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The Role of Information Concerning the Arbitrator's Preferences
La connaissance par les parties des préférences de l'arbitre et les types d'arbitrage

Christopher J. Bruce

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Article abstract

The purpose of this paper is to propose to extend the theoretical literature on bargaining under arbitration by categorising arbitration Systems not only by the type of selection procedure employed but also by the amount of information conveyed to the parties about the preference function of the arbitrator.

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The Role of Information Concerning the Arbitrator's Preferences

Christopher J. Bruce

The purpose of this paper is to propose to extend the theoretical literature on bargaining under arbitration by categorising arbitration systems not only by the type of selection procedure employed but also by the amount of information conveyed to the parties about the preference function of the arbitrator.

As the number of jurisdictions employing compulsory arbitration has grown, so too has the debate concerning the relative merits of different systems of arbitration[1]. The major distinction which has been made between these various systems has been based upon the selection procedure employed. In particular, most authors have distinguished between *conventional* selection procedures, in which the arbitrator is free to choose any outcome he wishes, and *final-offer* selection procedures, in which the arbitrator is forced to accept "one or the other" of the parties' final positions.

In this literature, two criteria have generally been applied to evaluate the relative merits of the different arbitration systems. First, they have been contrasted to identify their "chilling" effects; that is, to determine the degree to which they discourage bargainers from reaching their own agreements[2]. Secondly, most studies have implicitly contrasted the relative effi-

* BRUCE, Christopher J., Associate Professor, Department of Economics, The University of Calgary.

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1 Some of the most important articles in this literature include: C.M. STEVENS, "Is Compulsory Arbitration Compatible With Bargaining?", *Industrial Relations,* Vol. 5, No. 1, February 1966, pp. 38-52; T.P. GILROY and A.V. SINICROPI, "Impasse Resolution in Public Employment: A Current Assessment", *Industrial and Labor Relations Review,* Vol. 25, No. 4, July 1972, pp. 496-511; P. FEUILLE and C. LONG, "Final-Offer Arbitration: 'Sudden Death' in Eugene", *Industrial and Labor Relations Review,* Vol. 27, No. 2, January 1974, pp. 186-203; P. FEUILLE, "Final-Offer Arbitration and the Chilling Effect", *Industrial Relations,* Vol. 14, No. 3, October 1975, pp. 302-310; and C. FEIGENBAUM, "Final-Offer Arbitration: Better Theory Than Practice", *Industrial Relations,* Vol. 14, No. 3, October 1975, pp. 311-317.

2 For example, see P. FEUILLE, *loc. cit.*

ciency of outcomes attained under the different systems. For example, a common criticism of final-offer selection is that it may force the arbitrator to choose an outcome which all parties recognise as being sub-optimal[3].

We believe that a weakness of the existing literature is that it does not give adequate attention to the role which information about the arbitrator's preferences has on the ability of the parties to reach their own agreement and on the efficiency of agreements either reached voluntarily or imposed by the arbitrator. Accordingly, in this paper we propose to extend the theoretical literature on bargaining under arbitration by categorising arbitration systems not only by the type of selection procedure employed but also by the amount of information conveyed to the parties about the preference function of the arbitrator. In particular, we shall argue that three distinct information systems are possible: the parties may possess *full-information, limited-information,* or *no-information* about the preference function of the arbitrator.

Thus, we identify six arbitration systems rather than the usual two — three information systems, each offering two possible selection techniques. With respect to each of these systems we will analyse the bargaining process in order to identify (a) the (Pareto) efficiency of the outcomes and (b) the probability that the parties will be able to reach their own settlement. Some of our conclusions include:

1. The most important determinant of the parties' ability to reach their own settlement is not the selection procedure employed but the amount of information conveyed about the arbitrator's preferences.

2. That there "... is no showing that fewer negotiations reach impasse (under final-offer arbitration) than would occur under conventional arbitration..."[4] is due to the fact that most existing arbitration systems provide parties with the same, limited amount of information.

3. The relative success of the Michigan system in avoiding bargaining impasses results because it provides full information[5].

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3 For example, see C. FEIGENBAUM, *loc. cit.*, esp. p. 316.

4 *Ibid.*

5 For analyses of the Michigan system see C. FEIGENBAUM, *loc. cit.;* P. FEUILLE, *loc. cit.;* and C.H. REHMUS, "Is A 'Final Offer' Ever Final?", *Monthly Labor Review,* Vol. 97, No. 9, September 1974, pp. 43-45. For a brief description of the Michigan system see section I of this paper.

INFORMATION CATEGORIES

In this section we define the three information categories to be used in the paper.

Full-information

In a full-information arbitration system the arbitrator announces the outcome which he would prefer to choose after hearing the arguments of the two parties. He then gives the parties the opportunity — perhaps aided by mediation — to reach their own agreement[6]. If they fail to reach such an agreement the arbitrator either imposes his previously-announced outcome (full-information, conventional arbitration)[7], or uses that outcome to choose between the final offers of the two parties (full-information, final-offer arbitration)[8]. The system which most closely conforms to our model of full-information, conventional arbitration is that used in the federal arbitration system of Australia. In this system, the arbitrator is expected to make a broad statement of his views *before* the arbitration hearings take place and to encourage the parties to reach their own agreement at that time[9]. The full-information, final-offer model also has an empirical counterpart, in the Michigan final-offer statute. In this system, the parties do not have to make their final positions known until after the arbitration hearings have been held. Thus, some parties employ this latitude to delay announcement of their positions until after they have been able to "... receive some indication of the neutral's views through their appointed representative to the (arbitration) panel."[10]

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6 What I have in mind here might be referred to as arbitration-mediation, as opposed to the conventional mediation-arbitration process.

7 The selection technique in which the arbitrator "splits the difference" between the parties' final offers may be treated as a variant of full-information, conventional arbitration. For, in this technique, both parties are always completely informed about the outcome which would be chosen by the arbitrator.

8 Recently a number of authors have suggested that final-offer selection be modified to allow each of the parties to make more than one final offer. (Cf. C.B. DONN, "Games Final-Offer Arbitrators Might Play", *Industrial Relations,* Vol. 16, No. 3, October 1977, pp. 306-314; and V.P. CRAWFORD, "On Compulsory-Arbitration Schemes", *Journal of Political Economy,* Vol. 87, No. 1, February 1979, pp. 131-159.) However, as our primary interest is in the effects of information on arbitration we will deal only with schemes which allow a single final offer.

9 See K.F. WALKER, "Compulsory Arbitration in Australia"; in J. Joseph Loewenberg et al., *Compulsory Arbitration,* D.C. Heath & Co., Lexington, Mass., 1976.

10 REHMUS, C.H., *loc. cit.,* p. 44.

Limited-information

The parties to a dispute will be said to possess limited information about the arbitrator's preference function if their information is based upon precedent, previous decisions by the arbitrator in question, and/or statutory arbitration criteria. Clearly, most existing arbitration systems, whether conventional or final-offer, fall into this category.

No-information

No-information arbitration cannot refer to a situation in which the arbitrator bases his decision on a formal set of criteria. For, even though those criteria may not be publicised, they cannot be kept secret as they will be revealed through precedent. Thus, for the negotiators truly to have *no* information concerning the arbitrator's preferences, the arbitrated outcome must be chosen at random. Under conventional selection this would require that the arbitrator select at random from a previously-determined set of possible outcomes; whereas under final-offer selection it would require that the arbitrator "flip a coin" to determine which of the two offers would be accepted. Alternatively, in a final-offer system, the parties might each be asked to submit a list of potential arbitrators before bargaining began. If an impasse was reached, an arbitrator would then be chosen at random from this list. As the arbitrator so-chosen would normally be expected to select the final offer of the party which had appointed him, this procedure would have a similar effect to the selection of a final offer through the flipping of a coin. A form of this modified no-information, final-offer arbitration system has been employed at the University of Lethbridge, Lethbridge, Alberta.

In the analysis of each of these information systems it will be necessary to employ a model of the bargaining process. It is to the statement of this model to which we now turn.

A BARGAINING MODEL

The model which we propose to employ in this paper was first developed by Neil Chamberlain[11]. In this model, Chamberlain assumes that bar-

[11] CHAMBERLAIN, N.W., *A General Theory of Economic Process,* New York, Harper and Bros., 1955, esp. Ch. 6. (*Note:* we show in an Appendix that Chamberlain's model predicts the same results as do the models of Zeuthen and Nash. Chamberlain's model is employed in this paper because it has the greatest intuitive appeal.)

gaining behaviour will be governed by the trade-off between the cost to the bargainer of conceding to its opponent's demands — the "cost of agreeing" — and the cost to it of failing to reach any agreement at all — the "cost of disagreeing"[12]. In particular, the bargaining power of the union is measured by the ratio of management's costs of disagreeing and agreeing. That is, the union can be said to be in a strong bargaining position if the cost to management of disagreeing is high relative to its costs of making a concession. The reverse will then be true for management's bargaining power. Thus, the bargaining powers of the union and management can be represented by:

$$\text{Bargaining power of management} = \frac{\text{Cost to the union of disagreeing}}{\text{Cost of the union of agreeing}}$$

$$\text{Bargaining power of the union} = \frac{\text{Cost to management of disagreeing}}{\text{Cost to management of agreeing}}$$

The importance of bargaining power in Chamberlain's model is that the party with the greater bargaining power is assumed to be able to display the greater "commitment" to its position. Thus, the party with the lesser power is assumed to be forced to make a concession on its position. In doing so, however, it reduces the opponent's costs of agreeing to that position, thereby increasing its own power relative to that of its opponent. If the concession is large enough, the relative bargaining powers of the two parties will be reversed and it will then be the opponent who will be forced to offer a concession on its position. In this way concession is expected to be followed by counterconcession until an agreement is reached.

We now employ this simple model to analyse the bargaining process under each of the three information sytems described in the previous section.

FULL-INFORMATION ARBITRATION

Conventional Arbitration

Assume that there are two issues over which management and the union are bargaining: an across-the-board wage increase and a change in the number of hours worked per week[13]. Assume further that the union's

12 In normal collective bargaining, the cost of disagreeing is the cost of a strike. In an arbitration system, however, it is the cost of having to accept the arbitrator's decision rather than the party's preferred position.

13 Although we have chosen, for ease of exposition, to considere only two bargaining issues, it can easily be shown that our results hold for any situation in which there are more than two issues. These results do *not* hold, however, for a single-issue situation.

utility-maximising demand is for a 20 percent increase and a 35 hour work week — which, for simplicity, we will denote as U (20%, 35 hr.) — that management's profit-maximising offer is for M (8%, 40 hr.), and that the arbitrator has announced that he would award A (12%, 37 hr.) in the event of an impasse. If there is an outcome which *both* parties would prefer to A (12%, 37 hr.) then the arbitrator's award may be said to be *Pareto inefficient*. On the other hand, if that award is such that any movement away from it would leave at least one party worse off, it is said to be *Pareto efficient*. It is generally assumed in the industrial relations literature that (interest) arbitrators' awards will be inefficient in this sense. The reason for this assumption is that arbitrators cannot be expected to possess sufficient information to identify with certainty the preference functions of both parties, particularly when a large number of issues is being considered. Thus, throughout the remainder of the paper we will assume that the arbitrator's award is Pareto inefficient, although we certainly do not mean to imply that this would always be the case[14].

Given these assumptions, the "cost of disagreeing" to each party will be the perceived cost of having the arbitrator's award imposed (rather than having its own, preferred position accepted); and the "cost of agreeing" will be the cost of accepting its opponent's last offer. Under these circumstances, we anticipate that bargaining will occur as Chamberlain predicted and that both sides will make concessions which will move them "towards" the arbitrator's announced award[15].

This process can be expected to continue at least until one of the parties has offered either the arbitrator's award or an outcome which both sides prefer to that award. For example, assume that management offers outcome M (13%, 38 hr.), which both it and the union prefer to A (12%, 37 hr.). The bargaining process at this point undergoes a subtle change as the threat that the dispute will go to arbitration subsides — both sides would now prefer to settle on management's last offer rather than submit to arbitration. The goal of the union now becomes to find an offer which both it and management would prefer to management's last offer. Assume that U (15%, 39 hr.) is such an offer. Once this offer has been made, management will seek a counteroffer which is preferred by both parties, etc. This process will only end when one of the parties has reached a position which cannot be

14 Indeed, there may be situations in which arbitrators can produce awards which are superior to the outcomes which the parties would have reached themselves. Cf. Christopher BRUCE, *Private Law and Public Conflict: The Use of Private Arbitration Procedures to Resolve Industrial Relations Disputes,* Institute of Economic Affairs, London, 1980.

15 The bargaining process will never tend to converge on an award which one party finds less satisfactory than the arbitrator's award, as that party can always obtain the arbitrator's award by refusing to bargain.

improved upon without making one of the parties worse off. Settlement can be expected to occur at this position.

Thus, the effect of providing full information concerning the arbitrator's preferred award in conventional arbitration is to induce the parties to bargain with one another in an attempt to find a result which both prefer to that award. It seems not unreasonable to anticipate that this bargaining will continue until an outcome is found to which alterations cannot be made without making at least one party worse off. By definition, such an outcome is Pareto efficient[16].

Final-offer Arbitration

The information requirements under final-offer arbitration are much more stringent than they are under conventional arbitration. Whereas the bargainers would be said to be fully informed in the latter if they knew only the award which the arbitrator would impose in the event of an impasse, full information in the former requires that they know *both* the award which the arbitrator would wish to impose *and* his relative preferences for outcomes which deviate from that award. For, in final-offer arbitration, the cost of disagreement to each party is provided by the threat that the arbitrator will select the opponent's last offer. Thus, "full information" implies that each party is able to determine which of the two "final" offers would be selected by the arbitrator in the event of an impasse.

Assuming that the arbitrator is able to provide this information, bargaining can be expected to proceed as follows: First, assume again that the union's initial demand is U (20%, 35 hr.), that management's initial offer is M (8%, 40 hr.), and that the arbitrator's preferred outcome is A (12%, 37 hr.). Assume also that the parties are able to determine that, in the absence of further negotiations, the arbitrator would select management's offer. Clearly, the union will be provided with a very strong incentive to make a sufficiently large concession on its initial position that its new demand

16 In a recent article, Henry FARBER and Harry KATZ ("Interest Arbitration, Outcomes, and the Incentive to Bargain", *Industrial and Labor Relations Review,* 33(1), October 1979, pp. 55-63) imply that there will be no bargaining in the face of full-information. (In their terminology, our model assumes $Y_{aF} = Y_{bF}$ and $\sigma^2 = 0$.) This difference results from their implicit assumption that the arbitrator is considering only one issue and, therefore, that it would not be possible to alter the arbitrator's award without making one party worse off. For example, if the arbitrator was to decide only on the issue of the across-the-board wage increase, and if he were to decide that that increase should be 10 percent, no other figure would be preferred by *both* sides. Thus, the parties would have no reason to bargain with one another. However, although this assumption may apply to grievance arbitration it clearly does not apply to interest arbitration.

would be selected by the arbitrator. In response, management will be induced to make a further concession in order to ensure that its position would be selected, etc.

As this process of concession and counterconcession will lead the parties to move "closer" and "closer" to the arbitrator's preferred award, A (12%, 37 hr.), it can be expected that one of the parties will ultimately be induced to offer that position. Crawford argues that bargaining will cease at this point — that is, that the parties will agree to A (12%, 37 hr.) — because neither party "... can obtain a settlement he prefers to the equilibrium one (in this case, the arbitrator's award) by *unilaterally* changing his offer."[17] (Emphasis added.) That is, as both parties realise that the arbitrator would select A (12%, 37 hr.) in the event of an impasse, neither party will be able to impose any other outcome on its opponent.

In our view, Crawford's argument ignores the existence of an important alternative which is open to the two parties; namely, that they may choose to reach a mutual agreement to a position other than that preferred by the arbitrator. For example, assume that the union has offered to accept the arbitrator's preferred award of A (12%, 37 hr.). Although management will be unable to find an alternative position which would be chosen by the arbitrator in the event of an impasse, it may be able to find a position which both it and the union prefer to A (12%, 37 hr.). In such a case, we expect that it would be able to induce the union either to accept such an outcome voluntarily, or to make a counteroffer which both preferred to management's position. As in the discussion of conventional arbitration, management might offer M (13%, 38 hr.), for example, to which the union might respond by offering U (15%, 39 hr.), etc. Such a process would only be expected to end when one party had offered an outcome on which neither party could make an improvement without making one of them worse off. Furthermore, it seems reasonable to assume that a voluntary agreement would be reached at this point[18].

Thus, under full-information, final-offer arbitration bargaining can be expected to take place in two stages. In the first stage the parties are drawn towards the outcome which is preferred by the arbitrator, an outcome to which naive bargainers may agree. But, if the arbitrator's preferred out-

17 CRAWFORD, *loc. cit.*, note 8, p. 135.

18 No technical proof of this assertion can be given. For, although there may exist no other outcome which is preferred by both union and management, there will (generally) exist other outcomes which are preferred by both the arbitrator and one of the parties. Thus, that party might consider it advantageous to offer such an outcome. In this case, the bargaining process would begin anew and no predictions could be made with regard to the eventual outcome. However, such a strategy would require that one of the parties renege on an offer which it had made previously. We shall assume that institutional constraints deter such a stragegy.

come is Pareto inefficient there is no reason to believe that most bargainers would not enter into a second stage of negotiations in which they can be expected to bargain towards a Pareto efficient agreement. It is for this reason that we argued in the introduction that the Michigan arbitration system (which is a form of full-information, final-offer arbitration) would be successful in avoiding impasses.

Once again, therefore, we conclude that if the parties are fully informed about the arbitrator's preferences the two parties can be expected to reach their own agreement. However, one caveat must be introduced with respect to the comparison between conventional and final-offer, full-information arbitration. That is, in conventional arbitration the parties need only know the arbitrator's preferred *outcome* in order to induce them to bargain towards their own agreement; whereas under final-offer arbitration they must also be well informed concerning the arbitrator's preference *function*. For, if the parties disagree concerning the shape of that function, they may be unable to approach the arbitrator's preferred outcome during the first stage of bargaining and an impasse may result.

LIMITED-INFORMATION ARBITRATION

Conventional Arbitration

When the bargainers' perceptions of the arbitrator's preferred outcome are based on incomplete information, two distinct possibilities arise. First, the perceptions of the two parties may differ in such a way that each party expects that, in the event of an impasse, the arbitrator will choose an outcome which is more favourable to its opponent than to itself. We will refer to this situation as one in which the parties' perceptions "intersect". For example, management may expect that the arbitrator's award will be A_m (14%, 36 hr.) and the union may expect that it will be A_u (10%, 39 hr.). In such a case, we would normally expect that the parties would be able to reach an agreement without reference to an arbitrator. For the bargaining process which we described in section III will lead the union to make concessions which move it "towards" A_u (10%, 39 hr.); while management will be induced to move "towards" A_m (14%, 36 hr.). Eventually, therefore, one party will make an offer which the other considers to be at least as satisfactory as the outcome which it believes the arbitrator would award. From that point onward, the second party will have a strong incentive to settle voluntarily rather than to submit to arbitration. Furthermore, there is no reason to believe that the settlement so-produced would be Pareto inefficient, as

there would be no constraint to prevent the parties from seeking outcomes which made them both better off.

Thus, the initial conclusion must be that if the parties have intersecting expectations, there will be a strong inducement for them to reach a voluntary agreement. But Farber and Katz[19] show that this conclusion must be tempered in those situations in which the parties are risk-takers. That is, as neither party is certain concerning the value of the award which the arbitrator will impose, the award which each of them "expects" to receive will be an average of a large number of possible outcomes. Thus, a risk-taking negotiator who was dissatisfied with the outcome of voluntary negotiations might elect to go to arbitration, not because he expected, on average, to obtain a preferable result from arbitration than from voluntary bargaining, but because there was *some* chance that a preferable outcome might be obtained.

Based on evidence collected by Farber[20], however, Farber and Katz conclude that negotiators will be risk-averse and, therefore, that this caveat will not be of importance. But Farber's evidence relates only to individual union members, whereas the negotiating decisions will be made by an agent or bargaining team whose preferences may differ from those of the rank-and-file. Indeed, in a recent study of 111 municipal and school bargaining units in six American states, Gerhart and Drotning found persuasive evidence to indicate that "... the parties in public-sector bargaining are more likely to push disputes on to the terminal step of an impasse procedure — whether compulsory arbitration or a strike — the greater their uncertainty about future costs and benefits of continued bargaining."[21] Apparently the subjects of their interviews were not risk-averse and, therefore, they could be expected to choose arbitration even in some situations in which their expectations concerning the arbitrator's award intersected.

The second situation which may arise under limited information, conventional arbitration is that in which the perceptions of the parties differ in such a way that each party believes that the arbitrator would choose an outcome which was more favourable to itself than to its opponent. That is, the perceptions of the parties concerning the arbitrator's award may be "non-intersecting". The industrial relations literature gives us reason to believe that this situation will be more common than that in which these percep-

19 FARBER and KATZ, *loc. cit.*, note 16.

20 FARBER, Henry S., "Individual Preferences and Union Wage Determination: The Case of the United Mine Workers", *Journal of Political Economy*, 86(6), October 1978, pp. 923-42.

21 GERHART, Paul F. and John E. DROTNING, "Do Uncertain Cost/Benefit Estimates Prolong Public-Sector Disputes?", *Monthly Labor Review*, 103(9), September 1980, pp. 26-30.

tions intersect. For, as Walton and McKersie argue in their seminal work, *A Behavioral Theory of Labor Negotiations*[22], one of the most important tactics in the bargaining process is for each party to attempt to convince its opponent of the logic of its own position, while simultaneously attempting to belittle the logic of its opponent's position. One of the results of this tactic is that each party will convince *itself* of the legitimacy of its own position and, therefore, will come to believe that an arbitrator would favour that position in the event of an impasse.

In such a case, the presumption must be that the parties will generally fail to reach a voluntary agreement. Only if they were sufficiently risk-averse that they would prefer the certainty of a bargained outcome to the uncertainty of a potentially superior arbitration award would arbitration be avoided. However, although some such situations will undoubtedly exist, the evidence presented by Gerhart and Drotning[23] indicates that they will be much less common than those in which the parties are risk-takers. Thus, both theoretical and empirical considerations lead us to conclude that negotiators will reach fewer voluntary agreements in the face of conventional arbitration if they have limited information concerning the arbitrator's award than if they have full information.

Final-offer Arbitration

The analysis of limited-information, final-offer arbitration is very similar to that of limited-information, conventional arbitration. For example, if the parties have intersecting expectations concerning the arbitrator's preferences, each will believe that it is its opponent's offer which would be chosen in the event of an impasse. Therefore, unless they are both risk-takers, the parties will have a very strong inducement to agree voluntarily. On the other hand, if their expectations concerning the arbitrator's preferences do not intersect, each party will believe that it is its own offer which will have the greatest chance of being chosen in the event of an impasse. Thus, the parties will only be induced to reach their own agreement if they are strongly risk-averse.

Whether limited-information, final-offer arbitration will be able to induce more parties to reach voluntary agreements than will conventional arbitration will depend upon the degree of risk-aversity within the bargaining groups. If the parties' expectations concerning the arbitrator's preferences are non-intersecting, as we have argued, the bargaining process in both sys-

22 WALTON, R.E. and R.B. McKERSIE, *A Behavioral Theory of Labor Negotiations*, London, McGraw-Hill, 1965.

23 *Loc. cit.*, note 21.

tems can be expected to induce the parties to make offers which they believe to be "close" to the outcome which the arbitrator prefers. And in each case they must then decide whether they consider the benefits to be gained from arbitration to be sufficient to overcome the potential losses. Under final-offer arbitration, the benefit which each party expects to obtain from arbitration is the selection of its own final offer, weighted by the (relatively high) probability that it is that offer which would be chosen by the arbitrator; while the expected loss is represented by the selection of its opponent's final offer, weighted by the (relatively low) probability that it is that offer which would be chosen. Under conventional arbitration, however, each party will consider there to be a continuum of probabilities of selection across all outcomes which lie "between" its final offer and the final offer of its opponent. This continuum will be skewed in such a way that each party will believe that outcomes "close" to its own last offer will have a higher probability of selection than will offers which lie "close" to its opponent's final offer. Thus, while the probability that a party will be able to obtain acceptance of its own final position will be greater in final-offer arbitration than in conventional arbitration, the probability that its opponent's final position will be chosen is also higher. For this reason we anticipate that risk-averse parties which are not strongly committed to their own positions, but which have strong aversions to their opponents' positions, will settle voluntarily more often in a final-offer system than in a conventional system. On the other hand, if the parties are not risk-averse, of if they have strong commitments to their own positions, there is no reason to believe that they would seek a voluntary settlement under final-offer arbitration more often than under conventional arbitration. Indeed, if the parties are risk-*takers,* they will be *less* likely to settle voluntarily under final-offer than under conventional arbitration.

To conclude, as it is our belief that most failures in contract negotiations arise because one, or both, of the parties is a risk-taker or has a strong attachment to a particular position, the model developed in this section gives us no reason to believe that limited-information, final-offer arbitration will produce a (voluntary) settlement rate which is significantly higher than that found under limited-information, conventional arbitration. Furthermore, as final-offer arbitration forces a choice between two incompatible positions when bargaining fails, there are strong reasons for preferring the conventional selection process to the final-offer process.

NO-INFORMATION

Conventional Arbitration

In no-information, conventional arbitration, the arbitrator selects his award at random from among a predetermined set of possible outcomes. Thus, the "cost of disagreeing" to each party is measured primarily by the attitude which it takes towards the uncertainty which such a procedure creates. That is, the probability that a highly unfavourable outcome would be selected becomes so great that only a party with a dominant "taste" for risk would be willing to submit its disputes to such a random procedure. Thus, no-information, conventional arbitration provides a very strong inducement for the parties to reach a voluntary agreement. The primary, practical difficulty with this procedure arises when this inducement is *not* strong enough to avoid an impasse. For in that case a random selection must be made, a selection which will have no basis in the merits of the case.

Final-offer Arbitration

The particular variant of no-information, final-offer arbitration which we wish to investigate is that which is employed at the University of Lethbridge. That is, in the event of an impasse an arbitrator is chosen at random from a partisan panel which has been selected in advance. This arbitrator then chooses between the parties' final offers, which had been made before his selection.

Assuming that the arbitrator chosen in this way will normally choose the final offer put forward by the party which nominated him, during the negotiation process each side will believe that there is a 50 percent chance that its position would be selected in the event of an impasse. In such a system there will be an incentive for the two parties to "trade" concessions as long as the value which each party places on the concession which it makes exceeds the value which it places on the concession obtained in exchange. For example, if the union has demanded a 15 percent wage increase and management has offered a 5 percent increase, they might both consider it to be a "fair" trade if the union moderated its demand to 13 percent while the firm raised its offer to 6 percent. Provided only that management finds increments in its offer to be increasingly costly and that the union finds each reduction in its demands to be similarly more costly[24], this bargaining process can be expected to bring the parties into agreement with one another. Furthermore, because such an agreement would be reached voluntarily we can expect that it would be Pareto efficient[25].

24 Our assumption is that management's marginal cost, and the union's marginal disutility, of concessions are both increasing functions of the number of concessions made.

25 If the outcome was not efficient, the parties would be free to alter that outcome to their mutual benefit.

However, there is an important situation in which the bargaining process can be expected to break down. Assume that both sides are strongly committed to obtaining a particular outcome. For example, management might feel that it could not afford a pay increase in excess of 10 percent while the union felt that it could not accept an increase of less than 15 percent. Each side may consider the cost of even a small concession on its position to be so great that neither would be able to induce the other to alter its final offer. Thus, bargaining would reach an impasse and the arbitration procedure would have to be invoked.

EQUITY

We have argued that under full-information arbitration the parties to a dispute can be expected to reach their own Pareto efficient settlement. But that settlement is only efficient *relative* to the arbitrator's preferred outcome. Economists have yet to develop a rigorous criterion against which the arbitrator's outcome itself can be judged. Yet it appears intuitively clear that some such outcomes may be considered unjust or inequitable. In these cases,the discovery of a relatively efficient agreement will not rectify this inequity[26].

Thus, it may be desirable to devise a bargaining instrument in which the ultimate outcome is not determined by some arbitrary exogenous factor, such as an arbitrator's preferences, monopoly power, or the ability to withstand a strike, but by the parties own perceptions of equity and efficiency. We would suggest that no-information, final-offer arbitration represents such an instrument. For, in this system, the arbitrator's preferences play no role in the determination of a bargained settlement, and the primary determinant of the ultimate outcome is the parties own views of the relative merits of their cases.

SUMMARY AND CONCLUSIONS

Our basic theoretical finding is that the ability of bargainers to reach their own agreements is determined primarily by the amount of information which they possess concerning the arbitrator's preferences[27]. As this infor-

26 For example, assume that the arbitrator has announced that his preferred outcome is A (12%, 37 hr.). Although the parties may still be able to agree voluntarily to settle for the Pareto superior outcome (14%, 39 hr.), the arbitrator's announcement will act as a major deterrent to their ability to reach voluntary agreement to (14%, 35 hr.) or (10%, 39 hr.) regardless of whether society considered those outcomes to be superior to (14%, 39 hr.).

27 This theoretical finding is given strong empirical support by GERHART and DROTNING (*loc. cit.*, note 21).

mation increases, the settlement rate increases also. An important implication of this finding is that it would be inappropriate to contrast settlement rates under various conventional and final-offer arbitration systems without first making allowance for differences in the amounts of information provided in those systems.

Our model predicts that, *ceteris paribus,* the settlement rate under limited-information, final-offer arbitration will not differ significantly from that under limited-information, conventional arbitration. However, it also predicts that any agreement reached under either of these systems will be strongly influenced by the outcome which the parties believe would be imposed by an arbitrator; for at least one party will prefer to seek arbitration rather than accept a settlement which deviates significantly from the arbitrator's expected award. Thus, voluntary agreements reached under limited information cannot be expected to differ appreciably from those reached under full information. And, as full-information arbitration systems can be expected to produce higher settlement rates than can limited-information systems, greater gains could be made by a movement from the latter to the former than by a movement from conventional to final-offer arbitration within the limited-information mode.

Given that the full information system has been adopted, our model suggests that conventional arbitration will be superior to final-offer arbitration. First, as the conventional selection process requires that less information be provided to the parties than does the final-offer process, (the former requires knowledge only of the arbitrator's award whereas the latter requires knowledge of his complete preference function), the former would be easier to implement than the latter and could, therefore, be expected to produce a higher settlement rate. And, secondly, conventional arbitration proves superior in the event that negotiations reach an impasse. That is, although the arbitrator in a conventional system cannot, as a rule, be expected to be able to produce a Pareto efficient award, at least he is able to take into account the preferences of both parties when constructing that award. Under final-offer arbitration, on the other hand, the arbitrator is forced to accept one-or-the-other of the parties' final positions, effectively ignoring the preferences of the second party altogether.

Finally, we have argued that both full-information and limited-information arbitrations place severe limitations on the parties which constrain them to bargain over outcomes which are "in the vicinity" of the arbitrator's (expected) award. Thus, although the parties may be able to obtain their own, Pareto efficient settlement in the face of such a constraint, there is no reason to believe that such a settlement will be seen to be "fair" or "equitable" in the eyes of the participants.

One method of avoiding this inequity would be to employ no-information, final-offer arbitration. As the parties in this system have no prior indication as to how the arbitrator would reach his decision, that decision cannot constrain the bargaining process. Thus, there is reason to believe that voluntary settlements reached under no-information, final-offer arbitration will not only be Pareto efficient but will be seen, by the parties, to be equitable.

The primary drawback to this type of arbitration is that the incentive which it provides the parties to reach a voluntary agreement is much less than that offered by full — and limited-information arbitrations. Thus, it would be inadvisable to employ such a system in a situation in which the parties might be expected to commit themselves to extreme positions.

La connaissance par les parties des préférences de l'arbitre et les types d'arbitrage

Au cours des derniers dix ans, beaucoup de choses se sont écrites sur l'arbitrage des conflits d'intérêts qui ont consisté à mettre en contraste deux façons de procéder: l'arbitrage traditionnel, dans lequel l'arbitre est libre de choisir la décision qu'il désire, et l'arbitrage des propositions finales où il est forcé de choisir l'une ou l'autre des deux propositions finales des parties. En outre, ces études comparatives visaient d'abord à faire ressortir la valeur relative des deux processus pour amener les parties à conclure elles-mêmes des conventions collectives.

Le présent article considère que l'intérêt porté à l'examen de ces deux processus a eu pour effet de mettre en veilleuse une deuxième caractéristique du régime d'arbitrage, qui est tout aussi importante pour déterminer si les parties peuvent s'entendre de gré à gré, soit le degré de connaissance que possèdent les parties contractantes de la décision de l'arbitre s'il y avait impasse ou rupture. Le but de l'article est d'évaluer le résultat de cette connaissance tant dans le système d'arbitrage traditionnel que sous le système d'arbitrage dit des propositions finales.

Ou les parties peuvent connaître la décision de l'arbitre (celui-ci leur dit ce que serait sa décision); ou elles en ont une connaissance relative, limitée (il s'agit alors de décisions antérieures du même arbitre, de précédents, de critères préfix); ou elles n'en savent rien du tout (l'arbitre garde toute liberté de décision). Le fait que les parties connaissent les conclusions de l'arbitre les incite fortement à s'entendre, qu'il s'agisse de l'arbitrage traditionnel ou de l'arbitrage des propositions finales. Cependant, comme la connaissance des intentions de l'arbitre est beaucoup plus convaincante dans le deuxième cas que dans le premier, l'arbitrage traditionnel est préférable à l'arbitrage des propositions finales, lorsque les préférences de l'arbitre sont connues. En effet, les propositions finales exigent que les négociateurs sachent en tout temps laquelle de leurs propositions serait choisie, tandis que l'arbitrage traditionnel exige seulement qu'ils soient au courant de la décision que l'arbitre favorisera.

En deuxième lieu, on peut affirmer que la possibilité pour les deux parties d'en venir à une entente lorsqu'elles n'ont qu'une connaissance limitée des intentions de l'arbitre dépendra de leurs attitudes face au risque. Si les deux parties aiment à risquer, on peut s'attendre à ce qu'elles aient de la difficulté à s'entendre de gré à gré, particulièrement si leurs estimations de la conclusion de l'arbitre ne coïncident pas. Ce n'est que si les négociateurs ne tiennent pas à courir des risques que le modèle théorique exposé conduit à une double conclusion: 1) soit que les parties seront en mesure de régler volontairement la plupart de leurs différends lorsqu'elles disposent d'une connaissance relative des préférences de l'arbitre; 2) soit, également, qu'il y aura plus de règlements de gré à gré dans le cas de l'arbitrage des propositions finales que dans le cas de l'arbitrage traditionnel.

En troisième lieu, les parties peuvent généralement en arriver à un accord volontaire et efficace, si l'arbitre choisit sa décision sans fournir aucun indice de ses préférences. Cependant, ce système est inférieur aux autres, lorsqu'il n'y a pas d'accord.

Finalement, l'article conclut que l'une des conséquences de ce modèle, c'est que les comparaisons des règlements obtenus sous les systèmes d'arbitrage traditionnel ou d'arbitrage des propositions finales ne vaudraient pas, à moins qu'un ajustement ne soit effectué pour tenir compte des différences se rapportant à la connaissance des tendances exprimées par l'arbitre. Ainsi, le modèle démontre que le nombre d'ententes de gré à gré dans le cas de l'arbitrage des propositions finales en pleine connaissance des préférences de l'arbitre est plus élevé que dans le cas de l'arbitrage traditionnel avec connaissance limitée des tendances de l'arbitre, non pas à cause de la différence entre les deux systèmes d'arbitrage, mais à cause de la différence du degré de connaissance des préférences de l'arbitre.

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