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Arbitrator Decision-Making in Multi-Issue Disputes

By

Craig A. Olson
Princeton University &
University of Wisconsin-Madison

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Abstract

Most research on arbitrator decision-making has used a model that assumes there is only one disputed issue. This study shows this model is not appropriate in multi-issue disputes under a final-offer by package law. Using data from Wisconsin, I find arbitrators do give substantial weight to non-wage issues in multi-issue disputes. However, the written awards of arbitrators substantially understate the weight given to non-wage issues in the final offer selection.

A significant share of the interest arbitration research over the last decade has focused on the decision process of arbitrators (Ashenfelter & Bloom, 1984; Farber & Bazerman, 1985; Bloom, 1985; Olson & Jarley, 1991). This attention by scholars reflects the influence arbitrator decision-making is thought to have on the behavior of the parties that negotiate under the threat of arbitration (Farber & Katz, 1979; Farber, 1980). Virtually all of the research on this topic is based on a simple model where the wage rate is the only disputed issue. In this model the arbitrator's belief about the "fair" wage (W_A) depends on a set of exogenous characteristics of the bargaining pair and environment observed by labor and management (X_s) and an unobserved component, ϵ :

$$(1) \quad W_A = XB + \epsilon.$$

In final offer arbitration each side presents their final wage offer and the arbitrator selects the offer closest to W_A . If W_U equals the union's final offer and W_E is the employer's final offer, the probability the union's final offer is chosen is

$$(2) \quad \text{Pr}(\text{Union win}) = (W_U - W_A < W_A - W_E).$$

Assuming ϵ is normally distributed, the probability of a union win is

$$(3) \quad \text{Pr}(\text{Union win}) = 1 - \Phi\left(\frac{(W_U + W_E) - 2W_A}{\sigma}\right).$$

$\Phi(\cdot)$ is the CDF for a standard, normal random variable. β , σ_ϵ and their standard errors are estimated using a slight modification of the standard probit model where the dependent variable is the offer chosen by the arbitrator.

Provided all of the X variables observed by labor and management are also observed by the researcher, the probit estimates provide information on the weight placed on the X variables by arbitrators when determining the fair wage outcome and the parties' uncertainty about the fair wage beliefs of

arbitrators. This conclusion assumes the wage rate is the only disputed issue. In disputes where the final offers of the parties include more than simply the wage rate, the single issue model is appropriate only if arbitrators completely ignore the non-wage issue(s) when reaching a decision.

The single issue model was appropriately used in the previous experimental research because the wage rate was the only disputed issue in the scenarios presented to arbitrators (Farber & Bazerman, 1986; Bloom, 1986; Dell'Omo, 1989). It also appears to have been appropriate in the Ashenfelter & Bloom (1984) study of the early New Jersey experience, perhaps because the only issues subject to arbitration under the New Jersey statute are "economic" issues. As Olson & Jarley (1991) discuss, this model does not appear to be appropriate in many of the teacher disputes under Wisconsin's final offer by package procedure.

If arbitrators give some weight to the non-wage issue(s) when making decisions in multi-issue disputes, then the appropriate model of arbitrator decision-making must reflect their multi-dimensional character. In this paper I elaborate on Olson & Jarley (1991) and show the single issue model is not appropriate in multi-issue disputes under a final-offer by package regime. I then empirically explore the decisions of arbitrators in multi-issue disputes.

Multi-Issue Final-Offer Disputes

For the nine schools years beginning with 1977-78, data were collected on 230 final offer decisions in k-12 school districts where at least one of the disputed issues was wages. This sample is similar to the sample in Olson & Jarley except for the exclusion of a small number of awards in k-8 and 9-12 districts. Additional details regarding the statute and data can be found in Olson & Jarley. In 49 percent of these disputes the only disputed issue is

the wage rate. A wage dispute is defined as a dispute over adjustments to the salaries in the salary grid, changes in the structure of the salary grid (e.g., number of lanes or steps) or proposals for lump-sum payments. The distribution of awards by the number of issues is:

Characteristics of the Case	No. of Cases
Wages only	112
Wages + 1 other issue	33
Wages + 2 other issues	25
Wages + 3 other issues	22
Wages + 4 other issues	16
Wages + 5 other issues	8
Wages + 6 other issues	7
Wages + > 5 other issues	7

There is also substantial variation in the type of non-wage issues in the multi-issue cases. The seven most common issues in the sample are:

Issue	No. of cases where at least one party submitted an offer on this issue
Extra-curricular or extra-duty pay	20
Health Insurance (typically cost sharing proposals)	19
Dental Insurance (typically introduction of)	11
Union Security	9
Contract duration	6
Long term disability (typically introduction of)	5
Lay-off language	11

These two tables show a majority of the awards settled both the salaries for teachers and at least one other issue.

The single issue wage model of arbitrator decision-making is inappropriate in the multi-issue disputes only if arbitrators give some consideration to the non-wage issue(s) when making their final offer decision; if the non-wage issues are ignored by the arbitrator then a model that also ignores these issues is correctly specified. A natural way to test whether or not arbitrators consider the non-wage issues is to estimate the single issue wage model separately for the wage only disputes and the multi-issue disputes. If the two samples provide different estimates, then the non-wage issues are important when arbitrators make their final offer selections. The estimates for the two samples are shown in columns (1) and (2) of Table 1. The variables included in the model are: (a) the percentage change in consumer prices during the first year of the contract (means = 4.9, SD = 3.8), (b) an index of the MA maximum point on the salary schedule in the district relative to the average MA maximum salary in the district's athletic conference for the previous year and (mean = 100.1, SD = 5.9) (c) the average percentage increase for the MA maximum salary cell for contracts settled earlier in the current school year (mean = 7.6, SD = 2.0). This average is computed over negotiated settlements in the district's athletic conference. Final offers are measured as the percentage increase in the MA maximum point on the salary schedule for the first year of the contract (mean = 7.4, SD = 2.6).

A likelihood ratio test of the null hypothesis that the parameters are the same in the multi-issue and wage only decisions is constructed by comparing the results from columns (1) and (2) with the constrained model reported in column (3). The data do not reject ($\chi^2_{5 \text{ d.f.}} = 6.982, p = .222$) the hypothesis that the models are the same in the single issue and multi-issue cases. However, the failure to reject this null hypothesis appears to

be because the error variances are significantly different in the two samples. A model which allows σ_ϵ to vary across the two sets of cases is shown in column (4). This model is preferred to the model in column (1) which constrains σ_ϵ to be the same in each sub-sample ($\chi^2_{1 \text{ d.f.}} = 4.662, p = .032$). Moreover, the model in column (4) is not significantly different from the less constrained model that permits both σ_ϵ and the β s to vary across the two types of cases ($\chi^2_{3 \text{ d.f.}} = 2.36, p = .501$). These results show the weight arbitrators apply to the facts of the case when determining the fair wage outcome is the same in single issue and multi-issue disputes. However, the uncertainty around W_A is greater in multi-issue cases because of the weight given to the non-wage issues.

The consequences of ignoring the distinction between single issue and multi-issue disputes and estimating the single issue model on the pooled data is apparent from a comparison of the results in columns (1) and (3). The estimated standard deviation of ϵ is 5 percent in the pooled sample. The difference between the final offers of the parties should be about 7 percent if the true value of σ_ϵ is 5.4 percent and the parties are risk neutral (Farber, 1980; Gibbons, 1988). Since the observed difference between the final wage offers is much lower (mean = 2.99, SD = 2.98) than 7 percent, the estimates from the pooled sample imply an implausible level of uncertainty about the fair wage beliefs of arbitrators. The biased estimate of σ_ϵ obtained from the entire sample produces biased estimates of the β s because the estimates of the β s are proportional to σ_ϵ . The magnitude of this bias can be seen by comparing the estimates in columns (1) and (2). For example, the pooled estimates in column (1) imply a one percent increase in negotiated settlements in the surrounding school districts increases the fair wage

beliefs of arbitrators by .5 percent. In the single issue cases, the estimated effect of this variable is .29 or 40 percent smaller than the pooled sample estimate.

Stated Versus Revealed Preferences

A content analysis of the written awards in the multi-issue cases reveals an interesting pattern. Although arbitrators in Wisconsin are constrained to select the entire final offer package of one side, in a majority of the multi-issue awards arbitrators discuss each issue and indicate in the written award their preferred offer on each issue. Frequently, this discussion also includes the weight the arbitrator said was given to an issue when reaching a decision on the two sets of offers.

The preference information in the written decisions is a potentially rich data source for studying multi-issue decisions. This information could be used to estimate a model where an arbitrator evaluates the parties' positions on each issue and then forms a weighted average of the parties' positions over all the issues when deciding between the two packages. A natural first step in developing such a model is to investigate whether or not the stated positions of arbitrators on a single issue in the multi-issue disputes correspond to the decisions the arbitrators would have made if the single issue had been the only disputed item. The Wisconsin data are sufficient to analyze the stated wage preferences of arbitrators in multi-issue cases.

The fifth column of Table 1 reports the probit estimates which try to predict the stated position of the arbitrator on the wage issue for the sample of multi-issue wage cases. A small number of cases are omitted from the analysis because the arbitrator said he or she was indifferent between the two

wage offers. These results contrast sharply with the estimates in column (2) for the sub-sample of wage only cases. The parameter estimates shown in column (5) are individually and jointly ($\chi^2_{4 \text{ d.f.}} = 7.14, p = .13$) not different from zero at conventional levels of significance. Thus, none of the variables that predict arbitrator decisions in wage cases are useful in predicting the stated wage position of arbitrators in multi-issue awards.

The results in column (5) have several interesting implications. First, school boards, the state teachers' union (WEAC) and their agents spend substantial resources analyzing the written decisions of arbitrators in an attempt to reduce the uncertainty of the arbitration process and improve their ability to predict how arbitrators will make decisions. Since most final offer cases in Wisconsin involve wages, much of this effort is devoted to an analysis of the wage positions of arbitrators. These results suggest some of this effort is wasted because the stated wage preferences of arbitrators in multi-issue disputes are not useful in predicting the actual decisions of arbitrators in wage disputes.

The intriguing question is why the stated preferences of arbitrators do not match their decisions. Insight into this question is provided in Table 2 which gives a breakdown between the preferred wage offer, the final offer award and the predicted wage decision. In this table each case is divided into one of two categories based on whether or not the predicted probability the arbitrator prefers the union's wage offer is greater or less than .5. This classification is based on the parameter estimates in column 2 of Table 1 and provides an estimate of the wage offer an arbitrator would most likely select if the case only involved wages.

Table 2

Preferred Wage Offer, Predicted Preferred Wage Offer
and Final Offer Selection

Preferred Wage Offer		Union		Predicted Pr(Union Wage Offer is Preferred)
Employer				
< .5	≥ .5	< .5	≥ .5	
16	17	5	10	Employer is FOA Winner
1	1	19	40	Union is FOA Winner

There are two important results in this table. First, there is a very strong relationship between the winning package and the wage offer preferred by the arbitrator. Arbitrators express a preference for the union's wage offer in 97 percent (19+40/61) of the cases where the union's final offer is chosen. Overall, the final offer decision match the preferred wage offer in 84 percent (16+17+19+40/109) of the cases. Second, this correlation between the stated wage preference and the final offer award is caused by the divergence between the stated wage preference and the predicted wage decision. In 39 percent (17+1+5+19/109) of the cases the stated position of the arbitrator on wages is different from the predicted wage offer the arbitrator would select if the wage is the only issue. As the numbers in the two shaded cells show, most of this inconsistency occurs because of the cases where the predicted wage decisions are different from both the preferred wage offer and the FOA decision. This suggests arbitrators give more weight to the non-wage issue(s) in multi-issues disputes than they are willing to reveal in their written decisions.

This finding could be because many of the non-wage issues are "lumpy" issues and have only a discrete number of outcomes. For example, some of the multi-issue cases are disputes where the employer paid 100 percent of the cost of health insurance and proposed that teachers share in the cost of insurance under the new contract. In these disputes the union views a change from 100 percent employer paid coverage as a major concession. There is little uncertainty about the arbitrator's position on health insurance if a decision is based on this issue and this fact is revealed in the written award. Regardless of the arbitrator's position on the issue, the probability the arbitrator will be selected in a future dispute of this type is reduced because one party will likely strike the arbitrator's name from future panels.

The Relative Importance of Wage and Non-Wages Issues

Since the stated position of arbitrators on individual issues in multi-issue disputes appears to be of limited use in modelling arbitrator decisions in these cases, in this section I pursue a slightly different approach. I assume the probability the union's package is selected is a weighted average of the probability the arbitrator prefers the union's final wage offer and the probability the arbitrator prefers the union's position(s) on the non-wage issues. If α equals the weight given to the wage issue, the probability the union's offer is chosen equals

$$\text{Pr(Union package is selected)} = \alpha \text{Pr}(W_U - W_A < W_A - W_E +$$

$$(1-\alpha) \text{Pr(Non-wage Offers(s) of the Union is preferred)}.$$

Ideally, I'd like to parameterize the last term in this equation using the final offers of the parties on the non-wage issues and a matrix of exogenous factors that determine the fair outcome belief of the arbitrator. Such an approach is not feasible because of the small number and the tremendous

variety of non-wage issues. Instead, I simply estimate the average probability the non-wage offer of the union is preferred by replacing the last term in the equation with a constant, λ . If ϵ is assumed to be normally distributed, then β , σ , α and λ is estimated over the pooled sample of wage and multi-issue wage disputes. If $U=1$ if the union's package is selected and $S=1$ if the dispute is a single issue wage dispute, the likelihood function for this model is

$$(4) \quad L = \prod_{U=1, S=1} \Pr(W_U - W_A < W_A - W_E) \quad \prod_{U=0, S=1} [1 - \Pr(W_U - W_A < W_A - W_E)] \\ \prod_{U=1, S=0} [\alpha \Pr(W_U - W_A < W_A - W_E) + (1 - \alpha) \lambda] \\ \prod_{U=0, S=0} \{1 - [\alpha \Pr(W_U - W_A < W_A - W_E) + (1 - \alpha) \lambda]\}$$

The parameter estimates for this model are shown in the last column of Table 1. This model fits the data substantially better than the simple pooled model which sets α equal to zero and the fit is similar to the model shown in column (4). The estimates of α and λ are different from zero and neither are significantly different from .5. This suggests arbitrators prefer the position of the union about half the time on the non-wage issues in multi-issue disputes. This result is very close to the union win rate in wage only cases, suggesting that on both wage and non-wage issues the parties present final offers that are, on average, equidistant from the fair outcome belief of the arbitrator. Since α is also not different from .5, these estimates suggest arbitrators give equal weight to the wage and non-wage items when deciding which package to select. Finally, the estimates of β and σ are very similar to the estimates obtained on the wage only sub-sample.

Conclusion

I draw three conclusions from this study. First, under a final offer by package law the simple, single issue model of arbitrator behavior is not an appropriate model for disputes where there is more than a single issue. Second, the written arbitration awards which include statements about the preferred positions of the arbitrators on the individual issues do not resemble the decisions the arbitrators would make if the cases involved only the single issue. Third, the results suggest the written awards understate the weight given to non-wage issues in multi-issue disputes. On average, arbitrators give equal weight to wage and the non-wage issue(s) in multi-issue disputes.

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Table 1
Estimates of Fair Wage Beliefs of Arbitrators

Variable	Dependent Variable					
	Final Offer Decision (1)	Final Offer Decision (2)	Final Offer Decision (3)	Final Offer Decision (4)	Stated Position On Wages Offers (5)	Final Offer Decision (6)
Constant	20.082 (7.427)	14.560 (6.450)	24.306 (17.197)	17.362 (6.145)	11.006 (25.623)	16.970 (5.834)
Inflation	.376 (.128)	.303 (.157)	.491 (.289)	.379 (.124)	.704 (.449)	.376 (.121)
Wage Increases in the Ath. Conference	.500 (.208)	.292 (.150)	.728 (.488)	.344 (.150)	1.043 (.820)	.359 (.133)
Wage Level relative to the Ath. Confer, t-1	-.186 (.070)	-.108 (.064)	-.245 (.164)	-.142 (.060)	-.109 (.233)	-.139 (.058)
σ_e	5.027 (1.063)	2.380 (.762)	8.044 (3.555)		10.264 (5.365)	2.434 (.732)
σ for wage only cases				2.613 (.872)		
σ for the multi-issue cases				7.239 (2.485)		
α						.554 (.173)
λ						.473 (.124)
- Log L	146.343	65.976	76.876	144.032	64.847	142.995
Sample Size	230	112	118	230	109	230
Description of the Sample Cases	Wage & Multi-Issue Cases	Wage Issue only	Multi-Issue Cases Only	Multi-issue wage cases	Multi-issue only	Wage & Multi-issue Cases

Standard errors in parentheses.