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Wage bargaining and political strength in the public sector

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WAGE BARGAINING AND POLITICAL STRENGTH IN THE PUBLIC SECTOR

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WAGE BARGAINING AND POLITICAL STRENGTH IN THE PUBLIC SECTOR

Abstract

This paper analysis the link between political strength and public sector wages using a unique matched individual-employer data set for Norwegian local governments during the period 1990-1998. The results indicate that political strength, measured in several ways, has a positive effect on wages, while administrative strength, measured by the tenure of the chief executive, has a negative effect. The positive effect of political strength is consistent with a model in which the budgetary process is a multistage game and employment is determined in an interaction with interest groups prior to the wage bargain.

JEL Code: D73, H72, J45.

Keywords: public sector labor market, wage bargaining, political strength, budgetary process.

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1. Introduction

This paper addresses the relationship between wage setting and the political environment in the public sector. While there exists a large body of research linking wage outcomes in private firms to bargaining and efficiency wage models, surprisingly little work has been done to apply such models to understand wage outcomes in the public sector. Notable empirical exceptions are Inman (1981), Gyourko and Tracy (1991), Strøm (1995) and Falch and Rattsø (1999).[1] One reason why bargaining models have been less popular in studies of labor markets in the public sector might be the absence of a well established and widely accepted theory of decision–making in public institutions similar to profit maximizing behavior in the private sector. While the median voter model has been popular as a description of public sector decision–making, this model fails to include important features of the public sector, such as interest group pressure and multidimensionality features. The aim of this paper is to provide some evidence on the wage determination process in a unionized public sector taking into account the role of political and budgetary constraints.

A common belief is that politically weak governments, often associated with coalition governments, lead to higher public sector expenditure and lower budget surplus than politically strong governments as suggested in the seminal paper by Roubini and Sachs (1989). This hypothesis is also relevant in the local public sector, and the evidence indicates that more politically fragmented local councils lead to higher local public expenditure [Abrams and Dougan (1986), Bosch and Suarez-Pandiello (1995), Kalseth and Rattsø (1998)].[2] The usual interpretation of these findings is that more powerful political entities are less vulnerable to interest group pressure than weak ones [Potters and Sloof (1996)].

The present paper departs from this literature in the following respects. First, while the

[1] All these papers include both theoretical and empirical contributions. Theoretical papers on collective bargaining in the public sector include Holmlund (1993), Babcock et al. (1997), Strøm (1999) and Falch (2001).

[2] Allers et al. (2001), however, find that more fragmented local councils decrease local taxes in the Netherlands.

literature mostly considers the relationship between political strength and broad measures of economic outcomes, i.e. aggregate public expenditure, tax income and budget deficits, this paper focuses more narrowly on public sector wages. Second, we also allow the administrative leadership to have a separate role in the budgeting and wage bargaining processes.

We present a theoretical model explicitly taking into account that the budgetary process may be a multistage game, with different decisions taken at different points in time. One main feature of the model is that the activity level in some parts of the local government is determined in an interaction with an interest group. Within this setup, the relationship between wages and political strength depends on the order of moves in the budgetary game. If wages are determined in the first stage of the game, wages are inversely related to political strength, consistent with the conventional view. However, if the activity level in the interest group sector is determined firstly, a positive relationship between wages and political strength may arise. When the strength of the political leadership is reduced, the activity level in parts of the local government increases, and within a given total budget, the resources available in the wage bargain is reduced. Because the wage bargain can be seen as dividing available resources between the bargaining parties, reduced political strength may for this reason reduce the bargained wage. Another prediction from the model is that if the administrative leadership is more involved in the wage setting process than in the interaction with interest groups, wages are likely to be negatively related to administrative strength.

We estimate the relationship between wages, political and administrative strength, and other variables, using a matched employee-employer sample of Norwegian local governments for the period 1991-1998. The results clearly suggest that local public wages depend positively on political strength. On the other hand, administrative strength appears to have a negative effect on the wages. These results are quite robust across a range of different specifications of the model. Overall, the results are consistent with the model in which the activity levels in some sectors are determined prior to wage bargaining.

The rest of the paper goes as follows: Section 2 presents the theoretical model. Section 3 gives a description of the institutional setup in the Norwegian local public sector and the data, while empirical results are presented in Section 4. Section 5 contains concluding remarks.

2. A multistage budgeting and wage–setting model

We present a stylized budgeting and wage-setting model to shed light on the link between political strength and public sector wages. Our modeling framework is motivated by the institutional setup in the Norwegian local public sector with a highly centralized fiscal system with very limited local discretion to set tax rates. Thus, the assumption of a fixed local government budget seems to be a good approximation to reality. This means that higher wages must be financed by redistribution of resources within the budget.

The collective decisions in a situation with distributional conflict among interest groups are difficult to incorporate in a complete budgeting model. Typically governmental decision–variables are determined at different stages. This could involve all types of decision–variables as labor input, non-labor input, wages and internal prices. The basic idea is that when some decision–variables for which interest group pressure may result in overspending are determined prior to wage determination, this reduces the money available at the wage setting stage.

To proceed in a simple way, we will assume that the total budget R is divided between two activities. Assuming that employment L is the only input and that the wage w is equal for all employees, the budget constraint of the local government is $R = w\left(L_1 + L_2\right)$.

The model includes three agents, the political leadership, the labor union and an interest group. We do not explicitly model the internal political process of the government, but

assume well-defined preferences defined over activity levels in the two sectors. For analytical tractability we assume that the political leadership has Cobb Douglas preferences, $V = vL_1^{\alpha}L_2^{1-\alpha}$, where α can be interpreted as the relative weight given to sector 1. The interest group is best seen as representing the users of the public services produced in sector 1. The interest group is assumed to have preferences biased in favor of sector 1 relative to the government, $G = gL_1^{\beta}L_2^{1-\beta}$, and $\beta>\alpha$. The trade union is assumed to be of the rent maximization type, $U = (L_1 + L_2)(w - r)$, where the union members not employed by the government earns a reservation wage r.

Consider first the case where real activity in sector 1, i.e., the employment level L_1, is determined in the first stage of the game in an interaction between the political leadership of the government and the interest group.[3] The political leadership must balance the pressure for more spending in the sector where interest groups have a stake against spending on the other activities. In the second stage of the game, the government bargains with the union over the wage. In the third and final stage of the budgetary process, employment in sector 2 is given residually by the budget constraint, i.e.

$$L_2 = \frac{R}{w} - L_1 . \tag{1}$$

To solve the model we start by examining the wage bargaining outcome conditional on the activity level in sector 1. The bargaining outcome is illustrated by the Nash bargaining solution. When a dispute implies that $L_1 = L_2 = 0$, the Nash maximand reads

$$\Omega^U = \left(vL_1^{\alpha}L_2^{1-\alpha}\right)^{\eta}\left((L_1 + L_2)(w - r)\right)^{1-\eta}, \tag{2}$$

where η is the bargaining power of the government. Utilizing (1), some manipulation gives the bargained wage

$$w = r\frac{1-\alpha\eta}{\eta(1-\alpha)+(1-\eta)rL_1/R} . \tag{3}$$

The wage is equal to the reservation wage if the union has no bargaining power ($\eta = 1$),

[3] Babcock et al. (1997) and Falch (2001) pursue the stylized idea that employment is determined prior to wages in the public sector.

while $w = R/L_1$ (and $L_2 = 0$) if the government has no bargaining power ($\eta = 0$). The wage depends negatively on the employment level in sector 1 decided prior to the wage bargain.

While utilizing the Nash bargaining solution is the usual modeling strategy in the wage bargaining literature, there is no uniform tradition of how to formally modeling interest group influence.[4] A simple approach, pursued by, e.g., Kalseth and Rattsø (1998), is to assume that the outcome of the interaction between one interest group and a political entity is a weighted average of the most preferred outcome of the two, where the bargaining power determines the weights. We will show that this may be the outcome of a Nash bargaining game. If one is willing to assume that a dispute between the interest group and the political leadership in the first stage of the game implies that $L_1 = 0$, the Nash–maximand reads

$$\Omega^G = \left(vL_1^{\alpha}L_2^{1-\alpha}\right)^{\gamma}\left(gL_1^{\beta}L_2^{1-\beta}\right)^{1-\gamma}, \tag{4}$$

where γ is the bargaining power of the government in the bargain over the activity level in sector 1. Maximizing (4), subjected to (1) and (3), gives

$$L_1 = \frac{R}{r}\left(\gamma\alpha + (1-\gamma)\beta\right) \tag{5}$$

Notice that employment level in sector 1 is a weighted average of the preferred employment levels for the interest group and the political entity, $\alpha R/r$ and $\beta R/r$, respectively, with the respective bargaining powers γ and $(1-\gamma)$ as weights. Thus, under the assumption that a dispute implies zero activity in sector 1, the Nash bargaining solution gives a formal representation of the idea that the realized activity level is a compromise between the optimal levels from the interest group and political entity's point of views. While this is a simple way of describing the bargaining outcome, other assumptions regarding the activity level in sector 1 during a dispute, produce a highly nonlinear solution of the model.

Inserting (5) into (3) gives the reduced form wage as

[4] For example Mitchell and Munger (1991) discuss different maximizing models of interest group influence.

$$w = r\frac{1-\alpha\eta}{\eta(1-\alpha)+(1-\eta)(\beta-\gamma(\beta-\alpha))}. \tag{6}$$

It is straightforward to establish that $dw/d\eta < 0$ and $dw/d\gamma > 0$. While the result that higher bargaining power of the employer in the wage bargain (higher η) leads to lower wage is a conventional result, the fact that the model predicts a *positive* relationship between wages and the bargaining power of the government in the employment setting stage (γ) deserves some explanation. With high γ, the activity level in sector 1 will be relatively low, and hence more resources are available to wages and employment in sector 2. Since the wage is increasing in the resources available when the wage bargaining takes place, higher bargaining power of the local government in the employment setting stage of the model has a positive effect on the bargained wage. The important point in this setting is that the interest group and the political leadership differ in their preferences over activity levels. If preferences are equal, i.e. $\alpha=\beta$, the wage outcome is independent of γ.

So far we have implicitly assumed that the bargaining powers of the interest group and the union are completely different concepts. In reality, however, the governmental bargaining powers in the different stages of the budgetary process are not independent. Broadly speaking, a government able to resist interest group pressure is also likely to be able to resist large wage demands from unions. To investigate the consequences of the fact that η and γ are positively correlated, consider the extreme case when $\eta = \gamma$, and denote the bargaining power of the government as political strength. Now there are two effects of increased political strength. First, L_1 will be lower, partially increasing the wage. Second, the bargaining power of the union decreases, working in the opposite direction. It follows from (6) that $w = r$ when $\gamma = 1$ and $w = r/\beta$ when $\gamma = 0$. When the government has no power, the interest group sets L_1 so high that there is very little room for increased wage above the reservation wage. The marginal effect is given by

$$\left.\frac{dw}{d\gamma}\right|_{\eta=\gamma} = \frac{\beta(2-\alpha)-1-(\beta-\alpha)\gamma(2-\alpha\gamma)}{\left[\gamma(1-\alpha)+(1-\gamma)(\beta-\gamma(\beta-\alpha))\right]^2}. \tag{7}$$

Since the first term of the nominator in (7) is positive, the effect of increased political strength can be positive. It can be shown that the marginal effect is positive if

$$\gamma < \gamma^* = \frac{(\beta-\alpha)-(1-\alpha)\sqrt{\beta(\beta-\alpha)}}{\alpha(\beta-\alpha)} \tag{8}$$

Thus, $dw/d\gamma = 0$ for $\gamma = \gamma^*$, $dw/d\gamma > 0$ if $\gamma < \gamma^*$, and $dw/d\gamma < 0$ if $\gamma > \gamma^*$. Hence, the effect of increased political strength is approximately inverse U–shaped. Again, the possibility of a positive effect of γ will only occur when the interest group and the political entity have diverging preferences over activity levels in the two sectors. To see this, consider the case with $\alpha = \beta$. Now the marginal effect of γ is always negative since γ^* is zero in this case. As the other extreme, if $\beta = 1$, $\gamma^* = \left(1-\sqrt{1-\alpha}\right)\alpha^{-1}$.

Next, we compare the results from this model with the case where wages are determined prior to employment in the interest group sector. As above, L_2 is determined residually by the budget constraint in the final stage. Then the bargaining outcome is given by

$$w = r\frac{1}{\eta}. \tag{9}$$

The wage mark-up above the reservation wage is only a function of the bargaining power of the government in the wage bargain. If η is positively related to political strength, the bargained wage is always *negatively* related to political strength in this case.

The conclusion from the analysis so far is that the effect of political strength on wages depends crucially on the order of moves in the budgetary process. If wages are determined prior to (after) employment in the interest group sector, an ambiguous (negative) association arises between local public sector wages and political strength. While the models deliver interesting testable implications, we would ideally like to model the bargaining power parameters more explicitly as functions of observable variables in order to further discriminate between the main models. Since the theoretical setup above is limited in this direction, we now relax the assumption that the political leadership has the full responsibility and control in both the formulation and implementation of budgeting and wage bargaining decisions. A more realistic description of government institutions is that the administration also influences the budgeting and wage bargaining processes. First, in most cases the negotiations with the

unions on wage issues is delegated to the chief executive in the local government. This suggests that the competence and power of the chief executive may be a better proxy for employer bargaining power in the wage determination stage than political strength. Second, a powerful and competent chief executive may be a necessary condition for a strong political leadership to implement its first-best outcomes in the budgetary process.

Consider first what happens if we allow for separate administrative strength in the model where employment in the interest group sector is determined prior to wage bargaining. As formally shown in Appendix A, in the limit, when political strength is only relevant in the employment setting stage, there is an unambiguous positive relationship between wages and political strength, while there is an inverse relationship between wages and administrative strength. Further, the difference between the effect of administrative and political strength is reduced when the political and administrative leadership are both involved in the wage setting stage.

It is important to notice that a reversion of the order of moves in the budgetary game, with wages bargained prior to the employment determination, implies that both the effect of administrative and political strength are negative.

A final question concerns repeated interaction between the bargaining parties. While a formal treatment of repeated play between three actors is beyond the scope of the present paper, we discuss informally how this would affect our model. An important legal constraint in many countries, including Norway, is a requirement of a balanced budget, i.e., the government cannot use overspending and deficits strategically. Given that the government has limited local fiscal instruments, and that higher local wages does not influence the size of the budget, the budget should be seen as exogenous in each period. The relevant question each period is then how to allocate the exogenous local budget, and which variables that are perceived as exogenous by the actors involved at each decision stage. The flexibility of service production in sector 1 relatively to wages is crucial for this issue. Changing or restructuring important public services usually requires long preparation processes, involving many interests and political controversies. On the other hand, wage changes usually involve only actors

within the local government, and may to some extent be viewed as an internal issue of personal policy. This suggests that the model where employment in sector 1 is considered as exogenous in the wage bargain may be a realistic description also in a setting with repeated interaction between the actors involved.

To sum up: The multistage budgeting model implies that the effect of political strength on local wages depends crucially on the order of moves in the budgetary process. The model implies that public sector wages may be positively related to political strength if employment in sectors where interest groups have a stake is determined prior to the wage bargaining. Further, higher administrative strength may reduce wages if the administrative leadership is relatively more involved in the wage setting process than the political leadership. On the other hand, if employment in all sectors is determined after the wage bargain, the effect of both political and administrative strength on local wages is negative.

3. Empirical implementation

Empirical evidence on the relationship between economic outcomes and political variables is easily criticized since theoretical variables such as political strength are very difficult to operationalize and measure. Proposed measures of political strength are likely to be correlated with other characteristics of governments such as size, historical traditions, demographic composition etc. To the extent that such characteristics are excluded from our analysis, significant statistical relationships between wages and measures of political strength may be spurious. While the possibility of spurious effects is impossible to remove completely, we believe that our empirical strategy and data is particularly suitable to reduce the problem. First, we specify below a number of variables intended to measure political strength, and we investigate whether the results are robust across the different measures. Second, since we utilize a matched employee-employer panel data set for several years, we can in principle control for both unmeasured time-invariant individual characteristics of the employees and unmeasured time-invariant community characteristics by including both fixed individual and local

government effects in the estimated wage equations.

While political variables may be important in shaping pay in the local public sector, an empirical wage model must include the basic economic forces driving the wages as the fiscal situation and local labor market conditions. In the following, we discuss both the political, administrative and economic variables included in the model.

3.1. The dependent variable

We utilize a unique data set provided by the Central Organization of Local Governments in Norway (KS). The data set covers all municipal employees in Norway from 1986-1998, except teachers. A major change in the wage-setting system emerged in 1990. From then on, the national wage contracts gave the local governments a lot more freedom to set their own wages.[5] In order to avoid complicated issues regarding changes in wage formation, the 1980s are not included in the analysis, and our measure of administrative strength described below restricts the sample period to 1991–1998.[6] The data covers employees working above 20 percent of a full–time equivalent position in the welfare services provided by municipalities as of October 1 each year. The sample consists of 452 municipalities, excluding the capital of Oslo because the institutional setup differs.[7]

Table 1 presents the development in aggregate real wages and in different measures of wage differentials. The average real wage is almost constant until it starts to rise in 1996. The unconditional standard deviation of the wage is fairly constant over the period. The main part of the variation is within local governments, with smaller variation across local governments. This must be seen as a result of a relatively centralized wage setting system. There has historically been little geographical variation in public sector wages. In the last two columns in Table 1 we show the standard deviation in wages across local governments calculated using the coefficients on

[5] Falch and Strøm (2001) provide an analysis of the regime shift in 1990.
[6] The effect of political strength in models excluding administrative strength does only marginally depend on whether the sample starts in 1990 or 1991.
[7] Sources in Norwegian describing different wage setting institutional features are available from the authors on request.

municipal dummy variables from year–specific regressions of individual wages against measured individual characteristics. This measure shows that wage differences across municipalities conditional on observable individual characteristics increased slightly during the empirical period. In the empirical work below we investigate further whether these wage differences are related to political and administrative factors.

Table 1. Wages and wage dispersion

		Unconditional statistics		Statistics conditional on individual characteristics	
	Observations	Mean real wage[1]	Std. dev. log wage	Std. dev. log wage *within* local gov.	Std. dev. log wage *across* local gov.[2]
1990	149,084	15,886	0.144	0.095	0.079
1991	162,965	15,577	0.141	0.094	0.078
1992	173,781	15,563	0.146	0.099	0.085
1993	185,581	15,701	0.149	0.100	0.084
1994	192,063	15,725	0.148	0.100	0.083
1995	200,723	15,752	0.147	0.101	0.081
1996	206,390	16,489	0.142	0.100	0.078
1997	203,207	16,439	0.143	0.102	0.075
1998	208,727	17,572	0.133	0.094	0.108

[1] 1998–NOK, deflated by the consumer price index (NOK/Euro ≈ 8). [2] Calculated by the method suggested by Haisken-DeNew and Schmidt (1997).

The advantage by using individual data for analyzing political behavior is that one can condition on individual characteristics. In the model we include sex-specific categorical variables for education, age, and working time. The variables used are defined in more detail in Appendix B, which also presents some descriptive statistics.

3.2. Political variables

As to the operationalization of political strength, it is important to discuss in some detail the political institutions. The Norwegian local governments have multi-party proportional representation in a local council, with election every fourth year. The local council does not work as a parliament system establishing a ‘cabinet’, but instead elects an executive board among the members of the council. The executive board has

proportional representation of the political parties. The local council also elects the major and the deputy major. Within this setup, we define several measures of political strength based on the composition of the local council.[8]

Our first measure of political strength is related to the political fragmentation in the local council. Falch and Rattsø (1999) and Tovmo and Falch (2002) find a strong impact of political fragmentation on local government behavior. The fragmentation is represented by an Herfindahl index defined as

$$\mathrm{HERF} = \sum_{p=1}^{P} \mathrm{SH}_p^2$$

where SH_p is the share of representatives from party p in the local council and P is the number of parties. This index is inversely related to party fragmentation, as it is equal to 1/P if the seats in the local council are equally distributed among the parties and equal to unity if all seats are held by one party. It is likely that a more fragmented local council increases the number of possible outcomes in the budgeting process and hence creates more room for lobbying by interest groups. This suggests that the Herfindahl index is positively correlated with political strength.

Kontopoulos and Perotti (1999) investigate the relationship between two different measures of fragmentation, the number of spending ministers and the number of political parties in a coalition, and fiscal performance in the OECD countries. The number of spending ministers is not relevant for the institutional setting of the Norwegian local governments. But the number of political parties in the cabinet is a simpler measure of fragmentation than the Herfindahl index presented above. Kontopoulos and Perotti (1999) find that increased number of political parties in a coalition increases public expenditures. In the Norwegian context, the number of parties in the local council is a good approximation to the number of parties in a coalition since most parties are represented in the executive board. To facilitate interpretation and comparison with other studies, we use the inverse of the number of political parties in the local council, as our second measure of political strength.

[8] The composition of the local council and the executive board are very similar due to the proportional representation in the executive board, but only information about the local council are regularly collected.

Another set of variables intended to characterize the political basis of the political leadership is suggested by Kalseth and Rattsø (1998) and related to the index proposed by Roubini and Sachs (1989). They assume that a one-party majority behind the mayor and deputy mayor represents a strong leadership, while, at the other extreme, a coalition of parties without a majority behind the mayor and deputy mayor constitute a weak political leadership. Based on this reasoning we define four dummy variables corresponding to the following political configurations: Minority coalition, one party minority, majority coalition, and one party majority. According to this classification, minority coalition represents the weakest government, while one party majority represents the strongest government.

Our last measure of political strength is the share of representatives in the local council reelected. It is expected that reelected representatives have better knowledge of the political system and are more able to handle pressure from interest groups.[9]

While the above variables are intended to characterize the ability of the political leadership to oppose pressure from interest groups, it is commonly argued that political ideology is an important force in shaping economic outcomes. In our setting, political ideology may influence wages through two mechanisms. First, if socialist parties on pure ideological grounds prefer a higher employment share in the interest group sector than conservative parties, wage responses may be driven both by interest group pressure and political ideology. Within our theoretical model, this means that for a given level of government strength, and interest group preferences, a conservative government will lead to higher wages than a socialist government, as more money are left for the bargaining table in this case. The second possible link between political ideology and wage determination in the Norwegian local public sector is the close relationship

[9] Zax (1990) proposes that another measure of the political and institutional structure of the local councils may be important for the wage and employment levels. Reform municipal governments, characterized by nonpartisan, at-large councils and professional city manager, may yield higher wages and employment because the influence of neighborhood and partisan constituencies is reduced. In Norway, all seats in the local councils are elected at-large, the waste majority of the representatives represent national political parties in almost all local governments, and all local governments' employs a Chief executive (expect the capital of Oslo which is excluded from the analysis).

between the largest trade union (Norsk kommuneforbund) and the Labor party and other smaller socialist parties. Thus, the union bargaining power in the wage bargaining could be positively related to the strength of the socialist parties in the local council, leading to positive association between wages and the political power of the socialist parties. Consistent with this view, Strøm (1995) finds that wages of lower skilled workers in Norwegian local governments are positively related to the share of socialist parties in the local council. Although our ambition is not primarily to discriminate empirically between these two hypotheses, both mechanisms suggest the importance of controlling separately for political ideology in addition to political strength. Thus, we include the share of members in the local council representing the non-socialist parties in the model.

3.3. Administrative strength

To our knowledge, measures of administrative strength have not been used in models of governmental behavior.[10] We propose that the tenure of the Chief executive is correlated with administrative strength. The Chief executive is responsible for the administrative tasks, and is obligated to make proposals to the executive board on all major political issues as budgetary issues and structural issues. A Chief executive with much experience is likely to know more about the behavior of the parties involved in the budgeting process and may help a strong political leadership to reach its goals. Likewise, an experienced Chief executive is likely to represent a tougher opposition to the union wage demands than an inexperienced Chief executive. An important caveat, however, is that most of the Chief executive's are employed on regular contracts, implying that they cannot easily be fired if they turn out to perform badly.

In our data, we can identify a single Chief executive in most of the observations of the

[10] Notice, however, that some papers have investigated the wage effect of having a city manager versus a mayor or council government, see for example Ehrenberg and Goldstein (1975), Edwards and Edwards (1982) and Gyourko and Tracy (1991). The hypothesis in Ehrenberg and Goldstein (1975) is lower wages under a city manager because "city managers may be more efficient negotiators than elected mayors or commissioners, because of managers' professional training or the different political pressure they face" (p. 228). The typical finding, however, including Ehrenberg and Smith (1975), is a *positive* effect of city managers on the wages of public sector employees. On the other hand, Edwards and Edwards (1982) find that the impact of unionism on wages is higher in cities that do not employ a city manager.

local governments. In 9 percent of the observations, however, we observe several employees with leading administrative positions. The latter group contains mainly the largest local governments as it includes all local governments with more than 60 000 inhabitants. In such local governments there typically exists a leader group, and with our data it is impossible to single out the Chief executive due to incomplete data. In these cases we use the mean tenure of the individuals in the leader group as our measure of administrative strength.

We have no information about the Chief executive's (or the other employees) before 1986, and the existing information of the positions in 1986 is poor. Since it is not satisfactory to use the number of years as a Chief executive after 1987 as tenure, we simply calculate a dummy variable, which is equal to unity if the Chief executive has been a Chief executive in at least five years and zero otherwise. In order to use a breakpoint of five years, we have to reduce the sample period to 1991-1998. To control for other characteristics of the Chief executive's, we also include in the model a dummy variable equal to unity if the Chief executive is without tertiary education and a dummy variable equal to unity if the Chief executive is below 40 years of age, see Table 3 below for descriptive statistics.[11]

Table 2 reports the mean values of the measures of political and administrative strength and correlation coefficients. The two measures of political fragmentation, the Herfindahl index and the number of parties in the local council, are highly correlated. They are also highly correlated with the political basis of the political leadership measured by the one party majority dummy. The share of the non-socialist political parties in the local council is negatively correlated with the other variables measuring political strength, while the share of the representatives reelected and the measure of administrative strength seems to be uncorrelated with the other variables.

[11]In the cases where the tenure variable is based on the leader group, the age and education variables are computed as the share of the group members with age below 40 years, and the share with tertiary education, respectively. The fact that the Chief executive and other administrative leaders are not elected, but have permanent job contracts, imply that they do not have incentives to act strategically towards the union or the interest group for reelection or job security purposes. Thus, it seems safe to consider our

Table 2. Mean values and correlation coefficients for the variables measuring political and administrative strength

	Mean (std)	HERF	PC	POL_ 2	POL_ 3	POL_ 4	RE	CON	TEN
Herfindahl index for party fragmentation in the local council (HERF)	0.25 (0.06)	1.00	-	-	-	-	-	-	-
The inverse of the number of political parties in the local council (PC)	0.15 (0.04)	0.68	1.00	-	-	-	-	-	-
One party minority behind the mayor and the deputy mayor (POL_2)	0.22 (0.42)	0.25	0.05	1.00	-	-	-	-	-
Majority coalition in the local council (POL_3)	0.20 (0.40)	0.09	0.17	-0.27	1.00	-	-	-	-
One party majority in the local council (POL_4)	0.08 (0.27)	0.61	0.35	-0.15	-0.15	1.00	-	-	-
The share of the representatives in the local council reelected (RE)	0.38 (0.09)	-0.02	-0.11	0.08	-0.02	-0.04	1.00	-	-
The share of the representatives in the local council from non-socialist parties (CON)	0.58 (0.14)	-0.48	-0.11	-0.26	0.08	0.40	-0.04	1.00	-
Chief executive's tenure is at least five years (TEN)	0.62 (0.49)	-0.04	0.04	-0.04	0.06	0.01	0.06	-0.02	1.00

3.4. Economic variables

As noted above, in the centralized fiscal system in Norway, the largest part of local government income is determined by the national government. It is a tax revenue sharing system, with extensive use of central government grants. The sum of the income tax, wealth tax, and unconditional grants is included as the local government income variable. The real value of income depends on the payroll tax, and the payroll tax rate varies between regions and to some extent over time. In the case with labor as the only input and exogenous income, the budget constraint of the local government is $R=w(1+t)L$, where t is the actual payroll tax rate which varies both across regions and over time and L is the total number of employees. Based on the fact that labor costs are the major expenditure component, we use $R/(1+t)$ as our local government income measure.

As a measure of the local labor market conditions, we include the local unemployment rate, expecting that higher unemployment decreases the expected value of the outside

proposed measure of administrative strength as an exogenous variable in the model.

option of the employees and thereby tends to reduce the wage. In addition, the model includes several other variables that to some extent may characterize the local labor market; the population size, variables describing population composition, and municipal fixed effects. Definitions and summary statistics are provided in Table 3.

Table 3. Definitions and descriptive statistics for local government and administrative characteristics included in the empirical model.

Variable	Definition	Mean	Standard deviation
Local government characteristics			
income	Real yearly exogenous income per capita in 1998–NOK for the local government. Income includes the sum of general grant and tax revenue sharing, and is corrected for the payroll tax rate as described in the main text	16,146	4,257
unemployment	Unemployment rate in the local government.	4.46	1.92
population	Population size	35,103	52,493
share pre–school	The share of the population below 7 years of age.	0.10	0.01
share youth	The share of the population between 7 and 15 years of age	0.11	0.01
share elderly	The share of the population above 80 years of age	0.04	0.01
Administrative characteristics			
Low education	The chief executive does not have tertiary education	0.08	-
Age below 40	The chief executive is below 40 of age	0.47	-

4. Empirical results

In this section we first present the estimated effects of the variables intended to measure political and administrative strength in linear models. Thereafter we investigate possible nonlinear effects and an interaction effect between political and administrative strength.

The model specification includes local government specific effects to control for potential omitted time-invariant variables at the local government level. But because the composition of the local government employees typically changes over time, fixed local government effects will not fully control for unobserved time-invariant individual characteristics of the employees. Thus, we also include fixed individual effects in the model. While it is straightforward to estimate linear models with one set of fixed effects by using deviations from individual means for each variable, it is not straightforward to

include two sets of fixed effects because only one set of fixed effects can be removed by differencing the model, see Abowd et al. (1999). Because all types of fixed effects in principle can be handled by including dummy variables in the model, this is a high-dimensionality problem. Our approach to deal with this problem is to utilize that with fixed individual effects included, local government specific effects are solely identified by employees moving between different local governments in the sample period. By technically treating an individual moving from one municipality to another municipality as different individuals when being employed in the two municipalities, the model is straightforward to estimate. A similar approach is proposed by Goux and Maurin (1999). The method implies that we not only condition on all individual and local government characteristics that are constant over time, but we also condition on the interaction between these unobserved characteristics. In this way, the model allows the unobserved individual characteristics to have different effects in different local governments. Thus, the models include a full set of individual and local government effects and the interaction between these fixed effects.

Since our focus is on political and administrative strength, we only report the effect of these variables in the following tables. For completeness, we report the results for all variables in one version of the model in Appendix Table 1B. It appears that there is a positive effect of local government income and population size as expected, although the effect of unemployment is positive contrary to our hypothesis.[12] The effect of the individual characteristics are as expected, but in interpreting the effects one has to keep in mind that individual specific effects are included in the model, making the coefficients small due to limited within-group variation in the variables.

4.1. The role of political strength

Columns (1)-(5) in Table 4 present the wage effect of each of the proposed political

[12] It is not obvious how to interpret the positive unemployment effect in the model with a full set of fixed effects, in particular since the variation in unemployment rate through time is very similar across the local governments. When estimating the model without fixed effects (not reported), the effect of unemployment is negative. This picture is consistent with estimated regional wage equations for Norway where a negative unemployment effect is found only for non-unionized male workers [Barth et al. (2002)]. It is also consistent with earlier studies of local public wages in Norway reporting positive unemployment effects in fixed effects specifications [Strøm (1995)].

variables when they are included separately. The estimated effects of political strength are significantly positive at one percent level in all cases except that the wage seems to be lower under one party minority (the mayor and the deputy mayor are from the same political party, and this party is in minority) than under a coalition minority. To illustrate the numerical effects, consider the effect of the Herfindahl index for party fragmentation in the local council. The model in column (1) indicates that reduced fragmentation of two standard deviations increases the wage by 0.13 percent. The effect is small, which partly reflects that the wage determination in the Norwegian local governments still is very centralized, and partly is a result of including local government specific effects in the model. When the fixed local government effects are excluded (only fixed individual effects are included), the effect is almost three times larger. In addition to the positive association between wages and political strength, the results indicate a negative relationship between wages and the share of non-socialist representatives in the local council. This last result is consistent with the findings of Strøm (1995) and may indicate that non-socialists represent a tougher opposition to wage demands from the union than socialist parties.[13]

[13] This variable is included as a continuous variable following Strøm (1995). When a dummy variable indicating if conservative parties are in majority is included together with the original variable, the effect of both variables are negative, but only the continuous variable is significant at ten percent level. We also tested whether the effect of the non-socialist share depends on whether one single non-socialist party was in majority. We did not find any such interaction effects.

Table 4. The effects of political and administrative strength. Dependent variable is the log of the wage

	(1)	(2)	(3)	(4)	(5)	(6)
Herfindahl index for party fragmentation in the local council	0.010 (7.38)	-	-	-	-	0.010 (5.25)
The inverse of the number of political parties in the local council	-	0.007 (3.19)	-	-	-	0.001 (0.40)
One party majority in the local council	-	-	0.0008 (3.67)	-	-	-0.0001 (0.31)
Majority coalition in the local council	-	-	0.0001 (0.45)	-	-	-0.0003 (2.31)
One party minority behind the mayor and the deputy mayor	-	-	-0.0006 (4.64)	-	-	-0.0008 (6.04)
The share of the representatives in the local council reelected	-	-	-	0.002 (4.99)	-	0.002 (4.81)
The share of the representatives in the local council from non-socialist parties	-	-	-	-	-0.002 (2.17)	0.001 (0.63)
Chief executive's tenure is at least five years	-0.0005 (6.13)	-0.0005 (6.04)	-0.0005 (6.18)	-0.0005 (6.39)	-0.0005 (6.08)	-0.0005 (6.39)
Interacted individual and local government specific effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,522,705	1,522,705	1,522,705	1,522,705	1,522,705	1,522,705
Equation standard error * 100	3.24078	3.24084	3.24079	3.24082	3.24085	3.24070

Note: Sample period is 1991-1998. Absolute t-values in parentheses. Year specific effects are included. Individual characteristics included are sex–specific effects of education (6 categories), age (7 categories), and part time work (2 categories). Local government characteristics included, all at logarithmic form, are local government income, unemployment, the population size, and the shares of the population below 7 years of age, 7-15 years of age and above 80 years of age. In addition, the models include a dummy variable for whether the Chief Executive does not have tertiary education and a dummy variable for whether the Chief Executive is below 40 years of age.

The measure of administrative strength, a dummy variable indicating if the tenure of the Chief executive is at least five years, has a significantly negative effect on wages. This is in accordance with the hypothesis that the Chief executive plays a larger role in the wage bargaining than in the interaction with the interest groups and that an experienced Chief executive is more able to oppose wage pressure than an inexperienced Chief executive. Notice that the numerical effect of political strength is independent of whether the measure of administrative strength is included in the model.

For the sake of completeness we also report in column (6) the results when all measures of political strength are included in the same model. As expected, the results are rather mixed, which reflect the fact that most of the measures of political strength are highly correlated and accordingly the results in these specifications must be interpreted with care. The most robust result seems to be that the local wages is positively related to the Herfindahl index of party fragmentation since the effect of this variable is unaffected by the inclusion of the other measures of political strength. The same is true for administrative strength because this variable is not highly correlated with the measures of political strength as seen in Table 2.

So far, our findings that wages are positively related to political strength and inversely related to administrative strength is consistent with the model where real activity in the interest group sector is decided prior to wage bargaining. A further prediction from the theoretical model in section 2 is that the effect of political strength is inverse U–shaped. To investigate this hypothesis, we first add the square of each of the political strength variables to the model, and the results are presented in Table 5.[14] The results are mixed, which is not surprising because several of the measures of political strength have limited within local government variation. Typically the within variation, covering three different election terms, accounts for only about 10 percent of the overall variation. The only exception is the share of reelected representatives in the local council where the within and between variation is about the same size. Interestingly, for this variable the relationship is significantly inverse U–shaped, with the largest effect one standard deviation above mean.

[14] The variable measuring the political basis of the political leadership are not included because higher order values of dummy variables are equal to the dummy variables themselves.

Table 5. Nonlinear effects of political strength. Dependent variable is the log of the wage

	(1)	(2)	(3)	(4)
	Measure of political strength			
	Herfindahl index for party fragmentation in the local council	The inverse of the number of political parties in the local council	The share of the representatives in the local council reelected	The share of the representatives in the local council from non-socialist parties
Political strength	0.012	-0.002	0.018	-0.001
	(2.52)	(0.32)	(9.41)	(0.14)
Political strength squared	-0.004	0.022	-0.020	-0.001
	(0.53)	(1.50)	(8.46)	(0.42)
Chief executive's tenure is at least five years	-0.0005	-0.0005	-0.0005	-0.0005
	(6.13)	(6.02)	(5.89)	(6.07)
Interacted individual and local government specific effects	Yes	Yes	Yes	Yes
Observations	1,522,705	1,522,705	1,522,705	1,522,705
Equation standard error * 100	3.24078	3.24084	3.24072	3.24085

Note: Sample period is 1991–1998. Absolute t-values in parentheses. The specifications of the models are equal to the models in Table 3 except as indicated.

A less rigid interpretation of the non-linearity implied by the theoretical model is that the numerical size of the wage effect of a marginal increase in political strength is larger for relatively low values of political strength than for relatively high values of political strength. To investigate this hypothesis empirically, we split the sample in order to isolate the marginal effects under different degrees of political strength. In the lower end, we single out local governments with political strength of the relevant measure below the overall mean in all sample years, and in the upper end we single out local governments with political strength of the relevant measure above mean in every sample year. With such a split of the sample, the effect of party fragmentation measured by the Herfindahl index is four times higher than the average effect under weak political leadership, and weakly negative under strong political leadership (both subsamples include about 30 percent of the observations). The same qualitative result applies for the inverse of the number of political parties in the local council. Overall, the evidence therefore indicates that the relationship between wages and political strength is

consistent with the predictions from the theoretical model.[15]

Table 6. Interaction between political and administrative strength. Dependent variable is the log of the wage

	(1)	(2)	(3)	(4)	(5)
	Measure of political strength				
	Herfindahl index for party fragmentation in the local council	The inverse of the number of political parties in the local council	The share of the representatives in the local council reelected	The share of the representatives in the local council from non-socialist parties	The political basis of the mayor and deputy mayor
Political strength	0.011 (7.63)	0.008 (3.12)	0.0004 (0.53)	-0.001 (0.73)	-
One party majority in the local council (POL__4)	-			-	0.0010 (3.30)
Majority coalition in the local council (POL_3)	-	-		-	-0.0002 (0.91)
One party minority behind the mayor and the deputy mayor (POL_2)	-	-		-	-0.0002 (0.88)
Chief executive's tenure is at least five years (TEN)	0.0002 (0.56)	-0.0004 (1.28)	-0.0016 (5.10)	0.0005 (1.58)	-0.0004 (3.93)
Interaction between political strenght and TEN	-0.003 (2.31)	-0.0009 (0.50)	0.0029 (3.60)	-0.0018 (3.15)-	-
POL_4*TEN	-	-		-	-0.0002 (0.73)
POL_3*TEN	-	-		-	0.0004 (2.06)
POL_2*TEN	-	-		-	-0.0006 (3.32)
Interacted individual and local government specific effects	Yes	Yes	Yes	Yes	Yes
Observations	1,522,705	1,522,705	1,522,705	1,522,705	1,522,705
Equation standard error * 100	3.24072	3.24084	3.24076	3.24081	3.24084

Note: Sample period is 1991–1998. Absolute t-values in parentheses. The specifications of the models are equal to the models in Table 3 except as indicated.

The theoretical model also implies that the effect of political strength depends

[15] This is also confirmed by models excluding all the fixed effects. In such models, the effect of party

negatively on the size of administrative strength.[16] In the models in Table 6 interaction terms between the measures of political and administrative strength are included. For party fragmentation, the interaction effect is significantly negative, indicating that administrative strength mainly has a negative effect under strong political leaderships. Within the theoretical model above, the interpretation is that a strong political leadership is able to resist interest group pressure and thereby leave more resources to be shared in the wage bargaining. This increases the union's wage demand, and the demand will be met to a greater extent under a weak administration than a strong administration. For the other measures of political strength, the results are mixed.

5. Concluding comments.

A common hypothesis in the empirical literature on public finance is that a strong political leadership reduces government spending since a more powerful political entity is less vulnerable to interest group pressure than a weak one. We have investigated the relationship between public sector wages and political strength by estimating wage equations using individual data on employees in the Norwegian local governments in the period 1991-1998. The evidence suggests that the strength of the political leadership, measured in different ways, is positively related to public sector wages. This conclusion is robust across a number of empirical specifications including both fixed local government and fixed individual effects. The evidence also indicates that administrative strength has a negative effect on the local public wages.

The positive effect of political strength found is surprising in light of the existing literature clearly indicating that a strong political leadership is better able to hold down pressure for overspending than a weak one. However, while the existing literature considers broad measure of economic outcomes as total expenditures and budget deficits, wages are only a part of the budget. In practice, decisions on the different

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fragmentation and the number of political parties are inverse U–shaped.

[16] The model also predicts that the effect of administrative strength is nonlinear. But because our measure of administrative strength is a dummy variable, it is impossible to include higher order values of administrative strength in the model.

components of public expenditure are determined at different points in time. Our evidence is consistent with a model where employment in sectors where interest groups have a stake is determined prior to wage bargaining. A strong political leadership will hold down the activity level in the interest group sector while leaving more money to be shared in the wage bargain. Based on the argument that the strength of the administrative leadership is relatively more important in personnel policy and wage negotiations, it is reasonable that the effect on wages of administrative and political strength have opposite signs.

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Appendix A. The role of administrative strength

The purpose of this appendix is to extend the theoretical model in the main text to allow for influence from the administrative leadership. Consider first the determination of real activity in sector 1. The local government bargaining power in the interaction with the interest group at this stage can be written $\gamma = \varepsilon P + (1-\varepsilon)A$, where P is political strength, A is administrative strength, and ε is the weight of P. Consider next the wage bargaining stage, where representatives from the local government bargains with the union. In the Norwegian case, the Chief executive seems to be relatively more engaged, compared to the political leadership, in the wage setting stage than in the employment determination stage. To illustrate the difference between political and administrative strength within this setting, consider the extreme case where η = A. Now it follows from (6) that dw/dP > 0, and

.

$$\frac{dw}{dA} = \frac{\beta(2-\alpha)-1-(\beta-\alpha)\left[A(2-\alpha A)+\varepsilon\left(1+(1-\alpha)P\right)\right]}{\left[A(1-\alpha)+(1-A)\left(\beta-\left(\varepsilon P+(1-\varepsilon)A\right)(\beta-\alpha)\right)\right]^2} \tag{A.1}$$

To evaluate the effect, consider first the case when ε = 1. Now dw/dA < 0, which follows directly from the fact that the bargaining powers γ and η are completely separated. Consider then the case when ε = 0. Now γ = η, the marginal effect can be of either sign, and the model is equal to the model in Section 2. Thus, given that ε < 1, the effect of A will be smaller than the effect of P.

It is possible to show that the marginal effect of political strength depends on the level of administrative strength. An evaluation of the interaction effect, however, is easiest using a simulation experiment. Figure A1 presents the marginal effect of P for different values of A.

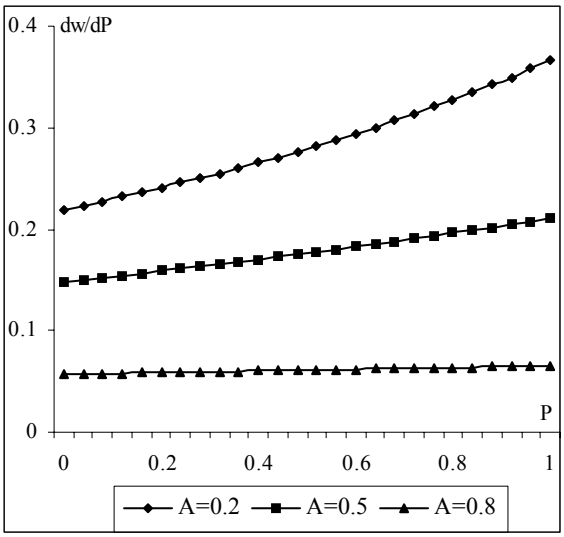

Figure A1: The marginal effect of political strength; $r = \beta = 1$, $\alpha = \varepsilon = 0.5$

From Figure A1 it is clear that the marginal effect of political strength is larger for low values of A than for high values of A. Consider a strong political leadership that hold down employment in sector 1 and leave much to be shared in the wage bargain. With a weak administration the wage will be high, while with a strong administration, the wage will be low. Obviously, the effect of political strength depends negatively on administrative strength.

Appendix B. Data appendix

Observations of individuals working less than 20 percent of a full-time equivalent position are excluded from the sample. The following variables are used in the analysis. A more detailed definition of the variables is available upon request.

Dependent variable. The real full–time equivalent monthly wage level, excess of supplement pay due to for example overtime and night work. The mean of the variable in 1998_NOK is 16,108, with standard deviation 2,577. Source is the Federation of Local Governments.

Individual characteristics. Source is the Federation of Local Governments (mean values in parentheses).

– Education categories
  – Master degree (0.02)
  – Engineer (0.02)
  – Education in business and administration (0.01)
  – College education (0.45)
  – High school education or less (0.42)
  – Education missing (0.08)
– Age categories
  – Age up to 19 years (0.002)
  – Age 20–24 years (0.02)
  – Age 25–29 years (0.08)
  – Age 30–39 years (0.26)
  – Age 40–49 years (0.31)
  – Age 50–59 years (0.22)
  – Age above 60 years (0.10)
– Man (22.8)
– Working less than 50 percent of full time (0.12)
– Working less than full time but at least 50 percent of full time (0.44)

Local government characteristics. Source is the Norwegian Social Data Services. Definitions of variables and descriptive statistics are summarized in Table 3 in the main text.

Administrative characteristics. Source is the Federation of Local Governments. Definitions of variables and descriptive statistics are summarized in Table 3 in the main text.

Table 1B. Results of full model. Dependent variable is the log of the wage

	Men	Women
Individual characteristics		
Master	0.025 (9.91)	0.026 (10.5)
Engineer	0.021 (9.71)	0.035 (6.11)
Business and administration	0.033 (12.8)	0.051 (23.3)
Bachelor	0.017 (22.9)	0.028 (86.4)
Education missing	-0.007 (5.00)	-0.002 (1.79)
High school or less	-	-
Below 20 years of age	-0.089 (25.6)	-0.125 (88.3)
20–24 years of age	-0.047 (37.2)	-0.079 (129.6)
25–29 years of age	0.007 (9.19)	-0.023 (49.9)
30–39 years of age	0.043 (66.3)	0.015 (38.9)
40–49 years of age	0.038 (72.2)	0.017 (56.1)
50–59 years of age	0.021 (50.1)	0.012 (49.0)
60 years of age or older	-	-
Working less than 50 percent of full time	-0.022 (34.4)	-0.012 (60.4)
Working between 50 and 100 percent of full time	-0.010 (27.0)	-0.008 (59.2)
Working full time	-	-
Local government characteristics		
Log of income	0.005 (6.75)	
Log of unemployment	0.001 (6.49)	
Log of population	0.010 (5.52)	
Log of share pre–school	0.0001 (0.12)	
Log of share youth	-0.005 (4.05)	
Log of share elderly	-0.002 (2.66)	
Low education of Chief executive	-0.0006 (2.79)	
Age below 40 of Chief executive	0.0002 (1.67)	
Herfindahl index for party fragmentation in the local council	0.010 (7.38)	
Chief executive's tenure is at least five years	-0.0005 (6.13)	
Time specific effects		
1991	-	
1992	0.003 (22.2)	
1993	0.011 (80.4)	
1994	0.014 (94.8)	
1995	0.020 (118.7)	
1996	0.068 (376.9)	
1997	0.068 (308.6)	
1998	0.141 (515.7)	
Interacted individual and local government specific effects	Yes	
Observations	1,522,705	
Equation standard error * 100	3.24078	

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