

WORKING PAPER #219
INDUSTRIAL RELATIONS SECTION
PRINCETON UNIVERSITY
FEBRUARY 1987

Arbitrator Behavior

Orley Ashenfelter
Princeton University

February 1987

Abstract

Arbitration systems are often used to resolve labor disputes because on-going employment relationships are likely to contain specific (human capital) investments. Recent research indicates that the ex ante acceptability of arbitration to the parties must depend, in part, on the unpredictability of the arbitrator's award. It is shown that the usual selection process for arbitrators does imply that arbitrator decisions should be statistically exchangeable (in the limit), and the evidence available to date supports this hypothesis.

Arbitrator Behavior

It is rarely worth specifying the contractual obligations in an on-going agreement so completely as to cover every contingency. This means that disputes may arise in any on-going economic relationship. When the parties have made specific investments that cannot be recaptured it will often be the case that the consequences of an unresolved dispute are costly for both parties. The arbitration of disputes by a third party is intended to settle disputes in a way that avoids these costs.

In a labor agreement the costs of unresolved disputes may be dramatic, as when there is a strike, or they may evolve more slowly as the steady erosion of morale and productivity in the workplace. Arbitration systems are often used to resolve labor disputes, perhaps because on-going employment relationships are so likely to contain specific (human capital) investments. It would be incorrect to suggest that arbitration systems are used only for the resolution of labor disputes, however. Commercial contracts often involve on-going relationships where specific investments have been made and these contracts also often contain provisions for the arbitration of disputes. (See Joskow) Moreover, the resolution of disputes that end up in the courtroom, whether commercial or otherwise, bears much in common with their resolution by arbitration.

In a civil suit and in an arbitration proceeding the disputing parties present their cases to a third party for a binding decision. In both cases the parties may negotiate a settlement whose terms are influenced to some extent by what it is expected the neutral would otherwise decide. A key difference between the arbitration of disputes

and their resolution in a court, however, is in the nature of the fact-finder. An arbitrator is typically a professional who is selected at least in part by mutual agreement of the parties to a dispute. The evidence suggests that a key determinant of the parties preferences for an arbitrator is usually the extent of the arbitrator's "experience" in deciding related arbitration cases. (See Bloom and Cavanagh.) In the courts, however, juries are selected because they have little or no experience with the nature of a particular dispute, and the jurors are certainly never expected to cumulate "experience" by deciding a number of related cases. This suggests that arbitration appeals to the parties because it resolves their disputes without exposure to the greater risk associated with a court decision.

At the same time, a key feature of the ex ante acceptability of jury decisions is their unpredictability. Indeed, it is the inability to predict with certainty the outcome of a jury trial that defines what is meant by "fairness." A major finding that is emerging from the research on arbitrator behavior is that arbitrator decisions are also statistically exchangeable; that is, arbitrator decisions contain an unpredictable component that may be characterized by a probability density function.¹ It seems likely that it is the exchangeability of arbitrator decisions that also leads to the continued acceptability of arbitration systems.

The discovery that actual arbitrator decisions are statistically exchangeable has resulted primarily from a series of simple empirical analyses and considerable data collection. The first section of this

paper provides detailed explanations of two simple empirical examples that I believe most readers will find convincing as evidence for the arbitrator exchangeability hypothesis. The second part of the paper provides an explanation for why arbitrator exchangeability provides so good a statistical model for arbitrator decisions. The basic idea for this model is simple: The parties to an arbitration decision are always allowed to express their preferences in the selection of the arbitrator who will handle their case. Each party will naturally rule out arbitrators whose historical decisions are unfavorable to their position. Arbitrators who have taken extreme positions relative to their colleagues are thus excluded from future selection by either one party or the other. Knowing this, the strategy of a successful (that is, enduring) arbitrator is to provide decisions that are forecasts of the decisions other arbitrators will make in similar situations. This is the only systematic strategy that keeps an arbitrator's decisions from looking aberrant. Arbitrators who follow this strategy thus make decisions that have the appearance of forecast errors; indeed, they are forecast errors.

I. Evidence of Arbitrator Behavior

Table 1 contains the basic facts on the operating characteristics of an arbitration system used to resolve disputes over compensation among public safety officers throughout the State of New Jersey. Under conventional arbitration the parties present their cases to an arbitrator who fashions whatever award seems most reasonable. Under final-offer arbitration each party must present an offer for selection

by the arbitrator without compromise. Under the New Jersey Statute the parties opt for conventional arbitration when they mutually agree to adopt this procedure, while final-offer arbitration is used if they do not mutually agree to something else. As in most states, more than two-thirds of the compensation disputes in New Jersey are resolved by the parties without arbitration. Final-offer arbitration is used four to five times as frequently as conventional arbitration.

The data in Table 1 raise an immediate puzzle, and it is the resolution of this puzzle that has lead to evidence for the arbitrator exchangeability hypothesis. Unlike the expectations of many, employers have won only about one-third of the final-offer decisions in New Jersey. What accounts for this unbalanced win-loss record?

A clue to unravel the puzzle is available through a comparison of the sample statistics on the offers made by the union and employer bargainers (in the first and third columns of Table 1) with the sample statistics on the conventional awards (in the second column of Table 1). In each of the years for which data are presented it is obvious that the mean union offer was closer to the mean conventional arbitration award than was the mean employer offer. Using the conventional arbitration awards as a benchmark, it is clear that the union offers were, on average, more "reasonable" than the employer offers. Early on it was suggested that perhaps this accounts for the union success in win-loss ratios and that a simple model where arbitrator decision-making is characterized as stochastic, but independent of the institutional setting (conventional versus final-offer arbitration), may unify the

puzzling findings that characterize Table 1. The model I shall describe is more than a simple response to the data in Table 1, however, because it generates additional testable cross-equation (econometric) restrictions that may well be rejected. It is thus a candidate for explanation of the known facts that may explain still other data.

To proceed, suppose that arbitrator wage increase decisions, w , may be characterized as a draw from some distribution with density function $f(w | x)$, and parameters x . The simplest scheme is then to suppose that under conventional arbitration the arbitrator simply mandates the preferred award w . This implies that the parameters of the distribution of arbitrator preferences may be estimated directly from the observations on the conventional arbitration awards. Under this hypothesis an uncontaminated estimate of the mean of arbitrator preferences for wage increases in 1980 is, from Table 1, simply the mean of conventional arbitration awards in that year; that is, 8.26%.

How are we to imagine that an arbitrator will make a decision under final-offer arbitration? The simplest scheme is for an arbitrator to first prepare a preferred award, given the facts (x) of the case. Next, the arbitrator may compare w against w^e , the employer proposal, and w^u , the union proposal, and select whichever of these proposals is closer to w . The basic idea is demonstrated in Figure 1, where the density $f(w | x)$ is plotted. The point midway between w^e and w^u is $\frac{1}{2}(w^e + w^u)$. Since an arbitrator is expected to select whichever parties proposal is closer to the arbitrator's preferred award, w^e is selected if an arbitrator is drawn whose preferred award is less

than $\frac{1}{2}(w^e + w^u)$. Alternatively, w^u is selected if an arbitrator is drawn whose preferred award is greater than $\frac{1}{2}(w^e + w^u)$. It follows that the probability of selecting the employer offer (P_e) is simply $P_e = F(\frac{1}{2}(w^e + w^u) | x)$, which is the shaded area under the curve in Figure 1 to the left of the point $\frac{1}{2}(w^e + w^u)$ on the horizontal axis. Increases in w^e or w^u thus increase the probability that the employer's offer is selected.

In order to approach the data in Table 1 it is necessary to be more concrete. Suppose, therefore, that the distribution of arbitrator preferences is normal with mean μ and standard deviation σ . Then the probability an employer's offer is selected is given by the probit function $P_e = F[\frac{1}{2}(w^e + w^u)/\sigma - \mu/\sigma]$, and μ and σ may be estimated from paired data on the mean of the offers and the identity of the winner. Estimates of μ and σ are thus available from the two separate, independent sets of data representing conventional and final-offer arbitration cases.

Column 2 of Table 1 contains the estimates of μ from the conventional arbitration cases while column 4 contains the estimates of μ from the probit function for final-offer arbitration cases. The "actual" and "predicted" mean of arbitrator preferences from these two sets of data are remarkably close, and certainly not significantly different by conventional tests. (The estimated standard deviations, which are not reported, also match quite closely, and are around 2 percent.) These data clearly support the cross-equation restrictions implied by the arbitrator exchangeability hypothesis.

A second set of data covering 8 years of final-offer arbitration cases in the Iowa public sector is described in Table 2. Final-offer arbitration is used in Iowa only when the parties opt to eliminate the provision that a factfinder (selected by the parties) is first asked to provide a recommended, but non-binding compensation award. There are thus relatively few cases of final-offer arbitration in Iowa. The summary statistics for these cases also contain a puzzle, however. Again, win/loss ratios are unbalanced, but in Iowa employer offers have been accepted in two-thirds of the cases. How are we to account for this puzzle, and the reversal of arbitrator behavior from that found in New Jersey?

A key to the solution of this puzzle is found by comparing the mean of the union and employer offers with the mean recommended award in other arbitration cases in each year in Iowa. In each of the years 1976-1982 the employer offers were typically closer to the recommended awards elsewhere than were the union offers. By this standard, the employers were typically more "reasonable" in Iowa than were the unions. Consistent with the arbitrator exchangeability hypothesis, in five of the six years in which there were awards the employer offers were more likely to be accepted than the union offers. Remarkably, in 1983 the union offers were slightly closer to the recommended awards than the employer offers, and in that year the union offers were accepted more frequently also.

The fifth column of Table 2 provides the predicted values of P_e using μ and σ estimated from the independent data on factfinder

recommendations. Although hardly exact, these predictions are impressive further confirmation of the arbitrator exchangeability hypothesis.

II. The Arbitrator Exchangeability Hypothesis

There is a simple rationale for the finding that arbitrators appear to be statistically exchangeable that is consistent with the anecdotal evidence of arbitrator behavior as well. At any given date we may imagine that the facts of a particular arbitration case are known to the parties and the arbitrator, and indicated by X_i . After all cases have been arbitrated there will be some population regression function

$$w_i = bX_i + \epsilon_i$$

by which we may relate the arbitrator's decision w_i to the facts of the case X_i . If the weight b to be given to the facts were known, each arbitrator could simply elect to assign the decision $w_i = bX_i$, in which case $\epsilon_i = 0$. Certainly no arbitrator could be accused of bias by following such a practice as they would all make identical decisions in the same circumstances. Arbitrators would certainly be exchangeable if this were to occur, but the distribution of their decisions would be degenerate. This kind of arbitrator behavior would no doubt generate negotiated settlements, but only because the settlement (bX_i) was effectively being dictated.

In fact, however, the population regression coefficient b is not observable at the time the arbitrator prepares an estimated b_j of b and makes the award

$$w_i = b_j X_i,$$

so that $\epsilon_i = (b_j - b) X_i \neq 0$. In a single cross-section the variability in arbitrator awards will, therefore, look like forecast errors. Good arbitrators will be those for which $E(b_j - b) = 0$ and $E[(b_j - b) X_i] \neq 0$, where the expectation is taken over time. Indeed, arbitrators who do not satisfy these criteria will not be selected by the parties and must eventually leave the business. Thus, the variability of arbitrator awards among surviving arbitrators will have the same properties as well behaved forecast errors. The important point is that the arbitrator's preferred awards will resemble a stable stochastic process independent of the institutional setup in which the arbitrator participates.

It is important to emphasize that arbitrator exchangeability need not characterize all observed arbitrator behavior. Arbitrator exchangeability is the limiting behavior that would be observed if information collection were costless. In practice, however, the parties must have some incentive to continue to collect the information that allows them to determine whether an arbitrator might be partial toward or against their own case. It is the potential gain that comes from selecting an arbitrator who provides a party a slight probabilistic edge that gives the incentives for information collection that should drive arbitrator behavior toward exchangeability. The arbitrator exchangeability hypothesis thus provides a workable benchmark against which observed behavior may be contrasted. Its empirical performance to date is impressive, but better and more complete data may well indicate predictable exceptions to its implications that knowledgeable parties will attempt to exploit.

III. Implications

These strong findings favorable to the arbitrator exchangeability hypothesis have also been confirmed in further empirical work. (See Farber and Bazerman, Bloom, and Ashenfelter, Dow, and Gallagher.) These findings have a number of implications for further research into the nature and design of arbitration systems. First, these results provide support for the pioneering theoretical approach used by Farber that explicitly recognizes the stochastic nature of arbitrator decisions. Second, the arbitrator exchangeability hypothesis provides a simple rationale for the study of alternative arbitration systems in laboratory experiments where the arbitrator decisions may conveniently be treated as a stable stochastic process. (See Ashenfelter, Neelin, and Spiegel.) Finally, the arbitrator exchangeability hypothesis provides a benchmark that can serve as a convenient null hypothesis in the search for predictable deviations to it that might be (profitably) exploited by the parties.

Footnotes

¹A set of n random variables y_1, \dots, y_n is said to be K -exchangeable if the joint distributions of any $K < n$ of these random variables are the same. So long as a panel of jurors (or arbitrators) is K -exchangeable, for example, then any deterministic rule for aggregating K juror's (or arbitrator's) decisions will lead to the same distribution of awards. An interesting analysis of rules for the aggregation of juror preferences that (implicitly) uses the assumption of K -exchangeability is Klevorick and Rothschild and Winship. I find it fascinating that the concept of exchangeability, which is so intertwined with the definition of statistical behavior, is also closely related to the appearance of "fair behavior".

References

- Ashenfelter, Orley and David Bloom, "Models of Arbitrator Behavior: Theory and Evidence," American Economic Review, March 1984, 74, 111-125.
- Ashenfelter, Orley, James Dow and Daniel Gallagher, "Arbitrator and Negotiation Behavior Under an Appellate System," mimeo., Industrial Relations Section, Princeton University, 1986.
- Ashenfelter, Orley, Janet Neelin and Matthew Spiegel, "Experiments Comparing Alternative Arbitration Systems," mimeo., Industrial Relations Section, Princeton University, 1986.
- Bloom, David E, "Empirical Models of Arbitrator Behavior Under Conventional Arbitration," The Review of Economics and Statistics, November 1986, 68, 578-585.
- Bloom, David E., and Christopher L. Cavanagh, "An Analysis of the Selection of Arbitrators," American Economic Review, June 1986, 76, 408-423.
- Farber, Henry S., "An Analysis of Final-Offer Arbitration," Journal of Conflict Resolution, December 1980, 5, 683-705.
- Farber, Henry S., and Max H. Bazerman, "The General Basis of Arbitrator Behavior: An Empirical Analysis of Conventional and Final-Offer Arbitration," Econometrica, November 1986, 54, 1503-1528.
- Klevorick, Alvin K., Michael Rothschild and Christopher Winship, "Information Processing and Jury Decisionmaking," Journal of Public Economics, April 1984, 23, 245-279.
- Joskow, Paul L., "Contract Duration and Relationship-Specific Investments: Empirical Evidence from Coal-Markets," American Economic Review, March 1987, 77, 000-000.

Table 1

**Final-Offer Arbitration in New Jersey Police Disputes:
Union Offers, Employers Offers and Awards
in Conventional Arbitration Cases^{a/}**

	Mean Union Offer (%)	Mean Conventional Award (in other disputes) (%)	Mean Employer Offer (%)	Predicted Mean of Conventional Awards (%)	Employer Wins (%)
1978	7.14	6.55	5.01	7.41	32
1979	8.29	8.59	6.51	8.51	35
1980	8.54	8.26	5.70	8.27	27

Source: Tabulation of arbitration reports, State of New Jersey, presented in Ashenfelter and Bloom.

Note: ^{a/} Union and employer offers and the factfinder recommendations are expressed as proposed percentage changes in compensation.

Table 2

**Final-Offer Arbitration in Iowa:
and Employer Offers, Factfinder Recommendations and
Actual and Predicted Win-Loss Percentages**

	Mean Union Offer (%)	Mean Recommended Award (in other disputes) (%)	Mean Employer Offer (%)	Actual Employer Wins (%)	Predicted Employer Wins (%)
All Years	7.54	5.96	4.89	65.5	61.1
1976 ^{a/}	10.61	6.18	5.67	100	80
1977	8.26	5.22	5.52	72.7	74
1978	13.89	5.08	5.57	0	76
1979	9.01	6.19	6.68	100	82
1980	10.89	9.44	8.95	66.7	56
1981	----	7.65	----	----	----
1982	6.91	3.64	5.14	75	57
1983	4.84	3.51	1.50	42.9	44

Source: Tabulation of arbitration reports, State of Iowa, presented in Ashenfelter, Dow and Gallagher.

Note: ^{a/} Union and employer offers and the factfinder recommendations are expressed as proposed percentage changes in compensation.

Figure 1

Determination of The Probability of an Employer Victory

