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**Public-private sector pay gaps and centralized wage  
setting: Aggregate and industry data evidence**

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## ABSTRACT

This study analyzes public-private sector pay gaps in Finland. We estimate separate selectivity corrected earnings equations for the whole sample and for four industries. The data shows that the unconditional public-private sector pay gap is modest, 1.3 per cent. This finding is consistent with other countries with centralized wage setting procedure. However, the conditional results imply that this gap is specious in two ways. First, returns to personal characteristics, such as occupation and field of education, are considerably higher in the private sector. Second, the industry-level analysis indicates that the earnings gaps vary across industries. This suggests that public sector wage setters need greater local flexibility, which should result in less uniform wages within the public sector.<sup>1</sup>

JEL: J31, J45

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## 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 labor with the private sector will be at a serious disadvantage in terms of the recruitment and retention of good quality labor. 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 labor 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. Recent developments, showing a tendency towards local level wage bargaining and some attempts at 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.

Table 1 emphasizes for the importance of sectoral pay gap studies. In Scandinavian countries the average public-private sector pay gap, is close to zero, varying from -4 to 3 per cent, while in other European countries the pay gap varies between 6 and 37 per cent. This suggests that wage gaps are smaller if wage formation is more centralized. This result is consistent with Lucifora and Meurs (2006) with their cross-country study for France, Italy and Great Britain. In this study we contribute to this literature and recent country studies on public sector pay<sup>2</sup> by analyzing 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 labor 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. One advantage of the data at hand is that it allows us to examine pay gaps in specific industries, providing more detailed information on industry-level pay differentials across employers' status. The policy implications of these industry specific analyses are striking.

The rest of this paper is organized as follows. Section 2 outlines the wage bargaining institutions in the Finnish labor market and presents information on sectoral pay gaps. In section 2.1 we describe the pay determination system and show the macro-evolution of pay across the public and private sectors over recent decades. In sections 2.2 and 2.3 we describe

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<sup>2</sup> See, Disney and Gosling (1998), Blackaby, Murphy and O'Leary (1999), Mueller (1998), Chatterji and Mumford (2007) and Disney (2007).

and analyze the pay gaps in a cross-sectional micro data from an employee-based survey (Finnish Labor Force Survey) with rich details of workers' characteristics and accurate information on the employer's sector, whether public or private. Section 3 concludes.

*Table 1. Aggregate public-private sector pay gaps for males in selected European countries*

Scandinavian countries	Aggregate public-private pay gap, %	Other Western European countries	Aggregate public-private pay gap, %
Norway	-4	Germany	6
Sweden	-3	France	12
Iceland	-2	UK	17
Denmark	-1	Italy	33
Finland	3	Spain	37

*Source: National Statistics in 2007 for Scandinavian countries. For France, Italy and UK (Lucifora & Meurs 2006), Spain (Lassibille 1998; Garcia-Pérez & Jimeno 2005), and for Germany (Dustmann & van Soest 1998).*

## 2. Public-private sector pay gaps in Finland

### *2.1 Bargaining institutions and long-term aggregate pay gaps*

The Finnish labor market is heavily unionized, having one of the highest rates of union membership in the industrialized world, with membership in trade unions being approximately 70 per cent of all employees.<sup>3</sup> With around 70 trade unions organised into three labor 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 labor confederations on the employees' side.<sup>4</sup> 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, and about one-third in private services. The members of these unions work in a wide range of occupations, including childminders, flight attendants, bus drivers, waiters, builders and paper mill employees. Furthermore, one quarter of SAK members work in the public sector. When one recognizes that the size of the Finnish labor force is only 2.7 million, the significance of SAK becomes clear.

<sup>3</sup> See OECD, 2007, for a recent country comparison.

<sup>4</sup> See Työmarkkina-avain, 2007.

The Finnish Confederation of Salaried Employees, STTK, consists of 19 affiliated trade unions that represent approximately 640 000 professional employees that are covered by contracts. 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 (private sector) and three confederations on the public sector side; the Office for the Government as Employer, the Commission for Local Authority Employers and the Church of Finland Negotiating Commission.

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, e.g. JUKO. This system covers about six per cent of the labor 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.

Industrial relations are regulated by collective agreements which, in turn, regulate the minimum conditions for the job in question and establish labor peace. Collective wage bargaining, in which the government plays a prominent role, has been used in the Finnish labor market since 1968. These agreements provide the framework for branch-specific collective agreements; see Appendix, Figure A. In all cases the employers' associations and trade unions sign collective agreements of their own. Because collective labor 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.

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 labor 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.<sup>5</sup> The old pay system, based on tenured positions and seniority, is thus gradually changing.<sup>6</sup>

Figure 1 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 four 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.<sup>7</sup> The average wage rates do, however, differ across the sectors. In the private sector, the average gross wage was 2 794 euros in 2007. In the public sector, the average monthly wage was 2 621 euros, the gross wage gap thus being about 6 per cent in favor of the private sector. The picture is, however, different when examining gross wages only for males. In the private sector the average monthly wage for full-time workers was 3 017 euros in 2007. In the public sector, the average wage was 3 107 euros, the wage gap being 3 per cent in favor of the public sector.

Although wage increases over the years have been of a similar magnitude in all these three sectors, as Figure 1 shows, minor growth differentials can produce changes in wage premiums across the sectors. This is displayed in Figure 2, which depicts wage gaps, measured as deviations from private sector pay, over the last 25-year period. The aggregate

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<sup>5</sup> Ministry of Finance, The Office for the Government as Employer, 2007.

<sup>6</sup> 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.

<sup>7</sup> See Honkapohja et al. (1999) for Finnish and Holmlund (1992) for Swedish evidence.



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 2, 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 14 per cent in 1980 to about 8 per cent in 2008. The negative gap of local government employees rose, in turn, from about 4 per cent to 10 per cent over the same period. The total public-private sector pay gap declined steadily from 2 per cent in 1980 to about minus 6 per cent in 2008. 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.<sup>8</sup>

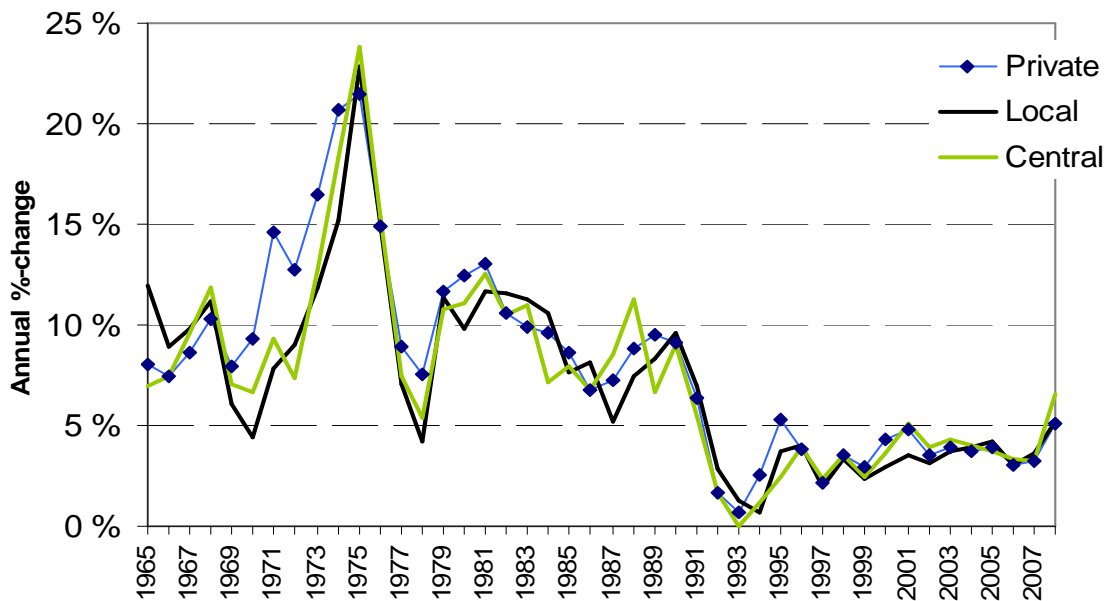


Figure 1. Annual wage increases, employees in local government, central government and the private sector, 1965-2008

<sup>8</sup> The Finnish public sector as employer, 2007.

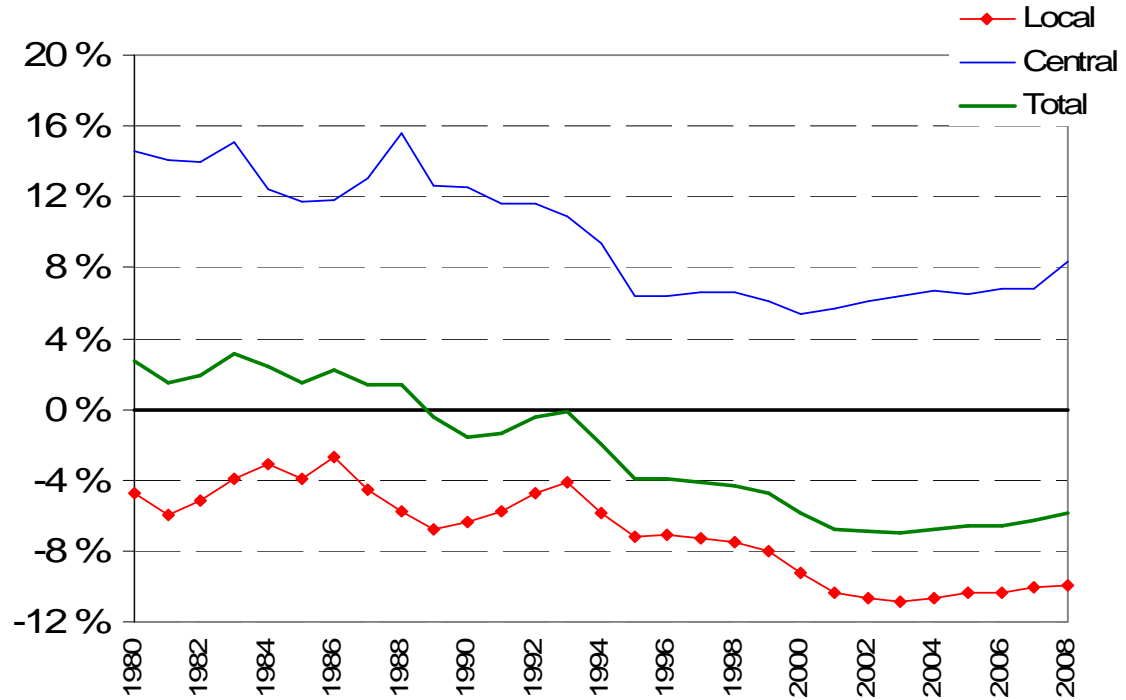


Figure 2. Pay premiums, central and local government and total public sector, 1980-2008

## 2.2 Pay gaps in a cross-sectional micro data

In this section we illustrate pay gaps by utilizing micro data drawn from the Finnish 2004 census. The data contain information on 41 444 male workers, 8 668 in the public and 32 776 in the private sector. Tables 2-5 present descriptive statistics drawn from the data.<sup>9</sup> Table 2 reports average monthly wages by the status of the employer (private or public) and the employees' level of education. In Table 3, the classification is done by occupation, in Table 4 by field of education and in Table 5 by the employees' industry.

<sup>9</sup> The wage variable is monthly earnings. We exclude all workers whose monthly earnings are below 1 200 euros per month 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 monthly earnings are capped at 6 000 euros. A full list of these variables is given in Appendix 1. Given that very high salaries, but also very low salaries are more common in the private sector, the truncation of the data implies that the gap may overstate the public sector premium.

The monthly wages are, on average, higher in the public than private sector. Private sector workers earn more at all educational levels, the wage gap varying from -7 per cent to -11 per cent (lowest level tertiary education); see Table 2. The numbers show 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. 25 per cent of all public sector employees) compared to the high proportion of workers with only secondary-level education in the private sector (approx. 47 per cent of the total). For the first group the average monthly wage is 3,664 whereas in the second group it is only 2,559 euros.

Table 3 reports that private sector workers enjoy a premium in all occupations, excluding sales and care where the wage gap in favor of public sector workers is 11 per cent. The average monthly earnings of private sector workers are highest in managerial occupations (3,865), where the wage premium is also very high (-8 %). The wage gap is highest in technical (-15 %) occupations and little smaller ones in clerical and professional occupations (-12 % and -7 %). The lowest average wages in the public sector are in craft (2,325) and clerical (2,194) occupations. Sales and care, in turn, are the low paid occupations (2,238) in the private sector.

*Table 2. Employment shares (%), wages (euros) and premiums (%) by education level*

	Employment share		Wages		Public premium
	Public sector	Private sector	Public sector	Private sector	
Primary	12	20	2,333	2,515	-7*
Secondary	33	47	2,380	2,559	-7*
Lowest-level	19	14	2,785	3,126	-11*
Lower-level	11	11	3,104	3,358	-8*
Highest-level or doctorate	25	8	3,664	3,924	-7*
No's of obs./ aggregate wages	8 668	32 776	2,843	2,824	1

*Note: \*-sign rejects the hypothesis of similar wages between sectors*

Table 3. *Employment shares (%), wages (euros) and premiums (%) by occupation*

	Employment share		Wages		Public premium
	Public sector	Private sector	Public sector	Private sector	
Managerial	13	5	3,553	3,865	-8*
Professional	31	15	3,318	3,586	-7*
Technical	20	19	2,664	3,133	-15*
Clerks	4	4	2,194	2,497	-12*
Sales & care	10	7	2,491	2,238	11*
Craft	7	21	2,325	2,466	-6*
Operative	5	21	2,429	2,575	-6*
Others	10	8	2,115	2,298	-8*
No's of obs./ aggregate wages	8 668	32 776	2,843	2,824	1

Note: \*-sign rejects the hypothesis of similar wages between sectors

Table 4 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 sciences and general and in humanities. Public sector workers, in turn, exhibit a substantial premium in services.<sup>10</sup> The wage gap is lowest if the field of education is technology or teaching. Table 5 that reports wages by industry, in turn, shows that the public sector premium over the private sector is highest in transportation (12 %). The premium is also high in health (9 %). In education the premium is 3 per cent euros per month. Private sector workers earn a premium in three industries namely, construction (12 %), sales & hotel & restaurant (12 %) and real estate (9 %). Finance is the highest-paid industry amongst workers in the private and in the public sector. The data shows that the average pay gaps vary across industries both from negative to positive, and are remarkable in some cases. Therefore there is a demand for detailed analysis of industry-level differences on pay gaps.

<sup>10</sup> Field of education services includes degrees for example from education in safety and security, beauty care, leisure activities, hotel and catering and sport and health science, excluding medicine.

Table 4. *Employment shares (%), wages (euros) and premiums (%) by field of education*

	Employment share		Wages		Public premium
	Public sector	Private sector	Public sector	Private sector	
General & other	16	26	2,369	2,572	-8*
Teaching	3	0	3,015	2,900	4
Humanities and art	3	1	3,129	2,927	-7*
Business and social sciences	13	11	3,201	3,085	-4*
Natural sciences	5	2	3,246	3,731	-13*
Technology	32	52	2,826	2,910	-3*
Agriculture	4	3	2,490	2,610	-5*
Medical	8	1	2,975	2,692	11*
Services	16	4	2,889	2,452	18*
No's of obs./ aggregate wages	8 668	32 776	2,843	2,824	1

Note: \*-sign rejects the hypothesis of similar wages between sectors

Table 5. *Employment shares (%), wages (euros) and premiums (%) by industry*

	Employment share		Wages		Public premium
	Public sector	Private sector	Public sector	Private sector	
Manufacturing	4	44	3,009	2,898	4*
Construction	4	6	2,460	2,784	-12*
Sales & hotel & restaurant	1	17	2,302	2,614	-12*
Transportation	6	12	2,926	2,601	12*
Finance	1	2	3,723	3,765	-1
Real estate	14	13	2,729	3,002	-9*
Education	18	1	3,037	2,942	3
Health	11	1	2,700	2,483	9*
Rest	41	4	2,846	2,799	2
No's of obs./ aggregate wages	8 668	32 776	2,843	2,824	1

Note: \*-sign rejects the hypothesis of similar wages between sectors

### 2.3 Empirical results of aggregate and industry-level analysis

As Figure 2 showed the unconditional wage gap between the public sector and private sector has varied between 2 and -6 per cent over the years. In our sample the unconditional public-private sector wage gap for males working full-time is about 1 per cent, which is too small to be of material importance. 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: age (experience) and education.<sup>11</sup> The results indicate that public-private sector wage gap is about -9.2 per cent when controlling 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 (-6.7 per cent) and highest in the 75th percentile (-12.9 per cent) of the wage distribution. This calls for a detailed analysis of how individual characteristics are rewarded across the public and private sectors. This is the main aim of this section.

Following the literature separate wage equations for cross-section samples of public and private sector (group  $j$ ) workers (individuals  $i$ ) can be expressed as

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

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. To account for possible selection bias, we follow the Heckman (1979) procedure and assume that working in a certain sector is endogenous. To formalize this, we let

$$(2) I_{i,j}^* = \gamma_j Z_{i,j} + v_{i,j}$$

$$(3) I_{i,j} = 1 \text{ if } I_{i,j}^* \geq 0 \text{ (public sector)}$$

$$I_{i,j} = 0 \text{ if } I_{i,j}^* < 0 \text{ (private sector)}$$

where  $I_{i,j}^*$  is an unobserved variable that reflects the utility of an individual working in the public sector,  $I_{i,j}$  is a binary variable which is assigned the value one if the individual works in

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<sup>11</sup> The model is  $\ln(W) = \alpha + \beta \cdot \text{dummy}(\text{public}) + \beta_1 \cdot \text{age} + \beta_2 \cdot \text{age}^2 + \beta_3 \cdot (\text{Education}) + \text{error}$ . Educational levels are described in the data appendix.

the public sector and zero if in the private sector.  $\gamma_j$  is a vector of unknown parameters and  $v_{i,j}$  is an error term. Furthermore,  $v_{i,j}$  and  $\varepsilon_{i,j}$  are i.i.d error terms that jointly follow a bivariate normal distribution  $(0, 0, \delta_{\varepsilon_j}, \delta_{v_j}, \rho_j)$ .  $Z_{i,j}$  is the matrix of variables determining the worker's sector choice.<sup>12</sup> We express the probability of public sector attainment as

$$(4) \text{Prob}(I_{i,j}^* > 0) = \text{Prob}(v_{i,j} > -\gamma_j Z_{i,j}) = \Phi(\gamma_j Z_{i,j})$$

and for private sector correspondingly. In the previous equation,  $\Phi(\gamma_j Z_{i,j})$  is the cumulative distribution function of the standard normal distribution. Summing up, the expected wage for individual  $i$  in the public sector can be estimated as follows:

$$(5) E(\ln W_{i,j} | I_{i,j}^* \geq 0) = \beta_j X_{i,j} + E(\varepsilon_{i,j} | v_{i,j} > -\gamma_j Z_{i,j}) = \beta_j X_{i,j} + \theta_j \lambda_{i,j}$$

where  $\theta_j = \rho_j \delta_{\varepsilon_j}$ ,  $\lambda_{i,j} = \Phi(\gamma_j Z_{i,j})' \phi(\gamma_j Z_{i,j})$  and  $\phi(\cdot)$  is the standard normal density function. Taking the error term into account we obtain the Heckman's selectivity corrected wage equation for the public sector

$$(6) \ln W_{i,j} | I_{i,j}^* \geq 0 = \beta_j X_{i,j} + \theta_j \lambda_{i,j} + error$$

and for private sector respectively. For reasons of symmetry, the sign in front of  $\lambda_{i,j}$  changes.

To scrutinize wage premiums more closely we apply the widely used Neuman and Oaxaca (2004) methodology where the difference in observed mean log earnings between the public sector ( $pu$ ) and the private sector ( $pr$ ) is decomposed as follows:

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<sup>12</sup> Following the literature we use age, mother language, parents' socio-economic status and regional characteristics to determine public/private sector participation choice (see, e.g. Kanellopoulos 1997; Garcia-Pérez & Jimeno 2005; Tansel 1999; Lassibille 1998; Adamchik & Bedi 2000 and Christofides & Pashardes 2002). Unlike most previous studies we omit education (level) from the sector choice function. Instead we use a field of education variable as a proxy for education effect (see Dustmann and van Soest 1998). Following Dustmann et al. (1998), parents' socio-economic status is used as an exclusion restriction-variable.

$$(7) \ln \bar{W}_{pu} - \ln \bar{W}_{pr} = (\bar{X}_{pu} - \bar{X}_{pr}) \hat{\beta}_{pr} + \bar{X}_{pu} (\hat{\beta}_{pu} - \hat{\beta}_{pr}) + (\hat{\theta}_{pu} \hat{\lambda}_{pu} - \hat{\theta}_{pr} \hat{\lambda}_{pr}) + (\hat{\alpha}_{pu} - \hat{\alpha}_{pr})$$

The average differential in log wages between the two sectors is thus decomposable into three components. The first term on the right-hand side of equation (7) 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 second 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 third term captures the part of the total pay gap due to the selectivity and the last term on the right-hand side of the equation captures the difference between the estimated constant terms and is added to the unexplained part of the total pay gap.

### 2.3.1 Results from the aggregate equations

We obtain consistent estimates of  $\beta_j$  by first estimating the usual probit associated with Equation (4) which provides us the estimate of  $\lambda$  required to estimate the wage equation (6). The explanatory variables (the Z variables) used in the probit are native language, field of education and region in which he works. As exclusion restriction variables we use age and parent's socioeconomic status. Table 6 reports the selectivity corrected estimates of our earnings function. i.e Equation (6) above. 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.<sup>13</sup>

There is evidence of the nonrandom sorting of male workers between the sectors. The estimates of the selection variables (i.e.  $\lambda\theta$ ) are statistically significant at least at the 1 per cent significance level in both sectors and specifications, except only barely significant at 10 per

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<sup>13</sup> 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.



cent level in the private sector equation in the baseline model.<sup>14</sup> The empirical performance of both specifications is adequate, the explanatory power of the model varying from 0.37 (baseline, private sector) to 0.53 (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).

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 1.3 per cent per month versus 1.1 per cent in the private sector. This result deviates from previous findings elsewhere.<sup>15</sup> The returns from tenure are, in turn, slightly higher in the private sector than in the public sector (0.7-0.8 versus 0.2-0.4 per cent per month). The previous wage literature indicates that married men enjoy higher wages than unmarried men. In both sectors the premium is about 6-7 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 public sector. In the augmented model both non-native speakers and Swedish speakers capture a modest negative premium in both sectors, whereas in the baseline model non-native employees obtain a premium in the private sector.<sup>16</sup>

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 (2,333 a month compared to 2,515 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

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<sup>14</sup> The results from the probit model for public sector choice are available on request from the authors. Following the literature the probit-model estimates are well-defined and have expected signs. The marginal effect of age is positive and statistically significant, indicating that older individuals are more likely to be employed in the public sector. Non-native men have a higher probability of working in the public sector. Further examination suggests that these non-native men are highly educated and work mostly in central government. The probability of working in the public sector is highest amongst individuals with education in teaching and health or services. In line with findings of Dustmann et al. (1998), selection into the public sector is higher amongst men whose parents have worked in general government. Finally, the marginal effects of the regional characteristics capture the existing regional employment differences between sectors, where smaller cities have relatively more public sector jobs.

<sup>15</sup> Studies in Greece (Kanellopoulos 1997), Canada (Prescott & Wandschneider 1999), Peru (Stelcner & Gaag & Vijverberg 1989), Great Britain (Chatterji & Mumford 2007; Bender & Elliott 2002), Poland (Adamchik et. al. 2000), Spain (Lassibille 1998) and Turkey (Tansel 1999) imply a premium from experience in the private over public sector.

<sup>16</sup> 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.

higher university level education is about 48-52 per cent in the public sector compared to about 37-43 per cent in the private sector; see columns 1-4. In absolute terms, this implies an increase in monthly pay of about 1,170 in the public and 1,030 in the private sector.<sup>17</sup>

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. The premium over the reference group (technology) is negative in all cases, except amongst individuals with education in general in both sectors and natural sciences in the private sector. In the public sector, the fields of education with a high negative premium are the teaching (approx. 30-36 %) and humanities or arts and natural sciences (approx. 21-26 %). Individuals with education in the humanities or arts and teaching, in turn, suffer from a negative premium of about 10-18 per cent in the private sector. Overall the negative returns to field of education are considerably higher in the public sector than in the private sector.

The returns from being in upper end (managerial, professional and technical) rather than craft occupations are all higher in the private sector. Premiums in these occupations are about 37, 26 and 17 per cent in the private sector and 25, 18 and 8 per cent in the public sector, respectively. These differences are notable since also the average monthly pay in craft occupations is over 140 euros higher in the private sector (2,325 versus 2,466). The returns from being in lower end occupations (clerks, operative and sales & care) are similarly noteworthy. For sales & care the relative returns are clearly better for public sector employees, the premium being plus 9 per cent in the public sector (augmented equation) and minus 2 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 (-2 versus -7 %). These findings fall in line with the previous Finnish results.<sup>18</sup>

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<sup>17</sup> Korkeamäki (1999) and Asplund (1993) 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.

<sup>18</sup> 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-Pérez et. al. (2005).

Table 6. Selectivity corrected regressions for males; the dependent variable is log monthly earnings

Specification	Baseline		Augmented	
	Public	Private	Public	Private
ln(month pay)				
Experience	0.013***	0.011***	0.012***	0.010***
Experience squared.	-0.024***	-0.021***	-0.025***	-0.020***
Tenure	0.004***	0.008***	0.002***	0.007***
Married	0.064***	0.063***	0.056***	0.061***
Child	0.001	-0.001	0.003	0.007**
Language				
Swedish	0.014	-0.013**	-0.014	-0.027***
Non-native	-0.026	0.032**	-0.043**	-0.016
Education				
Secondary	0.053***	0.077***	0.043***	0.056***
Lowest level	0.134***	0.158***	0.111***	0.127***
Lower-degree level	0.259***	0.242***	0.227***	0.199***
Higher-degree or doctorate	0.419***	0.380***	0.389***	0.311***
Field of education				
General	0.033**	0.014**	0.036***	-0.001
Teaching	-0.362***	-0.102***	-0.450***	-0.193***
Humanities & art	-0.254***	-0.144***	-0.299***	-0.146***
Business and social sciences	-0.106***	-0.023***	-0.136***	-0.042***
Natural sciences	-0.233***	0.061***	-0.284***	0.004
Agriculture	-0.113***	-0.116***	-0.140***	-0.082***
Medical	-0.167***	-0.043**	-0.214***	-0.097***
Services	-0.081***	-0.020	-0.193***	-0.097***
Occupation				
Managerial	0.214***	0.307***	0.244***	0.323***
Professional	0.145***	0.226***	0.191***	0.241***
Technical	0.061***	0.152***	0.093***	0.158***
Clerk	-0.080***	-0.017**	-0.057***	-0.022***
Sales & care	0.056***	-0.074***	0.088***	-0.024***
Operative	0.036***	0.042***	-0.004	0.042***
Other	-0.085***	-0.053***	-0.062***	-0.033***
Industry				
Manufacturing	-	-	0.223***	0.148***
Construction	-	-	0.083***	0.127***
Sales & Hotel & restaurant	-	-	0.006	0.049***
Transportation	-	-	0.183***	0.098***
Finance	-	-	0.293***	0.237***
Real estate & research	-	-	0.010	0.047***
Health	-	-	-0.046***	-0.016
Public administration and other	-	-	0.056***	0.009

R&D in the area	-	-		
R&D2	-	-	0.044***	0.036***
R&D3	-	-	0.066***	0.040***
R&D4	-	-	0.056***	0.085***
Province	-	-		
West	-	-	-0.004	-0.035***
East	-	-	-0.033***	-0.067***
North	-	-	-0.041***	-0.051***
Sub-region	-	-		
University	-	-	-0.020	-0.041***
Regional centre	-	-	0.014	-0.055***
Industrial centre	-	-	0.075***	0.029***
Rural area	-	-	0.066***	-0.082***
Countryside	-	-	0.021	-0.106***
Unemployment	-	-	-0.004	0.002*
Constant	7.782***	7.497***	7.937***	7.372***
$\theta_j$	-0.719	-0.133	-0.929	0.458
$\lambda_{i,j}$	0.279	0.263	0.343	0.262
$\theta_j \lambda_{i,j}$	-0.200***	-0.035*	-0.319***	0.120***
Adj. R-squared	0.485	0.372	0.526	0.419
Number of observations	8 668	32 776	8 668	32 776
Industry dropped F(n1 n2)	-	-	72.97***	130.57***
R&D dropped F(n1 n2)	-	-	3.71**	37.85***
Province dropped F(n1 n2)	-	-	7.31***	34.43***
Sub-region dropped F(n1 n2)	-	-	10.14***	71.43***

Notes: \*\*\* (\*\*, \*) denotes statistical significance on at least at the 1 % (5, 10) level. Reference categories are: no child/children, Finnish, primary education, technology, craft, education, south, metropolitan area and R&D1. F(n1, n2): n1 = 8 for industry, 3 for R&D, 3 for province and 5 for sub-region; n2 = 8 620 and 32 728 for public and private sector.

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 (for the joint significance of regional dummies and industry dummies) indicate that the relative role of the industry and regional variables differ across the two sectors. For example, the R&D-indicator is highly significant in the private sector equation but only barely significant at 5 per cent level in the public sector equation (37.9

versus 3.7; see the lower part of the Table).<sup>19</sup> 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 130.6 for the private sector and 73.0 for the public sector. The returns relative to education, which is the reference industry, are, however, similar in both sectors, with two exceptions. In transportation and manufacturing the premiums in the public sector exceed those of the private sector considerably, being 20 per cent versus 10 per cent in the former and 25 per cent versus 16 per cent in the latter.

Finally, inclusion of the control variables does not materially change our interpretation on the parameter estimates reported in the baseline equation. These parameter estimates remain remarkably stable despite adding regional and industry controls. In the public sector equation there is a small reduction in the returns from tenure and (from 0.4 to 0.2 % per annum) and a decline in the returns from being a non-native speaker (from -2.6 to 4.3 %). In the private sector, being a non-native speaker now significantly lowers pay (from 3.2 to -1.6 %).

Taken together 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. But both region and industry do impact directly on wages, especially in the private sector. This prompts us to consider separate regressions for each industry which we report in the next subsection.

### *2.3.2 Results from the industry-level equations*

We continue the investigation by estimating earnings equations for four industries where the representation of workers in both public and private sector is sufficient. These industries are: namely, construction, real estate, transportation and health. The results are reported in Tables 7 and 8. 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.

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<sup>19</sup> 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.

The industry level results are consistent with the results for the whole sample, and the earnings equations fit the data well. The adjusted R<sup>2</sup> varies from 0.35 in the private sector earnings equation for construction to 0.70 in the public sector equation for health. The selection correction variables are statistically insignificant in transportation and health. In real estate the selection correction is statistically insignificant only for the private sector. 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 construction (approx. 30 %), whereas in health the private sector premiums exceed that of the public sector and in real estate the public sector premium exceeds that of the private sector. Amongst professional employees the returns in the private sector are higher in transportation. As before, employees in sales and care occupations are slightly 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 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 or/and province variables from the public sector earnings equations but not from the private sector equations, excluding health.

Table 7. OLS-regressions for males by industry; construction and real estate

ln(month pay)	Construction		Real estate	
	Public	Private	Public	Private
Experience	0.002	0.006**	0.001***	0.017***
Experience squared.	-0.010	-0.014**	-0.021***	-0.034***
Tenure	0.002	0.005***	0.002**	0.06***
Married	0.063***	0.068***	0.065***	0.061***
Child	0.021	-0.002	-0.013	0.026***
Language				
Swedish	-0.034	-0.111**	0.012	-0.012
Non-native	0.128	-0.061	-0.037	0.018
Education				
Secondary	0.031	-0.018	0.016	0.070***
Lowest level	0.112	0.047	0.093*	0.174***
Lower-degree level	0.265***	0.088	0.194***	0.251***
Higher-degree level	0.217*	0.202**	0.356***	0.363***
Occupation				
Managerial	0.243***	0.268***	0.345***	0.280***
Professional	0.278***	0.143***	0.151***	0.178***
Technical	0.150***	0.056**	0.037	0.087**
Clerk	-0.039	-0.080	-0.061*	-0.020
Sales & care	NA	0.056	-0.021	-0.098***
Operative	0.121***	-0.049*	0.062	-0.073**
Other	-0.016	-0.032	-0.081***	-0.122***
Constant	7.803***	7.797***	7.737***	7.499***
$\theta_j$	-0.819	1.000	-0.778	0.003
$\lambda_{i,j}$	0.189	0.349	0.237	0.271
$\theta_j \lambda_{i,j}$	-0.155***	0.349***	-0.184***	0.001
Adjusted R-squared	0.554	0.351	0.614	0.420
Number of observations	308	2 122	1 239	4 116
Field of education dropped				
F(n1,n2)	3.22***	5.26***	7.58***	5.59***
R&D dropped F(n1, n2)	1.35	3.19**	1.06	1.89
Province dropped F(n1,n2)	3.17**	6.00***	6.31***	0.20
Sub-region dropped F(n1, n2)	1.64	5.27***	2.11*	3.38***

Notes: NA= no observations.  $F(n1, n2)$ :  $n1 = 8$  for field of education, 3 for R&D, 3 for province and 5 for sub-region;  $n2 = 271$  (public) and 2 038 (private) for construction and 1 199 (public) and 4 076 (private) for real estate.

Table 8. OLS-regressions for males by industry; transportation and health

ln(month pay)	Transportation		Health	
	Public	Private	Public	Private
Experience	0.012***	0.010***	0.008***	0.015***
Experience squared.	-0.020**	-0.017***	-0.011*	-0.029**
Tenure	0.003**	0.006***	0.001	0.004
Married	0.035	0.051***	0.044***	0.035
Child	0.018	0.015*	-0.003	-0.009
Language				
Swedish	-0.029	-0.021	-0.004	0.053
Non-native	-0.064	-0.015	0.005	0.006
Education				
Secondary	0.090*	0.044***	0.135***	0.061
Lowest level	0.212***	0.107***	0.200***	0.126
Lower-degree level	0.347***	0.181***	0.260***	0.104
Higher-degree level	0.406***	0.298***	0.669***	0.440***
Occupation				
Managerial	0.254***	0.302***	0.230***	0.351***
Professional	0.116*	0.302***	0.196***	0.103
Technical	0.212***	0.217***	0.036	0.054
Clerk	0.117*	-0.096***	-0.072*	0.039
Sales & care	0.106	0.057**	0.023	0.071
Operative	-0.083	-0.016***	-0.186***	0.034
Other	-0.123**	-0.040*	-0.119***	-0.008
Constant	7.506***	7.493***	7.451***	7.518***
$\theta_j$	-0.455	0.510	-0.511	-0.446
$\lambda_{i,j}$	0.245	0.254	0.199	0.253
$\theta_j \lambda_{i,j}$	-0.111	0.130	-0.102	-0.113
Adjusted R-squared	0.453	0.362	0.697	0.379
Number of observations	479	4 037	984	390
Field of education dropped F(n1,n2)	2.28**	3.43***	16.63***	1.14
R&D dropped F(n1, n2)	2.88**	0.55	2.19*	0.11
Province dropped F(n1,n2)	1.27	2.74**	1.90	0.56
Sub-region dropped F(n1, n2)	2.85**	3.83***	0.83	0.34

Notes: NA= no observations. F(n1, n2): n1 = 8 for field of education, 3 for R&D, 3 for province and 5 for sub-region; n2 = 440 (public) and 3 997 (private) for transportation and 944 (public) and 350 (private) for health



### 2.3.3 *Decompositions of wage gaps*

In the data the earnings gap is 1.3 per cent, full-time private sector employees earning about one per cent less on average than full-time public sector employees. Using our estimated wage equations, we decompose this gap into the component explained by differences in the mean values of the personal 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 9 and 10 show these decompositions based on the estimated earnings equations. When we look at the whole sample, the observable characteristics imply a pay gap of around 5.4 per cent in favour of private sector employees. Lower returns from the characteristics, in turn, reduce the gap by 6.7 percentage points.<sup>20</sup> 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 (5.0 %) but less experienced (-5.3 %). Furthermore, public sector employees work, on average, in better paid occupations (5.5%) but, on the other hand, they are employed in industries that pay less (-7.8 %). Second, private sector workers enjoy higher returns from personal characteristics, such as field of education (-5.9 %) and occupation (-3.3 %). This result suggests better matching of jobs and field of education amongst private sector employees. The total unobserved pay gap is still positive in favour of public sector workers. This is mainly due to higher public constant term<sup>21</sup> and calculated difference of selection terms between sectors.

One might expect that since the region's R&D level reflects the average productivity of firms in an area that private sector workers would capture a part of the resulting rent as higher earnings. This is surprisingly not the case, since the R&D is not associated with significantly higher earnings, see Table 9. Finally, the impact of regional characteristics on the observable

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<sup>20</sup> The value is calculated as follows: total unexplained part minus selection correction term. Overall, the effect of the selection variable is important and is better denoted as unexplained part of the total pay gap.

<sup>21</sup> This implies that average earnings are higher for those reference group men (primary education, craft workers, not married etc.) working in the public than in the private sector. This view is consistent with the preliminary result of quantile regression, in which the gap is found to be smallest for workers in the lowest 25<sup>th</sup> percentile.

pay gap is modest. Overall, compared to some international findings, the role of personal and industry attributes in explaining public-private pay differentials is important in Finland.<sup>22</sup>

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.

Table 9. Decomposing wage differentials, whole sample, %

Selectivity corrected estimates		
	Explained, due to characteristics	Unexplained, due to returns
<i>Personal characteristics</i>		
Work experience and tenure	-5.3	0.1
Education	5.0	1.5
Field of education	-2.8	-5.9
Occupation	5.5	-3.3
Other personal characteristics	0.3	-0.5
<b>Total personal</b>	<b>2.7</b>	<b>-8.1</b>
<i>Business environment</i>		
Industry	-7.8	1.8
R&D	0.1	-0.5
<i>Regional characteristics</i>		
	-0.4	-1.1
<b>Total Business environment and regional</b>	<b>-8.1</b>	<b>0.2</b>
<i>Constant term+Selection term</i>	-	14.6*
<b>Total (1.3%)</b>	<b>-5.4</b>	<b>6.7</b>

Note: value in \*-sign is measured as a difference between constant term and selection term, which are 48.4 and -41.7 respectively.

<sup>22</sup> See, for example, findings from Greece (Kanellopoulos 1997; Papapetrou, 2006), Cyprus (Christofides et al. 2002), France and Italy (Lucifora 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 10. Decomposing wage differentials, selected industries, %

Selectivity corrected estimates for four industries			
	Log Earnings gap (public-private)	Explained, due to characteristics	Unexplained, due to returns
<i>Construction</i>	- 10.5	- 13.3	2.8
<i>Real Estate</i>	- 7.8	- 3.2	- 4.6
<i>Transportation</i>	11.7	7.1	4.6
<i>Health</i>	7.0	3.1	3.9

*Notes: values in column three measure the “total” unexplained part of the total pay gap, if the selection correction term is denoted as the unexplained part.*

In real estate the gap is about -8 and in construction -11 per cent. The values are in log points. In real estate the private sector premium is almost evenly due to inferior characteristics (-3.2%) and lower returns from the characteristics of the public sector employees (-4.6 %). In construction, the private sector premium is mainly due to differences in characteristics (-13.3 %) and less due to differences in returns (2.8 %). In transportation the public sector enjoys a premium of about 12 per cent. This is mainly due to differences in individual characteristics (7.1 %). The component associated with returns from the characteristics contributes to about 5 per cent of the premium. In health, the public sector premium (7.0 %) is almost evenly due to differences in characteristics (3.1 %) and higher returns from characteristics (3.9 %).

### 3. Conclusions

The study shows that aggregate 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. The results based on a cross-section data suggest that the public-private 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, particularly from personal 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.

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. 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 1), 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.

This conclusion regarding greater flexibility on the part of public wage setters is further reinforced by our industry-based results. These 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.

The difficulties for public sector wage setters in implementing the required wage discrimination for similar workers across different industries should not be underestimated. The ethos of “equal pay for equal work” is strong in the public sector. Introducing significant industry level differentials for otherwise identical public sector workers requires a cultural and paradigm shift. The alternative is to allow a gradual decline in quality of the public workforce in those industries where the private sector offers a premium relative to skill. Where greater inter industry wage flexibility in public sector is encouraged and implemented, there will need to be strong central mechanisms to prevent “catch up” wage claims from other public sector workers if a damaging wage-wage spiral is to be prevented. The success of the U.K. in setting up independent pay review bodies for public sector workers may be an institutional mechanism which could facilitate change without threatening stability.

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## Appendix 1. Variable descriptions

Variable	Description
Wage	Monthly wage/euros (annual earnings/12)
<i>Personal characteristics</i>	
Age	Age in years
Age sqd.	Age squared/100
Experience	Potential work experience
Exper sqd.	Potential work experience <sup>2</sup> /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
Business and social sciences	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
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
<i>Family background</i>	
Father's/mother's socio-economic group	



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F/M_unknown	1 if status unknown
F/M_selfemploy	1 if self-employed person
F/M_manual	1 if manual workers and others
F/M_emppub	1 if employees in general government
F/M_empoth	1 if employees in other sectors
<i>Business environment</i>	
Industry	Industrial classification
Manufacturing	1 if manufacturing, mining, quarrying, 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
Education	1 if education
Health	1 if health and social work
Public administration and others	1 if public administration and defense, agriculture, others or not known
R&D	R&D investment in the sub-region, million Euros
R&D1	1 if R&D investments is 0.10-4.90
R&D2	1 if R&D investment is 5-49.90
R&D3	1 if R&D investment is 50-499.90
R&D4	1 if R&D investment is 500 or more
<i>Regional characteristics</i>	
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 (%)

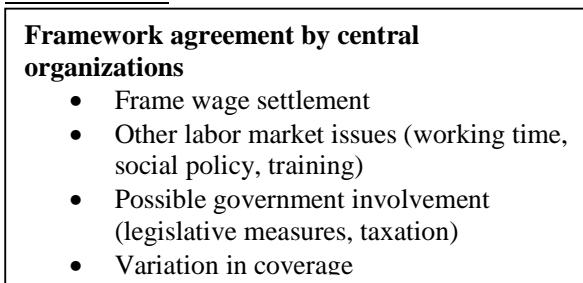
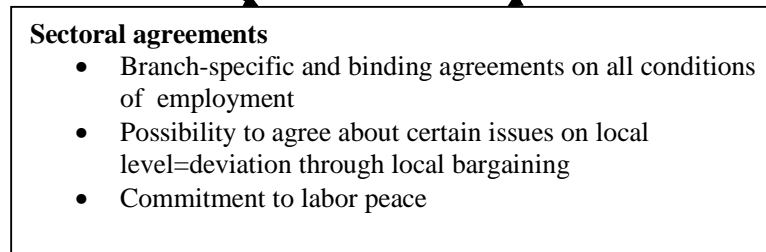
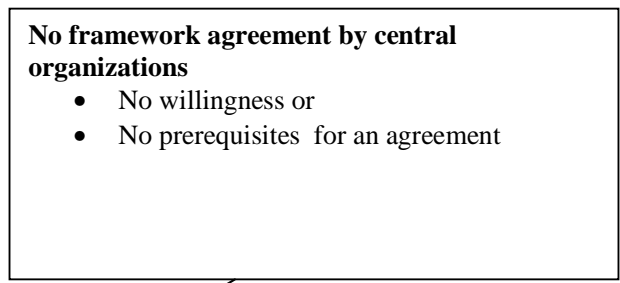
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## Appendix 2. Descriptive statistics: public and private sector males

Variable	Public		Private	
	Mean	s.t.d	Mean	s.t.d
Monthly wage (euros)	2 843	934.0	2 824	967.4
<i>Personal characteristics</i>				
Age	43.26	9.61	39.75	9.99
Age sqd.	19.64	8.20	16.80	8.12
Experience	17.29	11.42	17.94	11.10
Exper sqd./100	4.29	4.54	4.45	4.58
Tenure	2.30	5.67	9.34	8.78
Married	0.740	0.438	0.691	0.462
Child	0.552	0.497	0.539	0.498
<i>Language</i>				
Finnish	0.937	0.244	0.936	0.244
Swedish	0.047	0.213	0.049	0.216
Non-native	0.016	0.125	0.015	0.119
<i>Education</i>				
Primary	0.125	0.331	0.198	0.399
Secondary	0.332	0.471	0.473	0.499
Lowest-level	0.192	0.394	0.141	0.348
Lower-level	0.106	0.307	0.110	0.312
Highest-level or doctorate	0.245	0.430	0.078	0.268
<i>Field of education</i>				
General and other	0.162	0.368	0.259	0.438
Teaching	0.026	0.159	0.002	0.045
Humanities and art	0.034	0.179	0.014	0.117
Business and social sciences	0.127	0.332	0.107	0.310
Natural sciences	0.045	0.208	0.017	0.128
Technology	0.318	0.466	0.516	0.500
Agriculture	0.040	0.197	0.030	0.171
Medical	0.085	0.279	0.013	0.112
Services	0.163	0.370	0.042	0.201
<i>Occupation</i>				
Managerial	0.119	0.324	0.049	0.217
Professional	0.311	0.463	0.149	0.356
Technical	0.198	0.398	0.190	0.393
Clerks	0.041	0.199	0.044	0.204
Sales & care	0.103	0.303	0.065	0.247
Craft	0.074	0.261	0.211	0.407
Operative	0.051	0.221	0.212	0.409
Others*	0.103	0.304	0.080	0.272
<i>Family background</i>				
Father's/mother's socio-economic group				

F_unknown	0.199	0.399	0.173	0.378
F_selfemploy	0.109	0.311	0.112	0.315
F_manual	0.445	0.497	0.491	0.500
F_emppub	0.101	0.301	0.059	0.236
F_empothor	0.146	0.354	0.165	0.371
M_unknown	0.104	0.306	0.086	0.280
M_selfemploy	0.091	0.288	0.092	0.289
M_manual	0.436	0.496	0.470	0.499
M_emppub	0.181	0.385	0.141	0.348
M_empothor	0.188	0.390	0.211	0.408
<i>Business environment</i>				
Industry				
Manufacturing*	0.045	0.028	0.441	0.497
Construction	0.036	0.233	0.065	0.246
Sales & hotel & restaurant	0.009	0.081	0.169	0.374
Transportation	0.055	0.215	0.123	0.329
Finance	0.003	0.055	0.016	0.125
Real estate & research	0.142	0.357	0.125	0.331
Education	0.183	0.341	0.008	0.088
Health	0.113	0.329	0.012	0.108
Public administration and others*	0.414	0.493	0.041	0.198
R&D				
R&D1	0.087	0.282	0.086	0.281
R&D2	0.283	0.451	0.318	0.466
R&D3	0.197	0.398	0.178	0.382
R&D4	0.433	0.495	0.418	0.493
<i>Regional characteristics</i>				
Province				
South	0.450	0.498	0.469	0.499
West	0.306	0.461	0.343	0.475
East	0.112	0.315	0.087	0.281
North	0.132	0.339	0.101	0.301
Sub-region				
Metropolitan area	0.334	0.472	0.335	0.472
University	0.294	0.456	0.259	0.438
Regional centre	0.195	0.396	0.193	0.395
Industrial centre	0.072	0.258	0.109	0.311
Rural area	0.063	0.243	0.081	0.273
Countryside	0.042	0.200	0.023	0.151
Unemployment	11.51	3.344	11.27	3.114
Number of obs	8 668		32 776	

*Notes: others=armed force, agriculture and fishery workers and others; manufacturing = mining, manufacturing, electricity, gas and water supply; public administration and others = public administration and defense, agriculture, others and not known.*

***Procedure 1******Procedure 2***

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