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Public Sector Pay in Finland

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ABSTRACT

This study analyses the forces determining public and private sector pay in Finland. The data used is a 7 per cent sample taken from the Finnish 2001 census. It contains information on 42 680 male workers, of which 8 759 are employed in public and 33 921 in the private sector. The study documents and describes data by education, occupation and industry. We estimate earnings equations for the whole sample as well as for four industries (construction, real estate, transportation and health) that provide an adequate mix of both public and sector workers. The results suggest that the private-public sector pay gap of about one per cent can be accounted for by differences in observable characteristics between the sectors (3.4 per cent) and lower returns from these characteristics (-2.3 per cent). However, the industry-level analysis indicates that the earnings gaps vary across industries, and are negative in some cases. These inter-industry differences in public-private gaps persist even when the usual controls are introduced. This suggests that public sector wage setters need greater local flexibility, which should result in less uniform wages within the public sector.

1 Introduction

Public sector pay is a matter of natural concern for economists and policy makers. It is commonly stated that public sector pay settlements need to be kept at a modest level for reasons of macroeconomic stability. It may thus be argued that if public sector pay is too high, then this puts upward pressure on the public sector wage bill – which is a significant part of public expenditure. Upward pressure on public spending may well increase government borrowing requirements and also potentially set the macro-economy on a wage-price inflationary path. If the private sector looks to the public sector before setting its wages, then high public sector wage awards can lead to expectations of high inflation and hence high private sector awards. It is this wage-price-wage expectation driven spiral that public sector wage setters are keen to avoid. On the other hand, public sector employers do not operate in a vacuum. If public sector pay is set at too low a level, then the public sector which competes for labour with the private sector will be at a serious disadvantage in terms of the recruitment and retention of good quality labour. This latter effect may have become more important in recent years. In their study based on UK data, Nickell and Quintini (2005) found that for male employees declining relative pay in the public sector did in fact result in measurable loss of quality. The same phenomenon did not appear important for female workers.

The nature of public sector employment has changed radically since the 1980s. Most European countries have seen significant privatisations of former state monopolies in the last two decades. This has meant a shift in the type of workers employed in the public sector from blue collar skilled manufacturing-based to white collar service-based. At the same time, governments have come under increasing public pressure to be more accountable to the public for the standard of public services whether in teaching, healthcare, or social provision. This increased pressure to perform means that the quality of the public sector workforce is of increasing importance. If public sector pay falls significantly below that of the private sector, then in a competitive labour market, high quality workers will desert the public sector for private sector employment and hence undermine the government's commitment to high quality provision in the public sector services. This situation is a bigger potential threat in times of relatively low unemployment.

The explicit competition between the public and private sector for good quality workers implies that any study of public sector wage determination cannot be carried out in isolation. At least for contextual reasons, it is necessary for the process of public sector wage determination to be carried out simultaneously with that of private sector wage determination. Indeed, this allows us to focus directly on the public-private wage gap.

In this study we analyse the forces determining public and private sector pay in Finland. The Finnish economy provides a good case study as in many ways it is representative of modern advanced countries – high GDP per capita, a strong welfare state, high employment, a secular decline in manufacturing and corresponding rise in the service sector, a strong tradition of public sector employment and a well educated labour force. Collective wage bargaining procedures, in which the government has played a prominent role since 1968, together with high coverage of wage agreements and tight wage-wage links between different sectors of the economy, lend special interest to our country analysis. Recent developments, showing a tendency towards local level wage bargaining and performance-related pay, in particular, call for an empirical analysis that examines differences in how individual characteristics are rewarded in the private and in the public sector and how work-place characteristics and local environment affect pay. Our empirical analysis utilises an employee-based survey (Finnish Labour Force Survey) with rich details of workers' characteristics and accurate information on the employer's sector, whether public or private. One advantage of the data is that it allows us to examine pay gaps by certain industries, providing more detailed information on industry-level pay differentials across employers' status.[1]

The rest of this paper is organised as follows. Section 2 outlines the wage bargaining institutions in the Finnish labour market. We describe the pay determination system and show the evolution of pay across the public and private sectors over recent decades. Section 3 outlines the data and the econometric framework. We examine pay gaps using individual-level data, thus controlling for differences in employee characteristics across the public and private sector. We also perform disaggregated analysis for certain industries. Section 4 reports the results of the empirical analysis, and section 5 concludes.

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[1] Our analysis thus contributes to recent country studies on public sector pay, conducted for the UK, Canada, France, Spain and Italy, among others; see Disney and Gosling, 1998, Lassibille, 1998, Blackaby, Murphy and O'Leary, 1999; Mueller 1998; Chatterji and Mumford, 2007; Lucifora and Meurs, 2007 and Disney 2007.

2 Wage bargaining institutions in Finland

The Finnish labour market is heavily unionized, having one of the highest rates of union membership in the industrialised world with approximately 75 per cent of employees organised in trade unions.[2] With around 70 trade unions organised into three labour confederations, there is a union for every employee in Finland regardless of line of work, type of employment or status in the enterprise.

There are three main central labour confederations on the employees' side.[3] The largest of those is the Confederation of Finnish Trade Unions, SAK. It is a confederation of 21 trade unions with more than one million members. About half of the members of SAK-affiliated unions work in industry, about one-third in private services and one quarter in the public sector. The members of these unions work in a wide range of occupations, including childminders, flight attendants, bus drivers, waiters, builders and paper mill employees. When one recognises that the size of the Finnish labour force is only 2.7 million, the significant of SAK becomes clear.

The Finnish Confederation of Salaried Employees, STTK, consists of 19 affiliated trade unions that represent approximately 640 000 professional employees. The member unions organize employees in industry, private services, local government and central government. The members of STTK-affiliated unions are employed in various occupations, including nurses, technical engineers, police officers, secretaries and salesmen. AKAVA, the Confederation of Unions for Professional and Managerial Staff, is a trade union confederation for those with university, professional or other high-level education, formed by 31 affiliates and with about 460 000 members. In the public sector AKAVA's bargaining mandate is held by Public Sector Negotiating Commission, JUKO. In the private sector, the negotiating body is the Delegation of Professional and Managerial Employees (YTN), although certain affiliates negotiate independently.

The four employer confederations are: the Confederation of Finnish Industries, the Office for the Government as Employer, the Commission for Local Authority Employers and the Church of Finland Negotiating Commission. Membership in employers´ associations is also high. About 60 per cent of all firms, representing about 70 per cent of the total work force belong to employers' associations.

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[2] See OECD, 2007, for a recent country comparison.
[3] See Työmarkkina-avain, 2007.

In the public sector all agreements for government employees are made between the Office for the Government as Employer operating, under the Ministry of Finance, and the bargaining agents. This system covers about six per cent of the labour force, totalling about 130 000 employees. The Commission for Local Authority Employers, in turn, negotiates with the bargaining agents representing the personnel of local and joint authorities. This covers about 430 000 employees. Local government employers, comprising more than 400 municipalities and 200 joint municipal authorities, include hospitals, health centres, comprehensive schools, upper secondary schools, vocational institutions, polytechnics, day care centres, libraries, museums, homes for the elderly, youth affairs centres, and local traffic and fire and rescue departments.

Industrial relations are regulated by collective agreements which, in turn, regulate the minimum conditions for job in question and establish labour peace. Collective wage bargaining, in which the government plays a prominent role, has been used in the Finnish labour market since 1968. These agreements provide the framework for branch-specific collective agreements; see Figure 1. In all cases the employers´ associations and trade unions sign collective agreements of their own. Because collective labour contracts are binding for non-union members in industries where more than half of the employees are union members, around 90 per cent of all employees are covered by collective agreements.[4]

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[4] Työmarkkina-avain, 2007.

Figure 1: Public and private sector pay determination in Finland; two main alternative procedures

Procedure 1

Framework agreement by central organizations
• Frame wage settlement
• Other labor market issues (working time, social policy, training)
• Possible government involvement (legislative measures, taxation)
• Variation in coverage

Procedure 2

No framework agreement by central organizations
• No willingness or
• No prerequisites for an agreement

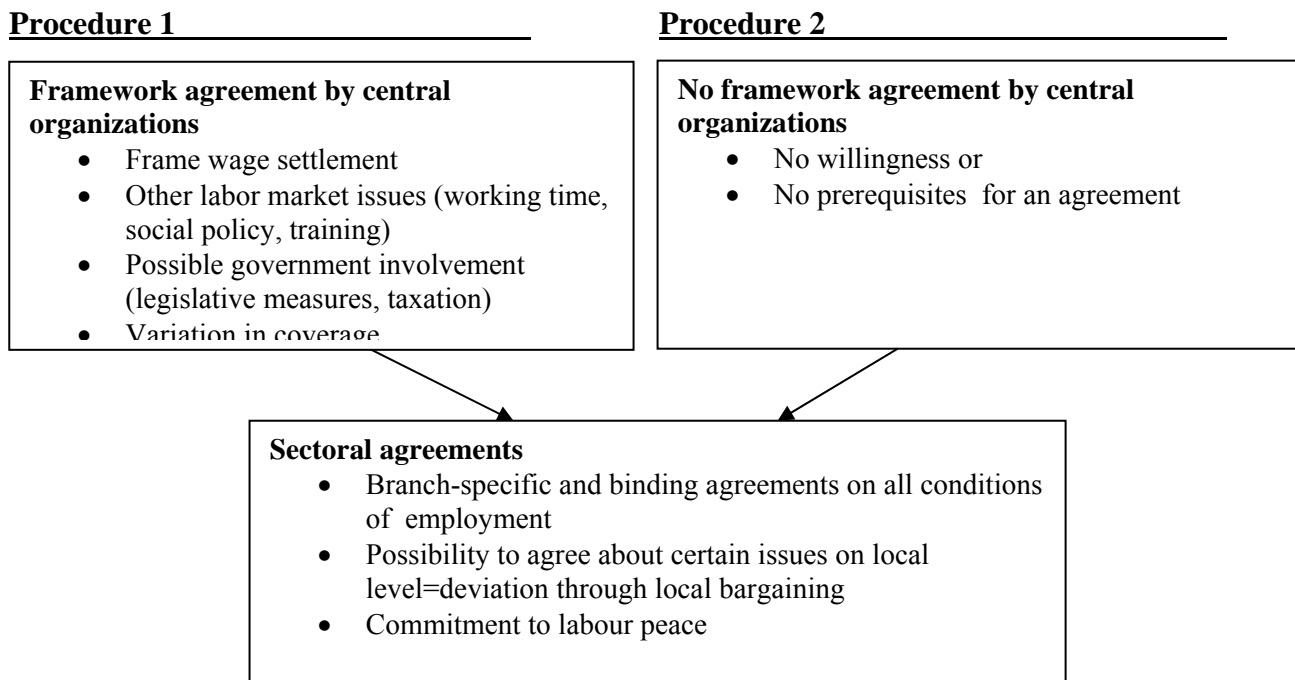| Sectoral agreements |
| --- |
| • Branch-specific and binding agreements on all conditions of employment |
| • Possibility to agree about certain issues on local level=deviation through local bargaining |
| • Commitment to labour peace |

Figure 2 shows that wages have increased, although with modest discrepancies, at the same pace in both the private and public sector, the latter consisting of the pay of local and central government employees, over the past three decades. This development is in line with the view that wage-wage links across different sectors and segments of the labor market tend to be tight in a unionized economy.[5] The average wage rates do, however, differ across the sectors. In the private sector, the average gross wage was 2 597 euros in 2006. In the public sector, the average monthly wage was 2 460 euros, the gross wage gap thus being about 5.5 per cent in favor of the private sector.

Although wage increases over the years have been of a similar magnitude in all these three sectors, as Figure 2 shows, minor growth differentials can produce changes in wage premiums across the sectors. This is displayed in Figure 3, which depicts wage gaps, measured as deviations from private sector pay, over the last 25-year period. The aggregate private-public sector wage gap conceals the fact that within the public sector there is a significant differential between the central and local government employees. This is clearly visible in the Figure, which also shows some narrowing of the gap with the relative position of the private sector showing steady improvement since 1980. The positive wage premium of central government employees declined from about twelve per cent in

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[5] See Honkapohja et al (1999) for Finnish and Holmlund (1992) for Swedish evidence.

1980 to about four per cent in 2005. The negative gap of local government employees rose, in turn, from about four per cent to eight per cent over the same period.

This difference in gross earnings is noteworthy since skill requirements, measured by level of education, are on average much higher in the public sector than in the private sector. In 2004, for example, 34 per cent of all central government employees had at least a Master's level university degree. In local government jobs this figure was 16 per cent, and in the private sector only about 10 per cent.[6]

Although centralized agreements have also been the main mode of wage bargaining during the present decade, there has been a growing tendency towards local level wage bargaining. This reflects, to some extent, the desire of private sector employers to allow more decision-making on pay rises on the company level. This has been motivated by the need to boost and ensure the firm's competitiveness in global markets.

In the public sector the shift towards local (authority) level bargaining stems from the introduction of new pay schemes that are based on job evaluation and performance appraisal schemes. The broad objective of such pay schemes has been to improve the competitive edge of the public sector in the labour market. In 2004, performance-related pay systems accounted for about 15-20 per cent of the sector's employees. In the central government, such pay systems were applied by about 50 agencies and departments, covering about 40 per cent of employees. Since the beginning of 2008 the new pay system has been applied across the entire public sector where employee remuneration consists of a job-specific and a personal pay component. The personal pay component can account for up to 48 per cent of the job-specific pay.[7] The old pay system, based on tenured positions and seniority, is thus gradually changing.[8]

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[6] The Finnish public sector as employer, 2007.
[7] The Office for the Government as Employer, 2007.
[8] The latest proposal concerns the employee-status of university workers, the biggest group of workers in the central government sector. If the new legislative proposal is passed, all employees working in academia will no longer be civil servants but contract-based workers from 2010 onwards. Secure life-time contracts cannot be replaced by unsecured contracts without pay-related compensations. The debate on this issue will commence soon.

Figure 2: Annual wage increases, employees in local government, central government and the private sector, 1965-2005
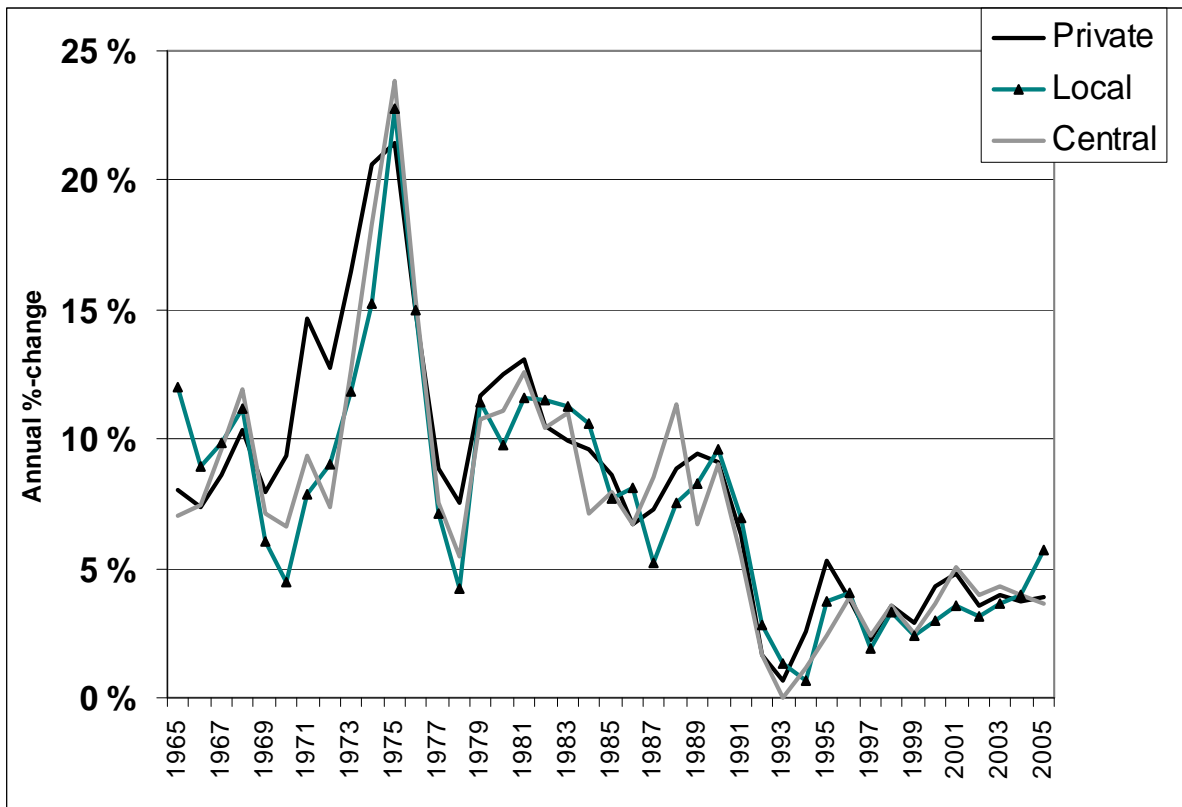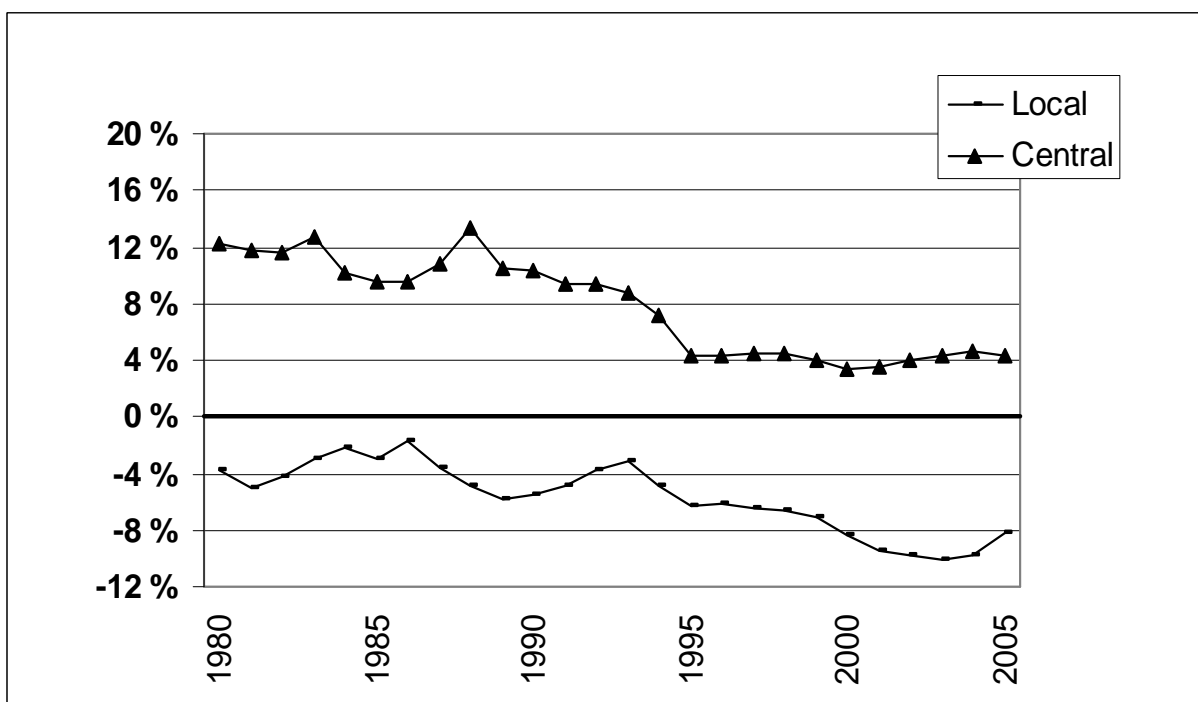

Figure 3: Pay premiums, central and local government, 1980-2005

3 The Data and Econometric Model

3.1 Data

The data used is a 7 per cent sample taken from the Finnish 2001 census. The data contain information on 42 680 male workers, 8 759 in the public and 33 921 in the private sector. The wage variable is annual earnings. However, we have no information on hours worked. Accordingly we exclude all workers whose annual earnings are below 12 000 euros per annum on the grounds that these are likely to be part-time workers. At the upper end of the earnings distribution, the data is truncated as reported annual earnings are capped at 72 000 euros. Information is available on a range of worker characteristics – age, education, experience, marital status and occupation. A full list of these variables is given in Appendix 1. Crucially, the data also contain information on the industry worked in and whether the employer is in the private or public sector.

Tables A1- 4 present descriptive statistics drawn from the data. Table A1 reports average monthly wages by the status of the employer (private or public) and the employees' industry. In Table A2, the classification is by education, in Table A3 by occupation and in Table A4 by the employees' field of education.

The monthly wages are, on average, higher in the private than public sector. The private sector premium over the public sector is highest in electricity (557), electricity being also the highest-paid industry amongst private sector workers. The premium is also high in real estate (421), manufacturing (409) and construction (279). Public sector workers earn a premium in three industries namely, transportation (383), health (147) and education (38). In the public sector transportation is the highest-paid industry with the average monthly wage of 2,815 euros.

Private sector workers earn more at all educational levels, the wage gap varying from 216 euros (secondary education) to 409 euros (lowest level university education); see Table A2. The numbers shows that the approximate equality of public and private sector wages at the aggregate level is mainly due to the high proportion of public sector workers with a high level of education (approx. 23 per cent of all public sector employees) compared to the high proportion of workers with only secondary-level education in the private sector (approx. 49 per cent of the total). For the first group the average monthly wage is 3,502 whereas in the second group it is only 2,383 euros.

Table A3 reports wages by occupation. Private sector workers enjoy a premium in all occupations, excluding services where the wage gap in favor of public sector workers is 191 euros. The average monthly earnings of private sector workers are highest in managerial occupations (3,798), where the wage premium is also the highest (617). The wage gap is also high in technical and clerical occupations (434 and 421). The lowest average wages in the public sector are in craft (2,110) and clerical (1,927) occupations. Sales and care, in turn, are the low paid occupations (2,077) in the private sector.

Finally, Table A4 reports wages by field of education. This variable is measured by the highest level of education an individual has attained. According to our data private sector workers have the biggest premiums over the public sector in the natural and technical sciences and in agriculture. Public sector workers, in turn, exhibit a substantial premium in services. The wage gap is lowest if the field of education is trade.

As figure 3 showed the unconditional wage gap between the public sector and private sector has varied between 12 and -8 per cent over the years, depending on the sector of employment (local authority versus central government). In our sample the unconditional wage gap for males working full-time is 1.4 per cent. To illustrate the importance of individual characteristics on pay, we estimated a simple wage equation that includes a dummy variable for the public sector and controls for two basic variables affecting individual pay: experience (age) and education.[9] The results indicate that public sector wage gap is about 5.5 per cent when controlled for age and education. In other words, workers with same education and age earn considerably less in the public sector than in the private sector. The gap is smallest for the workers in the lowest 25th percentile (-2.4 per cent) and highest in the 75th percentile (8.1 per cent) of the wage distribution. This calls for a detailed analysis of how characteristics are rewarded across the public and private sectors. This is the main aim of the next section.

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[9] The model is $\ln (W) = \alpha + \beta*dummy + \beta_1*age + \beta_2*age2 + \beta_2*(Education) + error$. Educational levels are described in the data appendix.

3.2 Econometric model

The main purpose of this paper is to study private-public wage differentials. According to previous Finnish studies, there seems to be differences between wages as well as in pay determination processes. Therefore it is appropriate to allow the coefficients of all the explanatory characteristics to vary across the two labor markets. Separate wage equations are therefore estimated by OLS for cross-section samples of public and private sector (group j) workers (individuals i) and are expressed as

$$\ln W_{i,j} = \alpha_{i,j} + \beta_{i,j} X_{i,j} + \varepsilon_{i,j} \qquad (1)$$

where $\ln W_{i,j}$ is the natural logarithm of monthly earnings, $\alpha_{i,j}$ is the constant term, $X_{i,j}$ determines the matrix of the values of the explanatory variables, $\beta_{i,j}$ stands for a vector of unknown parameters and $\varepsilon_{i,j}$ stands for the error terms. An assumption for this model is that $E(\varepsilon_{public}) = E(\varepsilon_{private}) = 0$. This indicates that employees between the private and public sector are normally distributed. This is, however, questionable.[10]

To scrutinize wage premiums more closely we apply the widely used Oaxaca (1973) and Blinder (1973) methodology where the difference in observed mean log earnings between the public sector (*pu*) and the private sector (*pr*) is decomposed as follows:

$$\ln \overline{W}_{pr} - \ln \overline{W}_{pu} = (\hat{\alpha}_{pr} - \hat{\alpha}_{pu}) + (\overline{X}_{pr} - \overline{X}_{pu})\hat{\beta}_{pr} + \overline{X}_{pu}(\hat{\beta}_{pr} - \hat{\beta}_{pu}) \qquad (2)$$

The average differential in log wages between the two sectors is thus decomposable into two components. The second term on the right-hand side of equation (2) captures the explained part (or endowments) of the total wage differential, which is due to differences in the individual's characteristics weighted by the parameters from the model for the private sector *pr*. The third measures the unexplained gap (or treatment), which is due to differences in the parameters weighted by the means of the public sector (*pu*) regressors. The first term on the right-hand side of the

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[10] In this paper we do not control for selection bias for two reasons. First, the selection process is extremely difficult to model, and, second, the qualitative and quantitatively results of this study accord with those reported in Mazculjskij 2008.

equation captures the difference between the estimated constant terms and is added to the unexplained part of the total pay gap.

4 Empirical results

4.1 Results from the aggregate equations

Table 1 reports the OLS-estimates of our earnings function. Column 1 shows the results of the baseline specification where only individual characteristics are controlled for. The specification incorporates one seldom-used variable, namely field of education, into the model. Column 2 reports the results from a specification that augments the baseline model by industry and regional variables.[11]

The empirical performance of both specifications is adequate, the explanatory power of the model varying from 0.38 (baseline, private sector) to 0.55 (augmented, public sector). Overall, the individual parameter estimates are well-defined, have the expected sign and are robust across specifications. For example, the returns from experience and qualifications fall in line with previous findings, including those of Korkeamäki (1999, 2000).[12]

The results indicate that the returns from experience and tenure are positive in both sectors. The returns from experience are slightly higher in the public sector at approximately 1.8 per cent per annum versus 1.2 per cent in the private sector. This result deviates from previous findings

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[11] The data at hand contain no firm-specific information. The role of work-place characteristics and local environment on pay are captured by the industry affiliation of an employee and regional characteristics of the area where the employee lives. These industry and regional effects are specified as a dummy variable (fixed effects). We assume that the industry variable captures differentials in pay that arise from differences in technology or market conditions across industries. Regional variables, in turn, capture rents from agglomeration, whereas R&D variables reflect differences in the average quality/productivity of firms across regions. Where cost of living factors influence pay, regional variables may to some extent capture those as well.

[12] Korkeamäki (1999) examines public and private-sector pay using microeconomic panel data over the years 1987-94. He finds that the private sector premium over public sector pay for males has been around 3-5 per cent over the period. In a follow-up study (2000) he analyses wage development in the central government compared to that in the general labour market (private sector and local government). The findings, based on a panel from the period 1989-97, imply that on average central government pay has been higher. On the other hand, the controlled wage gap decreased from about 10 per cent to about 5 per cent over the investigation period, the unexplained part of the wage gap increasing from zero to -8 per cent.

elsewhere.[13] The returns from tenure are, in turn, slightly higher in the private sector than in the public sector (0.7-0.8 versus 0.4-0.6 per cent per annum).

The previous wage literature indicates that married men enjoy higher wages than unmarried men. In both sectors the premium is about 5-6 per cent. Having a child or children is not associated with significantly higher earnings. The returns from being a non-Finnish speaker vary somewhat across the specifications. In the baseline model the estimates are not statistically significant. In the augmented model non-native employees in the public sector capture a positive premium, whereas both non-native speakers and Swedish speakers obtain modest negative premiums in the private sector.[14]

The returns to education are measured relative to the omitted education category, which in our case is primary education. Since this group is lower paid in the public sector (2,110 a month compared to 2,335 in the private sector), we might expect to see larger rates of return for higher education levels in this sector. This is, in fact, the case. For example, the return to higher university level education is about 52-54 per cent in the public sector compared to about 37-43 per cent in the private sector; see columns 1 and 2. In absolute terms, this implies an increase in monthly pay of about 1,050 in the public and 920 in the private sector.[15]

The field of education of an individual has a direct impact on wages in both sectors, after controlling for a number of individual characteristics as well as industry and regional characteristics. In the public sector the premium over the reference group (business and social sciences) is highest amongst individuals with education in medicine or services (approx. 15-19 %). In the private sector, the fields of education with a premium are the natural sciences (approx. 9 %) and general education (approx. 5-7 %). Individuals with education in the humanities and arts, in turn, suffer from a considerable negative premium in both sectors (approx. -7 %).

The returns from being in upper end (managerial, professional and technical) rather than operative occupations are all higher in the private sector. Premiums in these occupations are about 32, 20 and

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[13] Studies in Greece (Kanellopoulos, 1997), Canada (Prescott & Wandschneider, 1999), Peru (Stelcner & Gaag & Vijverberg, 1989, Great Britain (Chatterji 6 Mumford, 2007, Bender & Elliott, 2002), Poland (Adamchik & Bedi 2000), Spain (Lassibille, 1998) and Turkey (Tansel, 1999) imply a premium from experience in the private over public sector.
[14] Prescott and Wandschneider (1999) found that in Canada non-native speakers and French speakers suffer from a negative pay premium of about 5 and 3 per cent in both sectors.
[15] Korkeamäki (1999), Asplund (1993) and Maczulskij (2007) report a slight private sector premium in returns to education for males. Quantile regression estimates by Budria (2006), in turn, imply that return to education is highest in the lower and highest parts of the distribution in the public sector

12 per cent in the private sector and 20, 16 and 9 per cent in the public sector, respectively. These differences are notable since also the average monthly pay in operative occupations is over 150 euros higher in the private sector (2,220 versus 2,375). The returns from being in lower end occupations (clerks, crafts and sales & care) are similarly noteworthy. For sales & care the relative returns are clearly better for public sector employees, the premium being plus 7 per cent in the public sector (augmented equation) and minus 7 per cent in the private sector (augmented equation). In turn, the relative returns are slightly better for clerks in the private sector than in the public sector (-4 versus -9 %). These findings fall in line with the previous Finnish results.[16]

There are three issues related to the role of the industry affiliation and regional location of the employer that must be noted. First, the inclusion of industry and regional dummy variables considerably improves the statistical performance of the earning equation, the explanatory power of the augmented model increasing in both cases by about 5 percentage points. Second, the F-tests indicate that the relative role of the industry and regional variables differ across the two sectors. According to the test results we can drop the sub-region variables from the earnings equation for the public sector but not from that for the private sector. Similarly, the RD-indicator and province variable are highly significant in the private sector equation but only barely significant at 5 per cent level in the public sector equation (10.8 versus 2.4 and 17.6 versus 4.4; see the lower part of the Table).[17]

Third, industry affiliation has a clear role in pay but, once again, it bears less importance in the public sector, the F-test value being 98.3 for the private sector and 51.7 for the public sector. The returns relative to trade, which is the reference industry, are, however, similar in both sectors, with two exceptions. In transportation and finance the premiums in the public exceed those of the private sector considerably, being 24 per cent versus 8 per cent in the former and 38 per cent versus 21 per cent in the latter.

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[16] The analysis by Korkeamäki (1999) of white-collar and blue-collar workers indicates a private sector premium of around 14-22 per cent for white-collar workers, depending on econometric specification and time period. For blue-collar workers the private sector premium is considerably less, varying between 0.5 and 5 per cent. The separate analysis for occupational level by Brunila (1990) reveals a conditional pay gap by occupational level of 7-9 per cent in favour of private sector. For similar international results, see Kanellopoulos (1997) and Garcia-Pèrez & Jimeno (2005).
[17] The province effect in the public sector earnings equation is driven by a public pay system that compensates for rural conditions in the Northern provinces. It is worth noting that the unemployment variable does not provide evidence of the role of market forces in pay determination in the private sector, higher unemployment being associated with higher pay. This effect is, however, modest and dropping the variable from the equation does not affect the other estimates.

Finally, inclusion of the control variables does not change our interpretation on the parameter estimates reported in the baseline equation. In the publics sector equation there is a small reduction in the returns from tenure and (from 0.6 to 0.4 % per annum) and a rise in the returns from being a non-native speaker (from 3 to 6 %). In the private sector, being a non-native speaker now significantly lowers pay (3 %). These latter results suggest that there is some segregation of high paid non-native workers into high paying public sector jobs and the opposite in the private sector. As a whole the results suggest that the introduction of industry and regional characteristics does not have an impact on the relationship between the individual characteristics of the workers and their wages in the public or private sectors as a whole.

Taken together, these results suggest that there is greater flexibility in private sector wage setting. In particular, the significance of the effects of local factors on private sector pay is particularly important. If centrally determined pay awards are approximately of the same order in both the public and private sectors (see Figure 2), then it is precisely these local deviations from centrally negotiated norms that are driving a wedge between public and private sector pay. If deterioration in worker quality is not to blight public sector performance, then the public sector has to respond with greater local flexibility too. There are clear signs that this process is belatedly beginning. The new pay systems introduced in the public sector, where compensations consist of a job-specific and a personal pay component are clearly a step toward greater local flexibility. The private sector may still rely more heavily than the public sector on performance-related pay and rewards for greater productivity. However, the measurement of productivity is difficult in the public sector. Whilst this may limit the scope of performance pay in the public sector, it does highlight the need for more flexibility on the part of public wage setters in seeking to match private sector wage rises.

Table 1: OLS-regressions for males, the dependent variable is log annual earnings

Specification	Baseline		Augmented	
	Public	Private	Public	Private
Explanatory variables				
Experience	0,018***	0,012***	0,018***	0,012***
Experience squared.	-0,028***	-0,022***	-0,027***	-0,022***
Tenure	0,006***	0,008***	0,004***	0,007***
Married	0,060***	0,055***	0,060***	0,055***
Child	0,002	0,001	0,002	0,009***
Language				
Swedish	0,004	-0,007	0,006	-0,019***
Non-native	0,035	0,011	0,059***	-0,031**
Education				
Secondary	0,105***	0,116***	0,094***	0,095***
Lowest level	0,219***	0,204***	0,208***	0,176***
Lower-degree level	0,391***	0,289***	0,360***	0,253***
Higher-degree or doctorate	0,540***	0,434***	0,524***	0,376***
Field of education				
General	0,131***	0,076***	0,128***	0,053***
Teaching	-0,099***	-0,110***	-0,035*	-0,051
Humanities & art	-0,087***	-0,076***	-0,044**	-0,073***
Natural sciences	-0,096***	0,089***	-0,064**'	0,088***
Technology	0,058***	0,020**'	0,065***	0,018***
Agriculture	0,013	-0,079***	0,032**	-0,037***
Medical	0,148***	0,000	0,196***	0,024
Services	0,172***	-0,010	0,157***	-0,009
Higheduother	0,077***		0,129***	
Occupation				
Managerial	0,142***	0,320***	0,195*'*	0,323***
Professional	0,085***	0,206***	0,160***	0,209***
Technical	0,034***	0,117***	0,087***	0,121***
Clerk	-0,142***	-0,043***	-0,091***	-0,044***
Sales & care	0,019	-0,116***	0,075***	-0,068***
Craft	-0,038***	-0,035***	-0,008	-0,036***
Other	-0,127***	-0,090***	-0,057***	-0,079***
Industry				
Manufacturing			0,081	0,126***
Electricity			0,223***	0,261***
Construction			0,112***	0,113***
Sales & Hotel & restaurant			0,045	0,029
Transportation			0,241***	0,083***
Finance			0,377***	0,217***
Real estate & research			0,042***	0,048*

Public administration			0,109***	(dropped)
Health			0,030***	0,028
Other			0,064***	0,036
R&D in the area				
R&D2			0,035**	0,027**
R&D3			0,029	0,040***
R&D4			0,046**	0,054***
R&D5			0,068***	0,061***
R&D6			0,029	0,056***
R&D7			0,032	0,075***
R&D8			0,051**	0,096***
Province				
West			0,007	-0,016***
East			-0,007	-0,058***
North			0,025**	-0,019***
Sub-region				
University			-0,02	-0,072***
Regional centre			-0,015	-0,094**'
Industrial centre			-0,009	-0,026***
Rural area			-0,013	-0,128***
Countryside			0,004	-0,173***
Unemployment			-0,001	0,005***
Constant	9,666***	9,857***	9,510***	9,735***

Number of observations	8759	33921	8759	33921
Adjusted R-squared	0,519	0,388	0,552	0,432
Industry dropped F(n1 n2)	-	-	51,71***	98,35***
R&D dropped F(n1 n2)	-	-	2,40**	10,85***
Province dropped F(n1 n2)	-	-	4,46**	17,65***
Sub-region dropped F(n1 n2)	-	-	0,36	75,61***

Notes: *** (**, *) denotes statistical significance on at least at the 1 % (5, 10) level. Reference categories are: no child/children, Finnish, primary education, business & social sciences, operative, education, south, metropolitan area and R&D1. F(n1, n2): n1 = 9 for industry, 6 for R&D, 2 for province and 4 for sub-region; n2 = 8705 and 33 869 for public and private sector, respectively

4.2 Results from the industry-level equations

We continue the investigation by estimating earnings equations for four industries namely, construction, real estate, transportation and health. These industries were chosen solely for data considerations, i.e., the number of observations in both the public and private sectors.[18] The results of these experiments are reported in Tables 2 and 3. For the sake of brevity we do not report all the parameter estimates; the importance of unreported controls is given by F-statistics in the lower part of the Tables.

The industry level results are consistent with the results for the whole sample, and the earnings equations fit the data well. The adjusted R2 varies from 0.32 in the private sector earnings equation for construction to 0.72 in the public sector equation for health. In line with the results of the whole sample, the returns from experience and tenure are positive and of the same magnitude in all industries. Estimates on the returns to education, in turn, show more variation across industries and sectors. The results imply that the returns to education are highest in health and lowest in construction. The field of education also plays a role in the industry-level equations. The F-tests indicate that these controls enter all the equations significantly.

The results on the effect of occupation on earnings follow closely those reported for the whole sample. As before, managerial and professional occupations enjoy considerable premiums. Managerial premiums are comparable across the sectors in transportation and health (approx. 35 %), whereas in construction and real estate the private sector premiums exceed those of the public sector. Amongst professional employees the returns in the private sector are higher in all industries, excluding health. As before, employees in sales and care occupations are relatively better off in the public sector. Similarly, field of education contributes to earnings in all industries and sectors, excluding the private sector for health; see the F-test results.

The results suggest that employees of in metropolitan area have a small premium over the other areas. These premiums are larger in the private sector than in the public sector and, in fact, as the F-tests indicate, we can drop the sub-region variables from the public sector earnings equations but not from the private sector equations, excluding health. Again, this is in line with the results shown in Table 1 for the whole sample.

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[18] The small number of observations in certain cells (non-native, Swedish speaking) shows up in the empirical results; see estimates for these variables for construction and real estate in Table 3.

Table 2: OLS-regressions for males by industry; construction and real estate

ln(year pay)	Construction		Real estate	
	Public	Private	Public	Private
Experience	0,004	0,010***	0,018***	0,015***
Experience squared.	-0,008	-0,014***	-0,027***	-0,024***
Tenure	0,007***	0,005***	0,002*	0,005***
Married	0,037*	0,043***	0,087***	0,072***
Child	0,019	0,006	-0,018	0,017*
Language				
Swedish	0,009	-0,098***	0,006	0,016
Non-native	(dropped)	-0,153**	0,224***	0,055
Education				
Secondary	0,048	-0,046	0,053	0,103***
Lowest level	0,234***	-0,003	0,171***	0,163***
Lower-degree level	0,291***	0,066	0,283***	0,223***
Higher-degree level	0,298***	0,184***	0,442***	0,343***
Occupation				
Managerial	0,185***	0,315***	0,315***	0,471***
Professional	0,085*	0,266***	0,157***	0,318***
Technical	-0,048*	0,184***	0,066	0,170**
Clerk	-0,083	0,027	-0,039	0,115***
Sales & care	-0,011	0,080	0,093	-0,085***
Craft	-0,103***	0,082***	0,026	0,075**
Other	-0,195***	0,043	-0,039	-0,057*
Constant	9,964***	10,084***	9,586***	9,861***
Number of observations	505	2351	1316	4009
Adjusted R-squared	0,486	0,33	0,625	0,448
Field of education dropped				
F(n1,n2)	3,21***	3,56***	5,71***	4,71***
Province dropped F(n1,n2)	1,34	2,69*	0,41	0,13
Sub-region dropped F(n1, n2)	1,56	7,69***	1,39	5,84***

Table 3: OLS-regressions for males by industry; transportation and health

ln(year pay)	Transportation		Health	
	Public	Private	Public	Private
Experience	0,019***	0,015***	0,009***	0,011
Experience squared.	-0,030***	-0,024***	-0,011**	-0,016
Tenure	0,003**	0,004***	0,003	0,008
Married	0,024	0,057***	0,038**	0,150*
Child	0,007	0,01	0,007	0,024
Language				
Swedish	0,053	0,004	0,003	0,019
Non-native	0,084	-0,005	-0,046	-0,156
Education				
Secondary	0,261***	0,087***	0,226***	0,401*
Lowest level	0,429***	0,213***	0,331***	0,539**
Lower-degree level	0,523***	0,306***	0,421***	0,567**
Higher-degree level	0,652***	0,362***	0,879***	0,869***
Occupation				
Managerial	0,396*	0,367***	0,346***	0,335
Professional	0,140**	0,258***	0,278***	0,121
Technical	0,253***	0,223***	0,154**	-0,105
Clerk	-0,058	-0,044***	0,110	-0,372
Sales & care	0,117	0,131***	0,177***	0,065
Craft	0,038	0,059***	0,171***	-0,010
Other	-0,043	-0,002	0,048	-0,066
Constant	9,574***	9,783***	9,282***	9,280***
Number of observations	425	3935	1083	129
Adjusted R-squared	0,502	0,388	0,751	0,467
Education dropped $F_{(n1,n2)}$	12,57***	4,53***	9,14***	1,61
Province dropped $F_{(n1,n2)}$	0,69	1,73	0,26	1,51
Sub-region dropped $F_{(n1, n2)}$	0,98	8,23***	0,73	0,75

4.3 Decompositions of wage gaps

In the data the earnings gap is one per cent, full-time private sector employees earning about one per cent less on average than full-time public sector employees. We decompose this gap into the component explained by differences in the mean values of the individual characteristics (education, occupation etc.) and variables reflecting firm-specific factors (industry, region) and into an unexplained component that reflects differences in returns from these factors across the sectors.

Tables 4 and 5 show these decompositions based on the estimated earnings equations. To highlight the role of the observable variables, we show results where we have imposed equality between the constant terms of the equations.[19] When we look at the whole sample, the observable characteristics imply a pay gap of around 3.4 per cent in favour of private sector employees. Lower returns from the characteristics, in turn, reduce the gap by 2.3 percentage points. These results put the estimated gap at 1.1 per cent, which is very close to the actual estimate calculated from the data.

The lower part of the Table provides insights into various components of the gap. Two main comments are in order. First, the total premium stemming from the observable characteristics is mainly due to four factors namely, education, experience, occupation and industry. Public sector employees are better educated (-5.4 %) but less experienced (4.7 %). Furthermore, public sector employees work, on average, in better paid occupations (-5.4%) but, on the other hand, they are employed in industries that pay less (8.8 %). These results are consistent with those found by Korkeamäki (1999) and Maczulskij (2008).

Second, public sector employees receive higher returns from experience and tenure (-7 %) and field of education (- 5.5%). The former result accords well with the public sector's remuneration schemes with tenure-based pay rises. The latter result in turn suggests better matching of jobs and field of education amongst public sector employees. Private sector workers enjoy higher returns from occupation (2.7 %) and from factors that capture workers' regional environment (6.9 % and 3.2 %). Our guess is that the region's R&D level reflects the average productivity of firms in an area and that private sector workers capture a part of the resulting rent as higher earnings. Overall, compared

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[19] The data rejects this restriction at the 5 per cent but not at the 15 per cent level of significance. In short, the Oaxaca composition based on the unrestricted model gives less weight to the industry and regional variables. This suggests that the unobserved variables that are captured in the constant terms are correlated with factors describing type of region and industry. The results of the unrestricted model are available on request from the authors.

to some international findings, the role of individual, industry and regional attributes in explaining public-private pay differentials is important in Finland.[20]

Decompositions based on the earnings equations for the four industries confirm the importance of industry in pay determination and the wage gap. In particular, the results suggest that the macro analysis conceals and tones down industry-level differences: there appear to be considerable differences in the earnings gap between the public and private sectors across industries. In two out of the four industries that were examined the earnings gap is negative, i.e. public sector employees earn less than their counterparts in the private sector, and in two industries the gap is positive.

In real estate the gap is about -14 and in construction -11 per cent. In real estate the negative premium is evenly due to inferior characteristics (-7 %) and lower returns from the characteristics of the public sector employees (-7 %) In construction, the negative premium is mainly due to differences in characteristics (-7.3 %) and less due to differences in returns (-3.4 %). In transportation the public sector enjoys a premium of about 15 per cent. This is mainly due to differences in individual characteristics (+11 %). The component associated with returns from the characteristics contributes to about 4 per cent of the premium. In health, the public sector premium (5.2 per cent) is almost solely due to higher returns from characteristics (4.8 %).

Table 4: Decomposing wage differentials, whole sample, %

	Earnings gap (private-public)	Differences in characteristics	Differences in returns
Earnings gap of which	1.1	3.4	- 2.3
- experience and tenure		4.7	-7.0
- education		-5.4	-1.4
- field of education		0.6	-5.5
- occupation		-5.4	2.7
- industry		8.8	-0.5
- R&D		-0.1	6.9
- region		0.4	3.2

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[20] See, for example, findings from Greece (Kanellopoulos, 1997, Papapetrou, 2006), Cyprus (Christofides & Pashardes, 2002), France and Italy (Lucifore et al, 2006), UK (Chatterji et al, 2007, Lucifora et al, 2006) and Scotland (Heitmueller, 2004). These findings imply a public sector pay premium which is mostly attributed to the fact that public sector workers have greater skill characteristics.

Table 5: Decomposing wage differentials, selected industries, %

	Earnings gap (private-public)	Differences in characteristics	Differences in returns
Construction	10.6	7.3	3.3
Real Estate	14.0	7.0	7.0
Transportation	-15.0	-11.0	-4.0
Health	-5.2	-0.4	-4.8

5 Conclusions

This study analyses the forces determining public and private sector pay in Finland. The data used is a 7 per cent sample taken from the Finnish 2001 census. It contains information on 42 680 male workers, of which 8 759 are employed in public and 33 921 in the private sector. We estimate earnings equations for the whole sample as well as for four industries. The results suggest that the private-public sector pay gap of about one per cent can be accounted for by differences in observable characteristics between the sectors and lower returns from these characteristics. The industry-level analysis indicates that the earnings gaps vary across industries, and are negative in some cases. These inter-industry differences in public-private gaps persist even when the usual controls are introduced.

The study shows that private-public wage differential has grown in recent years and workers with same education and age earn considerably less in the public sector than in the private sector. Considerable variation emerges when one looks at data disaggregated by industry, by local vs. central government employees or by wage distribution. For example, the wage gap is smallest for the workers in the lowest 25th percentile and highest in the 75th percentile of the wage distribution. A similar variety is found when one examines the results of the decomposition of wage differentials.

Our analysis has important implications for public sector wage setting. All the evidence suggests that the private sector, but not the public sector, is taking advantage of the possibility for local flexibility. This implies that uniform across-the-board centrally determined pay increases in the public sector, although in some sense equitable, are not addressing the real issues. Unless the momentum to encourage greater pay in public sector wage setting is maintained, the greater flexibility of the private sector in offering effective remuneration based on the need to recruit and retain good quality labour will have deleterious effects on the public sector in terms of its performance.

Our industry-based results also suggest that the public sector may well need to discriminate between employees in different industrial sectors, because private sector competition varies across industries. Performance pay may not be easy to implement in the public sector because of difficulties in measuring public sector output. Nonetheless, greater flexibility, which would include the need to closely examine private sector rewards for similar workers, is required of public sector wage setters. To the extent that wage rises in one public sector industry are higher than in another, the greater flexibility resulting in greater wage differentials within the public sector need not necessarily threaten the overall public sector budget.

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Data Appendices

A0: Variable descriptions

Variable	Description
Wage	**Monthly wage/euros (annual earnings/12)**
Personal characteristics	
Experience	Potential work experience
Exper sqd.	Potential work experience^2/100
Tenure	Work experience in current workplace, years
Married	1 if married or cohabiting
Child	1 if presence of child or children
Language	Native language
Finnish	1 if native language Finnish
Swedish	1 if native language Swedish
Non-native	1 if native language other than Finnish or Swedish
Education	Level of education
Primary	1 if primary education
Secondary	1 if secondary education
Lowest-level	1 if lowest level tertiary education
Lower-degree level	1 if lower-degree level tertiary education
Higher-degree or doctorate	1 if higher-degree level tertiary or doctorate or equivalent level tertiary
Field of education	
General	1 if general, not known or unspecified
Teaching	1 if educational science or teacher education
Humanities or art	1 if humanities or art
Trade	1 if business or social sciences
Natural sciences	1 if natural sciences
Technology	1 if technology
Agriculture	1 if agriculture and forestry
Medical	1 if health or welfare
Services	1 if services
Higeduother	1 if interaction between higher-degree level and general
Occupation	Level of occupation
Managerial	1 if legislators, senior officials and managers
Professional	1 if professionals
Technical	1 if technicals and associate professionals
Clerks	1 if clerks
Sales & care	1 if service and care workers, and shop and market sales workers
Craft	1 if craft and related trades workers

Operative	1 if plant and machine operators and assemblers
Others	1 if elementary, armed force and agriculture and fishery workers

Business environment

Industry	Industrial classification
Manufacturing	1 if manufacturing, mining and quarrying
Electricity	1 if electricity, gas and water supply
Construction	1 if construction
Sales & hotel & restaurant	1 if wholesale and retail trade, maintenance, repairs, hotel or restaurant
Transportation	1 if transport, storage and communication
Finance	1 if financial intermediation
Real estate & research	1 if real estate, renting and business activities
Public administration	1 if public administration and defense
Education	1 if education
Health	1 if health and social work
Other	1 if agriculture, others or not known
R&D	R&D investment in the sub-region, million Euros
R&D1	1 if R&D investments is 0,10-0,90
R&D2	1 if R&D investment is 1-4.90
R&D3	1 if R&D investment is 5-9.90
R&D4	1 if R&D investment is 10-49.90
R&D5	1 if R&D investment is 50-99.90
R&D6	1 if R&D investment is 100-499.90
R&D7	1 if R&D investment is 500-999.90
R&D8	1 if R&D investment is 1000 or more

Regional characteristics

Province	Major regions
South	1 if major region is Southern Finland
West	1 if major region is Western Finland
East	1 if major region is Eastern Finland
North	1 if major region is Northern Finland
Sub-region	Type of (NUTS 4-level) sub-region
Metropolitan area	1 if the sub-region is metropolitan region
University	1 if the sub-region is a many-sided university region
Regional centre	1 if the sub-region is a regional centre
Industrial centre	1 if the sub-region is an industrial centre
Rural area	1 if the sub-region is rural
Countryside	1 if the sub-region is sparsely populated sub-region
Unemployment	Unemployment rate in the sub-region (%)

A1. Descriptive statistics: public and private sector males

Variable	Public		Private	
	Mean	**s.t.d**	**Mean**	**s.t.d**
Monthly wage (euros)	2586	920,9	2616	918,5
Personal characteristics				
Experience	19,01	11,97	19,13	11,71
Exper sqd./100	5,04	5,14	5,03	5,08
Tenure	3,17	5,92	9,63	9,40
Married	0,785	0,411	0,745	0,436
Child	0,566	0,496	0,544	0,498
Language				
Finnish	0,942	0,234	0,938	0,240
Swedish	0,046	0,209	0,049	0,216
Non-native	0,012	0,110	0,013	0,111
Education				
Primary	0,142	0,349	0,209	0,407
Secondary	0,356	0,479	0,487	0,500
Lowest-level	0,196	0,397	0,149	0,356
Lower-level	0,077	0,267	0,090	0,286
Highest-level or doctorate	0,229	0,005	0,065	0,246
Field of education				
General and other	0,227	0,419	0,269	0,444
Teaching	0,015	0,123	0,001	0,037
Humanities and art	0,021	0,145	0,008	0,088
Trade	0,111	0,314	0,099	0,299
Natural sciences	0,026	0,159	0,014	0,116
Technology	0,321	0,467	0,538	0,499
Agriculture	0,038	0,190	0,028	0,165
Medical	0,082	0,274	0,008	0,087
Services	0,159	0,367	0,035	0,185
Occupation				
Managerial	0,114	0,318	0,046	0,209
Professional	0,269	0,444	0,129	0,335
Technical	0,202	0,402	0,184	0,388
Clerks	0,045	0,207	0,042	0,201
Sales & care	0,102	0,303	0,062	0,242
Craft	0,093	0,290	0,259	0,438
Operative	0,066	0,249	0,208	0,405
Others*	0,109	0,311	0,070	0,256
Industry				
Manufacturing*	0,001	0,028	0,48	0,500

Electricity	0,049	0,215	0,011	0,103
Construction	0,058	0,233	0,069	0,254
Sales & hotel & restaurant	0,007	0,081	0,167	0,372
Transportation	0,048	0,215	0,116	0,320
Finance	0,003	0,055	0,014	0,116
Real estate & research	0,150	0,357	0,117	0,323
Public administration	0,346	0,476	0,000	0,000
Education	0,135	0,341	0,003	0,054
Health	0,123	0,329	0,004	0,062
Other*	0,080	0,271	0,019	0,137
R&D				
R&D1	0,032	0,177	0,024	0,153
R&D2	0,086	0,280	0,090	0,286
R&D3	0,075	0,264	0,080	0,271
R&D4	0,208	0,406	0,238	0,426
R&D5	0,057	0,233	0,049	0,217
R&D6	0,143	0,350	0,143	0,350
R&D7	0,070	0,255	0,070	0,256
R&D8	0,329	0,470	0,306	0,461
Regional characteristics				
Province				
South	0,526	0,499	0,557	0,497
West	0,223	0,416	0,255	0,436
East	0,130	0,336	0,090	0,286
North	0,121	0,327	0,098	0,297
Sub-region				
Metropolitan area	0,335	0,472	0,330	0,470
University	0,247	0,431	0,222	0,415
Regional centre	0,204	0,403	0,204	0,403
Industrial centre	0,068	0,252	0,112	0,315
Rural area	0,092	0,289	0,107	0,309
Countryside	0,054	0,227	0,026	0,159
Unemployment	12,26	4,690	11,85	4,230
Number of obs	8 759		33 921	

Notes: others=armed force, agriculture and fishery workers and others;
manufacturing = mining and manufacturing; other = agriculture, others and not known

A2 Descriptive statistics, wages by sectors (males)

Table A1: Observations and wages by industry

Males	Public		Private		Private premium
	N	Wage	N	Wage	
Manufacturing	7	2227	16 267	2636	409
Electricity	425	2644	365	3201	557
Construction	505	2253	2351	2532	279
Transportation	425	2815	3935	2432	-383
Real estate	1316	2463	4009	2884	421
Education	1180	2729	101	2691	-38
Health	1083	2688	129	2541	-147
Rest	3818	2565	6764	2515	50
Total	8759	2586	33921	2616	30

Table A2: Observations and wages by education level

	Public		Private		Private premium
	N	Wage	N	Wage	
Primary	1247	2111	7103	2335	224
Secondary	3118	2167	16513	2383	216
Lowest-level	1714	2478	5058	2887	409
Lower-level	678	2941	3052	3252	311
Highest-level or doctorate	2002	3502	2195	3769	267
Total	8759	2586	33921	2616	30

Table A3: Observations and wages by occupation

	Public		Private		Private premium
	N	Wage	N	Wage	
Managerial	998	3181	1548	3798	617
Professional	2359	3175	4371	3417	242
Technical	1773	2484	6249	2918	434
Clerks	392	1927	1438	2348	421
Sales & care	895	2268	2115	2077	-191
Craft	810	2110	8778	2294	184
Operative	582	2220	7035	2375	155
Others	950	1878	2387	2128	250
Total	8759	2586	33921	2616	30

Table A4: Observations and wages by field of education

	Public		Private		Private premium
	N	Wage	N	Wage	
General & other	1991	2547	9132	2423	-124
Teaching	134	2718	47	2612	-106
Humanities and art	187	2757	263	2566	-191
Trade	969	2853	3364	2913	60
Natural sciences	226	2783	465	3631	848
Technology	2815	2445	18250	2668	223
Agriculture	330	2137	945	2412	275
Medical	714	2874	258	2677	-197
Services	1393	2624	1197	2230	-394
Total	8759	2586	33921	2616	30