positive payoffs. Otherwise, they get 0. In addition, we know the following:

If all choose 1, player 1 gets 5, others get 1.
If all players choose n (≠ 1), player n gets 5, and all other players get 4.

It is easy to locate the Nash equilibria of this game. All players choosing the same integer (no matter which) is a Nash equilibrium. I shall call these Nash equilibria 'pinned Nash equilibria', since all players are pinned at the same integer.

Note now that, when people do not manage to converge on the same integer, as long as fewer than 9 players choose each integer, that is also a Nash equilibrium. I shall call these the 'chaotic Nash equilibria'. The chaotic Nash equilibrium is an interesting category. Here people are uncoordinated and miserable. It is an equilibrium only because there is nothing any person can do in his or her individual capacity to escape this predicament. In brief, this is a formal description of the idea of the life in the "state of nature," that goes back to Hobbes and several other enlightenment philosophers, and some early Chinese philosophers, such as Mozi, going as far back as four centuries BCE. There is a literature trying to formalize Hobbes's state of nature, the most popular characterization being via the Prisoner's Dilemma. That is, however, arguably a misrepresentation of Hobbes because if the Prisoner's Dilemma is the game of life, then the unfortunate outcome is inescapable. As Moehler (2009) argues, Hobbes is better represented by the Assurance Game. What I am arguing is that, ideally, we need to think of an extended

Assurance Game, consisting of not just 2 players but many, minimally 3 or more. In that sense, the above 10-player game is an extended Assurance Game. This game has outcomes which are stable in the sense of being equilibria; and no one can do anything unilaterally to get out of this, even though they are doing miserably.

Clearly players will always prefer a pinned equilibrium where they earn positive payoffs, rather than a chaotic equilibrium where they earn 0. From this, it is immediately clear that this is a game where having a leader can be critical, as suggested by Hobbes, so that they can coordinate on which integer to choose. So think of this now as a leadership game where all ten players are part of a group and player $N \in \{1, 2, ..., 10\}$ is the leader. It is immediately obvious that in this game, a Nash equilibrium is deviation proof if and only if it is a pinned Nash. For this, who is the leader does not matter.

But which of these deviation proof Nash will qualify as a Leviathan equilibrium clearly depends on who the Leviathan, that is, who is the leader. It is easy to see in the leadership game in which N is the leader, all players choosing N is Leviathan equilibrium. Hence, in determining where the players end up, it is critically important who the leader is. Moreover, if you are not the leader you should hope that anybody other than player 1 be the leader because that way you can be sure of getting a payoff of 4, whereas if 1 is the leader you will earn 1. Who the leader is clearly affects the well-being of the players.

As soon as we recognize the importance of who leads, the analysis segues naturally into a question that I have thus far avoided, to wit: How should we choose a leader, the one who is entrusted with selecting focal behavior?

Evidently, we have a collective interest in developing good rules for how the leader is selected. Of course, most modern societies already have developed rules for this. Some countries have direct voting for the choice of president, some vote for parties, who then select who will be the Prime Minister, and some have a system of electoral college majority in deciding who will be president. We have seen some disastrous choices that we have made in recent times. Clearly, this is a subject we need to return to and think in terms of revising the rules of how and who we select to lead. The models developed above are useful tools for such an exercise.

We may also use these models to analyze leaders with what kinds of morals are best suited to lead. Stepping beyond mainstream neoclassical economics, we should recognize that everybody does not always play to enhance his or her own payoff[14]. People have different kinds of moral compasses—utilitarian, welfarist, Kantian. There is a growing literature arguing that the self-interested *homo oeconomicus* may be the exception rather than the norm. Beyond this there "is a whole range of *homo moralis* preferences with many different moral profiles" (Alger and

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[14] This observation may sound contradictory in the light of the well-known fact that, at one level, in Nash's conceptualization players need not be selfish. They could equally be "altruistic, spiteful, moralistic" (Sethi and Weibull, 2016), because the payoffs in the payoff function can already be embodying these values. However, one can nevertheless be talking about morals at a meta-level. A utilitarian could thus be someone who tries to maximize the aggregate of everybody's payoff, even though the payoff itself may be some kind of aggregate.

Weibull, 2019, p. 395). Depending on their moral profiles people will choose differently. In our present context, this means, even in their capacity as leader, people with different morals would rank outcomes differently.

In the 10-player game above, if player 1 is the leader the game will end up at a Leviathan equilibrium in which player 1 earns 5 and everybody else earns 1. It is arguable however, if player 1 has a sense of fairness or moral responsibility as a leader, she may not choose the outcome where everybody else earns 1 and she earns 5. A moral person would ask whether it is fair to turn people away from earning 4 or 5 to the dreadful poverty of 1, just to enrich the leader. In brief, the moral compass of the leader will matter. I made no provision for that in this paper but the subject of what kind of morals we should seek in a leader is clearly a matter worth pursuing in the future.

5. Multiple Leaders and the Jigsaw Focal Point

Having a formal model and definition of equilibrium in leadership games can help us ask and answer many important questions that are pertinent to the world we live in. One such matter that immediately comes to mind is that, in reality, we do not have one leader but many. We have many nations, many tribes, each with a leader exercising authority over its respective followers. In the ancient world, when people lived more balkanized lives because it was difficult for one leader's remit to reach the people in other groups, we could treat an economy with one leader as a reasonable proxy for reality. With the rise of globalization, and especially over the last few decades with the increased reach of digital connectivity, we have to recognize that leaders and groups are jostling in overlapping spaces with the potential for more cooperation and also for greater conflict.

How does one model this? It is an easy extension to take the idea of the leadership game developed above to a game that has several leaders. We can then describe a 'multi leader equilibrium'. Such an exercise can provide us with the building blocks for important topics such as how to think of global constitutions and minimal rules of behavior that cut across all societies and nations so as to facilitate greater cooperation and curtail conflict (see Basu, 2018; Sarat, Douglas and Umphrey, 2011; Pistor, 2006). It can also be used to discuss and model responsible corporate behavior in the world where each corporation has a leader but the leaders are also aware of the existence of other corporations with other leaders (Sacconi, 2006).

What I shall do here is to show how we can develop the idea of a 'jigsaw focal point' and then formalize the idea of leadership competition. Given a **game** $G \equiv (N, S, p)$, here is how we can formally define a multi-leader game. Suppose we have t groups: $\{M_1, M_2, …, M_t\} \equiv M$, where $\#M_i > 1$, for all i, and M is a partition of the set of players N. It is possible to think of M being a partition

of a subset of N, in which case there may be individuals who are not members of any group, as above. But little is gained by this greater generality[15].

Let $m_i \in M_i$ be the leader of group i, for every group i. A **multi-leader game** is described by—it is time for another Bengali lesson—the letter খ, 'khaw', where

$$খ \equiv (G, (m_1, M_1), ..., (m_t, M_t)).$$

The formalization of the equilibrium of a multi-leader game can proceed in several ways that are all extensions of the idea of the Leviathan equilibrium. The first step is to consider all Nash equilibria from which no leader would want to and could persuade all followers to deviate to some other strategy tuple. These would be the collection of **deviation-proof Nash equilibria**. More formally, given a multi-leader game, খ, an n-tuple of strategies, s*, is **deviation proof** if there does not exist a leader m_i and an order y that this leader can give (that is, an element y in the Cartesian product of the sets of strategies of the players in M_i) such that $p_i(z) > p_i(z/s_i^*)$, for all i ∈ M_i, where z ≡ @(s*, y).

How then does one select the final equilibrium where this economy might settle? For this we need the idea of a focal point constructed in segments by the orders of different leaders, each to her respective followers. Suppose every leader gives an order. If the outcome that is constructed by all followers of each leader following the leader's order happens to be deviation-proof Nash, then that outcome is 'jigsaw focal point.' It is not a focal point created by one supreme leader pointing to one outcome but various leaders ordering their followers and the combination of these orders being deviation proof.

The next question is whether each leader has an interest in staying with this jigsaw focal point or whether she can do better by a unilateral deviation to a new order to her followers. If she cannot do better by a unilateral deviation, then we have a 'multi-leader equilibrium'

Formally, given a multi-leader game, খ, a deviation-proof Nash equilibrium, s*, of the game will be called a **multi-leader equilibrium** if there is no leader m_i, and no order y of leader m_i, such that z ≡ @(s*, y) is a deviation-proof Nash, and player m_i earns a higher payoff at z than at s*.

A jigsaw focal point as a multi-leader equilibrium provides an answer to Binmore's question as to why we have leaders at all. In a balkanized world, with rapidly changing scenarios or the games we are made to play, and with different groups having common interests but no obvious mechanism of coordinating their actions, each group needs a leader, who can create and join together the pieces of the society's grand puzzle of finding a focal point. There is scope for a lot of different kinds of analysis with this conceptualization of leadership and power.

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[15] In reality, people often have multiple and overlapping identities (Sen, 2006) and also belong to several groups with each having a leader. That would require allowing the existence of overlapping groups with possibly conflicting aims but, for reasons of simplicity, I shall stay away from this.

Here is an interesting and, at first sight, puzzling result. While each group may benefit by having a leader, for the collectivity of groups, the implicit competition between the leaders may backfire and leave everybody worse off. To see this, consider a modified verson of the Traveler's Dilemma game. There are four players, 1, 2, 3, 4. Of these, players 1 and 3 are called the odds, and 2 and 4 are called the evens. These are names, without any significance, akin to Dr. Seuss's famous Sneeches of two kinds--those with green stars on their bellies and those without.

The two groups go on a trip to a remote island and each person buys an identical toy. On return, they find the toys have been damaged and they seek compensation. The airline, not knowing the value of these strange toys offers to reimburse them as follows. All players have to write down an integer from 2 to 100 (supposedly the price of the object). If all 4 write the same number, they get that number in dollars as payoff (the airline assumes they are all saying the truth). If the odds write the same number, r, and the evens write the same number, t, then the players who wrote the lower number get the lower number plus 2 (bonus for likely honesty) and the ones who wrote the higher number get the lower number minus 2 (penalty for possibly lying). For all other plays, all players get zero.

It should be clear that in the modified Traveler's Dilemma there are many 'state of nature' equilibria, where all players get zero, but there is nothing anyone can do individually to change this. If, for instance, all four players write different integers, that will be a Nash equilibrium.

But apart from these there are other 'profitable' Nash equilibria. If all players write 100, they all get 100 and that is Nash. No one can individually deviate and do better. Likewise, for every integer, chosen by all.

Suppose now we are at the Nash equilibrium where they have all chosen 100. Note that, if the odds could cooperate and both of them move to 99, they would be better off. Likewise, for the evens. It follows that if this game was being played as a multi-leader game, with two groups, the odds and the evens and with 1 leading the odds and 2 leading the evens, then everybody choosing 100 will not be a multi-leader equilibrium. In fact, the only multi-leader equilibrium where they earn positive profit is when they all choose 2 and all get 2.

The formation of groups with leaders harms all individuals. Anarchy would have been better.

6. Moral Responsibility and the Game of Life

This analysis also engages with the long-standing philosophical problem concerning the moral responsibility of groups (Tannsjo, 2007; Petersson, 2008; Hess, 2014; Bjornesson, 2014; Pereboom, 2017). Bringing in concepts and tools from game theory to this analysis sharpens our ability to take on some difficult questions (Braham and Holler, 2009; Braham and van Hees, 2012; Halpern and Kleiman-Weiner, 2018; Friedenberg and Halpern, 2019; Basu, 2020). The central question is: Who are the individuals responsible when a group behaves badly, and, how, for that matter, do we define what the relevant group is? When a nation indulges in war crimes, is the entire nation responsible? Or only the ones who do the shooting? Or a set of individuals between

these two extremes? And, in case you did the shooting, but another person's shooting would have killed anyway, are you responsible for the consequence of your shot?

What this paper helps ask more sharply is about the leader's responsibility. Leadership games give rise to new tools of analysis. The view widely taken in the literature is that, if there is a person who by taking a different decision could have unilaterally avoided the bad outcome then that person has moral responsibility. When something bad happens and there is no such person, that is where the controversy erupts. But by this argument the responsibility for the outcome in, for instance, the Leader's Burden game is with player 1, the leader. It is her order, that takes society to a bad outcome. But there are two attenuating observations we have to keep in mind.

First, the leader's power arises in the first place because of the beliefs and behavior of ordinary people. So the collectivity of ordinary people who follow the leader has equal or maybe even greater responsibility. Without their followership, the leader has no power; and they are free not to follow. Indeed, in most cases the leader does not even have to explicitly give the order. People can see what the leader wants; and so knowing who the leader is may be enough for the focal point to emerge, whereby they go for the deviation-proof Nash equilibria where the leader is better off. The fact that it is a collectivity that has the responsibility should not be used to absolve the collective of moral responsibility, and then place all the responsibility on the leader.

Secondly, and related to the above, a leader often does not choose herself to be the leader. Through history, till now, there are examples of individuals who may be evil or a fool, or maybe both, who end up as political leader (I am sure the reader will not have any difficulty finding examples). And, once a leader, such a person may take actions that take society down the tube. Is the leader to be held responsible? Here is a troubling example. In an orchestra, the players of various instruments typically follow the conductor who plays the role of a leader by waving his baton. Now suppose, during an orchestra's performance, a lady in the balcony, combing her hair with a long comb, captures the players' attention and, with their eyes transfixed on her, the music gradually shifts to the one suggested by the movements of her comb. Is she responsible for the bad music that now emanates from the orchestra? Our instinctive response to this, and I believe that is the right response, is that it depends on her *intention*. She did not choose to be the music conductor. If her intention was to just comb her hair, the bad music is not her responsibility, at least not a moral responsibility. But if her intention was to steal the music from the music conductor, that may be her moral responsibility. Often the leader's intention, like the lady with the comb, may be distinct from the collateral damage that her actions inflict.

But no matter if it is the leader's action that prompts the bad action, those who choose and then follow the leader also have a responsibility for the bad outcome, since it happens by virtue of their choices. But once again, the decision to choose the leader (not modelled in this paper) and also the decision to obey the leader (modelled above) are typically a collective decision where every single person can take cover behind the ground of relative insignificance. I raise these matters here not to provide final answers nor to absolve some of the world's recent leaders who were clueless about what they were trying to do, and ended up doing great harm to society. My aim is to draw attention to some of the ambiguities of responsibility that come into sharper focus

when we bring game theory to analyze moral responsibility in contexts where we have leaders. This can have important implications for our understanding of many of our social ills. What the paper tried to do is to set up a structure for conducting some of these investigations.

The use of game theory helps us give formal structure and shape to popular arguments and enables us to answer questions we may not have been able to do otherwise. But, equally, it is folly to forget that the assumptions that we made to allow us to represent reality in the form of normal-form games are assumptions. This forgetfulness is a common affliction among some mainstream economists, who consider the contestation of these 'assumptions in the woodwork' anathema (Basu, 2018).

In reality, we get some of our deepest insights, when, after constructing the model, we begin to ask questions that go beyond the formal structure. In that spirit, I may point out that, in reality, people rarely know the full structure of the game they are playing. So, in reality, they obey the leader's order not always because they know that it is in their self-interest, but because, through trial and error, they have come to 'trust' the leader and expect it to be in their self-interest. But this in turn creates the opportunity for the leader to cheat and give orders to move society to outcomes that are in the leader's self-interest but may not serve the interest of all the followers. A lot of reality around the world and through history, such as the blatant exploitation of loyal followers by leaders, the splintering of groups, and the collapse of leadership, can be explained by this reasoning beyond the formal model. This is also a reminder why in choosing a leader it is important to gauge the kind of moral compass the leader has. This may provide not a guarantee but some safeguard against the exploitation of followers once a leadership moves into the trust phase.

These are ideas that lie beyond the model developed in this paper, but one reason for developing these formal models is to push the reader to think beyond the model and help us grapple with real-life questions and policies.

What the above and the previous two sections talk about have one common element. They touch on the matter of how we can design policies so as to ensure that leadership games, including multi-leader games, do not end up in 'bad' equilibria, such as Pareto dominated ones or ones where the followers do badly. Even when we discuss who all are morally responsible for driving society to some bad outcome, implicitly we are often asking ourselves how we can change the behavior of such individuals (Basu, 2020). There is, however, something contradictory about these discussions. They entail stepping outside of the game of life to discuss how the outcome of the game of life can be bettered. But, is it even meaningful to talk beyond the game of life which is meant to be an all-encompassing description of society? If we can step outside of the game of life, that clearly was not the game of life but some part or segment of the real game of life.

This is an important methodological matter for which Binmore bears some responsibility, because he pioneered some of these ideas in the discipline. For Binmore, the 'game of life' includes all the things that all the players can do. In the game of life only "nature's rules" are given (Binmore, 1995). That you have to drive on the left in Japan cannot be a defining feature of

the game of life in the way that you cannot defy gravity is a part of the game of life. The former is our creation; the latter is beyond us. This is a definition that has caught on in the game theory literature and is widely used today.

What we need to realize however is that such an ultimate game of life does not exist. This is true in the same sense in which, as we know from modern set theory, that there is no such thing as "the set of everything". If we start by uttering those magic words and then develop our set theory, we will run into paradoxes. Hence, the convention is to start by explicitly specifying a "universal set" and assuming that that is all we have, and then proceed from there. The universal set is artificially created with the agreement that for this discourse we shall treat this as the set of everything, and that we shall not step outside it.

The game of life is similar. It is a well-defined game that we, the analysts, specify, and then treat as though there is nothing beyond it. However, starting from this, if we find that the game leads us to a bad outcome, our standard response has been to then think about how such an outcome can be averted. But that is not a legitimate exercise. To think of how we can improve the outcome of the game of life is to step beyond the game of life. That amounts to violating our initial methodological commitment, when we described the game. If the game of life leads to a bad outcome, strictly speaking, there is nothing to be done. All we can do is to lament the fate of the players and stare at the outcome with equanimity, in the spirit of ataraxia, that Binmore discusses in his book. There is nothing for us to do.

What we do in practice is however very different. The previous sections are examples of this. We talk of how we should choose the right leader or how we can try to have prior constitutions to curb certain kinds of behavior, or how we can decide who is morally responsible for the bad outcome and then think of punishments to incentivize better behavior. But strictly speaking, these are all illegitimate moves that entail modifying the game of life. I do not have a resolution for this paradoxical practice of specifying the game of life and talking of actions beyond the game. I am reconciled that this is a paradox that, at least for now, we have to live with.

I may close the paper with an attribution to Binmore for which I cannot cite a source because this is from the classroom of the London School of Economics. After discussing paradoxes in the analysis of strategic behavior, Professor Ken Binmore had assured us, the students, that the existence of these unresolved paradoxes must not be treated as grounds for abandoning the theorems and findings of the discipline. He pointed out that mathematics has many unresolved paradoxes but we, nevertheless, deliberately look away from them and continue to use mathematics. And, arguably, the world has benefited from the use of mathematics greatly. In short, we should try to resolve the paradox but not put everything on hold till we have done so.

References

Alger, I. and Weibull, J. (2019), 'Morality: Evolutionary Foundations and Policy Implications,' in K. Basu, D. Rosenblatt and C. Sepulveda (eds.), **The State of Economics, the State of the World**, Cambridge, MA: MIT Press.

Aumann, R. (1959), 'Acceptable points in general cooperative n-person games', in **Contributions to the Theory of Games IV**, Princeton: Princeton University Press.

Barrett, J. (2020), 'Punishment and Disagreement in the State of Nature,' **Economics and Philosophy**, vol. 30.

Basu, K. (2000), **Prelude to Political Economy**, Oxford University Press, Oxford and New York.

Basu, K. (2018), **The Republic of Beliefs: A New Approach to Law and Economics**, Princeton University Press, Princeton.

Basu, K. (2020), 'The Samaritan's Curse: Moral Individuals and Immoral Groups,' **Economics and Philosophy**, forthcoming.

Basu, K. and Weibull, J. (1991), 'Strategy Subsets Closed under Rational Behavior,' **Economics Letters,** vol. 36.

Basu, K. and Weibull, J. (2003), 'Punctuality: A Cultural Trait as Equilibrium,' in R. Arnott, R. Kanbur, B. Greenwald, and B. Nalebuff (eds.), **Economics for an Imperfect World: Essays in Honor of Joseph Stiglitz**, Cambridge, MA: MIT Press.

Bernheim, B. D., Peleg, B. and Whinston, M. D. (1987), 'Coalition-Proof Nash Equilibria: Concepts,' **Journal of Economic Theory**, vol. 42.

Binmore, K. (1994), **Game Theory and the Social Contract: I. Playing Fair**, MIT Press, Cambridge, MA.

Binmore, K. (1998), **Game Theory and the Social Contract: I. Just Playing**, MIT Press, Cambridge, MA.

Binmore, K. (1995), 'The Game of Life: Comment,' **Journal of Institutional and Theoretical Economics**, vol. 151.

Binmore, K. (2020), **Crooked Thinking or Straight Talk?** Springer-Verlag, Cham.

Binmore, K. and Samuelson, L. (2006), 'The Evolution of Focal Points,' **Games and Economic Behavior**, vol. 55.

Bjornsson, G. (2014), 'Essentially Shared Obligations,' **Midwest Studies in Philosophy,** vol. 38.

Bockenforde, E.–W. (1967), 'Die Enstehung des states als Vorgang der Sakularisation,' in E. Forsthoff (ed.), **Sakularisation and Utopie**, Kohlhammer, Stuttgart.

Bockenforde, E.–W. (1975), Protection of Liberty against Societal Power: Outline of a Problem,' translation from the original German, in M. Kunkler and Stein, T. (eds.) (2017), **Constitutional and Political Theory: Selected Writings**, Oxford: Oxford University Press.

Braham, M. and Holler, M. J. (2009), 'Distributing Causal Responsibility in Collectivities,' in R. Gekker and T. Boylan (eds.), **Economics, Rational Choice and Normative Philosophy**, Routledge, New York.

Braham, M. and van Hees, M. (2012), 'An Anatomy of Moral Responsibility,' **Mind**, vol. 121 (483).

Chung, H. (2020), 'Analysis of Public Reason vs. Convergence Discourse,' **American Journal of Political Science**, vol. 64.

Crawford, V., Gneezy, U. and Rottenstreich, Y. (2008), 'The Power of Focal Points is Limited:

Even Minute Payoff Asymmetry May Yield Large Coordination Failures,' **American Economic Review**, vol. 98.

Friedenberg, M. and Halpern, J. Y. (2019), 'Blameworthiness in Multi-Agent Settings,' Association for the Advancement of Artificial Intelligence: https://www.cs.cornell.edu/home/halpern/papers/group_blame.pdf

Genicot, G. and Ray, D. (2003), 'Group-Formation in Risk-Sharing Arrangements,' **Review of Economic Studies**, vol. 70.

Gintis, H. (1999), 'The World according to Binmore,' mimeo University of Massachusetts, Amherst.

Goldsmith, M. M. (1996), 'Hobbes on Law,' in Sorrell, T. (ed.), **The Cambridge Companion to Hobbes**, Cambridge University Press, Cambridge.

Hadfield, G. and Weingast, B. (2010), 'What is Law? A Coordination Account of the Characteristics of Legal Order,' **The Journal of Legal Analysis**, vol. 4.

Halpern, J. Y. and Kleiman-Weiner, M. (2018), 'Towards Formal Definitions of Blameworthiness, Intention, and Moral Responsibility,' Association for the Advancement of Artificial Intelligence: https://www.cs.cornell.edu/home/halpern/papers/moralresp.pdf

Havel, V. (1986), 'The Power of the Powerless,' in J. Vladislav (ed.), **Living in Truth**, Faber & Faber.

Hess, K. (2014), 'Because They Can: The Basis for Moral Obligations for (Certain) Collectives,' **Midwest Studies in Philosophy**, vol. 38.

Hobbes, T. (1668), **Leviathan.** [1994 edition, edited by E. Curley, Hackett, Cambridge, MA.

Hoff, K. and Stiglitz, J. (2001), 'Modern Economic Theory and Development,' in G. Meier and J. Stiglitz (eds.), **Frontiers of Development Economics**, Oxford University Press, Oxford.

Hoff, K. and Walsh (2019), **The Third Function of Law is to Transform Cultural Categories**, Policy Research Working Paper, World Bank.

Holler, M. (1982), 'Forming Coalitions and Measuring Voting Power,' **Political Studies**, vol. 30.

Hume, D. (1758), 'Of the First Principles of Government,' in **Essays: Moral, Political and Literary**. [1987 edition by Liberty Fund, Indianapolis.]

Kahn, C. and Mookherjee, D. (1992), 'The Good, the Bad, and the Ugly: Coalition-Proof Equilbria in Infinite Games,' **Games and Economic Behavior**, vol. 4

Lewis, D. (1969), **Convention**, Harvard University Press, Cambridge, MA.

Mailath, G., Morris, S. and Postlewaite, A. (2017), 'Laws and Authority,' **Research in Economics**, vol. 17.

Manent, A.–F. (2018), 'Democracy and Religion in the Political and Legal Thought of Ernst-Wolfgang Bockenforde,' **Oxford Journal of Law and Religion**, vol. 7.

Marschak, J. and Radner, R. (1972), **Economic Theory of Teams**, Cowles Foundation Monograph, No. 22, Yale University.

Mehta, J., Starmer, C. and Sugden, R. (1994), 'Focal Points in Pure Coordination Games: An Experimental Investigation', **Theory and Decision,** vol. 38.

Moehler, M. (2009), 'Why Hobbes's State of Nature is best Modeled by an Assurance Game,' **Utilitas**, vol. 21.

Morone, A. and Morone, P. (2016), 'The Focal Point in the Traveler's Dilemma: An Experimental Study,' **Bulletin of Economic Research**, vol. 68.

Myerson, R. (2006), 'Fundamental Theory of Institutions: A Lecture in Honor of Leo Hurwicz,'

mimeo: University of Chicago.

Myerson, R. (2017), 'Village Communities in Economic Development,' mimeo: University of Chicago.

Pereboom, D. (2017), 'Responsibility, Regret and Protest,' **Oxford Studies in Agency and Responsibility 4** (D. Shoemaker, ed), Oxford University Press, Oxford.

Petersson, B. (2008), 'Collective Omissions and Responsibilities,' **Philosophical Papers**, vol. 37.

Pistor, K. (2006), 'Legal Ground Rules in Coordinated and Liberal Market Economies', in K. Hopt, E. Wymeersch, H. Kanda, H. Baum (eds.), **Corporate Governance in Context**, Oxford University Press, Oxford.

Posner, E. (2000), **Law and Social Norms**, Harvard University Press, Cambridge, MA.

Ray, D. (2007), **A Game-Theoretic Perspective on Coalition Formation**, Oxford University Press, Oxford.

Riker, W. (1962), **The Theory of Political Coalitions**, Yale University Press, New Haven.

Roemer, J. E. (2019), **How We Cooperate: A Theory of Kantian Optimization**, New Haven: Yale University Press.

Rubinstein, A. (1980), 'Stability of Decision Systems under Majority Rule,' **Journal of Economic Theory**, vol. 83.

Sacconi, L. (2006), 'A Social Contract Account for CSR as an Extended Model of Corporate Governance. I: Rational Bargaining and Justification,' **Journal of Business Ethics**, vol. 68.

Sarat, A., Douglas, L. and Umphrey, M. (eds.) (2011), **Law without Nations**, Stanford University Press, Palo Alto.

Sardo, A. and Esposito, F. (2019), 'Homo Ludicus: Expected Strategies and Jurisprudence,' **Theory and Criticism of Social Regulation**, vol. 2.

Schelling, T. (1960), **The Strategy of Conflict**, Harvard University Press, Cambridge, MA.

Schmitt, C. (1888), **Political Theology**. English translation with Introduction by G. Schwab, University of Chicago Press, Chicago, 1985.

Sen, A. (2006), **Identity and Violence**, W. W. Norton and Company, New York.

Sethi, R. and Weibull, J. (2016), 'Nash Equilibrium?' **Notices of the American Mathematical Society**, vol. 63.

Sugden, R. (1995), 'A Theory of Focal Points,' **Economic Journal**, vol. 105.

Sunstein, C. (1996), 'On the Expressive Function of Law,' **University of Pennsylvania Law Review**, vol. 144.

Sunstein, Cass R. (1996a), 'Social Norms and Social Roles', **Columbia Law Review**, vol. 96.

Tannsjo, T. (2007), 'The Myth of Innocence: On Collective Responsibility and Collective Punishment', **Philosophical Papers**, vol. 36.

Thrasher, J. and Vallier, K. (2015), 'The Fragility of Consensus: Public Reason, Diversity and Stability,' **European Journal of Philosophy**, vol. 23.

Umbhauer, G. (2019), 'Traveler's Dilemma: How the Value of the Luggage Influences Behavior,' Working Paper 2019-13, BETA, University of Strasbourg.

Vandershraaf, P. (2019), **Strategic Justice: Convention and Problems of Balancing Divergent Interests**, Oxford: Oxford University Press.

Vind, K. (1964), 'A Theorem on the Core of an Economy,' **Review of Economic Studies**, vol. 32.