NBER WORKING PAPER SERIES

LABOR RELATIONS, WAGES AND NONWAGES
COMPENSATION IN MUNICIPAL EMPLOYMENT

Jeffrey S. Zax

Working Paper No. 1582

Labor Relations, Wages and Nonwages
Compensation in Municipal Employment

ABSTRACT

In the private sector, 'unionization' typically refers to employees who
are organized, recognized, and covered by contracts, according to the
procedures established by the National Labor Relations Board. The
municipal sector provides an instructive contrast. There, 'unionization'
encompasses five mutually exclusive combinations of organizational
structure and labor relations practice. These 'modes' form a hierarchy
of employee power, from strongest to weakest: recognized bargaining
units, unrecognized unions in cities which contain other recognized
unions, unorganized employees in cities which contain recognized unions,
unrecognized unions in cities which contain no recognized unions, and
unorganized employees in cities which contain no recognized unions.
Differences in the effects of each mode on compensation for municipal
employees demonstrate differences in the intrinsic strength of different
union institutions.

Municipal compensation levels are dramatically higher for employees
represented by more powerful modes of unionization, regardless of other
conditions in factor and output markets. Union effects on total compen-
sation, in comparison to its mean, range from 3.8% for unrecognized
unions in cities which contain no recognized bargaining units, to 11.8%
for recognized bargaining units, themselves.

In addition, union effects on total compensation are greater than
union effects on wages in all modes. Relative union effects on expendi-
tures for paid time not worked and pension benefits are usually more
than twice wage effects. Union effects on medical benefits are nearly
twice wage effects.

Jeffrey S. Zax
National Bureau of Economic Research
269 Mercer St., 8th floor
New York, New York 10003

In October 1980, municipal governments had 2,560,516 full- and part-time employees (Labor-Management Services Administration), or 2.4% of the American labor force in that month (Economic Report of the President) More than half of full-time employees, 53.9%, were members of unions or employee associations (Labor-Management Services Administration). The size of the municipal sector, and the prominence of unions within it, have stimulated many studies of these unions and their economic activity.[1]

In addition, municipal unions provide several comparisons with unionization in the private sector. Municipal unions may be able to exercise greater influence over compensation levels than can unions in the private sector, because they have political as well as economic power (Wellington and Winter). That ability may be rarely exercised: current estimates of union wage effects in municipal employment seem to be modest in comparison to those in private sector employment, both in the aggregate (Freeman) and in individual functions (Edwards and Edwards, 1982a)

Furthermore, municipal unionization also offers a comparison -- unique in the American economy -- between different institutions of labor relations. The strengths of both municipal and private sector unions may vary with conditions in product and factor markets. Only municipal unions vary importantly in strength because of differences in union structure. The opportunity to study these differences has been

----

[1] Freeman, and Ehrenberg and Schwarz summarize this literature.

ignored in previous work.

In the private sector, 'unionization' typically refers to employees who are organized, recognized, and covered by contracts, according to the procedures established by the National Labor Relations Board. Exceptions to this characterization are only temporary: new unions still seeking recognition, and bargaining units whose most recent contract has lapsed prior to agreement on a successor. Private sector unions are at once employee associations and representatives of bargaining units. The bargaining units they represent are legally entitled to binding contracts (Beal, Wickersham and Kienast).

In the municipal sector, 'unionization' encompasses five mutually exclusive combinations of organizational structure and labor relations practice. These 'modes' form a hierarchy of employee power. Municipal compensation levels are dramatically higher for employees represented by more powerful modes, regardless of other conditions in factor and output markets. This paper describes the five modes of municipal labor relations and estimates the effects of each on total compensation levels, wages and four types of nonwage compensation.

I. Five Modes of Municipal Labor Relations

There is no single definition of 'unionization' in municipal employment.

Municipal employees may be organized by an employee association which is not recognized as a bargaining unit. They may be represented by a bargaining unit which is not covered by a contract. They may benefit from employment by a bargaining city, even if they are members of neither a bargaining unit nor an employee organization.

Accordingly, there is no single measure of unionization among municipal employees. Unfortunately, previous attempts to analyze the relationship between unionization in the local public sector and municipal compensation have not successfully differentiated between weak and powerful union structures. As examples, Ashenfelter, and Edwards and Edwards (1982b) use only a dummy variable indicating the presence of a union. Schmenner, Ehrenberg (1973) and Ichniowski use both this variable and a dummy for the presence of a contract, though only Schmenner uses them simultaneously. These studies present only polar concepts of municipal labor relations. Union membership, by itself, is the weakest form of municipal unionization. The strongest form is represented by an enforceable union contract.

These representations, in isolation, ignore two important dimensions of the relationships between municipal employers and employees. First, common patterns of municipal organization are intermediate to unionization and contractual agreement in sophistication and in union power. Second, union power is 'additive'; distinctive characteristics of weak municipal labor relations practices are incorporated into stronger forms, to whose power they contribute.

Municipal unionization takes on five different forms, each repre-
senting the joint effects of different levels of organization and dif-
ferent bargaining practices. [2] Bargaining is the most important aspect
of municipal labor relations. Employees in individual municipal func-
tions experience one of three bargaining environments; no bargaining, a
bargaining city or a bargaining function. Nonbargaining functions,
regardless of whether their city bargains, may or may not contain
employee organizations. [3]

Table 1 summarizes the levels of organization and the bargaining
practices which define each mode. It also introduces several additional
features of municipal unionization which further distinguish powerful
modes from weak. The distribution of these features across modes
demonstrates that institutions of municipal labor relations become more
sophisticated as bargaining practices become more formal.

Nonunion functions in nonbargaining cities represent the first,
weakest mode of municipal labor relations. Employees in these functions
are unorganized, and are employed by cities which do not bargain with
any of their employees in any function. Table 1 confirms that nonbar-
gaining cities in which nonunion functions are found do not enter into

----

[2] State laws impose limits on municipal bargaining and organizational
practices which may vary. No convenient summary of these laws ex-
ists. Therefore, the analysis of this paper does not introduce them
explicitly.

[3] Employees in bargaining functions always belong to an employee
association.

[==]

Table 1.

Mean Labor Relations Characteristics in Five Municipal Labor Relations Modes

Characteristic	Nonunion Function, Non-Bargaining City	Union Function, Non-Bargaining City	Nonunion Function, Bargaining City	Union Function, Bargaining City	Bargaining Function
Percent Organized	–	60.1%	–	74.4%	69.7%
Bargaining Unit Present	no	no	no	no	yes
Number of Bargaining Units	–	–	–	–	1.56
Bargaining City	no	no	yes	yes	yes
Percent Functions With Supervisors Represented	–	–	–	–	33.8%
Number of Contracts	0.	0.	1.07	2.67	3.20
Number of Memoranda	0.	0.	.43	.98	1.46
Percent Covered	0.	0.	13.4%	32.0%	34.8%
Number of Observations	1475	324	454	629	2747
Percent of Total	26.2%	5.8%	8.1%	11.2%	48.8%

Notes: These statistics are calculated from the sample described in the Appendix to this paper. Observations represent police, fire, sanitation and an aggregate of all other non-educational functions.

[==]

contractual agreements or memoranda of understanding with any of their

employees.

Employees who organize, though the city for which they work does not

bargain, belong to the second mode -- union functions in nonbargaining

cities. Union formation is the first initiative open to employees who

wish to increase their influence. Organized employees may, through

informal interactions with administrators in which their solidarity is

expressed, obtain greater compensation than were they unorganized,

though their union is not legally entitled to bargain.

Unorganized and organized functions, in conjunction with cities that

bargain, form the bases of modes three and four. Bargaining cities are

those in which at least one bargaining unit is recognized, or in which

unrecognized functions are routinely invited to meet-and-confer discus-

sions. [4] As indicated in Table 1, bargaining cities have typically

signed binding contracts, as well as memoranda of understanding. [5]

Nonunion and union functions in bargaining cities represent 39% of

all functions which do not contain a bargaining unit. Employees in these

functions enjoy some of the benefits which accrue to formal nego-

tiations. Some cities may prefer to establish conditions of employment

through a uniform procedure for all functions, whether or not they are

legally entitled to bargain. Many cities may offer unrecognized func-

tions conditions which are similar to those obtained by recognized

----

[4] Most cities that meet this definition do so because a bargaining
unit has been recognized.

[5] The Surveys of Government, from which these data are taken, report
only total contracts per city. They do not identify the functions
with which contracts are signed.

[6] The observations in these modes disproportionately represent sanita-
tion departments. They may regularly profit from the activities of

functions, in order to forestall organization and recognition drives. In either case, compensation levels for municipal employees in nonbargaining functions are increased because other functions bargain.

Bargaining functions -- the fifth mode of municipal labor relations -- represent the apex of employee power. Employees in these functions are organized, their unions are recognized, and they are entitled to legally enforceable contracts. [7] These functions are ordinarily responsible for the contracts signed by cities in which they are contained. Their employees have greater influence than any others over municipal compensation levels.

Table 1 lists the defining characteristic of bargaining functions, the presence of a bargaining unit. This table also reveals that recognition may entail more than the presence of a single bargaining unit. Municipal bargaining units vary widely in their scope. The broadest units include all workers in a function, and their supervisors, as well. Units with more narrow definitions may exclude supervisors, and may even exclude other 'rank-and-file' employees within the same function. In this latter case, several such units may coexist. The union status of supervisors and the presence of multiple bargaining units define distinctions between municipal employees. These distinctions offer strategic opportunities in negotiation to both employer and employee.

_____

more highly organized police and fire departments.

[7] Functions in which a bargaining unit is recognized are, by definition, in a bargaining city.

Supervisors are represented by bargaining units in one-third of those functions in which a bargaining unit is present. [8] These functions represent approximately one-sixth of the total. The influence and sophistication of municipal bargaining units may be increased by the inclusion of supervisory staff. However, their exclusion from municipal management may indicate that function employees are alienated from the city administration. The net effect of supervisor representation on municipal compensation levels depends on the relative strengths of these two effects.

Twelve percent of all functions, or nearly one-quarter of functions with bargaining units, harbor more than one bargaining unit. [9] Municipal employees at different grade levels may demand separate bargaining units, for two reasons. First, they reinforce professional hierarchies. Second, multiple bargaining units create opportunities for negotiations with different units to demand escalating concessions under the rubric of 'comparability'. Municipal employers may welcome multiple bargaining units as presenting opportunities to reduce employee solidarity. As with supervisory representation, the net effect of mulitiple bargaining units on municipal compensation depends on the relative advantages of comparability over solidarity.

Collective bargaining is the most powerful and the most complicated

---

[8] Supervisory representation is unique to the public sector. "Managerial employees [in the private sector] are excluded from coverage of the NLRA [National Labor Relations Act]" (Beal, Wickersham and Kienast, pg. 197).

[9] One function in the sample under study has 44 bargaining units.

among the five modes of municipal labor relations. Only unions which

exercise all the rights to which they may legally lay claim are entitled

to bargain. However, formal bargaining may engender formal divisions

between employees of the same function. These divisions create oppor-

tunities for both employee cooperation and competition in their rela-

tions with municipal employers.

[===]

Table 2.

Compensation Levels For Five
Municipal Labor Relations Modes

Compensation Measure	Nonunion Function, Non-Bargaining City	Union Function, Non-Bargaining City	Nonunion Function, Bargaining City	Union Function, Bargaining City	Bargaining Function
Total Compensation	6.01	6.50	6.71	7.46	9.01
Pay Per Hour Worked	4.50	4.73	4.94	5.42	6.33
Pay Per Hour Not Worked	.686	.851	.812	.885	1.17
Medical Benefits	.245	.223	.304	.392	.427
Pension Benefits	.488	.598	.569	.688	.950
Miscellaneous Benefits	.092	.096	.080	.076	.128

Notes: Modes are as defined in text.

[===]

Table 2 displays mean values of compensation levels for each mode.

These values support the hierarchy of union power attributed to the five

modes. Average levels of total compensation and of all its components --

with the exception of miscellaneous benefits -- are greater in functions

which participate more fully in collective bargaining. Among functions
with identical access to bargaining, those which are organized receive
higher compensation than do those which are not. These differentials,
and their relationship to municipal unionization, are analyzed more
thoroughly in the discussion which follows.

II. Municipal Labor Relations and Compensation Levels

Regression estimates of compensation levels which account for many of
their determinants, in addition to labor relations practices,
demonstrate the effects of municipal unionization predicted above. All
important measures of compensation per hour worked increase with in-
creased engagement in bargaining activity. At any level of bargaining,
compensation is higher in organized than in unorganized functions.
'Union compensation effects' increase monotonically across the five
modes for all measures of compensation with the exception of miscel-
laneous benefits.

The analysis in this section tests the models of municipal labor
relations presented above against the relationships between union
characteristics and compensation levels observed in a large sample of
functions from American cities. This sample is a pooled cross-section
time-series of function-years. Each observation represents one of four
functions (police, fire, sanitation and an aggregate of all other non-
educational functions) in one of three years (1975, 1977 and 1979), in

one of 889 cities. [10]

Total compensation per hour worked in this sample is comprised of five components; wages, paid time not worked, medical benefits, pension benefits and miscellaneous benefits. Levels of these compensation measures depend upon characteristics of demand for municipal services, supply of municipal services, and labor supply, as well as characteristics of labor relations. OLS equations discussed here take total compensation and its five components as dependent, and measures of all these determinants as independent, so as to distinguish their influences. [11] These equations account for compensation determinants other than union status with thirty-nine measures of population characteristics, alternative employment opportunities, government structure, function, geographic area, and year of observation.

Measures of the eight labor relations characteristics presented in Table 1 represent union status in these equations. Four variables -- the percent of employees belonging to employee associations, the presence and number of bargaining units, and the union status of supervisors --

----

[10] A description of the sample, a complete list of variables, the complete regressions and their summary statistics comprise the Appendix to this paper. Zax (1984a) discusses these matters further.

[11] The compensation packages analyzed here are measured in unusual detail. Previous attempts to estimate the effects of local public sector unionization on nonwage compensation have relied upon single, aggregate measures of expenditure. Ichniowski measures fringe benefits as "city contribution to employees' retirement benefits and insurance programs". Edwards and Edwards (1982b) use an expanded measure which additionally includes vacation and sick pay. Bartel and Lewin use the difference between total expenditures for personnel costs and total expenditures for salaries, presumably a number which is similar to that of Ichniowski.

summarize union characteristics within individual municipal functions.
Three variables -- the number of contracts and memoranda of understand-
ing to which the city is a party, and the proportion of all municipal
employees covered by contracts -- summarize labor relations practices
within the city as a whole. [12] One variable measures the interaction
between city-wide practices and union status within functions; an in-
dicator for functions without bargaining units, in bargaining cities. [13]

The coefficients for these eight variables are presented in Table .
They are the basis for the aggregate estimates of mode-specific compen-
sation effects with which this analysis culminates. As a preliminary to
these estimates, the effects of individual union characteristics are
worthy of some notice in their own right. Bargaining practices are more
important than any other aspect of municipal unionization in the deter-
mination of municipal compensation levels. Organization is important in
its own right, as well as a precursor to recognition and bargaining.
Municipal unionization usually elicits larger relative increases in

----

[12] The Surveys of Government, from which these measures are taken, do
not collect the number of contracts, the number of memoranda or the
percent covered for individual functions.

[13] Coefficient estimates for union variables in this specification are
subject to potential biases arising from two different considera-
tions. First, current compensation levels and current union status
may be chosen simultaneously. This bias is limited, here, because
union variables are measured in the year prior to that in which
compensation measures are made. Second, past compensation levels may
determine both current union status and current compensation. This
specification would spuriously attribute the effects of past on
current compensation to current union status. However, if current
unionization is due to low levels of past compensation, such at-
tribution would yield underestimates of union compensation effects.
Effects reported here would be lower bounds. Both sources of bias
are probably best dealt with in panel data sets. Bartel and Lewin
attempt to deal explicitly with these issues in a cross-section
context.

nonwage components of compensation than in wages.

Table 3.a

OLS Coefficients on Measures of Labor
Relations With Respect to Compensation Measures

Measures of Labor Relations	Total Compensation	Pay For Time Worked	Pay For Time Not Worked
% Organized	.00416	.00253	.000666
	(3.72)	(3.53)	(1.96)
Presence of Bargaining Unit	.612	.242	.201
	(5.29)	(3.28)	(5.73)
Number of Bargaining Units	-.0259	-.000874	-.00603
	(1.02)	(.0540)	(.783)
Supervisors in Bargaining Units	.0446	.0278	-.00696
	(.511)	(.499)	(.262)
Labor Relations Policy If No Bargaining Unit	.294	.114	.109
	(2.95)	(1.79)	(3.59)
Number of Contracts	.0583	.0346	-.00207
	(3.54)	(3.29)	(.414)
Number of Memoranda	.0255	.00632	.00448
	(1.46)	(.568)	(.846)
% of Employees Covered By Contracts	-.00113	.000700	-.000124
	(.625)	(.605)	(.226)

Notes: T-statistics are in parentheses.

Bargaining functions obtain an additional $.61 in total compensation per hour worked over the standard in nonbargaining functions. This differential represents 7.9% of mean total compensation. Employees in functions which do not bargain can, nevertheless, obtain approximately half the benefits acquired by those that do if the city for which they

----

[14] F-tests reject the hypothesis that bargaining units and nonbargaining functions in bargaining cities have equivalent effects on com-

[==]

Table 3.b

OLS Coefficients on Measures of Labor
Relations With Respect to Compensation Measures

Measures of Labor Relations	Medical Benefits	Pension Benefits	Miscellaneous Benefits
% Organized	.000338	.000678	-.0000478
	(2.05)	(1.89)	(.691)
Presence of Bargaining Unit	.0155	.133	.0199
	(.910)	(3.58)	(2.78)
Number of Bargaining Units	-.00107	-.0166	-.00137
	(.286)	(2.04)	(.873)
Supervisors in Bargaining Units	.000359	.0193	.00411
	(.0279)	(.688)	(.760)
Labor Relations Policy If No Bargaining Unit	.0201	.0507	.000244
	(1.38)	(1.58)	(.0396)
Number of Contracts	.00238	.0226	.000772
	(.981)	(4.26)	(.757)
Number of Memoranda	.0133	-.000279	.00167
	(5.18)	(.0498)	(1.55)
% of Employees Covered By Contracts	-.0000853	-.00137	-.000251
	(.320)	(2.36)	(2.24)

Notes: T-statistics are in parentheses.

[==]

work bargains. [14] Bargaining cities increase total compensation for

nonbargaining functions by $.29 . Total compensation increases by $.042

with each increment of ten percentage points in the proportion of

employees who belong to unions. [15]

Municipal union compensation effects are seriously underestimated if

----

pensation for all compensation measures with the exception of medi-
cal benefits.

[15] Alternative estimations, not reported here, demonstrate that the
effects of percent organized on compensation levels are estimated at
twice their true magnitudes and significance if equations do not
include variables for the presence of bargaining units and a bar-
gaining environment. Estimates derived from these incorrect
specifications notably exaggerate the actual power of organization.

their effects on nonwage compensation components are ignored. Bargaining functions and bargaining cities display marked preferences for nonwage compensation. Only 40% of their effects on total compensation are allocated to wages. Thirty-three percent take the form of additional paid time not worked. Twenty-two percent take the form of increased pension benefits. Organization, in itself, emphasizes nonwage compensation less. Even so, 39% of the union effect on total compensation is attributable to union effects on nonwage components, while these components comprise only 28% of the total, on average.

Previous analyses of municipal union compensation effects draw similar conclusions, though they employ less sophisticated measures of unionization and nonwage compensation. Hall and Vanderporten estimate that the practice of collective bargaining has greater impact on compensation levels than do signed contracts. Ehrenberg and Goldstein -- in analogy to the effects of bargaining cities -- find that compensation levels within function depend upon unionization in other functions. Ichniowski, and Edwards and Edwards (1982b) estimate greater municipal union effects on nonwage than on wage compensation.

These individual effects are interesting, but the principle theme of this paper is that individual union characteristics do not exist in isolation. Tables 4 and 5 combine the coefficients of Table 3 and mode-specific mean values for labor relations variables from Table 1 to construct estimates of compensation effects for each of the five pos-

----

[===]

Table 4.

OLS Union Absolute Effects on
Municipal Compensation Levels For
Four Modes of Municipal Labor Relations

Compensation Measure	Union Function, Non-Bargaining City	Nonunion Function, Bargaining City	Union Function, Bargaining City	Bargaining Function
Total Compensation	.250	.352	.748	1.06
Pay Per Hour Worked	.152	.163	.423	.571
Pay Per Hour Not Worked	.040	.107	.153	.232
Medical Benefits	.020	.027	.062	.062
Pension Benefits	.041	.056	.117	.185
Miscellaneous Benefits	-.003	-.002	-.008	.012

Notes: Modes are as defined in text. Mode 1 is omitted since, by
definition, no union effect is observed.

[===]

sible modes. [16] The effect of labor relations in mode i on labor market

outcome j (LR_{ij}) is calculated as:

$$LR_{ij} = \sum_{k=1}^{8} L_{ik}\hat{\beta}_{kj}$$

L_{ik} represents the mean of labor relations variable k for mode i. $\hat{\beta}_{kj}$

represents the coefficient of labor relations variable k on labor market

_____

[16] Modes of municipal unionization vary in their effects on compensa-
tion levels because they represent different assortments of union
characteristics, not because these characteristics have effects
which vary. F-tests reject, singly and jointly, the hypotheses of
different effects in different modes, for all five measures of labor
relations which appear in more than one mode: percent organized,
bargaining environment, contracts, memoranda and percent covered.

outcome].

Functions in all modes which include organization or bargaining

obtain increases in total compensation, compared to levels in mode one,

nonunion functions of nonbargaining cities. All components of compensa-

tion, with the exception of miscellaneous benefits, are increased, as

well. Absolute union effects on all but one measure of compensation

increase across modes. Again, miscellaneous benefits provide the sole

exception.

These estimates provide three interesting comparisons between the

power of union functions and bargaining cities. Union functions achieve

larger compensation increases in bargaining than in nonbargaining cities

-- effects in mode four exceed those in mode two. Compensation is higher

for nonunion functions in bargaining cities than in union functions in

nonbargaining cities -- effects in mode three exceed those in mode two.

Organization and bargaining cities reinforce each other -- their joint

impacts, as estimated for mode four, exceed the sum of their individual

effects in modes two and three.

Table 5 restates these absolute union effects as percentages of mode-

specific means. The same patterns reappear: relative effects increase in

----

[17] Where comparable, these effects are consistent with the range of
effects summarized in Freeman, and Ehrenberg and Schwarz. Total
compensation effects in modes two and five are representative of the
smallest and largest effects reported in previous studies. Nonwage
compensation effects for paid time not worked, medical and pension
benefits in mode five are comparable to those reported by Ich-

Table 5.

OLS Union Relative Effects on
Municipal Compensation Levels For
Four Modes of Municipal Labor Relations

Compensation Measure	Union Function, Non-Bargaining City	Nonunion Function, Bargaining City	Union Function, Bargaining City	Bargaining Function
Total Compensation	3.84%	5.24%	10.0%	11.8%
Pay Per Hour Worked	3.21%	3.30%	7.80%	9.01%
Pay Per Hour Not Worked	4.70%	13.2%	17.3%	19.7%
Medical Benefits	9.12%	8.92%	15.8%	14.4%
Pension Benefits	6.81%	9.88%	17.0%	19.4%
Miscellaneous Benefits	-2.98%	-1.98%	-10.1%	9.40%

Notes: Modes are as defined in text. Mode 1 is omitted since, by
definition, no union effect is observed.

[===]

magnitude with mode. [17] In addition, the strengths of union effects on

nonwage compensation components become apparent.

Relative union effects on expenditures for paid time not worked and

pension benefits are more than twice wage effects in modes 3, 4 and 5;

all modes with either a bargaining unit or a bargaining city. Both

compensation components are nearly twenty percent higher in functions

with bargaining units than they would be in the absence of any labor

relations practices. Union effects on medical benefits in these three

----
niowski, and Edwards and Edwards (1982b) for aggregate nonwage
compensation.

modes are nearly twice wage effects. The relative effects of unions in
mode two on paid time not worked, medical or pension benefits are also
greater than those on wage levels.

[===]

Table 6.

Aggregate OLS Union Relative and Absolute
Effects on Municipal Compensation Levels

Compensation Measure	Absolute Effect	Relative Effect
Total Compensation	.644	8.34%
Pay Per Hour Worked	.348	6.27%
Pay Per Hour Not Worked	.141	14.6%
Medical — Benefits	.040	11.4%
Pension Benefits	.110	14.7%
Miscellaneous Benefits	.005	4.41%

[===]

Table 6 presents aggregate union absolute and relative effects on
municipal compensation levels. The effect of labor relations in the
sample on labor market outcome j (LR_j) is calculated as:

$$LR_j = \sum_{k=1}^{8} L_k \hat{\beta}_{kj}$$

L_k represents the sample mean of labor relations variable k.[18] The

----

[18] This aggregate effect is identical to a sum of all mode-specific
effects, with each mode weighted by its share in the sample.

aggregate 8% union effect on total compensation is composed of a 6% effect on wages, a 4% effect on miscellaneous benefits, an 11% effect on medical benefits and 15% effects on paid leisure and pension expenditures.

III. Conclusion

Municipal labor relations are conducted under one of five mutually exclusive modes. These modes form a hierarchy of employee power. Union effects on total compensation and all its components are uniformly greater in more powerful modes. In particular, union compensation effects increase as bargaining practices become more formal. Union wage effects are uniformly smaller than are union effects on any other component of compensation, in all modes.

These results demonstrate that outcomes in municipal labor markets depend significantly upon the level at which municipal unions participate. That participation may have several aspects. Compensation increases associated with municipal unionization are explicable in terms of supply restrictions, but other evidence indicates that strong unions can increase employment, as well (Zax). Together, these results suggest that municipal unions can also alter the conditions of demand for municipal output, thereby altering the demand for their own services. In addition, intermode differences in union strength do not explain all intermode differences in compensation levels. They may be more com-

pletely explained by interactions between labor relations mode and other determinants of labor market outcomes, such as that with structure of municipal government (Zax).

These results are provocative, but they do not constitute a complete explanation of municipal union behavior. That explanation requires more comprehensive empirical models which treat compensation, employment and union status simultaneously. Comparisons between function-specific union effects may provide the best perspectives on interactions between employee unionization, publicness and politicization of output. On the evidence accumulated to this point, these further studies are worth pursuing.

IV. Appendix

A Sample of American Municipalities

The municipal labor market measures analyzed here are drawn from three

identical surveys of municipal employment and compensation, conducted in

1975, 1977 and 1979 (Friend and Pike, Friend and Bencivenga, Friend and

Lufkin). These surveys report numbers of full-time employees, standard

work schedules, paid time not worked, and fifteen categories of compen-

sation expenditures for employees in police, fire, sanitation, and all

other noneducational departments. Eight hundred and eighty nine cities

provide complete records for at least one function in one year.

The observations in this study consist of labor market outcomes in

one function, in one year. These observations are pooled across the

three survey years, and across the four functions. The sample which

results contains 5629 function-years.

Several sources provide the variables which appear in this analysis.

The Municipal Yearbook, 1978 (ICMA) reports government structure for

each of the cities in this sample. Censuses of Population and Housing,

1970 and 1980, publish characteristics of city residents and city hous-

ing stock. Data from these sources are specific to individual cities,

but do not vary over functions or years. Annual Surveys of Government

record the characteristics of municipal labor relations. Three of these

measures are specific to each city in each year. Five are observed in
each function, in each of the three years.

The complete sample yields six dependent measures of municipal com-
pensation levels and 47 independent variables. The compensation measures
are total compensation, wage payments, payments for time not worked,
expenditures on medical benefits, expenditures on pension benefits, and
expenditures on miscellaneous benefits per hour worked. By definition,
the five component measures sum to the total.

Compensation is measured as municipal expenditures rather than
employee income. This distinction is important with regard to nonwage
compensation components. In particular, the relationship between pension
expenditures and pension liabilities is not reported.

	Expenditures for Total Compensation		Expenditures for Paid Time Worked		Expenditures for Paid Time Not Worked	
	.5711		.5714		.2858	
R-square	5584		5584		5584	
Degrees of Freedom	4.356156		1.779845		0.402566	
Mean Square Error						
	Coefficient	T-statistic	Coefficient	T-statistic	Coefficient	T-statistic
Intercept	3.733425	4.7817	2.964838	5.9407	0.546705	2.3034
1970 Population, in 1,000	0.00064566926	3.1309	0.00070721411	5.3263	0.0001556318	2.4933
1960-70 % Increase, Population	.0000269944	0.4439	.0000382476	0.2865	.000001201208	0.0019
1960-70 % Decrease, Population	0.010193	1.1519	0.0127770	2.2577	0.000562319	0.2090
1970-80 % Increase, Population	0.000223463	0.2016	0.0001265988	0.1788	0.0002095857	0.6223
1970-80 % Decrease, Population	-0.0352554	4.4191	-0.0205543	4.0286	-0.0051010434	2.1048
1969 Families Below Poverty Level	-0.024430	1.9192	-0.013206	1.7678	-0.0068050515	1.6356
1969 Median Family Income, in $1,000	0.061729	1.6216	0.024315	0.9993	0.018927	1.9154
1970 Median Housing Value, in $1,000	0.0383848	3.1890	0.0214714	2.7938	0.00595692	1.6630
1970 % Units in One-Unit Structures	-0.00226947	0.6777	-0.00388681	1.8157	-0.0007133701	1.7010
1970 Black Population	0.0144335	4.0603	0.00917321	4.0649	0.00385456	1.1932
1970 Spanish Population	0.0094258294	2.1713	0.00395813	1.4256	0.0147511	1.8076
1970 % Population ¶18 Years of Age	-0.023579	2.8711	-0.00452761	0.8625	-0.0130551	5.9083
1970 % Population ¶65 Years of Age	-0.00455684	3.3648	-0.00129393	1.6211	-0.0023375	3.4383
1970 Median Year of School	0.0344349	0.5572	0.010446	0.2651	0.0233375	2.4472
1970 Male Operative Median Earnings in $1,000	-0.348807	7.9038	-0.238705	8.4620	-0.050639	3.7746
1970 Nonworker/Worker Ratio	-0.388203	2.0519	-0.264401	2.2029	-0.0576687	0.8291
1970 % Persons ¶23 With ¶3 Years High School	-0.00205726	3.3086	-0.00187043	4.4390	-0.0312337	1.5414
1980 Median Age	-0.010025	0.8733	-0.00579976	0.7904	-0.000670904	1.1923
1970 % in White Collar Occupations	-0.0117757	2.0487	-0.00427125	1.1644	-0.00131167	0.6487
1970 % Foreign Stock	0.0335598	6.8594	0.020734	6.6225	0.0053963383	6.2242
Middle Atlantic Division	0.8255558	4.7368	0.259903	2.3330	0.018192	3.4434
East North Central Division	1.4167742	8.9643	0.632475	6.2608	0.061253	1.2749
West North Central Division	0.966200	5.7961	0.319968	3.0029	0.0449916	0.8864
South Atlantic Division	0.656546	3.5680	0.240489	2.0446	0.047064	0.8414
East South Central Division	0.395190	1.8115	0.078268	0.5613	0.074052	1.166
West South Central Division	0.553306	2.8010	0.061801	0.5059	0.0907721	1.5615
Mountain Division	1.581037	7.7288	1.158367	8.1023	0.422670	4.8188
Pacific Coast Division	2.138601	12.7354	1.865271	11.0540	0.273330	3.1023
Presence of City Manager	0.293600	3.5775	0.158367	2.9061	0.0907721	0.2833
Partisanship on Election Ballot	0.049560	0.5944	0.0234474	0.2991	-0.00706812	0.9262
% of Councilmen Elected at-Large	0.222201	2.9292	0.067320	2.2991	0.0234474	2.9194
Percent Organized	0.00416089	3.7222	0.00349445	3.5346	0.00066644449	1.9612
Presence of Bargaining Units	0.611626	5.2928	0.201303	3.2777	0.201303	5.7304
Number of Bargaining Units	-0.025937	1.0234	-0.00602892	0.0540	-0.00602892	1.7825
Labor Relations Policy, no Bargaining Units	0.293926	2.9477	0.108904	1.7889	0.108904	3.5927
Presence of Supervisors in Bargaining Units	0.046625	0.5110	0.027833	0.4986	-0.00207453	0.2622
Number of Contracts	0.058287	3.5351	0.034640	3.2868	0.00474	0.4139
Number of Memoranda of Understanding	0.025483	1.4634	0.00631801	0.5676	0.00631801	0.8455
% Employees Covered by Contracts	-0.00113008	0.6246	-0.0001240036	0.6050	-0.0001240036	0.2255
Police Department	2.124842	26.2376	1.370998	26.4847	0.211940	8.6088
Fire Department	0.576446	6.5876	0.302969	5.4166	0.634224	23.8420
Sanitation Department	0.1265512	1.2629	-0.2365537	3.3029	-0.033274	1.0927
Observation From 1975	-2.946905	41.7337	-1.677026	37.1554	-0.365482	17.0263
Observation From 1977	-1.743607	25.7298	-0.857709	19.8011	-0.218325	10.5980

	Expenditures for Medical Benefits	Expenditures for Pension Benefits	Expenditures for Miscellaneous Benefits
R-square	.2754	.2801	.2401
Degrees of Freedom	5584	5584	5584
Mean Square Error	0.094651	0.449445	0.016674

	Medical Benefits Coefficient	T-statistic	Pension Benefits Coefficient	T-statistic	Miscellaneous Benefits Coefficient	T-statistic
Intercept	0.469526	4.0797	-0.363597	-1.4498	0.115953	2.4004
1970 Population, in 1,000	-0.000159053	-5.2320	-.000047127	-0.0711	-0.000049001	-3.8404
1960-70 % Increase, Population	0.00012802	4.1584	0.000006128	0.0913	-.000030801	-0.2384
1960-70 % Decrease, Population	-0.00125845	-0.9648	-0.000240402	-0.8458	0.0005224118	0.9542
1970-80 % Increase, Population	0.0002689467	1.6469	-0.000645282	-1.8133	0.0002634974	3.8443
1970-80 % Decrease, Population	-0.00457544	-3.8910	-0.00536436	-2.0935	0.0003330922	0.6749
1969 % Families Below Poverty Level	-0.004011	-2.3283	0.002154982	0.5741	-0.000562916	-0.7785
1969 Median Family Income, in $1,000	0.00104612	0.1864	0.016301	1.3332	0.0011139387	0.4838
1970 Median Housing Value, in $1,000	0.004021937	2.2690	0.014215	3.6801	-0.000767257	-1.0313
1970 % Units in One-Unit Structures	0.001896307	3.8415	-0.000709486	-0.0660	0.0005056815	2.4406
1970 Black Population	0.0005267867	1.0122	0.001263583	1.1142	-.0000558652	-0.2558
1970 Spanish Population	-0.000216642	-0.3386	0.003627614	2.6016	-0.0003326346	-1.2151
1970 % Population ≥18 Years of Age	-0.003597	-2.9713	0.002362732	0.8957	-0.00306675	-6.0356
1970 % Population ≥65 Years of Age	-0.000455814	-0.2476	0.013368	3.3322	-0.00312049	-4.0383
1970 Median Year of School	-0.024376	-2.6823	0.032880	1.6604	-0.0079769	-2.0914
1970 Male Operative Median Earnings in $1,000	0.013820	2.1245	0.040143	2.8318	0.005500519	2.0146
1970 Nonworker/Worker Ratio	0.013830	1.2131	-0.239335	-3.9383	0.036016	3.0769
1970 % Persons ≥23 With ≥3 Years High School	0.002409556	2.4523	-0.00340314	-1.5894	0.0001892676	0.4589
1980 Median Age	-0.00117077	-0.6919	-0.00258089	-0.6999	0.0001972558	0.2777
1970 % in White Collar Occupations	-0.00389371	-4.6030	-0.00271406	-1.4724	0.0002538567	0.7150
1970 % Foreign Stock	0.00221709	3.0708	0.00411477	2.8040	0.0008385899	2.7673
Middle Atlantic Division	0.086592	3.3708	0.472373	8.4379	-0.011502	-1.0667
East North Central Division	0.098935	4.2468	0.625028	12.3123	-0.000949741	-0.0971
West North Central Division	0.074317	3.0245	0.536289	10.0157	-0.00929033	-0.9008
South Atlantic Division	-0.029500	-1.0876	0.404260	6.8397	-0.00576692	-0.5066
East South Central Division	0.022953	0.7138	0.390920	5.5788	-0.014467	-1.0719
West South Central Division	-0.00211633	-0.0751	0.403302	5.5699	-0.018401	-1.5562
Mountain Division	0.098540	3.2679	0.537212	8.1758	-0.00351387	-0.2776
Pacific Coast Division	0.177810	7.1834	0.613984	11.3829	0.0019912933	0.1841
Presence of City Manager	0.049574	4.0979	0.070785	2.6852	0.027856	5.4862
Partisanship on Election Ballot	0.007080721	0.5762	-0.091321	-3.4100	-0.012197	-2.3645
% of Councilmen Elected at-Large	-0.012009	-1.0740	0.0009765884	0.0401	-0.006692065	-1.4259
Percent Organized	0.00383831	2.0536	0.0006782769	1.8890	-0.0000749786	-0.6911
Presence of Bargaining Units	0.015496	0.9097	0.132818	3.5783	0.019904	2.7839
Number of Bargaining Units	-0.00107007	-0.2864	-0.016596	-2.0386	-0.00136851	-0.8728
Labor Relations Policy, no Bargaining Units	0.020099	1.3674	0.050659	1.5816	0.0002443137	0.0396
Presence of Supervisors in Bargaining Units	0.003591196	0.0279	0.029288	0.6876	0.0004105997	0.7599
Number of Contracts	0.00384847	0.9813	0.022565	4.2607	0.0007717929	0.7566
Number of Memoranda of Understanding	0.013298	5.1806	-0.000278664	-0.0498	0.001670382	1.5504
% Employees Covered by Contracts	-0.000852764	-0.3197	-0.00136977	-2.3568	-0.000250691	-2.2394
Police Department	0.069847	5.8511	0.320395	12.3168	0.151662	30.2693
Fire Department	0.008506281	0.6595	0.167361	5.9543	0.069324	12.8050
Sanitation Department	0.065947	4.4662	-0.0123456	-0.4182	0.024260	3.9144
Observation From 1975	-0.295826	-28.4215	-0.563415	-24.8406	-0.045156	-10.3362
Observation From 1977	-0.216998	-21.7237	-0.413517	-18.9974	-0.037056	-8.8385

References

Ashenfelter, Orley, "The Effect of Unionization on Wages in the Public Sector: The Case of Firefighters", Industrial and Labor Relations Review, Vol. 24, #2, January, 1971, pp. 191-202.

Bartel, Ann and David Lewin, "Wages and Unionism in the Public Sector: The Case of Police, The Review of Economics and Statistics, Vol. 63, February, 1981, pp. 53-59.

Beal, Edwin F., Edward D. Wickersham and Philip K. Kienast, The Practice of Collective Bargaining, Fifth Edition, Richard D. Irwin, Inc., Homewood, Illinois, 1976.

Economic Report of the President, U. S. Government Printing Office, Washington, D. C., 1983.

Edwards, Linda N. and Franklin R. Edwards, "Public Unions, Local Government Structure and the Compensation of Municipal Sanitation Workers", Economic Inquiry, Vol. XX, July 1982(b), pgs. 405-425.

Edwards, Linda N. and Franklin R. Edwards, "Wellington and Winter Revisited: The Case of Municipal Sanitation Collection", Industrial and Labor Relations Review, Vol. 35, No. 3, April 1982(a), pgs. 307-318.

Ehrenberg, Ronald G., "Municipal Government Structure, Unionization, and the Wages of Fire Fighters", Industrial and Labor Relations Review, October, 1973, pgs. 36-48.

Ehrenberg, Ronald G. and Joshua L. Schwarz, "Public Sector Labor Markets", National Bureau of Economic Research, Working Paper #1179, Cambridge, Massachusetts, August, 1983.

Freeman, Richard B., "Unionism Comes to the Public Sector", Unpublished working paper, National Bureau of Economic Research, Cambridge, Massachusetts, August, 1984.

Friend, Edward H. and Albert Pike III, Third National Survey of Employee Benefits for Full-Time Personnel of U.S. Municipalities, Labor-Management Relations Service of the United States Conference of Mayors, Washington, D.C., 1977.

Friend, Edward H. and David F. Bencivenga, Fourth National Survey of Employee Benefits for Full-Time Personnel of U.S. Municipalities, Labor-Management Relations Service of the United States Conference of Mayors, Washington, D.C., 1979.

Friend, Edward H. and Lorraine A. Lufkin, Fifth National Survey of Employee Benefits for Full-Time Personnel of U.S. Municipalities, Labor-Management Relations Service of the United States Conference of Mayors, Washington, D.C., 1982.

Hall, W. Clayton and Bruce Vanderporten, "Unionization, Monopsony Power, and Police Salaries", Industrial Relations, Volume 16, Number 1, February 1977, pp. 94-100.

Ichniowski, Casey, "Economic Effects of the Firefighter's Union", Industrial and Labor Relations Review, Vol. 33, January, 1980, pgs. 198-211.

International City Management Association, Municipal Yearbook 1978, Washington, D.C. 1979.

Schmenner, Roger, "The Determination of Municipal Employee Wages", Review of Economics and Statistics, February, 1973, pgs. 83-90.

U. S. Bureau of the Census, Annual Survey of Governments, 1975, 1976 and 1978, Washington, D. C.

U. S. Bureau of the Census, Census of Population and Housing, 1970 and 1980, Washington, D. C.

U. S. Bureau of the Census, Labor-Management Relations in State and Local Governments: 1980 Series GSS No. 102, U. S. Government Printing Office, Washington, D. C., 1980.

Wellington, H. H., and R. K. Winter, "The Limits of Collective Bargaining in Public Employment", Yale Law Journal, Vol. 78, No. 7, 1969, pp. 107-1127.

Zax, Jeffrey S., Compensation and Employment in American City Governments, unpublished doctoral dissertation, Harvard University, Cambridge, Massachusetts, 1984.