WHO "WINS" IN WAGE BARGAINING?

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I. Collective Negotiations and Bargaining Theory

Bargaining theory contains very few interesting propositions that can be either refuted or verified empirically. Hicks' model [4, pp. 140-153] suggests that the final outcome of the collective bargaining process will lie somewhere between the maximum the employer will offer without a strike and the minimum the union will accept without a strike. While its analysis of union and management resistance is useful, the indeterminacy of the wage settlement makes the model useless for predictive purposes.

The work of Cross [2] links uncertainty over the opponent's rate of concession to the bargainer's own rate of concession and thus explicitly introduces into the theory the possibility that mistaken expectations on either side can produce a strike or lockout. It also implies that one bargainer's offers should be most responsive to his opponent's demands at that point in time when he realizes the seriousness of his opponent's intentions. In labor negotiations this time is likely to be the period directly preceding the expiration of the old contract, so that we should expect a flurry of bargaining at this time. This implication is verified by observing most collective negotiations, but beyond that it holds little interest for empirical research.

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Only the models of Zeuthen [6] and Nash [5] contain an interesting and potentially verifiable empirical hypothesis. Both imply that the union and management will settle at that point which maximizes the product of the increments to their utilities. If both sides in the negotiations have identical utility functions and there is no bluffing, the outcome of bargaining will be to "split the difference" between the extreme points of the core. If we construct data representing union demands, employer offers and final settlements, and make some assumptions about the net amount of bluffing and the shape of the utility functions, we should be able to discover whether the parties to bargaining do "split the difference." The result of this test should be of interest even apart from its implications for bargaining theory, for it provides the first evidence on the relation of wage settlements to demands and offers.

Consider the trading set depicted in Figure 1 and based upon Bishop's analysis [1, p. 410]. The initial point $P_0$ in Bishop's interpretation of Zeuthen and Nash is that set of utilities enjoyed by the parties in the absence of an agreement. The points $P_1$ and $P_2$ are the end points of

![Figure 1
The Bargainers' Utility Space]
of the frontier along which the final bargain must be reached, and the core itself corresponds to the frontier between these points.

There are two major problems with Figure 1 which make it difficult to apply the model to data based on actual negotiations. The existence of bluffing ensures that the initial offers and demands lie outside the trading set. In terms of Figure 1 the initial union demand can be represented as $P_3$ and the initial employer offer as $P_4$. The initial demand very likely lowers the employer's utility below that he expects to enjoy at the threat point $P_0$, while the initial offer produces less utility for union leaders than would be produced by a settlement at the threat point. If this were not so and the points $P_3$ and $P_4$ lay between $P_1$ and $P_2$, we should expect all settlements to occur without a strike. The occurrence of strikes makes it essential that we consider the bluffing problem. If, for example, the union engages in more bluffing than the employer, a comparison of offers, demands and settlements would fail to yield the "split the difference" result. The net amount of bluffing might be defined as the difference between the distances $P_1P_3$ and $P_4P_2$.

The second difficulty with the model is that its results are defined in the utility space, while the only data available measure compensation in money terms. In order to test the model we must assume that both sides have identical utility functions whose sole argument is compensation per employee and which are linear in this argument over the range of compensation discussed during bargaining. (These amount to the assumptions of the simplest model of Zeuthen [6, pp. 115-121].) We cannot, therefore,
distinguish between a failure to verify the implications of the complete model due to its inapplicability to collective bargaining and a failure due to the inappropriateness of the assumption that each side has this unusual utility function. Whatever our results, they must be qualified by possibilities such as the employment effect of the wage increase entering the union leaders' utility function.

II. Construction of the Bargaining Data and Results of the Test

The data we use cover forty-three negotiations which were concluded between September 1968 and December 1970. Of these observations twenty-five were teacher negotiations, nine were firefighters or policemen and nine covered miscellaneous occupations. Data were constructed on the previous wage paid, the union's initial demand, the employer's initial offer and the final settlement. Our data cover wages only and do not include any attempts to reduce changes in other forms of compensation and work rules to their monetary equivalents. This reduction is not done because of the difficulty of finding methods of calculation agreed upon by both sides to the bargaining. (See [3, p. 507] for a discussion of this problem.)

By necessity our data cover only negotiations in the public sector. Only for public employee bargaining can one obtain the requisite information,

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1These data were all culled from issues of Bureau of National Affairs, Government Employee Relations Report and were the only ones available during this period which had all the required information. We took great care to ensure that the initial demands and offers used were actually the first made by each side, but there is the possibility that the basic material failed to report the earliest publicized demand (offer) in some cases. An appendix listing these data is available on request from the author.
for only there is the employer's offer a matter of public record. In the private sector it is impossible in all but a few cases to find data on the employer's response to the union's initial demand. In any event, the public sector data are more easily analyzed, for there are few long-term contracts in this sector and thus no need to devise methods of compressing a number of deferred and cost-of-living increases into one figure representing the wage package. Furthermore, the demand for labor is likely to be relatively inelastic in this sector. Our failure to include the employment effect in the union leaders' utility function should bias our test of the Zeuthen model less than a test based on private sector data.

We use the raw data to compute $\hat{W}_D$, the percentage wage increase initially demanded; $\hat{W}_E$, the increase initially offered by the employer, and $\hat{W}_S$, the increase finally settled upon. All of these figures are calculated at an annual rate of increase, so that, for example, if a particular contract is to last two years, the percentage increase is divided by two. The means and the standard errors of the means over the sample of observations are presented in Table 1.

<table>
<thead>
<tr>
<th>$\hat{W}_D$</th>
<th>$\hat{W}_E$</th>
<th>$\hat{W}_S$</th>
</tr>
</thead>
<tbody>
<tr>
<td>22.05</td>
<td>8.28</td>
<td>11.95</td>
</tr>
<tr>
<td>(2.10)</td>
<td>(.77)</td>
<td>(.94)</td>
</tr>
</tbody>
</table>

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Table 1
Means and Their Standard Errors
To test the "split the difference" model we test the null hypothesis:

\[ Z = \hat{\omega}_D - 2\hat{\omega}_S + \hat{\omega}_E = 0. \]

The mean of \( Z \) is 7.23; the settlement lies much closer to the initial offer than to the initial demand. The \( t \)-value of the test of the null hypothesis is 3.83, so that we can reject the hypothesis that \( Z \) equals zero. Our result thus implies either that: 1) the two parties' utility functions are not identical and linear in the wage increases; 2) the amount of bluffing by the union is greater than by the employer; or 3) the "split the difference" theory of bargaining is inapplicable.

The first of these possibilities cannot be rejected, but there is no reason to assume (as one must to rationalize our results) that the public employer's utility decreases more in response to a given percentage wage increase than the union leaders' utility is increased by the same wage increase. The second may be realistic, for the pressure of public opinion may force public employers to offer an acceptable increase at the start of negotiations. There may thus be very little room for bluffing by state and local governments. Public employee unions, on the other hand, have an incentive to engage in bluffing in negotiating their first few contracts. After several rounds of negotiation, however, their relative bargaining power may force them to lower their demands as their threats become less credible. Since negotiations between public employers and unions have begun only quite recently, the unions may be bluffing
more than employers. The third possibility is, of course, the hypothesis we are trying to test.

On one level our results show that public employee unions only receive approximately one-fourth of the difference between their wage demands and the amounts public employers offer them. In this superficial sense public management might be said to "win" in collective negotiations. On a deeper level this conclusion cannot be supported. Since we do not observe the minimum increase for which union leaders are willing to settle, and since we expect more bluffing by unions than by employers in our sample, the unions may well not have "lost" in these negotiations.

Our efforts demonstrate the severe problems involved in using existing bargaining theory to derive and test propositions about behavior in non-experimental situations. Any empirical test is likely to be confounded both by the existence of asymmetries in bluffing and by the possibility that the utility functions of the parties contain different arguments and are not linear in the observable monetary quantities. One must conclude that the likelihood that current theory can help us to reach concrete conclusions based on tests using data on the collective bargaining process is small indeed.

2That at least one side in our sample is bluffing enough to place the other side beyond its threat point is demonstrated by the high proportion of cases (thirty-two out of forty-three) in which some work stoppage occurred after the initial demand and offer were made.
References


