The Effect of Unionization and Civil Service on the Salaries and Productivity Of Regulators

by

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A large number of recent studies have investigated the effect of unionization on the compensation of private and public employees. Other analyses, noticeably smaller in number and concentrating exclusively on the private sector, have looked at the effects of unionization on productivity (Clark 1980a, b; Brown and Medoff 1978; Ehrenberg and Schwarz 1981). Their focus is on the question of whether union protection reduces the incentives for employee performance, or whether it leads to a work force with higher morale and lower turnover, and hence to greater labor productivity. Surprisingly, no study has yet integrated the simultaneous effects of unionization on compensation and on productivity, even though they are plainly two sides of the same coin. A salary increase may attract a better and more productive quality of employee, while more productive employees may command higher salaries. Because of this simultaneity, an analysis of the effect of unionization on compensation is not conclusive without an investigation of the effects of unionization on productivity, and vice versa. Quite possibly, changes in wages that are attributed to unions are overestimated because they partly reflect changes in productivity due to an upgraded work force.

The aim of this paper is three-fold. First, to provide a simultaneous analysis of the salary and productivity effects of unionization, an approach that has not been taken by any previous study. Second, to investigate the relation of
unionization (and of civil service tenure) to the productivity of public employees, since past work on unions and their impact on productivity has dealt with the private sector only. And third, to look at the effects of unionization (and civil service) on regulators, since regulation is a public service that has not yet been investigated at all for its sensitivity to unionization.

The paper proceeds by developing a brief model of productivity and salary under a union and a non-union state, showing that the direction of a union effect is ambiguous theoretically and dependent on the parameters of the model. It then estimates these relations empirically for local building departments, finding significantly higher salaries but no higher productivity where unionization and civil service exist.

The Model

Assume a production function for a fixed-capital service of public administration, such as regulatory oversight, of a Cobb-Douglas form

$$\phi = \alpha (QL)^\beta$$

(1)

where

- $\phi = \text{units of output}$
- $L = \text{units of labor, in hours}$
- $Q = \text{quality of labor}$

and

$$\alpha > 0, \quad 0 < \beta < 1$$

The supply of labor is perfectly elastic at the prevailing wage. Only one type of labor is hired. The quality of labor $Q$ that is hired is a function of wage rate paid
- 3 -

\[ S = M + Q^\gamma \]  \hspace{1cm} (2)

where \( S = \text{wage rate} \)

\[ M = \text{minimum wage rate} \]

and \( \gamma > 1 \)

Also assumed is a fixed budget \( B \) for the public service, which is spent on salaries for its employees. We assume a purely administrative program without transfer payments, and without new capital outlays. For many established regulatory agencies, this is a fairly realistic budget structure. Over the past decade their budgets have increased very little in real terms. Thus

\[ B = S \cdot L \]  \hspace{1cm} (3)

Let us now consider two situations, one with a union and one without it. In state \( U \) an employee union and civil service exist and protect employees' jobs at hiring level \( L \), (or, alternatively, wage level \( \hat{S} \)) while in state \( N \) these numbers are variable. For both states it is assumed that the agency's objective is, within its constraints, to maximize its activity level, i.e., output. 5

In the no-unions situation \( N \), the head of an agency can hire any combination of labor quantity and quality, subject only to his budget constraint \( B \). We thus have a constrained maximization problem given by the Lagrangean function \( Z \)

\[ Z = \alpha (QL)^\beta + \lambda (B - L(M + Q^\gamma)) \]  \hspace{1cm} (4)

which can be solved for the optimal quantity of labor \( L \), in the non-union situation \( N \), by meeting the conditions
\[
\frac{3Z}{\delta L} = \alpha \delta Q^S L^{S-1} + \lambda (M + Q^Y) = 0 \tag{5}
\]

\[
\frac{3Z}{\delta Q} = \alpha \delta Q^{S-1} L^S + \lambda \gamma LQ^{\gamma-1} = 0 \tag{6}
\]

\[
\frac{3Z}{\delta \lambda} = B - L(M + Q^Y) = 0 \tag{7}
\]

This solves to the optimal labor hired

\[
L_N = \frac{B(\gamma - 1)}{MY} \tag{8}
\]

Second order conditions for a maximum are satisfied at that point.

With \(L_N\) known, average wages can be found by simply dividing the budget by the units of labor \(S = \frac{B}{L_N}\) so that optimal salary paid is

\[
S_N = \frac{MY}{\gamma - 1} \tag{9}
\]

Hence, the relation of the actual salary \(S_N\) to minimum wages \(M\) is determined by the size of \(\gamma\), (the elasticity of the salary addition to minimum wages with respect to the quality of labor). Where \(\gamma\) is large, \(S_N\) approaches \(M\), because it would be too expensive to hire highly qualified labor.

From (9) the optimal labor quality \(Q_N\), via equation (2) is

\[
Q_N = (S - M) \cdot \gamma^{-1} = \left(\frac{M}{\gamma - 1}\right) \tag{10}
\]

and the quantity of output produced is
\[ g_N = a(QL)^B = a \left( \frac{M}{Y-1} \right)^B \left( \frac{1}{Y-1} - 1 \right) \frac{B}{Y} \]  

(11)

In the alternative situation \( U \), an employee union and a civil service status exist and define an inflexible "civil service" employment level \( L \). Given a budget \( B \), the average salary is then

\[ S_U = \frac{B}{L} \]  

(12)

We can also make the alternative assumption that the union fixes salaries at a level \( \hat{S} \). This is merely the other side of the same coin. With quality and salary related, from before, by the function

\[ S_U = M + Q^\gamma \]  

(13)

the quality of labor is then determined at

\[ Q_U = \left( \frac{B}{L} - M \right)^Y \]  

(14)

and the output of the agency is

\[ g_U = a(LQ)^B = aL^B \left( \frac{B}{L} - M \right)^Y \]  

(15)

If we define average productivity per employee as \( \frac{g}{L} \), we find that in the non-union situation productivity is

\[ \left( \frac{g}{L} \right)_N = a \left( \frac{M}{Y-1} \right)^B \left( \frac{1}{Y-1} - 1 \right) + a \left( \frac{B}{Y} \right)^{B-1} \]  

(16)

and with unions it is
When the two sets of results are compared, one can predict the direction of the union effect on salaries, and on the quality of employees. A higher salary and greater labor quality exist under a union whenever the condition holds

\[ \hat{L} < \frac{B}{M} \frac{\gamma - 1}{\gamma} \]  

(18)

This is equivalent to the condition

\[ \frac{S}{M} > \frac{\gamma}{\gamma - 1} \]  

(18')

The direction of the union effect on productivity depends on the parameters, and cannot be predicted unambiguously. Productivity is higher (lower) under a unionized system when

\[ \left( \frac{B}{L} - M \right) \frac{\beta}{Y} \geq \left( \frac{\gamma}{\gamma - 1} \right) \left( \frac{B}{YL} \right) \]  

(19)

The next section will empirically test the relations of salaries and productivity with and without unions.

**Empirical Analysis**

The regulatory bodies which are analyzed are local building departments, the agencies that administer building codes. Building departments formulate and update the construction standards under which builders must operate (building codes); they pass judgment on technical construction plans by granting building permits; and they inspect construction sites
for compliance. Information for more than 1100 building departments is available from the 1970 survey.\textsuperscript{7}

Let the average productivity be given by the functional relationship

\[
\frac{\mathcal{G}}{L} = f_1(U, C, Q_i, X_j)
\]  

(20)

where

- $\mathcal{G}$ = labor output
- $L$ = number of employees
- $U$ = employee unionization
- $C$ = civil service status
- $Q_i$ = quality variables for employees
- $X_j$ = local characteristics that affect primarily productivity

Since equation (2) defines salaries as a function of employee quality, the productivity equation is also estimated, in the alternative, as a function of salaries

\[
\frac{\mathcal{G}}{L} = f_2(U, C, S, X_j)
\]  

(20')

Salary $S$ of building department employees (defined as the midpoint between starting salaries and that of the highest official next to the chief himself) is affected--by hypothesis--by unionization, civil service, and, from equation (2), by the quality of employees. It may also be a function of the prevailing level of compensation in the area, of the local tax base, the political attitude towards regulation in general, and the conformity of the agency's activities
to the local political balance. Hence, we write the effects of unionization on salaries as

\[ S = g(U, C, \$I/L, Q_i, I, Y, A, F) \]  

(21)

where \( S, U, C, \) and \( \$I/L \) are defined as above, and

\( Q_i = \) quality variables of employees

\( I = \) prevailing private industry wages

\( Y = \) local tax base

\( A = \) local attitude towards public spending

\( F = \) conformity of agency policy relative to local interest groups' strengths.

Thus, we have a system of equations describing interactions of productivity and salary. This system can be estimated empirically. Let us begin by defining the variables.

For output \( \$ \) we use two alternative measures: the number of building permits granted, and the total construction volume supervised. It is not obvious a priori which measure is the better one. The first gives the number of decision processes, but without regard to their complexity. The second aggregates the total volume of activity that is regulated, without regard to the number of decisions involved.

The other variables are defined as follows: \( Q_i \), the quality variables for manpower, is the number of years of schooling of entry-level employees, and the prior job experience, in years, of these employees. \( U \) and \( C \) are dummy variables for an employee union and civil service.

For \( I \), the prevailing private wages, the average hourly manufacturing wages in the SMSA is used; \( Y \), the local
ability to pay, is measured by median household income and the median value of houses. A, the attitude towards government spending, is assumed to be reflected in local "conservative" voting. F, the variable for conformity in policy, is a measure of the strictness of regulation relative to the prevailing strength of interest groups. Underlying F is the observation that regulatory policy, if not conforming to the relative strength of competing interest groups that favor or oppose the regulatory policy, leads to a reduction of political support for the agency and thus to a reduced budget and salaries (Noam, 1981). This can be expressed by a relation between regulatory strictness r to the balance of affected groups (construction unions \( G_1 \) and construction firms \( G_2 \)).

Among the local characteristics included is size (by population); housing market conditions (using rates of vacancy and increase of population as proxies for demand preferences); form of government (city manager vs. elected chief executive), which may affect efficiency; qualifications of the agency chief (as a proxy for managerial ability); and the existence of a national code, i.e., of regulation standards that are fairly easy to apply.

Estimation

First, we estimate the effects of unionization on productivity and on salaries in a separate fashion by using OLS over logarithmic functions of (20), (20'), and (21). The results are given in columns 1 and 3 of the four tables. More interesting, however, are the results for the systems (20) and (21), and (20') and (21), obtained by 2SLS.
These results are given in columns 2 and 4 of the tables, with Tables I and II corresponding to the set of equations (20) and (21) (the recursive model) and Tables II and IV to (20') and (21) (the simultaneous model). For both tables, the results are obtained for two different definitions of output, namely the volume of economic activity (i.e., of construction) that is regulated, and, alternatively, the number of cases (building permits) that the agency acted upon. The results are reported on the right and the left sides of the tables. As can be seen, the coefficients and statistical significance are very similar for both definitions of the output. Similarly, the results for the simultaneous model are very close to those of the recursive model.

First described are the results of the salary equation. Looking at the top row of Table 1, we can see a fairly strong and statistically significant positive association of employee unions and salaries. Both the size and significance of the coefficients are large in the simultaneous equations. In percentage terms, the results suggest about an 18.6% higher salary level where unions exist. (The antilog of the union coefficient of .1707, when the recursive model is chosen, is 1.1861; this number is the multiplying factor for the salary equation, in the presence of an employee union.) For civil service status the results show a higher salary, but without statistical significance.
Table I

Elasticities of Salary\(^a\)
(Recursive Model with Quality Variables)

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>(Output by Units)</th>
<th>(Output by Volume)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS Estimation</td>
<td>2-SLS Estimation</td>
</tr>
<tr>
<td>Employee Union</td>
<td>.1626</td>
<td>.1764</td>
</tr>
<tr>
<td></td>
<td>(3.3063)</td>
<td>(2.1394)</td>
</tr>
<tr>
<td>Civil Service Status</td>
<td>.0381</td>
<td>.0190</td>
</tr>
<tr>
<td></td>
<td>(1.1794)</td>
<td>(.3543)</td>
</tr>
<tr>
<td>Productivity per Employee</td>
<td>-.0153</td>
<td>.1838</td>
</tr>
<tr>
<td></td>
<td>(.7363)</td>
<td>(1.3635)</td>
</tr>
<tr>
<td>Employee Schooling</td>
<td>.1716</td>
<td>.7992</td>
</tr>
<tr>
<td></td>
<td>(2.3069)</td>
<td>(1.2805)</td>
</tr>
<tr>
<td>Prior Job Experience</td>
<td>.0143</td>
<td>-.3588</td>
</tr>
<tr>
<td></td>
<td>(.2421)</td>
<td>(.9970)</td>
</tr>
<tr>
<td>Median Housing Value</td>
<td>.1595</td>
<td>.1818</td>
</tr>
<tr>
<td></td>
<td>(4.0477)</td>
<td>(2.6327)</td>
</tr>
<tr>
<td>Private Industry Wages</td>
<td>.0314</td>
<td>-.0399</td>
</tr>
<tr>
<td></td>
<td>(1.4021)</td>
<td>(.6824)</td>
</tr>
<tr>
<td>Non-Conformity in Regulation</td>
<td>-.0228</td>
<td>-.0299</td>
</tr>
<tr>
<td></td>
<td>(1.9529)</td>
<td>(1.8613)</td>
</tr>
<tr>
<td>Political Conservatism</td>
<td>.0299</td>
<td>.0512</td>
</tr>
<tr>
<td></td>
<td>(.2771)</td>
<td>(.2723)</td>
</tr>
</tbody>
</table>

\(R^2\) \hspace{1cm} .3336 \hspace{1cm} .1625 \hspace{1cm} .3350 \hspace{1cm} .2663

(t - statistics in parentheses)

\(^a\) For employee unions and civil service, the coefficients are shift parameters.
Table 11

Elasticities of Salary\(^a\)
(Simultaneous Model with Salary Variables)

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>OLS Estimation</th>
<th>2-SLS Estimation</th>
<th>OLS Estimation</th>
<th>2-SLS Estimation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee Union</td>
<td>.1626</td>
<td>.1764</td>
<td>.1686</td>
<td>.1707</td>
</tr>
<tr>
<td></td>
<td>(3.3063)</td>
<td>(2.1394)</td>
<td>(3.4095)</td>
<td>(2.9094)</td>
</tr>
<tr>
<td>Civil Service Status</td>
<td>.0381</td>
<td>.0190</td>
<td>.0389</td>
<td>.0356</td>
</tr>
<tr>
<td></td>
<td>(1.794)</td>
<td>(.3543)</td>
<td>(1.2260)</td>
<td>(.9670)</td>
</tr>
<tr>
<td>Productivity per Employee</td>
<td>-.0153</td>
<td>.1838</td>
<td>-.0167</td>
<td>.0730</td>
</tr>
<tr>
<td></td>
<td>(.7363)</td>
<td>(1.3635)</td>
<td>(1.0000)</td>
<td>(1.1321)</td>
</tr>
<tr>
<td>Required Schooling</td>
<td>.1716</td>
<td>.7992</td>
<td>.1642</td>
<td>.4561</td>
</tr>
<tr>
<td></td>
<td>(2.3069)</td>
<td>(1.2805)</td>
<td>(2.2117)</td>
<td>(1.2662)</td>
</tr>
<tr>
<td>Prior Job Experience</td>
<td>.0413</td>
<td>-.3588</td>
<td>.0056</td>
<td>-.0343</td>
</tr>
<tr>
<td></td>
<td>(.2421)</td>
<td>(.9970)</td>
<td>(.0955)</td>
<td>(.1337)</td>
</tr>
<tr>
<td>Median Housing Value</td>
<td>.1595</td>
<td>.1817</td>
<td>.1622</td>
<td>.1454</td>
</tr>
<tr>
<td></td>
<td>(4.0477)</td>
<td>(2.6327)</td>
<td>(4.2084)</td>
<td>(3.0211)</td>
</tr>
<tr>
<td>Private Industry Wages</td>
<td>.0314</td>
<td>-.0399</td>
<td>.0274</td>
<td>.0202</td>
</tr>
<tr>
<td></td>
<td>(1.4021)</td>
<td>(.6824)</td>
<td>(1.2754)</td>
<td>(.7871)</td>
</tr>
<tr>
<td>Non-Conformity in Regulation</td>
<td>-.0228</td>
<td>-.0299</td>
<td>-.0221</td>
<td>-.0234</td>
</tr>
<tr>
<td></td>
<td>(1.9529)</td>
<td>(1.6413)</td>
<td>(1.9209)</td>
<td>(1.6288)</td>
</tr>
<tr>
<td>Political Conservatism</td>
<td>.0299</td>
<td>.0512</td>
<td>.0350</td>
<td>.0052</td>
</tr>
<tr>
<td></td>
<td>(.2771)</td>
<td>(.2723)</td>
<td>(.3248)</td>
<td>(.0359)</td>
</tr>
</tbody>
</table>

\(R^2\)          \( .3336 \)    \( .1625 \)    \( .3350 \)    \( .2663 \)

(t - statistics in parentheses)

\(^a\) For employee unions and civil service, the coefficients are shift parameters.
The usefulness of the interactive approach manifests itself in looking at the relation of productivity increase to salaries. In the non-simultaneous estimation, this relation appears to be negative, a counter-intuitive result. However, when the 2SLS approach is taken, we find that the sign reverses itself and becomes positive, though the statistical significance is not high.

Of the variables for labor quality, we also find a good-sized positive association of schooling and salaries. Prior job experience, on the other hand, shows an only limited relation to salaries.

Because the salaries of public employees' wages reflect a community's ability to pay, we also take them into account. The results show a strong association of wealth (using as a proxy for wealth the median value of houses) with salaries.

Interestingly, the relation of regional wages with those of public employees is fairly insignificant.

Some thought-provoking results are the good-sized and fairly significant coefficients for conformity of regulation. This variable, it may be recalled, shows the strictness of the regulation in relation to the interest group strengths in the community. For example, one expects a restrictive building code regulation in a city with strong construction unions. Where this is not the case, the results show that the regulatory agency has smaller salaries, ceteris paribus, which may be explained by a mechanism of incentives and punishment for an agency.
We next turn to Table III and the productivity equation. A first observation is that the existence of unions and of civil service is not associated with higher productivity. Coefficients for the union variable are actually often negative, though they are not statistically significant. For civil service, the coefficients are positive, but also not significant. Neither are the coefficients of employee quality on productivity particularly significant. Other factors that seem to contribute to productivity are the job experience—in years—of the agency chief, and the size of the jurisdiction, suggesting some economies of scale in building regulation.

What do these results tell us? First, that higher labor quality is associated with higher salaries of public employees in building agencies. Second, that the wealth of a community affects the salaries of these public employees. Third, that when the regulatory strictness which would "conform" to the local balance of interest group strengths is not in fact provided by building agencies, one also finds reduced salaries. More importantly, however, the analysis shows the relation between unionization and civil service status on the one side and productivity and compensation on the other. The results show that employee unions, but not civil service, are associated with higher salaries in a good sized and statistically significant way. Productivity, on the
Table 111
Elasticities of Productivity per Employee\textsuperscript{a}
(Recursive Model with Quality Variables)

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>(Output by Units)</th>
<th>(Output by Volume)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS Estimation</td>
<td>2-SLS Estimation</td>
</tr>
<tr>
<td><strong>Employee Union</strong></td>
<td>-.0824 (.4012)</td>
<td>-.1145 (.1932)</td>
</tr>
<tr>
<td><strong>Civil Service Status</strong></td>
<td>.0805 (.5891)</td>
<td>.0640 (.1601)</td>
</tr>
<tr>
<td><strong>Employee Schooling</strong></td>
<td>.3739 (1.1887)</td>
<td>8.8104 (.5309)</td>
</tr>
<tr>
<td><strong>Prior Job Experience</strong></td>
<td>.2734 (1.1105)</td>
<td>-2.2982 (.5292)</td>
</tr>
<tr>
<td><strong>Population Increase</strong></td>
<td>.0579 (.3888)</td>
<td>-.0733 (.1294)</td>
</tr>
<tr>
<td><strong>Vacancy Rate</strong></td>
<td>.1198 (1.4396)</td>
<td>.3684 (.5964)</td>
</tr>
<tr>
<td><strong>City Manager Form of Government</strong></td>
<td>-.0280 (.1937)</td>
<td>-.5894 (.4322)</td>
</tr>
<tr>
<td><strong>Land Area</strong></td>
<td>.1871 (3.1157)</td>
<td>.3150 (1.0853)</td>
</tr>
<tr>
<td><strong>Experience of Agency Chief</strong></td>
<td>.5884 (.6646)</td>
<td>1.8738 (.8619)</td>
</tr>
<tr>
<td><strong>National Code</strong></td>
<td>-.0785 (1.6161)</td>
<td>-.2134 (.6619)</td>
</tr>
<tr>
<td><strong>Strictness of Regulation</strong></td>
<td>-.6372 (1.516)</td>
<td>-.0722 (.0422)</td>
</tr>
</tbody>
</table>

| $R^2$ | .1438 | .2010 | .1199 | .0652 |

(t - statistics in parentheses)

\textsuperscript{a} For employee union, civil service, city manager and national code, the coefficients are shift parameters.
Table IV

Elasticities of Productivity Per Employee\(^a\)
(Simultaneous Model with Salary Variables)

(Output by Units)  (Output by Volume)

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>OLS Estimation</th>
<th>2-SLS Estimation</th>
<th>OLS Estimation</th>
<th>2-SLS Estimation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee Union</td>
<td>-.0125 (0.0581)</td>
<td>-.0682 (0.3273)</td>
<td>.3057 (1.1723)</td>
<td>.1861 (0.6997)</td>
</tr>
<tr>
<td>Civil Service Status</td>
<td>.0989 (0.7201)</td>
<td>.0805 (0.5791)</td>
<td>.0412 (0.2503)</td>
<td>-.0117 (0.0668)</td>
</tr>
<tr>
<td>Salary</td>
<td>-.2085 (0.6626)</td>
<td>.2034 (0.3288)</td>
<td>-.2547 (0.6717)</td>
<td>1.3058 (1.6561)</td>
</tr>
<tr>
<td>Population Increase</td>
<td>.0805 (0.5397)</td>
<td>.0729 (0.4858)</td>
<td>.2377 (1.4758)</td>
<td>.2326 (1.3574)</td>
</tr>
<tr>
<td>Vacancy Rate</td>
<td>.0987 (1.1951)</td>
<td>1.035 (1.2400)</td>
<td>.0831 (1.8337)</td>
<td>.1033 (0.9700)</td>
</tr>
<tr>
<td>City Manager Form of Gov'nm</td>
<td>.0388 (0.2693)</td>
<td>.0089 (0.0610)</td>
<td>.0243 (1.1399)</td>
<td>-.0735 (0.3925)</td>
</tr>
<tr>
<td>Land Area</td>
<td>.1801 (2.9929)</td>
<td>.1850 (3.0460)</td>
<td>.2035 (2.8249)</td>
<td>.2223 (2.8894)</td>
</tr>
<tr>
<td>Experience of Agency Chief</td>
<td>.6949 (2.0277)</td>
<td>.6787 (1.9670)</td>
<td>-.4866 (1.1804)</td>
<td>-.5286 (1.2048)</td>
</tr>
<tr>
<td>National Code</td>
<td>-.0061 (1.3627)</td>
<td>.0715 (1.4572)</td>
<td>-.0428 (1.7319)</td>
<td>-.0618 (0.9862)</td>
</tr>
<tr>
<td>Strictness of Regulation</td>
<td>-.6767 (1.9565)</td>
<td>-.6021 (1.3775)</td>
<td>-.2629 (0.5238)</td>
<td>.0004 (0.0007)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>(R^2)</th>
<th>(R^2)</th>
<th>(R^2)</th>
<th>(R^2)</th>
</tr>
</thead>
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<td></td>
<td>.1319</td>
<td>.1285</td>
<td>.1181</td>
<td>.1195</td>
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\(t - \) statistics in parentheses

\(^a\) For employee union, civil service, city manager and national code, the coefficients are shift parameters.
other hand, is not found to be higher where unionization and civil service exist, for both definitions of productivity.

Conclusion

This paper constructed two simple models of salaries and productivity under unions and without them. It then tested these relations empirically by using the data for building departments of 1100 American cities and towns and applies them in two interactive models. The results show that where public employee unions exist, the salaries of public employees in local regulatory agencies are higher, while productivity is not found to be increased.
1. Associate Professor Business and Lecturer in Law, Columbia University. The author wishes to thank John Addison, Ann Bartel, Charles Brown, Eugene Kroch, and David Lewin for helpful comments. Financial assistance by the Columbia University Center for Law and Economic Studies towards the computer expenses, and research assistance by Manachem Petrushka are gratefully acknowledged.

2. See survey in Parsley (1980), and many of the references of this paper.

3. A concurrent paper by Ehrenberg and Schwarz (1981) is the only exception. That study, however, is methodologically quite distinct, and draws on a limited data base; it is viewed by the authors as preliminary to their further work (p. 18f).

4. Quality increases require rising salary augmentations, as the progressivity of salaries over hierarchical ranks suggests. This may be caused by supply elasticity with respect to quality increases that is smaller than that of demand.

5. Some commentators of administrative agencies instead believe that an agency maximizes the number of its employees (Parkinson 1960), its budget (Niskanen 1971), its political support (Buchanan and Tullock 1962), or public benefits (Bator 1958). The optimization criterion of this paper accommodates both a public-benefit and agency self-interest hypotheses, as long as the supply of the public service is below its optimal level in terms of public benefits. Beyond that point, only the agency's self interest is operative, provided that affected interest groups could compensate each other for a lower activity level.

6. The assumption implies that the union can alter the quantity of labor demanded, but not the demand curve itself.


9. As measured by voting for Barry Goldwater in the 1964 Presidential election. The code survey data is for the year 1970 and reflects the codification, budgeting, and hiring that were undertaken in the preceding years; thus the 1964 voting figure—in an election where the political philosophies of the candidates were distinct—seems to be a good proxy for the attitudes towards regulation that existed in a locality.

11. Higher quality standards in construction, or greater frequency of prohibitions of building techniques do not by themselves require a costlier process of regulation. For example, a rule that completely prohibits plastic pipes is not more expensive to administer than one that permits agency discretion on the basis of quality demonstrations.

12. One would expect an above average interest group strength ratio $G_1/G_2$ to be associated with a high restrictiveness of regulation $r$, and a low rate to be associated with a low interest group strength ratio. Hence, the expression

$$D = \frac{r}{(G_1G_2)}$$

(with all measures normalized over national averages) should be close to 1 if the regulatory policy of an agency conforms to the relative strength of interest groups. Non-conforming agency behavior is denoted by $F = |1 - D|$.

13. This is analogous to Bartel and Lewin's (1981) findings on unionism as a cause and effect of compensation.

14. A multi-collinearity issue may exist for this variable, however.
REFERENCES AND BIBLIOGRAPHY


and James L. Medoff, "The Two Faces of Unionism," Public Interest, Fall 1979, pp. 69-93.


