THE MATHEMATICAL ORIGINS OF INTEREST-BASED BARGAINING

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Modern negotiation technique and strategy found its beginning in game theory, a branch of applied mathematics which studies strategic situations. Game theory was formalized by John vonNeumann during the 1940's and developed extensively during the following decades, primarily at the RAND Corporation in Santa Monica. John Nash (who's life was fictionalized in the film A Beautiful Mind) contributed to the precursors of game theory by studying equilibrium situations in the social sciences. In such situations, people tend not to change.

Much of our common wisdom about interpersonal behavior in bargaining, negotiation, and potential conflict situations comes from game theory. The zero-sum game, for example, characterizes adversarial interaction, where the winnings of one party become the losings of another party. All fair sporting contests are zero-sum games. Former Secretary of State Henry Kissinger was an avid student of game theory. Lose-lose diplomacy, practiced by the US government as MAD (Mutually Assured Destruction) for several decades, comes from the study of a game called the Prisoner's Dilemma. (Vice-President Cheney’s shock and awe tactics also derive directly from game theory.)

Interest-based bargaining (IBB), which is constructed on the win-win principle, comes from the Prisoner's Dilemma game also. Since the structure of this game (and many other games that characterize a diversity of interpersonal interactions) is a well-understood mathematical object, an understanding of how games work can contribute to the success of IBB. I'll describe the simplest case of the Prisoner's Dilemma for context.

The Prisoner's Dilemma

Mathematical games specify a payoff matrix for two or more players. The payoff matrix is simply a list of what each party wins or loses on each round of play. A round of play consists of parties simultaneously casting votes, or providing information that determines the result of that round. Each party votes at the same time, however they can communicate with, solicit, threaten, bribe, encourage, and/or befriend each other freely between rounds.

The Prisoner's Dilemma involves limited communication between parties. Here's the story: The police apprehend two suspects in a crime, who happen to be working together and are also guilty. Before being questioned separately they can devise a strategy. Both can go free if they each provides an alibi for the other. Both can be jailed if they admit guilt. This establishes the win-win and the lose-lose conditions. The win-lose condition, which creates the negotiation tension, is that each can plea-bargain for a lighter sentence by saying that the other is guilty. What would you do? Would you rat on your accomplice to save your skin, or would you trust that he would not rat on you?

To put the same game in a different context, consider two gas station owners on opposite sides of an intersection. If they both keep prices high, both win. If one cuts prices, he gets more customers (win-lose), that is until the other owner cuts prices even more. This results in a price war, in which both make less and less profit, the lose-lose situation.

Consider two parties at the bargaining table. The stronger one party gets, the weaker the other gets, in terms of likelihood to win by establishing their position. This is classic adversarial bargaining, where neither party particularly cares about the cost to the other, so long as they get what they seek. But if the negotiation is not zero-sum, then there also exist solutions in which both parties win, and in which both parties lose. Much of the IBB process is finding those win-win solutions.

The Payoff Matrix

A game payoff matrix helps to clarify negotiation strategies. In the simple game, the payoff matrix consists of four cells, rows defining what Party 1 wins or loses by voting YES or NO, columns defining what Party 2 wins or loses. In the table below, if both parties win or lose together, the consequence is little, but either party can win big by voting NO when the other party votes YES.

	Party 2: YES	**Party 2: NO**
Party 1: YES	+1 +1	+3 −1
Party 1: NO	−1 +3	+0 +0

The payoff matrix provide a rich mathematical structure; in particular the relative magnitudes of potential winnings (and losings) define effective negotiation strategies. Effective means that we can determine the best way to vote in order to maximize gain. The heart of IBB is to maximize the mutual gain of both parties. In the above matrix, note that this can be accomplished by a trusting relationship in which each party takes turns losing a little while the other wins big (alternating YES-NO and NO-YES). But the strategy changes if there is only one vote, only a YES-YES vote will permit both parties to win.

What This Means for LWTC

Even without delving into the books on game theory and political negotiation, we can summarize some important points about how IBB must be structured. For example, IBB is a YES-YES voting strategy, so the idea of taking turns with wins and losses is not available. This means that the optimal joint gain may be less than the optimal possible gain for both parties.

Perhaps the most important observation is that explicit entries in the payoff matrix are mandatory. You cannot develop a coherent strategy without knowing the gains and loses. More directly, all Interests in IBB must be explicitly defined and quantified, and these definitions and measures must be consensual. This is also common-sense bargaining: it is a good idea to know the value of what you are buying.

We also known (mathematically!) that lessening communication between parties drives a game from win-win to lose-lose. All transactions must be transparent and open.

The relative balance of costs and gains within the payoff matrix is critical. Kissinger and Nixon made NO-NO so onerous that anything else was a better alternative. (They also strengthened this by convincing the other parties that they were completely crazy, and thus could not be relied upon to avoid the onerous payoff.) Of course, knowing the relative balance of payoffs also requires anchoring possible decisions to explicit quantitative measurements.

The LWTC negotiation has many aspects, each with its own payoff matrix. In IBB it is necessary to define all these matrices prior to voting. Thus there is a premium in IBB for arriving at consensual definitions of the territory, and for redefining territories that may drive the process into positional, YES-NO moves. The general idea is to eliminate (or to make onerous) all payoffs that are not YES-YES. That is, Positions must have very high costs. And unilateral redefinition must be prohibitively expensive. Note that trust is not mandatory if the costs themselves make destructive moves self-destructive.

Underneath most mathematical analyses is an assumption of rational behavior. Self-destructive (ie NO-NO) moves are available strategies only when they later provide YES-YES situations. An explicit payoff matrix exposes the use of NO-NO moves (examples: 60 student classes, walking out of the negotiation) as tactical. Self-destructive tactics is not permitted in IBB.

The key that makes IBB work is the ability to redefine the payoff matrix so that all rational moves are YES-YES. The territory must first be defined consensually, the payoff then measured consensually, and then the decisions made rationally. It is known that rational decision-making is much easier and more common when the game is explicit.