J. COLLECTIVE NEGOTIATIONS, Vol. 31(1) 21-32, 2006

LABOR NEGOTIATIONS AND GAME THEORY: THE CASE OF ASYMMETRIC BARGAINING POWER

LAWRENCE J. HABER
Indiana-Purdue University at Fort Wayne

ABSTRACT

Recent labor negotiations suggest that game-theory models can be used to analyze a wide range of labor relations situations. This article presents examples of how the Prisoner's Dilemma game can be extended to highlight the incentives present in many contract negotiations, including sports. Examples are the successful asymmetric bargaining power applied to the Major League Baseball Players Association contract talks in 2002, and the problem-filled National Hockey League Players Association negotiations of 2004, which are likened to a game of Chicken, and in which it was unclear whether one side held an advantage over the other.

In a recent article in this journal the author and a colleague analyzed the bargaining surrounding contract negotiations in a game-theoretic framework, drawing an analogy between the negotiations and a repeated game of Prisoner's Dilemma [1]. The conclusion drawn in that article is that cooperative bargaining relations are difficult to achieve in view of perverse incentives. The probability of cooperative relationships is increased when each side of the negotiations exercises sufficient restraint to allow the other party to develop a sense of trust. That occurs when neither every possible advantage nor every slight deviation from normal behavior that might be misconstrued is met with an uncooperative response. Conversely, when threats or competitive moves are to be made, the underlying logic of the move and the potential force behind them must be clear. Idle threats simply destroy the credibility and the reliability of a negotiator.

Recent labor negotiations, particularly those in professional sports, suggest that game-theory models can be used to analyze a wider set of circumstances than had been envisioned in the original inquiry. The conclusion of the major league baseball (MLB) negotiations with its players' union (the Major League Baseball Players Association (MLBPA)) in 2002 and the impending (at this writing) National Hockey League (NHL) negotiations with its union (the National Hockey League Players Association (NHLPA)) provide instructive examples of how the Prisoner's Dilemma game can be extended to illustrate the incentives present in many contract talks.

A RECAPITULATION OF PRISONER'S DILEMMA

In Prisoner's Dilemma there are two agents (here management and labor), each of whom can pursue either of two actions. Each can either be aggressive (uncooperative) in the negotiations or each can be conciliatory(cooperative). The payoff received by one party depends not only on its own action, but on the action of the other. As depicted in the previous article, the payoffs of each party are represented in matrix form in Table 1, where first entry in each cell of the matrix reflects management's payoff from a combination of actions, while the second entry reflects labor's payoff. For example, if management is aggressive, but labor is conciliatory, then management's payoff is +10, while labor's payoff is –10.

In the absence of any communication from its counterpart, each party in the game has a dominant strategy—to behave noncooperatively. That is, whichever strategy one party adopts, the other party is better off taking an aggressive stance in the negotiations [2]. Clearly, however, both parties pursuing noncooperative behavior leads to an outcome (here (–5, –5)) that is suboptimal in the sense that both parties would be better off if each cooperated for a payoff of (+5, +5). Thus, each agent in the game pursuing its rational self-interest achieves a state that is said to be Pareto-inferior. Even if communication were allowed between the parties, there is no assurance that a better outcome would be reached. To achieve a cooperative outcome, both parties would have to agree to be conciliatory. Such an agreement, though, would be unstable without some enforcement mechanism because each agent (if it believed its partner would be cooperative) would have the incentive to cheat on the agreement (i.e., be aggressive), thereby raising its payoff

Table 1. Combined Payoff Matrix

Labor → Management ↓	Aggressive	Conciliatory
Agressive	(–5, –5)	(+10, –10)
Conciliatory	(–10, +10)	(+5, +5)

from +5 to +10. The moral of Prisoner's Dilemma, then, for collective bargaining is that the relationships established are edgy at best. Cooperation and trust between the parties are difficult to create and to maintain.

ASYMMETRIC BARGAINING POWER [3]

In the game presented in Table 1, each agent has an equal amount of bargaining power. That is, each agent raises its payoff by the same amount if a joint cooperative solution, rather than a joint noncooperative solution, is reached. (Each player raises its payoff from –5 to +5.) Further, once there is the prospect of a joint cooperative agreement, each agent has the same incentive to cheat on the agreement (thereby attempting to raise its payoff from +5 to +10). Suppose, however, that the payoffs are not symmetric in this way. Consider the example in Table 2.

Here as before, management can raise its payoff by +10 (from –5 to +5) if a joint cooperative agreement is established, but if it believes that labor will be conciliatory, it can raise its payoff by an additional +5 (from +5 to +10) by cheating (being aggressive). In contrast to the prior game, labor's incentives have changed. The gain to labor from reaching a joint accommodation with management is now +14 (from –5 to +9), but once there is the possibility of joint cooperation, there is little incentive for labor to cheat. If management is conciliatory, labor can raise its payoff only by +1 (from +9 to +10). Because it has the most to gain from joint cooperation (i.e., the most to lose if negotiations break down) and because it has less to gain from reneging on any agreement, labor is in a weak bargaining position. If the payoffs of each party are known, management may well be able to wring added concessions in view of labor's greater incentive to reach agreement.

In its negotiations with MLB in 2002, the players' union found itself in a situation similar to the one outlined in the previous paragraph. The bargaining history between the baseball team owners and their players had been contentious for years [4-7]. From 1972 to 2002, there had been no contract negotiations successfully settled without either a lockout or a strike. Over this period,

Table 2. Asymmetric Payoffs

Labor → Management ↓	Aggressive	Conciliatory
Agressive	(–5, –5)	(+10, –10)
Conciliatory	(–10, +10)	(+5, +9)

however, the players had achieved substantial gains that included obtaining rights to free agency, rights to salary arbitration, and improvement in their pension plan. Also, in the late 1980s, three separate arbitral decisions ruled that owners had colluded in setting free-agent salaries. The players collected a total of $280 million in damages, which sent a clear message that outright collusion between the owners in labor matters was not protected by MLB's exemption from the Sherman Anti-Trust Act. As a result of the players' victories in arbitration, in the courts, and at the bargaining table, the average salary of a player went from just over $34 thousand per year in 1972 to almost $2.3 million per year in 2002 [4, p. 256].

Approaching their negotiations with the owners in 2002, the players had few new demands. They would have been content simply to renew the collective bargaining agreement signed in 1996 on the same terms. The owners, on the other hand, were determined to be far more aggressive in their bargaining. They believed that the rate of growth of salaries that the players had achieved was unsustainable. In spite of existing revenue-sharing agreements among the owners and players, small market teams (most notably Montreal and Minnesota) simply could not afford a payroll sufficient to attract enough "quality" players to remain competitive. Their rosters were routinely depleted by free agency and salary arbitration of promising players by teams in larger markets whose attendance and attendant revenues could support paying higher salaries.

In the previous round of contract talks beginning in 1994, the owners asserted that the great majority of the teams in MLB were losing money, a claim that was hotly contested by the players and that the owners failed to establish credibly. When the owners attempted to force the issue by unilaterally repudiating the players' rights to free agency and salary arbitration on the basis that these were not mandatory issues for collective bargaining, the players took them to court. A federal judge rejected the owners' position and forced the owners to continue to negotiate with the existing free agency and salary arbitration systems in place pending a new collective bargaining agreement. That new agreement was reached in 1996 only after a long strike that cancelled the 1994 World Series and was followed by prolonged stalemate. Needless to say, this round of negotiations did little to engender trust between the players and owners.

The owners' chief representative in 2002, Bud Selig (the commissioner of baseball), was himself a former owner of a small market team, the Milwaukee Brewers. He altered the owners' negotiating strategy. Rather than assert the need for cost containment directly, Selig shifted the emphasis of the debate to the need for the league itself to maintain competitive balance. Selig's strategy struck a responsive chord both with regulators and with the public. Fans, particularly those who followed small market teams, were frequently dismayed when the stars of their teams were traded or hired away to richer franchises (most notoriously the New York Yankees) able to pay far more lucratively. While unpopular with most fans, this system had the effect of sharply raising the salaries of the best players and subsequently, the salaries of average players.

The owners came to the bargaining table with demands consistent with Selig's strategy. Instead of the defined salary cap to which they had adhered previously, the owners put forward a proposal for greatly increased revenue sharing and a luxury tax that progressively punished teams who habitually paid salaries above a set level [8]. In addition, the owners placed on the table a proposal to reduce the number of major league teams from 30 to 28. Contraction would have the immediate effect of raising the profits of the remaining teams, whose splits of national revenues (primarily the broadcasting rights) and any revenue sharing would increase. Of course, because fewer teams would mean fewer players and fewer competitors for their services, the demand for labor would decrease, perhaps causing a reduction in players' salaries (or, at least the rate at which they would increase). Also, the union would be weakened, as there would be fewer members from whom to collect dues. Except for the contraction proposal, the owners' proposals paralleled the proposals of a "blue-ribbon panel" appointed by Selig, giving added credence to the demands.

Even though the contract talks began the same way as most of the prior talks, with each side adamantly holding to its position, the players' union was clearly in a weaker position, despite the talents and tactics of the union's chief representative, Donald Fehr [9]. Given that the average player's salary had more than doubled since the previous contract was signed in 1996 [4, p. 256], the opportunity cost to the players of a strike had greatly increased. Because the players had already achieved nearly all of their demands in prior negotiations, they had little to gain through aggressive negotiation and much to lose from a work stoppage. ESPN columnist Doug Pappas summarized the position of each party in the negotiations as follows:

> Thanks largely to their advance planning, the owners secured a significant public relations advantage over the players. Although the players had almost no demands of their own and would have been happy to renew the old CBA for another five years, fans and the media talked incessantly about the "greedy players" while largely treating the givebacks demanded by the owners as moderate, reasonable proposals to improve the game.
>
> . . . Because of the parties' opening positions, though, the battle was fought almost entirely on the owners' turf. The only real question was how far the players would yield . . . [5].

Although there were many claims of bad faith, much bellicose posturing, and threats of a strike or lockout, both sides eventually agreed to settle without the cancellation of any games. Given the relative bargaining power of each side, one should not be surprised that the owners got the best of the deal. The players, however, did gain some significant concessions. By the terms of the contract, the number of teams was to remain at thirty, essentially for the life of the contract. The question remains whether contraction was a viable option even if the owners were allowed to pursue it independent of the players. The difficulty is that elimination of teams (particularly Minnesota) would jeopardize the goodwill that the owners had so carefully tried to cultivate with the general public. Legislators in Minnesota and elsewhere began to threaten a revisitation of MLB's antitrust exemption, an issue that the owners devoutly did not wish reopened. Contraction seems more of a chip meant to be bargained away than a serious threat in this contract.

As well, through negotiation, the player's union gained concessions from the owners on the proposed luxury tax. From the owners' original demands, the union reduced the amount of revenue sharing, raised the maximum salary limit after which the excess payroll tax would apply (to $117 million), and reduced the rate at which salaries over the limit would be taxed. One wonders, though, how much the owners overstated their initial demands in these areas, knowing that they would have to bargain some of them away. In any event, as compared with the 1996 contract, the owners greatly increased revenue sharing and imposed a larger luxury tax. The owners gained sufficient ground to lead this observer and many others to conclude that indeed they got the better of the negotiation because the players had too much to lose (both in terms of money and public image) and little to gain in the event of a work stoppage).

THE SLIPPERY SLOPE AND THE GAME OF CHICKEN

Consider a hypothetical situation in which, during the 2002 MLB contract talks, both sides remained sufficiently adamant in their initial positions that a settlement of the differences could not be reached. Beside the lingering ill will between players and owners after the previous contract talks, the fans were leery of both sides. Attendance and fan interest took several years to return to prestrike levels. Although the players gained the negotiating advantage at the time, there was overall damage done to the game and to the joint interests of both the players and the owners. If there was a lengthy work stoppage again in 2002, one can conceive that whatever advantage one of the parties could gain over the other would be greatly exceeded by the losses incurred by each party from the loss of fan support. The incentive created in this event can best be represented as the game called Chicken (with obvious reference to the activities of delinquent teenagers in movies of the 1950s and 1960s).

Consider a game with the set of payoffs shown in Table 3. In this game, the incentives for each party are different from those in Prisoner's Dilemma. Neither party has a dominant strategy. That is, pursuing its own self-interest, a party's optimal strategy demands on what it thinks the strategy of the other party will be. Consider management's alternatives. If it believes that labor will be conciliatory, then as before, the better strategy will be to be aggressive in bargaining (raising management's payoff from +5 to +10). Conversely, if it believes that labor will be aggressive in bargaining, then the better option for management is to be conciliatory (receiving a payoff of –10, but avoiding a payoff of –25 if it were aggressive). Because the payoff matrix is symmetric, labor is faced with the same set of choices and with exactly the same incentives and payoffs.

Assuming each party is self-seeking, the outcome of the game will largely be based on the perception that each party has of the game's payoff. Suppose labor believes that the payoff matrix is structured as shown in Table 4. Here, by being aggressive, labor could gain 30 if management were conciliatory (from +5 to +35), but would lose only 5 (from –10 to –15) if management were aggressive as well. On the other hand, labor would believe that by being aggressive, management would only gain 1 (from +9 to +10) if labor were conciliatory, but would lose 90 (from –10 to –100) if labor were aggressive. Because it would have far less to lose than management if no agreement were reached (i.e., if both parties bargained aggressively) and far more to gain by being aggressive, labor might try to assert itself in negotiations. Labor could presume that by threatening management with a strike, it could force concessions. In short, labor would believe that it had the greater bargaining power.

On the other hand, if management perceives the payoff matrix as shown in Table 5, the incentives of labor and management are reversed from Table 4. By analogous logic, management would believe that it had more to gain and less to lose from aggressive, noncooperative bargaining than labor. Thus, both parties might have an incentive to bargain aggressively (noncooperatively), even in the face of mutual disaster.

Table 3. Chicken

Labor → Management ↓	Aggressive	Conciliatory
Aggressive	(–25, –25)	(+10, –10)
Conciliatory	(–10, +10)	(+5, +5)

Table 4. Labor's Perceived Payoff Matrix

Labor → Management ↓	Aggressive	Conciliatory
Aggressive	(–100, –15)	(+10, –10)
Conciliatory	(–10, +35)	(+9, +5)

Table 5. Management's Perceived Payoff Matrix

Labor → Management ↓	Aggressive	Conciliatory
Aggressive	(–15, –100)	(+35, –10)
Conciliatory	(–10, +10)	(+5, +9)

What Tables 4 and 5 emphasize is that one party's perceptions of the relative bargaining strength of both parties go a long way toward determining the stance that the party will take in the contract talks. Precisely for this reason, both labor and management are motivated to disguise their own prospective payoffs in an attempt to mislead their opponents. Each side would like the opposition to imagine that its position is stronger than it actually is, in order to wring concessions from the other side. The situation can be likened to bluffing in poker.

At this writing (July, 2004), the NHL and its players' union (NHLPA) are engaged in contract talks to replace the collective bargaining agreement due to expire September 15, 2004. A public relations battle is being waged between the players whose representative is Bob Goodenow, and the owners' chief spokesman, Gary Bettman. The main issue of contention was the owner's stated need for cost containment. The form of this containment was unspecified by Bettman, but presumably would take the form of a salary tax or a steep luxury tax. Inasmuch as the average player's salary had more than doubled from 1996 to 2002 (roughly in lockstep with MLB baseball salaries) [4, p. 256], the players are interested in protecting the gains that they had achieved through free agency and arbitration. They vehemently oppose any form of coordinated salary control. Due to widely differing positions on the crucial issue, it is not surprising that the negotiations have been far from cordial to this point, with each side claiming bad faith on the part of the other.

To bolster the credibility of their claims of the need for cost containment, the owners hired Arthur Levitt (former chairman of the Securities and Exchange Commission (SEC)), Lynn Turner (former chief accountant of the SEC), and Eisner LLP (an independent accounting firm) to audit the profitability of the NHL's thirty teams and also to comment on the sustainability of the league itself going forward. The report found the following:

1. In the 2002-2003 season, the NHL teams in aggregate lost $273 million (an average of $9.1 million per team).
2. Nineteen of the 30 teams in the league lost money in 2002-2003.
3. From league revenues of $1.996 billion in 2002-2003, players salaries amounted to $1.494 billion, almost 75 percent [10].

Accordingly, in the conclusion of his report, Levitt stated:

> Based on our work, our understanding of the business of the sport of hockey, and our knowledge of the financial relationships that generally need to exist in order for a business enterprise to be financially sound and successful, the current relationship between League-wide player costs and League-wide revenues is inconsistent with reasonable and sound business practices. Player costs of $1.494 billion or 75% of revenues substantially exceed such relationships in both the NBA and the NFL as those relationships are set forth in their collective bargaining agreements.

The findings of the report have largely gone unchallenged and form the substantial basis of the owners' demands [10].

The players' response to the owners' contentions has been simple. They simply assert that they have achieved their gains through free and open bargaining. The salaries, therefore, are simply those that a competitive, free market will support. To allow owners increased monopsony power, in effect permitting them to collude in an attempt to lower salaries, would be unjust and inefficient. In effect, the players believe that they are being asked to participate in an agreement that will protect the owners from themselves to the players' detriment.

Each side remains adamant at this time. Given their financial state, the owners contend that they cannot continue under the present system. The Levitt report lends plausibility to this claim. On the other hand, if as they say, many owners do not have deep pockets, they can ill-afford a work stoppage that might alienate fans once the schedule resumed. If the stoppage is too long, fans might lose interest or find alternative outlets for their loyalty and patronage.

One major strength of the players' position is that, unlike Major League Baseball players, the hockey players conceivably have alternative outlets for their services. Well-established leagues in Europe have existed for some time. In addition, a fledgling league, the World Hockey Association (WHA—a different organization from the WHA that operated in the 1970s) is planning on starting play this fall. While the possibility of alternative employment does add strength to the union's bargaining position, just how much strength is debatable. First, there is the question of just how many players foreign teams would be willing and able to absorb. Even if the WHA does manage to begin play this fall, they plan to do so with only eight to ten teams, not the current thirty teams in the NHL. Further, the alternative leagues generally will not pay as much as the NHL. For example, the WHA plans to start play with a salary cap of $20 million per team [11]. The most severe proposal by the owners in the NHL talks called for a salary cap of $31 million per team [12]. Finally, if the current system is allowed to persist, there is a high probability that several teams will have to cease operations. The Buffalo and Ottawa franchises are already in bankruptcy proceedings. A league with fewer teams (as with contraction in MLB) provides fewer employment opportunities for the players.

Examination of each party's condition suggests the analogy to the game of Chicken. The players are certainly better off settling—even on the owners' most stringent terms—than they would be if they walked out or were locked out. For example, the owners' initial demand would reduce the average player's salary in the league from the 2002 level by slightly more than 37 percent. The announced salary cap in the WHA would reduce the average player's salary by more than 50 percent. Moreover, if there were a work stoppage, the number of players seeking alternative employment in the WHA and the European leagues would tend to create a glut and to depress wages in those leagues. The reason that the NHL is able to attract the best hockey talent from all over the world in the first place is that they pay superior salaries. Absent these superior salaries, the players will suffer economic losses even if they could find other employment.

At least in the view of this author, the owners are in a somewhat better bargaining position. They have offered credible evidence of the poor financial state (at least on a cash-flow basis) of the league largely due to high player salaries. In response to the Levitt report, the union has offered an across-the-board 5 percent reduction in those salaries (obviously, far less than the owners' demand for a 37 percent reduction).

Nevertheless, one should not conclude that the owners would be better off shutting down rather than accepting the players' offer of the 5 percent reduction in salaries. Despite the losses in the league in 2002-2003, Forbes.com reported that the average value of an NHL franchise was $159 million (down 3 percent from the previous year, as they note, largely the result of the impending labor strife) [13]. Quite clearly, the owners have an interest in protecting the market value of their franchises. The question remains of what happens to the value of those franchises if there is an extended work stoppage. There is reason to believe that such a stoppage would indeed decrease their value. Consider the following points:

1. An extended work stoppage will allow the WHA to enter the market without competition. If the WHA can establish itself as a viable alternative to the NHL, the value of the NHL franchises may be put under pressure.
2. One of the reasons that the NHL attracts the best hockey talent in the world is that it pays a premium over what that talent could earn elsewhere. To the extent that the NHL owners can achieve significant reductions in their players' salaries, thereby reducing that premium, the league may no longer be as attractive to that talent. If the quality of play in the league declines, fans may be more likely to find the WHL an acceptable substitute.
3. An extended work stoppage in and of itself may adversely affect fan loyalty even if there were no alternative hockey leagues. The NHL has always been in competition with other winter sports, primarily the National Basketball Association and NCAA basketball. In the event that there is a cancellation of a large number of NHL games, fans may turn their attention

to these sports. Because at least in the United States, hockey is far less popular than basketball, the NHL can hardly afford to alienate fans (perhaps permanently).

Arguably, then, the owners might be better off simply settling on the players' terms (i.e., accepting the offer of a 5 percent salary cut) rather than facing a long work stoppage, particularly if the stoppage forced cancellation of an entire season as the players have threatened.

It is obvious that both parties would be better off if the contract terms were settled without a work stoppage. This study has suggested that each party would be better off settling on the other's terms instead of risking an extended strike or lockout. Yet, each side has much to gain by winning concessions from the other. Perhaps each believes that it can impose a greater penalty on the other in the event of an impasse than it will endure itself. Regardless, the parties find themselves staring at each other on what is called the slippery slope in the game of Chicken, where the consequences are large. Until now, neither side has budged from its initial offers. Which side has the greater bargaining power? It is difficult to tell. What remains to be seen in this stare down is which party will blink first, when, and how much damage will be done to the joint and individual interests of the parties in the end.

CONCLUSIONS

In this article, there is an attempt to apply some of the tools of the game theory to contract negotiation, taking into account the possibility of asymmetric bargaining power. First, asymmetric bargaining power was presented in the context of the Prisoner's Dilemma game. Applying this game to the MLB contract talks in 2002, available evidence suggests that the owners, thanks to the negotiating skill of Bud Selig, had the better position and accordingly won much of what they realistically could achieve. In contrast, in the NHL contract negotiations taking place in 2004, the suggestion is made that the owners and the players have the ability to do more damage to their joint interests than either could hope to gain through aggressive bargaining. The analogy is drawn to the game of Chicken. Whether one side holds an advantage over the other in the talks is unclear. What is clear is that in this game of Chicken, an impasse and extended work stoppage may do permanent damage to both sides.

ENDNOTES

1. L. J. Haber and J. Wellington, Public-sector collective bargaining: Lessons from game theory, *Journal of Collective Negotiations in the Public Sector*, *30*(2), 2003, pp. 149-157.
2. For a more complete discussion of why this is so, see [1, pp. 149-152].

3. For an alternate, parallel discussion of bargaining power, see D. A. Dilts and C. R. Deitsch, *Labor Relations* (New York, Macmillan Publishing Company, 1983), pp. 131-138.
4. M. A. Leeds and P. von Allmen, *The Economics of Sports*, 2nd edition (New York, Pearson Addison Wesley, 2005), pp. 255-256, 315-330.
5. D. Pappas, "A Contentious History: Baseball's Labor Fights," retrieved September 8, 2002 from http://espn.go.com/mlb/columns/bp/1427632.html
6. D. Grabiner, "Frequently Asked Questions about the Baseball Labor Negotiations," retrieved 2004 from http://remarque.org/~grabiner/laborfaq.html#A4
7. J. Helyar, *Lords of the Realm—The Real History of Baseball* (New York, Villard Books, 1994).
8. The owners initially proposed a limit of $98 million [6, §A5].
9. For a brief biographical sketch, see M. Wright, "Fehr Factor," *Indiana Alumni Magazine*, *66*(6), July/August 2004, pp. 34-37.
10. For a complete transcript of the Levitt Report and discussion (biased toward the owners), see http://www.nhlcbanews.com/levitt/index.html
11. For further discussions of the WHA's plans, see a May 11, 2004 story on the AP wires that can be found at http://sports.espn.go.com/nhl/news/story?id=1799977
12. S. Burnside, "Commish States League' Case in CBA Clash," On ESPN.com, June 28, 2004, http://sports.espn.go.com/nhl/news/story?id=1829690
13. "Game Misconduct," on Forbes.com, retrieved December 12, 2003 from http://www.forbes.com/free_forbes/2003/1208/094tab.html

Direct reprint requests to:

Dr. Lawrence J. Haber
Associate Professor of Economics
School of Business and Management Sciences
Indiana-Purdue University at Fort Wayne
2101 Coliseum Blvd. East
Fort Wayne, IN 46805
e-mail: haber@ipfw.edu