J. COLLECTIVE NEGOTIATIONS, Vol. 15(3), 1986

THE IMPACT OF FINAL-OFFER ARBITRATION ON WAGE OUTCOMES OF PUBLIC SAFETY PERSONNEL: MICHIGAN vs ILLINOIS

MARIE D. CONNOLLY
Department of Economics
Chatham College

ABSTRACT

Outcomes under final-offer arbitration (FOA) were studied to test whether an FOA environment leads to above average wage levels. Because compulsory arbitration laws are state laws, thereby influencing all bargaining units within the state, an interstate comparison is made The results indicate that wages in Michigan, an FOA state, are approximately 5 percent greater than comparable public sector salaries for public safety personnel in Illinois, a nonarbitration state.

Over the past decade many states have legislated alternative impasse procedures to deal with labor disputes in the public safety sector. The most common forms of alternative impasse procedures are mediation, factfinding, and compulsory arbitration. Compulsory arbitration can be either conventional or final offer. Formulated to prevent strikes in the public safety sector, these impasse procedures have in and of themselves proved controversial. Most academics and practitioners question the impact of these procedures on the bargaining process and wage outcomes. If alternative impasse procedures interfere with "true" collective bargaining or if they result in above-average wage settlements, the public is paying the price for labor peace.

Because many states have yet to decide on an alternative impasse procedure, and others are contemplating changes in their present laws, it is important to evaluate the performance of these procedures. One important aspect of that performance is whether compulsory arbitration laws have led to above-average wage settlements. There are two different types of wage effects that can be

attributable to compulsory arbitration. One wage effect is when a particular form of compulsory arbitration law, or the mere presence of the compulsory arbitration law, increases the wage level over what it would have been in the absence of the law. The second wage effect is present if the arbitration procedure results in higher wages for those who use the procedure than for those who negotiate their settlements.

The purpose of this study was to investigate the effect of one form of compulsory arbitration, final-offer, on wage outcomes. Under final-offer arbitration, the arbitrator is forced to choose between the last best offer of the union and the last best offer of management. This article concentrated on exploring whether the presence of final-offer arbitration has a positive effect on the wage levels within a state.

REVIEW OF THE LITERATURE

Several authors have investigated the effect of compulsory arbitration on wage outcomes. Both the difference between arbitrated and negotiated wages in a compulsory arbitration environment and the difference between wages in jurisdictions with compulsory arbitration versus those without a law have been examined. The latter research has also included evaluations based on changes in impasse procedures. All of these issues must be considered in an evaluation of the performance of alternative impasse procedures.

Intrastate Comparisons

Compulsory arbitration (CA) laws are state laws covering a certain classification of employees statewide. For example, Michigan Act 312 covers all public safety employees in the state. This includes all police, fire, and deputy sheriff units. The question has arisen whether use of the procedure results in above-average wage settlements. Are arbitrated wages greater than negotiated wages in a CA environment?

Recent theoretical literature by Farber and Katz [1] deals with the expected effect of final-offer arbitration (FOA) on wage outcomes. They hold that a necessary requirement for measuring the effectiveness of an alternative impasse procedure is to investigate any bias introduced into the environment by the procedure. If outcomes are different in a CA environment from what they would have been if the parties had not availed themselves of the procedure, the procedure is said to introduce a bias. In the case of FOA, the contract zone sets the bounds for the negotiated settlement. Because the arbitrator's expected behavior influences these contract zones, the presence of FOA affects not only arbitrated awards, but also negotiated ones. The difference between negotiated and arbitrated settlements is a function of the uncertainty regarding the arbitrator's award, the relative bargaining power of the parties, and the relative

risk preferences of the parties. Any change in the average arbitrator's award will change negotiated outcomes by the same amount; therefore, a differential will not be detected by a simple comparison of negotiated and arbitrated outcomes. An increase in uncertainty will bias the negotiated outcomes, but as uncertainty is reduced all settlements will tend to converge.

Most empirical work in this area has supported the work of Farber and Katz. A study conducted by J. Joseph Loewenberg [2] examined the conventional CA experience in Pennsylvania. Loewenberg found that for firefighters, arbitrated awards and negotiated awards were similar, as were the salary ranges of those who decided to arbitrate over those who negotiated. For police units, salary ranges were higher for those who negotiated settlements than for those who arbitrated. Salary increments, however, were larger if they were the result of an arbitration decision. This seems to imply that certain police units used arbitration to catch up with their counterparts in other jurisdictions. If the firefighter experience were representative, however, there would be no reason to expect arbitrated awards to be higher than negotiated settlements once median salaries were equal.

In Stern, *et al.* the Wisconsin experience with FOA was examined [3]. The results suggested that "going to arbitration" did not increase salaries. Similar results were presented by David Bloom in a study on the effects of FOA on salaries of municipal police officers in New Jersey [4]. None of the coefficients on the arbitration dummies differed significantly from zero. In examining FOA in Michigan from 1973–1979, a study by Marie Connolly also found no significant difference between arbitrated and negotiated salaries in an FOA environment [5]. In comparing negotiated and arbitrated outcomes in a compulsory arbitration environment, none of the authors was able to quantify a significant wage differential attributable to compulsory arbitration.

Interstate Comparisons

The fact that no significant differential can be found between arbitrated and negotiated outcomes in a CA environment does not mean there is no cost to a state from passage of a CA law. If both negotiated and arbitrated wages are biased upward, no differential is observed, but there is a definite cost involved. Observing the bias to negotiated outcomes is very difficult. Because arbitration laws are state laws, no instate control group is available. Therefore, it is difficult to determine what negotiated wages would have been if there had been no arbitration option.

Several studies have tried to compare states before and after passage of a CA law. Stern, *et al.* and Kochan, *et al.* compared the effects of arbitration on firefighters' wages in selected states over a short period of time [3, 6]. The Kochan study examined wage changes in New York State when it changed the final step of its impasse procedure from factfinding to compulsory arbitration.

They found that salaries increased by .5 to 2.5 percent after implementation of CA, although the increases were not all statistically significant.[1] Stern, *et al.* reported, after studies involving the experience of Wisconsin and Michigan, that FOA appeared to produce a small one-time wage increase immediately following its adoption.

One study that did attempt to address the question of what cost a state can expect to incur if it moves from a no-law environment to a CA environment was done by Craig Olson [7]. Olson compared the salaries of firefighters in states with a CA law to those in states without CA laws. His study used data from seventy-two cities with populations of 100,000 or more. He found a positive arbitration effect on wages. Depending on the estimation procedure, the effect of the arbitration ranged from .39 (insignificant) to 4.24 percent (significant). In looking at wage changes over time, he concluded that if CA laws were enacted in 1972, by 1977 wages would be 3.12 to 6.54 percent higher than they would have been without the legislation.

Olson's study presents the best overall information on the observed differential between cities with CA laws versus those without laws. His sample, however, is limited. The experience of cities with populations over 100,000 may not be representative of all cities. Further study is needed, therefore, before his conclusions can be generalized.

EMPIRICAL SPECIFICATION

This article examined the wage level of police units between two states—Michigan and Illinois. The purpose was to discover whether police units in Michigan, an FOA state, have a higher level of wages than police units in Illinois, a state without a CA law. Michigan and Illinois were chosen for this study because they are both located in the North Central region, are both relatively industrial states, and are both dominated by one large city. Further information on the sample is given in the next section. Given the similarities between the states, this article assumed that the wage determination equation for municipal police units should also be similar.

Traditional labor theory holds that in a purely competitive market wages are determined by the interaction of supply and demand. The demand for police is derived from the community's demand for police protection. Therefore any change in demand for police protection, due to a change in taste, or changes in financial conditions, will affect the demand for labor. Demand for police, therefore, is a function of the wealth of the community, the willingness of the community to pay for police services through taxation, and the need and interest of the community in providing safety services. The supply of labor in the public sector is governed primarily by wages paid in the private sector. In

[1] Summary of Kochan's results was taken from Olson [7].

addition, the supply will be affected by the availability of the alternative wage. Areas experiencing low unemployment may have fewer job applicants and therefore need to entice potential employees with higher pay.

Outcomes under collective bargaining, however, are not only an interaction of supply and demand but also a result of the power relationship between the parties. To the extent that political and interpersonal factors affect the power relationship between the parties, they will also affect the wage settlement. Ehrenberg has hypothesized that city managers may be more efficient than mayors in producing fire services from a given number of firemen [8]. If city managers are more efficient, then the reduced demand for labor will exert downward pressure on wages.

Public sector wage determination is influenced, therefore, by a wide array of variables. To provide a model of public sector wage determination, it is necessary to take account of as many of these factors as possible.[2] The variables included in the model are similar to those used in previous studies and reflect the economic, political, and institutional factors that determine public sector wages. The variables used and the expected sign of each coefficient are as follows:

LAND:	land area in square miles, 1980	(+)
POP:	total persons in city, 1980	(+)
NPOP:	change in population, 1970-1980	(+)
PCY:	per capita money income, 1979	(+)
COLA:	dummy for COLA clause; 1 if COLA, 0 otherwise	(?)
CGV:	dummy for type of city government; 1 if city manager, 0 otherwise	(−)
REG:	dummy for region; 1 if Detroit or Chicago metro area, 0 otherwise	(+)
CRIM:	FBI total crime index, 1978	(+)
PRTX:	per capita property tax, 1976-1977	(+)
EXP:	per capita general expenditure, 1976-1977	(+)
UNP8:	county unemployment rate, 1978	(−)
NUNP:	change in unemployment rate, 1977-1978	(−)
OPCT:	wage of production workers, 1977	(+)
MVH:	median value of housing, 1980	(+)
DS:	dummy for state; 1 if Michigan, 0 otherwise	(+)

THE SAMPLE AND THE DATA

The sample consisted of seventy-six cities, forty-one in Illinois and thirty-five in Michigan. Michigan has had a CA law in effect since 1969 and FOA since 1973. Illinois has no state law mandating CA of public sector impasses. All cities used were unionized as of 1978. Only unionized cities were used, so as to

[2] For a good model of public sector wage determination, see Schmenner [9].

Table 1. Descriptive Statistics—Illinois

	Mean	*Standard Deviation*	*Minimum*	*Maximum*
POP	39720.5	28048.1	10410.0	139712.
NPOP	8.54878	29.6678	−14.1000	124.700
PCV	8356.61	2188.59	5271.00	15564.0
COLA	0.195122	0.401218	0.000000	1.00000
CGV	0.390244	0.493865	0.000000	1.00000
REG	0.414634	0.498779	0.000000	1.00000
CRIM	2593.27	2389.92	314.000	11060.0
PRTX	291.951	68.2700	132.000	408.000
EXP	720.146	133.641	465.000	1044.00
UNP8	6.45122	1.49300	4.20000	12.4000
OPCT	13568.6	2096.43	7987.20	18240.0
NUNP	−0.252759E-01	0.121867	−0.526773	0.240000
MVH	54326.8	24113.3	27100.0	128400.
LAND	11.5220	9.31404	2.40000	39.8000
	1	2	3	4

Table 2. Descriptive Statistics—Michigan

	Mean	*Standard Deviation*	*Minimum*	*Maximum*
POP	41867.8	38779.1	9622.00	181843.
NPOP	−5.98000	9.73178	−20.5000	19.7000
PCV	7950.86	2104.24	4576.00	13808.0
COLA	0.342857	0.481594	0.000000	1.00000
CGV	0.857143	0.355036	0.000000	1.00000
REG	0.428571	0.502096	0.000000	1.00000
CRIM	2696.57	2728.65	465.000	12544.0
PRTX	315.971	68.2510	178.000	405.000
EXP	809.943	156.277	507.000	1075.00
UNP8	6.75143	1.64806	4.60000	12.5000
OPCT	15187.0	2603.19	9068.80	18332.4
NUNP	−0.168946	0.493571E-01	−0.322917	−0.769231E-01
MVH	41414.3	16986.1	14700.0	90000.0
LAND	12.5229	11.1480	2.00000	43.4000
	1	2	3	4

prevent confusion between wage differences due to unionization and wage differences due to the arbitration law. The size of the sample was further constrained by the availability of wage data. Wage data were taken from the *Municipal Yearbook 1980* [10]. Whether the wage level in Michigan was the outcome of a negotiated settlement or an arbitrated award was not relevant because, as previous studies showed, there is no significant difference between negotiated and arbitrated outcomes in a CA environment. Despite these data limitations, the sample used represents a wide range of populations and regional locations in both states. (See Table 1 and Table 2.)

Data on the independent variables were taken from various sources. The majority of the information is census data reported in the *County and City Data Book 1983* [11]. Union and COLA information for Illinois were taken from the *1978 Municipal Compensation Survey* [12] published by the Illinois Municipal League. Wages for production workers were taken from the *1977 Census of Manufacturers* [13].

RESULTS

A simple, ordinary-least-squares (OLS) regression was used to estimate the wage effect of the arbitration law. The initial specification of the equation included a single dummy variable for state. This state dummy also represented the effect of the law because Michigan (DS = 1) has an FOA law and Illinois (DS = 0) does not. The results showed a significant difference in wage levels between Michigan and Illinois (see Table 3). Wages in Michigan, an FOA state, were significantly greater than wages in Illinois, a no-law state.

Examination of the coefficients on the other variables finds that the coefficients on the region, the level of expenditures, the unemployment rate, and the median value of housing are significant and of the expected sign. This suggests that differing financial conditions across cities are important in determining wage levels. The fact that population and per capita income were not significant is most probably due to multicollinearity with region and median value of housing, respectively. The coefficient on city government is positive and significant at the 10 percent level. This is contrary to Ehrenberg's hypothesis that one would expect lower salaries in cities with city managers.

As state earlier, the state dummy was positive and differed significantly from zero. This suggests that Michigan wages are greater than wages in Illinois. Using the dummy variable technique to measure the differential is only reliable, however, if the coefficients on all other explanatory variables are identical across states. The hypothesis of common slope coefficients was tested using a standard *F*-test. Although the hypothesis could not be rejected at the 5 percent level, the regression results showed that several of the coefficients on the variables had different signs in the different states. To test whether these coefficients were significantly different across states, interactive dummies were introduced. The

Table 3. Wage Equation—1979

Independent Variables	*Estimated Coefficients (Standard Errors in Parenthesis)*
Constant	12863.0 (1473.17)
Land	19.02 (30.18)
Population	0.0065 (0.0125)
Percent Change in Population	−5.676 (6.484)
Per Capita Income	−0.065 (0.156)
COLA Clause	−176.65 (315.86)
Type of City Government	515.52* (331.42)
Region	1593.10*** (494.74)
Crime Index	−0.0037 (0.146)
Per Capita Property Tax	3.38 (3.32)
Expenditures	4.07*** (1.29)
Unemployment Rate	−476.82*** (116.08)
Percent Change in Unemployment Rate	1920.10 (1498.57)
Production Wage	0.066 (0.074)
Median Value of Housing	0.024* (0.017)
State Dummy	1058.79*** (415.04)
R^2	.79
Mean of Dependent Variable	17157.2

* significant at the .10 level, one-tailed test.
** significant at the .05 level, one-tailed test.
*** significant at the .01 level, one-tailed test.

Table 4. Wage Equation with Interactive Dummies

Independent Variables	*Estimated Coefficients (Standard Errors in Parenthesis)*
Constant	13885.0 (1536.38)
Land	28.44 (27.37)
Population	0.031** (0.015)
Percent Change in Population	−8.36* (5.74)
Per Capita Income	0.015 (0.138)
COLA Clause	218.02 (295.80)
Type of City Government	269.48 (307.35)
Region	1731.89*** (445.32)
Crime Index	−0.386** (0.168)
Per Capita Property Tax	6.51** (3.36)
Expenditures	2.66** (1.17)
Unemployment Rate	−397.05*** (103.11)
Percent Change in Unemployment Rate	1418.95 (1352.76)
Production Wage	−0.065 (0.085)
Median Value of Housing	0.016 (0.015)
State Dummy	−1244.72 (1654.81)
DS—Population	−0.064*** (0.021)
DS—Crime Index	0.948*** (0.273)
DS—Per Capita Property Tax	−8.04** (4.66)
DS—Production Wage	0.332*** (0.132)
R^2	.84
Mean of Dependent Variable	17157.2

* significant at the .01 level, one-tailed test.
** significant at the .05 level.
*** significant at the .01 level.

interactions that proved to be significant were those on population, the crime index, property tax rates, and the private sector production wage (see Table 4).

Specifically, it seems that not only do these factors appear to play a major role in wage determination, but they enter the equations differently in the two states. Although population leads to higher salaries in Illinois, it has a negative impact on salaries in Michigan. This could be because the ability to resort to an arbitrator increases the bargaining power of small cities and therefore results in higher salaries. The introduction of the arbitrator, however, may neutralize the bargaining power of large cities in Michigan, thereby curtailing wages. The level of crime in the community enters the Illinois equation negatively. Police units in Illinois have not been able to translate working in more dangerous jurisdictions into more money. In Michigan, however, a premium seems to be paid for high-risk areas. Again, an appeal to an arbitrator may have made this possible. Higher levels of property taxes correspond to higher wage levels in Illinois, but in Michigan the relationship is negative. It could be that arbitrators, protecting the public interest, try to control wage levels in jurisdictions with above-average property tax burdens. What employees in the private sector are earning is significant in Michigan but not in Illinois. This again could be the result of the emphasis arbitrators put on comparability in determination of wages.

Although the intercept dummy itself is no longer significant, the differences in the slope dummies suggest that wages are in fact different in the two states. Attributing this difference between states to differences in the impasse procedure allows one to estimate the change in wage levels that would most likely occur if Illinois were to adopt a CA law. Taking the derivative of the wage equation with respect to the dummy for state gives a measure of the differential effect due to the state. Evaluation of this derivative at the mean values suggests that Michigan salaries are $954 greater than salaries in Illinois.[3] Evaluation of this equation at various other values gives an estimate of the range of effects expected across a state. For example, a small town in Illinois, with median property taxes, a low crime rate, and a median private sector wage would expect a wage effect smaller than the mean effect shown above.[4] Large cities would expect very small wage effects from a change in the law. This is because larger cities tend to pay well as a consequence of the bargaining power of unions, regardless of the arbitration law.

CONCLUSIONS

The main finding of this research is the positive effect of final-offer arbitration on wages. Using data from Michigan and Illinois, it was determined that wage levels in Michigan were 5.5 percent greater than comparable public

[3] $\partial W79/\partial DS = DS + DPOP(POP) + DCRIM(CRIM) + DPRTX(PRTX) + DOPCT(OPCT)$
$= -1245 - .064(40709) + .948(2641) - 8.0(303) + .33(14314)$
$= 954$

[4] In the equation of the previous footnote, substitution of the values POP, 20000; CRIM, 1000 yields a value of $723 for the differential.

sector salaries in Illinois. This result was measured using data from Michigan's public safety sector six years after the passage of final-offer arbitration. This result supports the earlier findings of Craig Olson, although Olson's study was confined to cities of more than 100,000 population. The positive effect of arbitration on the wage levels suggests that over time states passing compulsory arbitration laws pay a price for preserving labor peace.

Another interesting observation is the fact that the process by which wages are determined seems to change after the passage of a compulsory arbitration law. Although arbitrators are directly involved in only 10 to 15 percent of the contracts settled in the public safety sector, they exert an indirect influence on all contracts. The behavior of arbitrators and the factors they consider in arriving at an award have far-reaching consequences for the negotiated contracts of jurisdictions.

ACKNOWLEDGMENTS

The author wishes to thank Steven L. Husted and Patricia Beeson for their interest and help with this project.

REFERENCES

1. H. S. Farber and H. C. Katz, Interest Arbitration, Outcomes, and the Incentive to Bargain, *Industrial and Labor Relations Review, 33*, pp. 55-63, October, 1979.
2. J. J. Loewenberg, Compulsory Arbitration for Police and Firefighters in Pennsylvania in 1968, *Industrial and Labor Relations Review, 23*, pp. 367-379, April, 1970.
3. J. L. Stern, C. M. Rehmus, J. J. Loewenberg, H. Kasper, and B. D. Dennis, *Final Offer Arbitration*, D. C. Heath, Lexington, Massachusetts, 1975.
4. D. E. Bloom, *The Effect of Final Offer Arbitration on the Salaries of Municipal Police Officers in New Jersey*, Technical Report 129, Princeton University, Princeton, New Jersey, November, 1979.
5. M. D. Connolly, "The Impact of Final Offer Arbitration on the Bargaining Process and Wage Outcomes," Ph.D. thesis, Michigan State University, East Lansing, Michigan, 1983.
6. T. A. Kochan, *et al.*, *An Evaluation of Impasse Procedures for Police and Firefighters in New York State*, Cornell University Press, Ithaca, New York, 1977.
7. C. A. Olson, The Impact of Arbitration on the Wages of Firefighters, *Industrial Relations, 19*, pp. 325-339, 1980.
8. R. G. Ehrenberg, Municipal Government Structure, Unionization, and Wages of Firefighters, *Industrial and Labor Relations Review, 27*, pp. 36-48, October, 1973.
9. R. W. Schmenner, The Determination of Municipal Employee Wages, *The Review of Economics and Statistics, LV*, pp. 83-90, February, 1973.

10. *Municipal Yearbook, 1980*, International City Management Association, Washington, DC, 1980.
11. *County and City Databook, 1983*, U.S. Department of Commerce, Bureau of Census, U.S. Government Printing Office, Washington, DC, 1983.
12. *1978 Municipal Compensation Survey*, Illinois Municipal League, Springfield, Illinois, 1978.
13. *Census of Manufacturers, 1977*, Geographic Area Studies, U.S. Department of Commerce, Bureau of Census, U.S. Government Printing Office, Washington, DC, 1980.

* * *

Dr. Marie D. Connolly is currently Assistant Professor of Economics and Management at Chatham College. Her research interests include public sector collective bargaining and comparable worth.

Direct reprint requests to:

Dr. Marie D. Connolly
Department of Economics
Chatham College
Pittsburgh, PA 15232