# MUNICIPAL EMPLOYMENT, MUNICIPAL UNIONS, AND DEMAND FOR MUNICIPAL SERVICES

Jeffrey S. Zax

Municipal Employment, Municipal Unions,

and Demand for Municipal Services

ABSTRACT

Municipal unions may often use their own votes and those of sympathetic
fellow citizens to promote increases in demand for municipal services.
If successful, this strategy can increase member employment levels
without sacrificing compensation. Municipal employee unionization sig-
nificantly increases levels of annual manhours and employment per
capita, and reduces annual hours of work per employee. The net effect of
average unionization levels is to increase employees per capita by at
least 4.7%, and manhours per capita by at least 3.3%, over levels that
would prevail in the absence of municipal unions. These effects occur
almost entirely in functions with recognized bargaining units. In these
functions, employment levels are at least 9.9% higher than they would be
in the absence of unionization.

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"A Boston firefighter and two Boston Housing Authority police officers were among seven men indicted yesterday in connection with an arson ring alleged to have set 163 nighttime fires during 1982-83 in an attempt to force public officials to hire more police and firefighters." The Boston Globe, 26 July 1984.

Unions in the private sector place positive value on member employment as well as on member compensation. However, private sector unions increase only compensation. They restrict labor and output supplies in order to increase wages, at the same time encouraging substitution of nonlabor factors for union members, and reductions in total output. In consequence, private sector unions have negligible or negative effects on employment.

Union control over labor supply and output levels contributes to union power in the local public sector, as well. These unions also exercise influence over output demand. Arson by firemen is, presumably, among the most extreme techniques by which municipal employees generate demand for the services they provide. More often, local public sector unions promote their services to other citizens through political activities, and encourage members to exercise their own franchise in favor of service expansions. Municipal unions are distinctive both for these strategies and for the results they obtain; they increase municipal employment, as well as compensation levels.

The first section of this study explores the relationships between union activity and employment levels. It demonstrates that equilibrium employment levels should increase if unions can stimulate demand for output. It also demonstrates that, ordinarily, union employment effects

should increase with union strength.

The second section presents regressions which estimate that employ-
ment per capita in municipal functions with average union characteris-
tics is, at minimum, 4.7% greater than in functions lacking unioniza-
tion. However, only the strongest municipal unions achieve significant
employment gains. Employment in municipal functions represented by
recognized bargaining units is at least 9.9% greater than in unorganized
functions. This nearly matches the 10.7% increase in total compensation
per hour worked obtained in these same functions. These employment gains
are plausibly the result of increases in output demand; they are nearly
matched by increases of 7.7% in manhours of service per capita.

## I. Unionization and Employment

Local public sector employees often promote general increases in demand
for their services. They are frequently constituents as well as
employees of their local governments. They are thereby entitled to a
voice in the determination of demand for their own services. In addi-
tion, other members of their community may, because of their expertise,
respect their opinions with regards to appropriate service levels. In
consequence, local public sector employees are likely to have important
influence on output demand. They should be able to use this influence to
improve their own job security through increases in local public sector
employment.

## A. Employment and Output Demand

Local public sector workers employ a number of techniques in the exercise of their influence. Arson with the intent to stimulate demand for protective services is both the least savory and the least common. Teacher campaigns for increased teacher-student ratios and police campaigns for larger patrol car teams are examples of more common techniques. These campaigns serve two purposes; they are at once civic-minded attempts to arouse interest in the quality of public service, and strategies to improve public employee job security. [1]

More generally, local public sector employees can wield substantial political power. They are a powerful lobby for many reasons; they are numerous, they take an active interest in many government decisions, their interests are well-defined, and they are familiar with the manner in which government business is conducted. The extent of their ability to affect public policy through daily occupational interactions, labor relations negotiations and political lobbying with elected public officials is unknown. However, as an example, estimated effects of local public employees on public spending referenda are impressive.

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[1] As a specific example, the Boston Globe of 4 September 1981 reported (pg. 16) "In a press conference yesterday, Edward O'Reilly (President of the Boston Firefighter's Association) charged Boston Mayor (Kevin H.) White and Boston Fire Commisioner George H. Paul with misleading the public on the issue of fire safety and said he wanted all 116 (recently) laid off firefighters rehired to provide 'minimum fire protection for the city'." (pg. 16) O'Reilly made his remarks at the site of a fatal multiple-alarm fire.

Gramlich/Rubinfeld (1982b) report that local public sector employees in Michigan were more likely to vote in a referendum on budget limitations than other citizens, and more likely to vote for increased levels of government revenues and expenditures. Ladd/Wilson report similar results for Massachusetts. These authors estimate that public employee votes accounted for 5-7% of the difference between votes for and against limitations. The vote of public employees, themselves, in elections that concern them probably underestimates their total influence. They may also generate considerable support from people not on public payroll.

Barnum/Helburn examine the results of Texas referenda over the legal status of public sector bargaining. They report that, in cities where police and fire functions cooperated in promoting legalized bargaining, the total vote in favor was increased by 15%.

Union-induced increases in demand for local public services should increase derived demands for employment, and equilibrium employment levels, if production functions, elasticities of factor and output supply are unexceptional. The success of local public sector employees in this strategy depends on their level of organisation. Organized employees can more effectively encourage demand for public services, because their political activities are better coordinated. Organized employees can more effectively take advantage of increased demands for labor, because they can control labor supply.

A simple model of surplus maximization demonstrates that local public sector unions can increase equilibrium employment levels if they can stimulate demand for output. Local governments choose capital and labor

levels to maximize the difference between revenues and costs subject to production functions, known demands for output, fixed prices for capital and union-determined wages for labor. Unions set wage demands on the basis of their bargaining strength. They may also influence levels of output demand, with the extent of influence again dependent of strength.

Formally, q represents output levels, K gives the level of capital employed, and L gives the level of labor employed. Output is produced according to a Cobb-Douglas production function:

$$q = L^{\beta} K^{1-\beta} ,$$

(1)

where $0 < \beta < 1$. [2]

Demand for output is a log-linear function of output price p, and consumer income y. [3] Demand also depends on a multiplicative function of union strength, $\alpha_1(u)$, where u is a positive index of union power. The demand function is:

$$q = \alpha_1(u) \, p^{-\alpha_2} \, y^{\alpha_3} ,$$

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[2] The Cobb-Douglas production function is commonly used to represent production in the local public sector. Borcherding/Deacon and Gramlich/Rubinfeld (1982a) are examples.

[3] This form is commonly used to represent demand for local public goods (Mieszkowski/Stein, Bergstrom/Goodman, Borcherding/Deacon and Gramlich/Rubinfeld (1982a)). Local public goods are effectively private goods in consumption (Bergstrom/Goodman, Borcherding/Deacon and Gramlich/Rubinfeld (1982a)).

with $\alpha_2$, $\alpha_3 > 0$. Unions have no effect on demand in the absence of organization -- $\alpha_1(0) = 1$ -- they have either no or positive effects -- $\alpha_1(u) \geq 1$ -- and either fixed or increasing effects in union strength -- $\alpha_1'(u) \geq 0$.

Costs depend on the price of capital, r, and wages. The wage demanded by unions, w(u), is an increasing function of union strength. Wages are set at competitive levels in the absence of unions, $w(0)=w_c$.[4] Local public sector employers maximize surpluses,

$$p(q)q - w(u)L - rK ,$$

(3)

subject to equations 1 and 2.[5]

These equations give optimal local public sector employment levels in natural logarithms as:

$$\ln L = \theta_1 \ln r + \theta_2 \ln w(u)$$

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[4] In this model, as in the private sector models of Oswald, Blair/Crawford, Dertouzos/Pencavel, Farber (1978) and Pencavel (1984a), unions are restricted by labor demands. They may set wages, but employers are free to choose surplus-maximizing employment levels.

[5] Niskanen demonstrates that public managers seek to maximize the difference between budget allocations and the costs of providing service under typical bureaucratic incentive structures. Inman (1982) and Ott adopt this objective function in their applications.

$$+ \frac{\alpha_3}{\alpha_2^2} \ln y + \frac{1}{\alpha_2^2} \ln \alpha_1(u)$$

(4)

where

$$\theta_1 = - \alpha_2^{-2} (\alpha_2 - 1)(1-\beta) < 0 \text{ if } \alpha_2 > 1 ,$$

and

$$\theta_2 = - \alpha_2^{-2} (1-\beta(1-\alpha_2)) < 0 .$$

Optimal local public sector employment is a negative function of wages, a negative function of capital prices if output demand is elastic, and a positive function of demand characteristics. [6] In particular, public sector employment is a positive function of union-induced increases in public service demand, $\alpha_1(u)$.


Equation 4 predicts that local public sector unions may be able to increase employment, as well as wages, above levels which would prevail in the absence of employee organization through their influence on

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[6] A symmetrical condition gives optimal capital levels.

public service demand. [7] Benecki and Inman (1981) report preliminary evidence which supports this prediction. Benecki finds positive employment effects of municipal unions in a large sample of small cities. However, these effects are absent or reversed in his three samples of larger cities. Inman finds positive union employment effects for police and fire functions in a small sample of big cities. The results reported in the next section demonstrate that municipal unions increase employment, as well as compensation levels, in a large sample of American cities.

The derivative of equation 4 with respect to u, union power, demonstrates that public unions with greater influence over output demand will often enjoy greater employment gains than will those with less:

$$\frac{\delta \ln L}{\delta u} = \frac{1}{u\alpha_2^2} [ \frac{U}{\alpha_1} \frac{\delta\alpha_1}{\delta u} - (1-\beta(1-\alpha_2)) \frac{U}{w} \frac{\delta w}{\delta u} ]$$

$$= \frac{1}{u\alpha_2^2} [ \eta_1 - (1-\beta(1-\alpha_2)) \eta_2 ] .$$

(5)

Here, $\eta_1$ is the elasticity of public service demand and $\eta_2$ is the elas-

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[7] Courant/Gramlich/Rubinfeld also present a model in which, within a broad range of activity, local public employees can raise their own employment levels. Theirs is a general equilibrium model, with its emphasis on redistribution through local government. In contrast, the partial equilibrium approach adopted here emphasizes the production of local public services.

ticity of wages with respect to unionization. Union power tends to increase employment levels through induced increases in output demand, but also to reduce employment through employer reactions to compensation increases. Equation 5 states that optimal employment levels increase with u if output demand is sufficiently more elastic with respect to u than are wages. This is more likely to be the case when labor is prominent in the production function -- $\beta$ is high -- because production increases require large amounts of additional labor. It is also more likely if output demand is insensitive to price -- $\alpha_2$ is low -- because equilibrium output levels need not fall dramatically when employers increase prices to cover union compensation gains. Both these conditions are likely to hold for local public services. [8]

Previous studies do not offer any evidence with regard to the implications of equation 5. Differences in union strength and elasticities of local public output demand with respect to union power have not been measured. The next section uses a new categorization of union strength (Zax) to test these implications indirectly: If municipal union strength does not have a significant, positive relationship with union employmmnt effects, than municipal unions do not substantially alter demand for municipal services.

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[8] Bergstrom/Goodman and Gramlich/Rubinfeld (1982a) report price or tax share elasticities of demand for municipal services between zero and -1. Mieszkowski/Stein conclude that a value of -.5 is representative of most estimates. Borcherding/Deacon estimate many elasticities in the same range, though they also report elasticities less than -1 for some municipal services. In 1980, municipal expenditures for salaries and wages represented 47.9% of total general expenditure (Bureau of the Census).

## B. Employment and Efficient Contracts

Positive union effects on local public sector employment are one manifestation of union influence on the demand for local public services. However, positive effects do not prove conclusively that unions stimulate demand. Union employment effects could possibly be positive as the result of union activity on the supply side of the local public service market; if local public sector employment conditions are inefficient in the absence of unions, and unions negotiate efficient contracts. The empirical evidence presented in the next section does not address this issue directly. However, comparisons between union employment effects in the private and public sectors suggest that it is probably unimportant.

Unions affect employment levels through the supply of output with monopoly control over labor supply. In the exercise of that control, they may aspire to any bargain which does not preclude employment -- any bargain under which total employment costs do not exceed the total value of employee product. [9]

Union gains may be taken as increases in wages, employment, or both.

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[9] The value of employee product may, itself, depend upon union behavior. Employers, under union provocation or with union cooperation, may alter their supply behavior in output markets so as to increase profits. Unions can encourage employers to exercise monopoly power (Warren-Boulton), assist employers to collude in output markets (Maloney/McCormick/Tollison), and encourage government protection for cartels (this issue is one of many discussed in Simon). If these initiatives alter output supply functions, employers will alter their derived demands for labor.

The allocation of union gains depends upon relative preferences of unions and employers for the two, and on the bargaining process. Collective bargains will always set wage levels at or above those set by the competitive market. In simple monopoly models of unionism, increased wages imply reduced employment. However, employment under efficient bargains will typically exceed competitive levels, as well.

Unions have no effect on efficient employment levels in only the special case where union objective functions depend exclusively on wage levels. [10] Here, the labor demand function is also the contract curve. If union objective functions depend positively on employment levels, as well as wages, the contract curve must lie to the right of the demand curve in employment-wage space. With this specification of union objectives, the union effect on efficient employment levels is unambiguously positive; at any wage, efficient levels of employment exceed levels employers would choose unilaterally. [11]

Union objective functions depend significantly on employment levels

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[10] Fellner discusses this case at length.

[11] For example, Hall/Lilien construct a model with a vertical contract curve; the efficient employment level, at any wage, is identical with that established under competitive labor market conditions. In this case, efficient employment levels under employee unionization exceed those preferred by employers, though not those set under competition. McDonald/Solow discuss a model in which the contract curve must be positively sloped. Here, efficient employment levels not only exceed levels preferred by employers at any wage greater than the competitive level, but always exceed levels established in competitive markets, as well.

in all empirical studies of private sector union behavior. [12] Studies of

unions in the local public sector would almost certainly reveal similar

objectives. If this were the case, and local public sector unions were

able to negotiate efficient contracts, they would increase local public

employment levels regardless of their effects on public service demand.


In practice, efficient contracts are probably infrequent. Most

analyses of private sector union behavior assume that collective bar-

gains are not efficient, regardless of union preferences for employment.

[13] There is little private sector evidence of efficient employment

levels. Actual union employment effects appear to be negligible or

negative. Freeman/Medoff assert that, during the 1970's, unions

sacrificed employment in return for increased compensation (pg. 249).

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[12] Farber (1978) finds evidence that the United Mine Workers union is
strongly risk averse. In the context of his model, risk aversion
implies positive valuation of employment levels. Dertouzos/Pencavel
find that employment enters positively, with varying weights, into
the objective functions of all eight International Typographical
Union locals studied. Pencavel (1984a) finds positive elasticities
of substitution between wages and employment in most estimates of
union objective function characteristics, based on a pooled sample
of ten International Typographical Union locals. Farber (1984) cites
several other studies in support of these results.

[13] Dunlop originally assumed that the range of union choice was
restricted to wage/employment combinations on the employer's demand
curve for labor. Oswald supports this restriction with the assertion
that cooperative solutions, such as those required to obtain effi-
cient outcomes, are difficult to enforce. Blair/Crawford agree, on
the theoretical argument that union objective functions do not yield
well-defined maxima along employer isoprofit curves, and on the
practical argument that actual contracts leave the employer free to
choose employment levels. Dertouzos/Pencavel, Farber (1978) and
Pencavel (1984a), while demonstrating positive union preferences for
employment, adopt this restriction and enforce negative employment
effects. More generally, Farber (1984) argues that unions and
employers may be limited to inefficient contracts by internal union
politics and enforcement difficulties. Pencavel (1984b) suggests
that observed grievance levels are higher than would be expected
under efficient contracts.

Freeman states "In the private sector it is universally accepted that one of the substantial responses to union wage effects is a reduction of employment." (pg. 39). [14] The political nature of bargaining in the local public sector distinguishes it from private sector bargaining. However, there is no compelling argument to expect that the local public sector will be a favorable environment for the negotiation of efficient labor contracts, where the private sector is not.

Explanations of positive union employment effects in the local public sector as evidence of efficient contracts must be based on the speculative proposition that public sector labor markets are distinguished by unusual cooperation in bargaining between employer and employee. Positive union effects on output demand are the more plausible explanation of positive union employment effects. This explanation is consistent with the analytical and anecdotal evidence of local public employee

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[14] Union employment effects are the subject of very few studies. Farber (1984) does not discuss employment effects in his survey. Wessels asserts that empirical findings of moderate substitutability in production between labor and capital, large positive union wage and productivity effects imply larger negative union employment effects than have been commonly estimated. Pencavel/Hartsog find small, generally unimportant negative effects of unions on manhours in aggregate data covering 1920-80. However, as Jonathan Leonard has pointed out, their regressions include relative output levels as exogenous variables. The effects they estimate represent substitution.

political activity. [15] It is based on a fundamental distinction between

public and private sector employment; private sector employees are

factors of production, but public sector employees are constituents, as

well.


## II. Municipal Employment and Union Strength


This section investigates the effects of municipal unionization on

manhours per 10,000 capita, employees per 10,000 capita and annual work

hours per employee in the police, fire, sanitation, and other non-

educational functions of 839 American cities. [16] Observations on func-

tions in 1975, 1977 and 1979, pooled across functions and years, com-

prise the sample for statistical purposes. All results are taken from

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[15] There is little evidence, analytical or anecdotal, of positive
private sector union effects on output demand. Boycotts are probably
the most dramatic of the explicit strategies private sector unions
adopt to affect total demand for the goods they produce. The im-
mediate purposes of these actions are to reduce rather than increase
demand. Union label and anti-import campaigns are the most prominent
union efforts to increase demand for their own production. These
strategies only encourage substitution of union for nonunion and
foreign output. They have not been sufficiently successful to dis-
suade students of union activity from implicitly assuming that total
demand for output is independent of union behavior.

[16] The municipal employment measures analyzed here are drawn from three
identical surveys of municipal employment and compensation, con-
ducted in 1975, 1977 and 1979 by the International City Management
Association (Friend and Pike, Friend and Bencivenga, Friend and
Lufkin). These surveys report numbers of full-time employees, stand-
ard work schedules, vacation time, sick leave and compensation
expenditures for employees in police, fire, sanitation, and all
other noneducational departments. Eight hundred and thirty-nine
cities provide complete records for at least one function in one
year.

ordinary least squares (OLS) regression equations with one of the three employment measures as dependent variables, and measures of municipal unionization among the independent variables. [17]

These equations are, effectively, reduced forms of the structural equations for municipal labor markets. In addition to unionization measures, they include as exogenous variables extensive measures of city population characteristics, city government structure, employment conditions, and geographic division. [18] Respectively, these four groups of independent variables capture variations across cities in output demand conditions, government behavior, private sector alternatives to municipal employment, and region-specific effects.

Previous studies of municipal labor relations typically represent unionization by a single measure of organization, bargaining, or contract status. Zax identifies a hierarchy of 'unionization' in municipal functions which more effectively measures variations in union strength. This hierarchy includes six degrees of municipal unionization in a function, based on the interactions between organization in that function and in other functions of the same municipality. Functions are 'unorganized' if no employees belong to unions, 'organized' if some

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[17] All regressions reported here include dummy variables for functions and years.

[18] These variables are taken from Censusses of Population, Censusses and Surveys of Government, and surveys of government structure conducted by the International City Management Association. Further details with regard to the sample are contained in an Appendix, available from the author. It contains the complete equation estimates from which the results reported here are reproduced.

belong to a union or employee association, 'organized with a bargaining unit' if a union is recognized for bargaining purposes, and 'organized with a contract' if a collective bargaining agreement exists. For brevity, municipalities are designated as 'bargaining' if employees in any function of the municipality are represented by a bargaining unit. These cities are probably in states which prohibit public sector collective bargaining. Municipalities are 'non-bargaining' if no employees are represented by a bargaining unit. By definition, public sector bargaining is legal in these cities.

Two degrees of unionization occur in non-bargaining cities. Unorganized functions in non-bargaining cities are unambiguously non-union, the weakest degree. The second degree, organized functions in non-bargaining cities, is the simplest form of union structure. If state law denies unions the right to obtaining recognition, this degree represents the strongest permissible form of unionization in these municipalities. Employment in functions of this degree should be greater than in non-union functions.

Unorganized functions in bargaining cities represent the third degree of municipal unionization. The relative strength of unions in the second and third degrees is uncertain. Unorganized functions in bargaining cities can threaten to acquire recognition as a bargaining unit. At the same time, they are the weakest form of unionization where bargaining is legally permitted. Empirically, Zax demonstrates that compensation increases obtained by unorganized functions in bargaining cities are indistinguishable from those obtained by organized functions in non-

bargaining cities.

Organized functions in bargaining cities, the fourth degree of
unionization, are stronger than the lower degrees because these func-
tions can credibly threaten to obtain recognition. The fifth degree of
unionization, organized functions with bargaining units, is comprised of
municipal unions which have obtained legal recognition. Their advantage
over lower degrees is the entitlement to negotiate with municipalities
over terms of employment. The sixth and strongest degree includes only
organized functions with contracts. Terms of employment for employees in
these functions are legally protected. Bargaining units and contracts
can exist, by definition, only in bargaining cities. Union strength
increases monotonically across the four degrees in bargaining cities.
Employment effects should increase commensurately.

The specification of unionization in the equations reported here
consists of four dummy variables. The first degree, unorganized func-
tions in non-bargaining cities, is not represented. Degrees two through
four are each represented by one dummy variable. The fifth and sixth
degrees, functions with bargaining units and functions with contracts,
are pooled in a single dummy -- under the heading 'bargaining units' --
because no source reports contracts for all functions on a function-
specific basis. [19]

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[19] Empirically, dummy variables for geographic divisions provide addi-
tional controls for legal status. Geographic and unionization
dummies adequately account for state-specific effects; coefficients
reported here for union dummies are unchanged when divisional
dummies are replaced by dummy variables for each state.

The equations reported here will underestimate positive effects and overestimate negative effects of municipal unionization on municipal employment levels. Municipal compensation measures are not entered explicitly into the equations, because they are determined simultaneously with employment levels. Compensation levels in degrees two through five are significantly greater than in degree one, non-union functions (Zax). Compensation increases won by unions will force municipalities up their demand curves for labor, reducing employment in order to control total labor costs. These reductions, as well as the direct effects of unionization on employment, will be captured by the dummy variables for unionization.

Table 1 presents estimates of union effects on three measures of employment levels for each degree of unionization. Bargaining units have strong effects on manhours per capita, employees per capita and annual work hours per employee. Individual coefficients for other degrees are usually insignificant. However, the pattern of significance in the differences between these coefficients further confirms the hypotheses of the previous section.

Bargaining units, the strongest measured degree of municipal unionization, are the only degree in which employment per capita is significantly increased. F-tests demonstrate that bargaining unit effects on employment and manhours per capita are significantly different

Table 1.

OLS Absolute Union Effects of Four
Degrees of Municipal Unionization
on Municipal Employment Levels

| Employment Measure | Organized Function, Non-Bargaining Municipality | Unorganized Function, Bargaining Municipality | Organized Function, Bargaining Municipality | Organized Function, Bargaining Unit |
|---|---|---|---|---|
| Manhours Per 10,000 Capita | 2661. (1.27) | -3293. *** (1.75) | -2444. (1.32) | 4333. * (2.98) |
| Employees Per 10,000 Capita | 1.35 (1.19) | -1.44 (1.42) | -1.18 (1.18) | 3.00 * (3.82) |
| Annual Work Hours Per Employee | 2.10 (.123) | -38.7 ** (2.51) | -19.7 (1.30) | -40.4 * (3.40) |
| Total Compensation Per Hour Worked | $.265 ** (1.98) | $.323 * (2.68) | $.615 * (5.19) | $.965 * (10.4) |

Notes: Absolute t-statistics are in parentheses. Total compensation
effects are reproduced from Zax. Triple asterisks indicate coeffi-
cients significant at 10%, double asterisks indicate significance at
5%, single asterisks indicate significance at 1%.

from those in other degrees of unionization at the .01% level.[20] Unions

in this degree also reduce annual hours of work per employee substan-

tially, by forty hours, or one full work week. This effect, though

larger than that for other degrees, is not significantly different from

that obtained by in any degree of unionization within bargaining cities.


Employment effects in other degrees are usually insignificant. The

comparisons between effects in different degrees are revealing,

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[20] Details of these and all other F-tests are available from the
author.

nevertheless. F-tests show no significant differences in union effects on manhours per capita, employment per capita, and annual work hours per employee between organized and unorganized functions in bargaining cities. Equality in reduced-form employment effects may, in fact, be evidence that organized functions obtain employment increases above levels for unorganized functions in these cities. Compensation increases in the former significantly exceed those in the latter. Other things equal, bargaining municipalities should react to these differences in compensation effects by reducing employment further in organized than in unorganized functions. Organized functions may use their greater influence over demand for output to compensate. [21]

F-tests also demonstrate that coefficients on organized functions in non-bargaining cities are significantly different, at 5%, from those on unorganized functions in bargaining cities, for all three measures of labor quantities. These tests and the coefficient values indicate that organized functions in non-bargaining cities have more strongly positive effects on all three measures of employment, in addition to similar compensation effects. Apparently, the advantages of organizing, where bargaining is prohibited, outweigh those of only threatening recognition, where it is permitted.

These results suggest that the legal right to bargain is as much a

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[21] Sanitation functions are a greater share of these unionization categories than of the sample as a whole. Though the equations contain dummy variables for each function, these results may capture some element of spillovers from better-organized police and fire functions.

challenge as a benefit to municipal employees. The exercise of this
right, as represented by bargaining units, leads to employment and
compensation levels which exceed those under any other circumstances. As
shown by the comparison of employment and compensation effects between
organized functions in non-bargaining cities and unorganized functions
in bargaining cities, this right becomes a liability if it is not exer-
cised.

## Table 2.

### OLS Relative Union Effects of Four
### Degrees of Municipal Unionization
### on Municipal Employment Levels

| Employment Measure | Organized Function, Non-Bargaining Municipality | Unorganized Function, Bargaining Municipality | Organized Function, Bargaining Municipality | Organized Function, Bargaining Unit |
|---|---|---|---|---|
| Manhours Per 10,000 Capita | 5.00% | -7.42% *** | -9.26% | 7.66% * |
| Employees Per 10,000 Capita | 5.02% | -6.08% | -8.43% | 9.87% * |
| Annual Work Hours Per Employee | .103% | -2.06% ** | -1.05% | -2.10% * |
| Total Compensation Per Hour Worked | 4.06% ** | 4.81% * | 8.22% * | 10.7% * |

Note: Asterisks indicate elasticities derived from coefficients
significantly different from zero at 5% (see table 1).

Table 2 restates the absolute union effects of Table 1 as elas-
ticities, percentages of degree-specific means. Elasticities emphasize
the relative strength of bargaining units. Organized functions in bar-

gaining cities enjoy compensation increases of 8.2%, but may suffer
reductions in employment per capita of up to 8.4%. Functions with bar-
gaining units obtain employment increases of at least 9.9%, as well as
compensation increases of 10.7%.

Elasticities also reveal that work-sharing is not the source of
employment gains. Bargaining units reduce annual hours of work per
employee by more than 2%, but increase employment per capita by nearly
10%. These effects, combined, represent an increase in manhours of
service per municipal resident of nearly 8%. To the extent that employ-
ment gains estimated for organized functions in non-bargaining cities
are meaningful, they are also attributable to increases in service
levels.

These estimates of degree-specific union employment effects are
entirely consistent with the hypothesis that employment increases are
won through stimulation of output demand. Stronger unions more success-
fully reduce employment losses or obtain employment gains, within both
bargaining and non-bargaining municipalities. In addition, employment
gains are always associated with increases in manhours of service per
capita. These facts, while not inconsistent with the hypothesis that
municipal unions negotiate efficient contracts, are not predicted by
contemporary characterizations of such contracts.

Table 3 presents estimates of aggregate municipal union effects on
manhours per capita, employment per capita and annual work hours per

## Table 3.

### Aggregate Absolute and Relative Union
Effects on Municipal Employment Levels

| Employment Measure | Absolute Effect | Relative Effect |
|---|---|---|
| Manhours Per 10,000 Capita | 1733. | 3.34% |
| Employees Per 10,000 Capita | 1.30 | 4.73% |
| Annual Work Hours Per Employee | -24.9 | -1.29% |
| Total Compensation Per Hour Worked | $.581 | 7.50% |

Notes: Total compensation estimates are taken from Zax.

municipal employee. These estimates are sums of the absolute degree-specific effects, weighted by the proportion of all functions in each degree. Aggregate relative effects are aggregate absolute effects as proportions of aggregate means.

These estimates show that, on net, average levels of labor relations activity in a function and in a city increase manhours per capita by more than 3%, and employment per capita by nearly 5%, over levels that would obtain in the absence of any unionization. Average levels of unionization also reduce annual work hours by 28 hours, or nearly four

days. [22]

### III. Conclusion

The empirical results in this paper demonstrate that municipal unions which achieve recognition as bargaining units are able to increase municipal employment levels. Theoretically, municipal unions could achieve these effects by negotiating efficient contracts, unconstrained by municipal demand curves for labor. However, the evidence here suggests that they are more likely to arise from the ability of municipal unions to stimulate demand for municipal services. Private sector unions do not have positive employment effects. While there is no reason to believe that municipal unions are more adept at achieving efficient contracts than are unions in the private sector, there is persuasive anecdotal evidence that municipal unions exercise distinctive influence over demand for their output. This difference between public and private union effects on output demand could give rise to the contrast between public and private union employment effects.

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[22] Benecki and Inman (1981) report similar, but less definitive results. Benecki does not analyze individual compensation levels. Inman finds positive union effects on police employment, no effect on police wages, positive effects on fire employment and a positive effect of marginal significance on fire wages. Both measure unionization with a single variable: Benecki uses "the percentage of employees who are organized for negotiating purposes". Inman uses "the percent of workers who belong to a union or employee organization which negotiates a labor contract".

These results cast some doubt over estimates of municipal labor demand elasticities. Estimates are misleading in the presence of positive municipal union employment effects, regardless of the mechanism through which these effects are generated. If municipalities and municipal unions agree to efficient contracts, observed compensation and employment levels are probably not on the municipality's demand curve for labor, at all.

If, as seems more likely, municipal unions stimulate demand for municipal output, estimated elasticities of labor demand probably understate true elasticities. The elasticity implied by equation 4, holding only the rental price of capital and consumer income constant, is:

$$\frac{\delta \ln L}{\delta \ln w(u)} = \theta_2 + \frac{1}{\alpha_2^2} \frac{\delta \ln \alpha_1(u)}{\delta \ln w(u)} > \theta_2 \; .$$

The second term is positive, because $w(u)$ and $\alpha_1(u)$ are both increasing functions of u. This expression demonstrates that estimated elasticities are less negative than are true elasticities if union effects on output demand are neglected. Actual employment levels are less sensitive to union-induced wage increases than are employment levels given by labor demand functions, because they are preserved through union-induced increases in output demand.

These results emphasize the dual nature of municipal employment. Municipal unions represent both employees of the municipal government and an important municipal constituency. Positive union employment

effects may derive largely from this second role. However, this relationship cannot be definitively established without direct evidence of union effects on output demand. The anecdotes which provide what evidence is currently available need to be augmented by econometric studies, from which more robust conclusions might be drawn.

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