The Causes of Impasses in Labor Disputes

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Using data on teacher contract negotiations under final-offer arbitration, this paper investigates the causes of impasses in contract negotiations and finds some support for each of three perspectives: game-theoretic, psychological, and political. The large number of "consent awards" suggests that negotiators frequently wish to avoid the political costs of a compromise settlement, preferring to blame arbitrators for the outcome. The positive correlation between the probability of an impasse and the variance in comparable negotiated settlements suggests that the parties base their judgments of fairness using evidence most consistent with their own position.

DESPITE MUCH RESEARCH, THERE IS STILL no satisfactory explanation for why disputing parties resort to costly dispute resolution mechanisms such as strikes, litigation, or arbitration. Given the theoretical prediction (see Rubinstein, 1982) that voluntary agreements will occur if the parties have complete information about their opponent and if there are overlapping reservation values (a positive contract zone), explanations of the use of dispute resolution procedures typically focus on the parties' lack of information or the lack of a positive contract zone. One set of explanations developed in economics relaxes the assumption of complete information. These models show that if there is incomplete information (uncertainty) about an opponent, rational strategies may produce an impasse even if a positive contract zone exists (Rubinstein, 1985; Crampton, 1984). Tracy (1986, 1987) used these incomplete information models to explain the occurrence and duration of strikes. In his model, the union is uncertain about the future profitability of the firm and therefore is uncertain about the firm's reservation value. In Babcock's (1989) application, arbitration may be used when there is a positive contract zone if the parties are uncertain about their

opponents' arbitration expectations. This leads to uncertainty about their opponents' reservation values; hence a voluntary settlement cannot be guaranteed.

Explanations from the field of psychology argue that the parties do not behave in the manner described by economic models. Impasses in bargaining may occur as a result of negotiator overconfidence, the chilling effect, or egocentric assessments of fairness. Each hypothesis is discussed below.

Researchers have found that individuals are systematically overconfident in their beliefs and judgments (Kahneman and Tversky, 1973; Lichtenstein, Fischhoff, and Phillips, 1977; Einhorn, 1980; Bazerman and Neale, 1982). Kahneman and Tversky find that "people are prone to experience much confidence in highly fallible judgments" (1973, p. 249). In addition, beliefs about the probabilities that events occur do not correspond with the empirical frequencies. In a final-offer experimental study, Bazerman and Neale (1982) found that the sum of the parties' beliefs about their chances of winning a dispute was greater than one, implying overoptimism on the part of one or both sides. When negotiators have overly optimistic expectations about arbitration, negative contract zones may occur.

Other researchers explain impasses as the result of bargainers' unwillingness to make prearbitration concessions. This occurs when the bargainers believe concessionary behavior may later influence an arbitrator's belief about what is fair (Stevens, 1966; Feuille, 1975; Bloom, 1981; Farber and Bazerman, 1989). This is known as the chilling effect—the existence of arbitration "chills" the bargaining process. Once the parties have invoked arbitration, there is further resistance to retreat to their reservation values if they believe these actions will influence the arbitrator's decision.

Psychological experimental studies have found that beliefs and judgments are influenced by egocentric assessments of fairness (Messick and Sentis, 1979; Thompson and Loewenstein, 1992; Babcock et al., 1991). When there is uncertainty about future outcomes, individual beliefs may be biased in a manner that favors themselves (Thompson and Loewenstein, 1992). Furthermore, Babcock et al. (1991) found that biased assessments of fairness reduced the probability of a voluntary settlement. In negotiations, a negative contract zone will exist if the bargainers selectively choose information that is favorable to their bargaining position to develop their beliefs about arbitration.

A third explanation for impasse focuses on political factors. Ashenfelter and Johnson's (1969) model argues that strikes occur when union leaders are unable to convince their members to agree to the concessions necessary to achieve a peaceful settlement. Kochan (1980) notes that in the

public sector, "parties faced with difficult internal conflicts and political pressures may prefer to pass the buck to the fact finder or arbitrator and let themselves off the hook" (p. 291). Since the negotiators on each side are elected officials who are held accountable for the negotiated outcome, resolving an impasse through the intervention of a third party (the arbitrator) may free officials from responsibility for the outcome. Other researchers (Crawford, 1982; Schelling 1960; Allison, 1971) assert that bargainers face political costs associated with backing down from established bargaining positions. If both sides make commitments that create a negative contract zone, there is no way to resolve the dispute without arbitration.

Empirical support for these hypotheses is very difficult to provide without a carefully controlled experimental environment because expectations, uncertainty, and political costs are usually unobserved or difficult to infer. However, an inherent drawback of experimental research is the external validity of the results obtained. The data set we used in this note—Wisconsin teacher contract negotiations—allows us to overcome some of these difficulties.
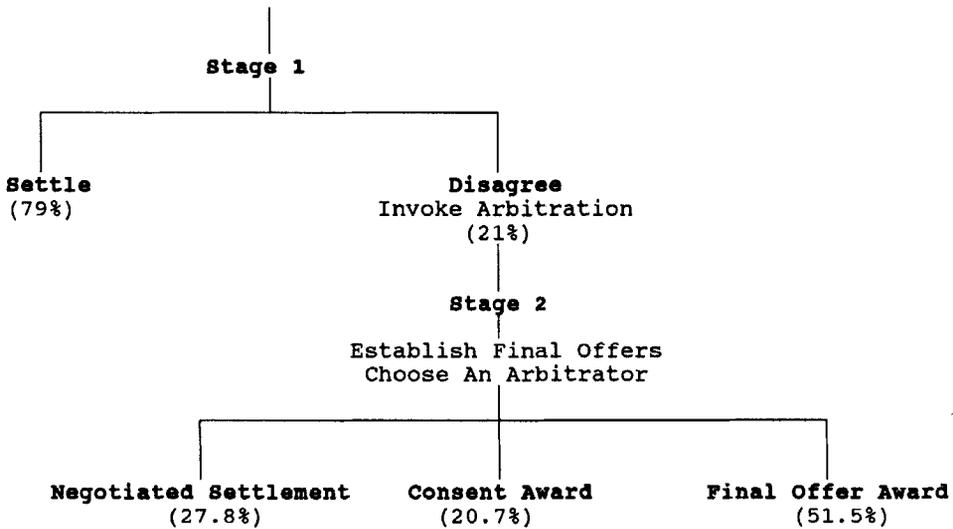
The Institutional Setting

Teachers and school boards in Wisconsin have negotiated under a compulsory final-offer arbitration law since 1978. In about 21 percent (Babcock, 1988) of all teacher negotiations, the parties have been unable to reach an agreement without initiating the final-offer procedure. Once an impasse has been "certified" by the Wisconsin Employment Relations Commission (WERC), the parties begin a procedure in which they submit, exchange, and modify their offers until each side has established its own final offer and with complete knowledge of its opponent's final offer. This procedure is unique to Wisconsin and allows us to portray the final offers as a Nash equilibrium.

Following an agreement on final offers, the parties select an arbitrator from a panel supplied by the WERC. Figure 1 summarizes the sequence of steps followed under the procedure. Our data come from 410 teacher contract negotiations in Wisconsin (from 1978 to 1985) where the parties initiated final-offer arbitration by agreeing to a set of final offers.[1]

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[1]The total population of teacher arbitration cases was slightly larger than the sample because in some cases the final offers could not be constructed from WERC records. An additional 109 cases were eliminated either because the final wage offers were not consistent with the single-issue framework used in the paper (e.g., the parties' final offers were identical or the board's offer was greater than the union's final offer) or because a measure of the variability in "comparable" negotiated settlements could not be constructed.

FIGURE 1

Settlement Stages Under Wisconsin's Arbitration Procedure

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                    |
         Stage 1
                    |
   ┌────────────────┴────────────────────┐
   |                                      |
Settle                           Disagree
(79%)                      Invoke Arbitration
                                 (21%)
                                    |
                              Stage 2
                                    |
                     Establish Final Offers
                     Choose An Arbitrator
                                    |
        ┌───────────────────────────┼───────────────────────┐
        |                           |                        |
Negotiated Settlement        Consent Award          Final Offer Award
     (27.8%)                    (20.7%)                  (51.5%)
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We collected information on the type of settlement and the final offers made by the parties. In the early years of the law, the parties bargained over wages as well as over other issues, such as fringe benefits, classroom size, and the school calendar. After several years, the latter issues became established in the contracts and wages became the primary issue of contention.[2]

All of the cases that invoked arbitration were resolved using one of the following three types of settlements:

Negotiated settlement. In 27.8 percent of the cases where offers were exchanged, the parties agreed to dismiss the case from arbitration, having reached a negotiated settlement on their own.[3]

Consent award. These awards occurred in 20.7 percent of the cases where final offers were exchanged. Consent awards occurred if the parties negotiated an agreement after final offers were made and they requested that the arbitrator formally write up this agreement as an arbitration award. Consent awards were requested because contracts reached by arbi-

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[2]Bargaining normally occurs with respect to wage increases instead of wage levels.

[3]Negotiated settlements typically are defined as those cases where the parties reach a bilateral agreement before exchanging final offers. This occurred in 80 percent of the teacher negotiations during the study period. We do not examine the decision to initiate arbitration process and exchange final offers because our analysis is based on the information revealed by the exchange of final offers.

tration are binding and need not be ratified by the union membership or by other school district officials.

Final-offer awards. In the remaining 51.5 percent of the cases, the parties received a final-offer award.

The Negotiating Framework

Bargainers develop negotiating strategies based on what they believe will happen if they go to arbitration. These expectations are based on the parties' beliefs about arbitrator preferences. Given these beliefs, the parties form "certainty equivalents" of arbitration—the union's (board's) certainty equivalent is the lowest (highest) wage increase it would accept (offer) to avoid the risks associated with using arbitration. The certainty equivalent is the party's reservation value in bargaining. This framework is specific to final-offer arbitration and was developed by Farber (1980).

Assume that the parties have the following beliefs about the arbitrator's preferred wage increase, WA[4]:

$$WA^u \sim F_u[WA_u - \tfrac{1}{2}D, WA_u + \tfrac{1}{2}D] \tag{1}$$

$$WA^b \sim F_b[WA_b - \tfrac{1}{2}D, WA_b + \tfrac{1}{2}D] \tag{2}$$

where WA^i is i's beliefs about $WA^{u)}$ (u = union, b = board), F is the uniform distribution, WA_i is the mean of i's belief distribution about arbitrator preferences, and D is the difference between the endpoints. Thus, the union believes that the probability that the board's offer will be chosen is:

$$\Pr[WA^u < \tfrac{1}{2}(W_u + W_b)] = F_u[\tfrac{1}{2}(W_u + W_b)]$$
$$= [\tfrac{1}{2}(W_u + W_b) - (WA_u - \tfrac{1}{2}D)]/D \tag{3}$$

where W_i is i's final wage offer. The final offers maximize the parties' expected utilities of arbitration:

$$\text{Max } E\{U_u(A)\} = F_u[\tfrac{1}{2}(W_u + W_b)]U_u(W_b)$$
$$+ \{1 - F_u[\tfrac{1}{2}(W_u + W_b)]\}U_u(W_u)W_u \tag{4}$$
$$\text{Max } E\{U_b(A)\} = F_b[\tfrac{1}{2}(W_u + W_b)]U_b(W_b)$$
$$+ \{1 - F_b[\tfrac{1}{2}(W_u + W_b)]\}U_b(W_u)W_b \tag{5}$$

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[4]While previous research has assumed this distribution to be normal (Farber and Katz, 1979; Farber and Bazerman, 1989), there is no theoretical reason to view the beliefs as forming the parameters of a normal distribution. We use the uniform distribution because it is computationally convenient.

where U_i is i's utility function. Solving these two equations:

$$\tfrac{1}{2}f_u[\tfrac{1}{2}(W_u+W_b)]\{U_u(W_b) - U_u(W_u)\}$$
$$+\{1 - F_u[\tfrac{1}{2}(W_u + W_b)]\}U_u'(W_u) = 0 \quad (6)$$

$$\tfrac{1}{2}f_b[\tfrac{1}{2}(W_u+W_b)]\{U_b(W_b) - U_b(W_u)\}$$
$$+F_b[\tfrac{1}{2}(W_u + W_b)] U_b'(W_b) = 0 \quad (7)$$

where $f_i(.)$ is i's probability density function of beliefs about the arbitrator, and $U_i'(.)$ is the derivative of U_i with respect to W_i. The simultaneous solution of equations (6) and (7) provides the Nash equilibrium pair of final offers. Given the final offers that each party expects to make and each party's belief about the arbitrator, the certainty equivalents are:

$$U_u(CE_u) = F_u[\tfrac{1}{2}(W_u + W_b)]U_u(W_b) + \{1 - F_u[\tfrac{1}{2}(W_u + W_b)]\}U_u(W_u) \quad (8)$$

$$U_b(CE_b) = F_b[\tfrac{1}{2}(W_u + W_b)]U_b(W_b) + \{1 - F_b[\tfrac{1}{2}(W_u + W_b)]\}U_b(W_u) \quad (9)$$

where CE_i is bargainer i's certainty equivalent. The certainty equivalents form the endpoints of the contract zone. Therefore, there is a positive contract zone if $CE_b - CE_u > 0$.

Calculating the contract zone. Using our data and this framework, we can calculate the contract zone for the cases where the parties made final offers. Our approach is a variation on a strategy employed by Farber and Bazerman (1989). They simplified equations (6) and (7) by assuming that the parties had identical beliefs about arbitration and that these beliefs matched the authors' earlier experimental research (Bazerman and Farber, 1985; Farber and Bazerman, 1986) on arbitrator decision making. They assumed different levels of risk aversion and inferred the optimal final offers, reservation values, and size of the contract zone under conventional arbitration and final-offer arbitration.

We use the parties' final offers to directly calculate each side's beliefs about arbitrator preferences using equations (6) and (7). To do this, we make the following assumptions about the forms of the utility functions:

$$U_u(W) = \frac{W^{(1-\alpha_u)}}{(1-\alpha_u)} \quad (10)$$

$$U_b(W) = \frac{\{(W_{max}-W)^{(1-\alpha_b)}}{(1-\alpha_b)\}} \quad (11)$$

The parameter α_i measures i's coefficient of relative risk aversion and W_{max} is the wage maximum against which the school district evaluates a settle-

ment. In the analysis the risk aversion parameter was permitted to range from .2 to .7 in increments of .1, and W_{max} was set equal to 25 percent wage increase.[5]

Since beliefs are assumed to be uniform, an analytic solution exists for the beliefs implied by equations (6) and (7). Specifically, the means of the union's and board's beliefs about the arbitrator's preferences are:

$$WA_u = \tfrac{1}{2}(W_u + W_b) - \tfrac{1}{2}D$$
$$-\{\tfrac{1}{2}(W_u)^{\alpha_u}[W_u^{(1-\alpha_u)} - W_b^{(1-\alpha_u)}]\}/(1 - \alpha_u) \qquad (12)$$

$$WA_b = \tfrac{1}{2}(W_u + W_b) + \tfrac{1}{2}D$$
$$-\{\tfrac{1}{2}(W_{max} - W_b)^{\alpha_b}[(W_{max} - W_b)^{(1-\alpha_b)}$$
$$- (W_{max} - W_u)^{(1-\alpha_b)}]\}/(1 - \alpha_b) \qquad (13)$$

After the final offers are inserted into equations (12) and (13), the only unknown parameter on the right-hand side is D. Previous research on arbitrator decision making in Wisconsin suggests a plausible value for D. Olson and Jarley (1991) find that the most important predictor of arbitrator beliefs and decisions is the mean of negotiated settlements agreed to without the use of the arbitration procedure by other bargaining pairs in the district's athletic conference.[6] The substantial weight given to this wage comparability measure suggests that the *range* of negotiated settlements in the athletic conference is a reasonable proxy for the parties' uncertainty about arbitration. Using parameters of this form is less restrictive than the approach taken in previous research (Farber and Bazerman, 1989) because it does not constrain uncertainty to be the same in all cases.[7] Once the parties' beliefs are derived from equations (12) and (13), the contract zone is calculated from the parties' certainty equivalents in equations (8) and (9).

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[5]We have assumed that the parties are risk averse—whether they actually are so is not known. Arguments in favor of this assumption include the following. Farber's study (1978) of the preferences of union members found them to be risk averse. It is also likely that public-sector jobs appeal to individuals who are risk averse (Farber and Katz, 1979). School board members may be risk averse since they are elected officials. Their chance for reelection will depend on the types of agreements they can secure. Final-offer arbitration is especially risky—one side wins and one side loses, so "losing" may carry a stigma.

[6]A district's athletic conference is the set of districts it competes with in high school sports. These districts are usually the same size and in the same geographic region. The athletic conference boundaries are exogenous to the bargaining process.

[7]As a sensitivity check on our results, the analysis was also conducted by setting D equal to a constant value for all cases that equaled either 2 or 8 percent. However, over the 2–8 percent range, the hypothesis tests led to the same conclusions (at .10 significance levels) as those reported here, where D is allowed to vary across the cases.

Empirical Analysis

We derived the average size of the contract zones for final-offer awards and for negotiated and consent awards. The mean size of the contract zone for the sample is reported in Table 1. At low levels of risk aversion, the mean size of the contract zone is significantly larger (at the 10% level) under final-offer awards than for dismissed and consent awards. However, for levels of risk aversion greater than .4, there is no difference between the mean sizes of the contract zones or standard levels of significance.[8]

TABLE 1

THE CONTRACT ZONE[a]: $CE_b - CE_u$
(standard errors in parentheses)

Risk Aversion	Final-Offer Arbitration	Dismissed and Consent
.2	.896	.681
	(.080)	(.086)
.3	.876	.661
	(.081)	(.089)
.4	.853	.645
	(.081)	(.091)
.5	.826	.627
	(.083)	(.093)
.6	.795	.596
	(.086)	(.101)
.7	.757	.566
	(.090)	(.108)
N	232	210

[a]The sample sizes are smaller than the 502 cases for which there is complete final-offer data because we were unable to converge on an estimate of the contract zone (this occurred where the difference between the final offers was less than 1.1 percent).

Table 2 presents the percentage of the parties who settled (by the various types of agreement) who had positive contract zones. For example, 86 percent of the parties who received final-offer awards had an estimated

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[8]Table 1 shows a decline in the size of the contract zone as risk aversion increases. The endpoints of the contract zone, defined by equations (8) and (9), are functions of the final offers observed in the data. An increase in risk aversion given the difference between a pair of final offers implies that the difference between the arbitration expectations of the parties, $(WA_b - WA_u)$, must decline. This is because the difference between each party's arbitration expectation and its final offer decreases with an increase in risk aversion. This causes the contract zone to shrink.

TABLE 2

Cases with Positive and Negative Contract Zones[a]
(percentages)

	Positive Contract Zone	Negative Contract Zone
Settled Before FOA[b] Award	79	21
Received FOA Award	86	14

[a]Risk aversion = .2.
[b]Final-offer arbitration.

positive contract zone. This indicates that even when the parties could conceivably settle voluntarily, they often choose to receive a final-offer award.

Table 3 reports results from estimation of a probit equation for the probability that the parties receive a final-offer award. The dependent variable equals one if the parties received a final-offer award; it equals zero if a consent award was received or if a settlement was negotiated. The independent variables in the model are the differences in the final offers of the parties $(W_u - W_b)$ and the range of the wage settlements negotiated in the district's athletic conference (D).

The results indicate that the differences between the parties' final offers have no effect on the probability that the parties receive an arbitration award. However, as D increases, the parties are more likely to receive an award. The parameter on D is significantly different from zero and has a practically significant impact on the chances of a postoffer bilateral settlement. The mean value of D in the sample is 5.66, with a standard deviation

TABLE 3

Probit Estimates of the
Probability of Receiving a Final-
Offer Arbitration Award
(standard errors in parentheses)

Variable	Coefficient
Constant	.2303
	(.0991)
Difference in Offers	−.0053
	(.0248)
D	.0485
	(.0152)
−Log L	341.67
N	502

of 7.16. At the mean values for D and the difference between the final offers of the parties, the estimated probability that the parties will receive a final-offer award is .688. When D is one standard deviation above the mean, the estimated probability of an award is 16 percentage points greater or .799.

Discussion

The empirical results provide varying degrees of support for the explanations for impasses discussed earlier in this paper. Support for the divergent expectations hypothesis (i.e., that the parties form different expectations about arbitration due to their differences in beliefs about arbitrator preferences) requires evidence of positive contract zones for disputes settled by negotiated settlements and consent awards and negative contract zones for disputes settled by final-offer awards. Such evidence would indicate that the parties that use arbitration maintain their biased arbitration expectations and use a costly procedure even after information is provided that shows that their expectations are inconsistent with their opponent's beliefs. The results presented in Table 1 show that the average contract zone for parties who receive final-offer awards is positive. This apparent lack of divergent expectations could be only a partial explanation, however: 14 percent of the parties who received a final-offer award had negative contract zones that resulted from divergent expectations.

If all parties have complete information about their opponents and a positive contract zone exists, the parties should be able to reach a settlement. The incomplete information hypothesis argues, however, that if parties are uncertain about their opponent's expectations concerning arbitration, then they are also uncertain about their opponent's reservation value. Given this and a finite bargaining horizon, there is a positive probability of initiating arbitration even when a positive contract zone exists (Babcock, 1989). Therefore, we should observe disputes when a positive contract zone exists only if the parties have incomplete information about their opponent. A positive contract zone was calculated in 86 percent of the sample cases in which the parties received final-offer awards, consistent with an incomplete information model.

Many researchers have suggested that arbitration "chills" the bargaining process. Farber and Bazerman (1989) suggest that in final-offer arbitration the "chilling" of the process increases as the final offers of the parties diverge because of greater uncertainty about the possibility of a negotiated outcome. The parties in Wisconsin operated under a "mediation-final-offer arbitration" state law that required that the arbitrator first attempt to

mediate the dispute before making a final-offer selection. During this mandatory mediation phase the parties may have been unwilling to try to reach a negotiated settlement because any movement at this stage might influence what the mediator-arbitrator would view as fair during arbitration. Support for this hypothesis would exist if the coefficient on Difference in Offers was positive and significantly different from zero, since the chilling effect is thought to be greater as the final offers diverge. The coefficient is not significantly different from zero, however (see Table 3).

Dispute resolution procedures may be used when there are political costs associated with reaching compromise agreements. Where the negotiators have successfully convinced their constituents that their final offer is fair and reasonable, it may be politically very costly to then ask their principals to ratify a negotiated agreement that involves concessions from the final offer. A consent award (which is legally binding on the parties and does not have to be ratified by the negotiators' constituents) avoids some of the political costs of compromising on the final offers because it permits the negotiators to shift responsibility for the outcome to the arbitrator. The use of consent awards in 20.7 percent of the sample cases is evidence that these political factors are important in explaining impasse.

Some bargaining pairs may be unable to reach a negotiated settlement after final offers are exchanged because each side reaches different assessments about what is fair. Different beliefs about fairness are reached if the bargainers selectively choose information that is favorable to their bargaining position to develop their beliefs about arbitration. Some parties in our sample may be unwilling or politically unable to reach a negotiated settlement where substantial variation in athletic conference settlements cause each side to maintain different but arguably reasonable views about what the arbitrator will define as fair. This hypothesis would be supported if the probability of using arbitration is positively correlated with D, the range of negotiated settlements reached in the school district's athletic conference.

Note that the contract zone defined in the divergent expectations model also includes D in the parties' arbitration beliefs. In that model, however, the contract zone increases in size as D increases because the risk aversion of the parties makes each side willing to concede more to avoid a more uncertain arbitration decision. Under the egocentric assessments of fairness hypothesis, an increase in D causes the settlements that the parties select to determine their beliefs to diverge, thereby reducing the chance for a compromise settlement. The results in Table 3 indicate that an increase in the range of settlements in the athletic conference increases the chances of a final-offer award, thus supporting the hypothesis.

Conclusions

We described the institutional arrangements of the bargaining process and used a unique data set to evaluate the validity of five hypothetical explanations for disputes: divergent expectations, incomplete information, the chilling effect, political factors, and egocentric assessments of fairness. Our results show that parties are unable to reach negotiated settlements where there is substantial variation in settlements negotiated in comparable school districts that are likely to influence arbitrators' decisions. This suggests that each party gives greater weight to information more favorable to its position when evaluating the likely arbitration outcome. Moreover, we interpret the fact that a substantial minority of the parties agreed to consent awards as evidence of the unwillingness of negotiators to accept the political costs of compromising from their final-offer positions. Finally, in a majority of cases where final-offer awards were received, we calculated a positive contract zone. This suggests that incomplete information about an opponent's beliefs is also likely to be an important explanation for disputes.

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