An Phríomh-Oifig Staidrimh
Central Statistics Office

National Employment Survey 2009 and 2010

Supplementary Analysis

12 October 2012

National Employment Survey 2009 and 2010
Supplementary Analysis

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Summary of Issues surrounding the comparison of pay in the Public and Private sectors

Comparing pay in the public and private sectors is not a straightforward task. A range of different results can be derived depending on the methodology or model specification used to estimate pay differentials. Complexity also arises as the composition of the two sectors are heterogeneous, comprising of a variety of different industries, occupations and workers who themselves come with a variety of education, experience and skill sets.

Using simple average mean (or median) hourly or weekly pay to compare earnings across the public and private sectors will therefore, most likely, be misleading. For example, pay differentials may arise from a range of structural differences: skill levels required for a particular job; experience; qualifications; or location. Typically the relative distribution of men and women also has an impact. For these reasons CSO have employed a number of multivariate statistical techniques in an attempt to standardize these effects and present comparable data.

Earlier iterations of the analyses presented in this report have been peer reviewed by a number of national and international experts. Expert opinion varies regarding a number of key issues, such as, whether to employ weighted or unweighted regression analyses, whether to take size of enterprise into account as an explanatory variable or even which model to use. Thus, on a number of technical issues no unanimity existed among our reviewers or exists within the international literature. These differences in approach can result in significantly different results.

This report updates the National Employment Survey (NES) 2007[1] Supplementary Analysis published in 2009 and presents statistical analyses on the wage differential between the public and private sectors in Ireland separately for the years 2009 and 2010. In order to present balanced, comprehensive and objective analyses, and reflecting the lack of international agreement as to the best measure of calculating public-private wage differentials, a *hybrid approach*[2] has been adopted whereby the full spectrum of results are presented in this report. Consequently, several estimates of the wage differential are presented. The models used is these analyses are: Ordinary Least Squares Regression (OLS); Blinder-Qaxaca Decomposition Regression; and Quantile/Percentile Regression. For each of these models, a range of specifications are also presented: weighted; un-weighted; size of enterprise as a wage determining characteristic included and; size of enterprise excluded. The result of all these analyses are a range of public-private wage differentials. This may result in some confusion but it is important that readers understand there is no single, best measure of the public-private wage gap. Thus any attempt to present a single, definitive, public-private pay differential would be subjective and prone to over simplification.

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[1] CSO (2009), National Employment Survey 2007 - Supplementary Analysis.
[2] Bender, K.A. and R.F. Elliot (2002), "The Role of Job Attributes in Understanding the Public-Private Wage Differential", *Industrial Relations*, Vol. 41, No.3, pp407-421.

While, the report presents the full spectrum of results, for comparability with previous studies done in Ireland, notably: National Employment Survey 2007 - Supplementary Analysis; Foley & O'Callaghan[3]; and Kelly et al[4], greater emphasis is placed on weighted data. Greater emphasis is also given to the specification that includes the size of enterprise as a wage determining characteristic. In the view of CSO, this gives a better measure of the public-private wage differential than some of the alternatives, but again it must be stressed, there is no universal agreement on this point. The arguments for and against this approach are outlined in Foley & O'Callaghan (2009).

A number of other technical points should also be noted:

1. In so far as possible, analyses have been done on the basis of weekly 'contracted hours'. However, in a number of instances actual working hours vary from contracted hours. Typically these cases arise in occupations that require employees to be flexible, such as in the educational sector or occupations with shift-work or where 'stand-by' or 'emergency call out' is an integral condition of the job. In these cases, CSO has agreed a 'notional' contracted hours with employers or representative bodies.

2. Data for 2009 were collected directly as part of NES 2009. Data for 2010 were derived by updating the 2009 NES with changes to individual net incomes sourced from the Revenue Commissioners. While this approach incorporated changes to income, the hours worked are unchanged between 2009 and 2010 (see Background Notes).

3. Between 2007 and 2009 a number of organisational improvements were made to the NES. Most notably, the facility for enterprises to file statistical returns directly from their payroll software systems. This innovation has resulted in some discontinuities between 2007 and 2009 as the new system better identifies irregular payments and allowances.

4. These analyses do not take account of the pension levy introduced in 2009.

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[3] Foley, P. & F. O'Callaghan (2009), "Investigating the Public-Private Wage Gap in Ireland using Datafrom the National Employment Survey", *Journal of the Statistical and Social Inquiry Society of Ireland*, Vol. XXXIX, pp 23-52.
[4] Kelly, E., S. McGuiness and P. O'Connell (2009), "The Public-Private Sector Pay Gap in Ireland: What lies Beneath?", *ESRI Working Papers*, No. 321. Dublin, Ireland: The Economic and Social Research Institute.

Introduction

This report updates the National Employment Survey (NES) 2007 Supplementary Analysis which was published by the CSO in October 2009. It presents supplementary statistical analysis on the wage differential between the public and private sectors in Ireland for the years 2009 and 2010.

This statistical analysis takes into account the differences in characteristics of employees in both sectors. Sector of employment is not the only determinant of earnings; in this study, both the attributes of the employees (e.g. educational attainment, experience, hours worked etc.) and the characteristics of their employment (e.g. size of organisation) were used to further explore the wage differential between the two sectors. This analysis does not compare similar jobs between the public and private sectors. For example, An Garda Síochána and Defence Forces personnel are found exclusively within the public sector, while persons engaged in the Accommodation and Food Services and Industry & Construction are found exclusively in the private sector.

The range of estimates of the public/private sector pay-gap for all employees, and separately for males and females, are presented in this report. The trend in all the estimates is a reduction in the pay-gap over the period 2009/10. The public sector pension levy, introduced in 2009, is not included in these estimates, while the public sector pay cut introduced in 2010 is included in the 2010 estimates.

Table (I) Blinder-Oaxaca Decomposition estimates of the Public Sector Wage gap NES 2007, 2009, 2010

All employees - Males & Females

	Weighted		Unweighted	
	Including Size	**Excluding Size**	**Including Size**	**Excluding Size**
Year	**Wage gap**	**Wage gap**	**Wage gap**	**Wage gap**
2007	19.1%	25.1%	16.1%	21.7%
2009	14.0%	21.0%	14.4%	20.2%
[*]2010	11.1%	18.9%	10.4%	16.7%

Permanent, Full-time employees aged 25-59 years - Males & Females

	Weighted		Unweighted	
	Including Size	**Excluding Size**	**Including Size**	**Excluding Size**
Year	**Wage gap**	**Wage gap**	**Wage gap**	**Wage gap**
2007	12.6%	18.3%	10.8%	16.0%
2009	12.1%	17.2%	11.6%	16.5%
[*]2010	7.3%	14.1%	6.1%	11.6%

[*]Only includes employees working 10 or more hours per week and 50 or more weeks per year

Table (II) OLS Regression estimates of the Public Sector Wage gap NES 2007, 2009, 2010

Permanent, Full-time employees aged 25-59 years - Males & Females

	Weighted		Unweighted	
	Including Size	**Excluding Size**	**Including Size**	**Excluding Size**
Year	**Wage gap**	**Wage gap**	**Wage gap**	**Wage gap**
2007	13.8%	20.1%	10.1%	15.1%
2009	11.9%	19.1%	11.0%	16.6%
[*]2010	8.5%	17.0%	6.3%	12.6%

[*]Only includes employees working 10 or more hours per week and 50 or more weeks per year

The analyses were carried out on both weighted and un-weighted data. For comparability with the recent publication by Foley and O'Callaghan (2009), the main results presented in this report were based on weighted data and size as an explanatory variable as it is the opinion of the CSO that size is appropriately included for the public sector. It should be noted that there are issues surrounding the use of survey weights in multivariate analysis.

Summary of main findings

- Overall, the summary results show that, on average, public sector employees had higher educational attainment, longer service, were older, and were more likely to be in professional jobs than their counterparts in the private sector.

- The multivariate analysis provided a range of estimates of the public/private pay gap. The range of estimates provided reflect the fact that there is no unanimity in the international literature regarding the most appropriate model/parameters to use and as such no single best measure exists and to present one would be subjective and prone to over simplification. The pay gap estimates ranged from 6.1% to 18.9% for NES 2010 and all estimates showed a reduction in the pay gap between 2009 and 2010. *See Tables I and II.*

- Further analysis based on gender showed that the public sector pay gap ranged from 2.3% to 14.5% for males and for females it ranged from 9.2% to 20.4% in 2010. In 2009 the pay gap ranged from 7.9% to 17.2% for males and from 14.8% to 23.4% for females. *See Appendix C.*

- The distribution of weekly earnings in both the public and private sectors for permanent full-time employees aged 25-59 was also analysed. The earnings distribution for the private sector was more positively skewed than that for the public sector, i.e. there was a higher concentration of employees from the private sector at the lower end of the earnings distribution. *See Figure 1.16.*

- Further analysis of the differential at differing points throughout the earnings distribution for NES 2009 and 2010 showed that the public sector pay differential was largest at the lower end of the earnings distribution and generally decreased as earnings increased. *See Appendix D for detailed results.*

- The pay differential varied across the earnings distribution and the scale of the differential varied according to the parameters used. In 2010, analyses based on a quantile regression model (weighted and including size class of enterprise) for permanent full-time employees aged 25-59, showed a pay differential at the 1st percentile was 33%. The pay gap became negative (-0.4%) at the 82nd percentile (i.e. an annual salary of €60,900). The same analyses based on a weighted model excluding size class showed a pay differential at the 1st percentile of 50.6%. The pay gap became negative (-0.1%) at the 96th percentile (i.e. an annual salary of €96,000). *See Figure 2.4.*

- The gender pay gap in the public sector based on average hourly earnings was 12.1% higher for males than females, compared to 21.1% higher in the private sector in 2010. *See figure 1.12.*

Detailed Report

Data and Methodology

The National Employment Survey

The NES 2009 was a major workplace survey conducted by the CSO. The survey covered both the public and private sectors, the only excluded sectors being agriculture, forestry and fishing.

The purpose of the NES was to provide structural information on workplace issues, including earnings and factors influencing earnings. Information was collected in a linked and integrated way from a sample of employers and employees. For more detailed information see the CSO's NES 2008 and 2009 Publication and Background Notes.

Overall the number of respondent employees was equivalent to 4.5% of all relevant employees. The respondent enterprises represented approximately 5.5% of all enterprises. The data provided from employers and employees were then weighted to compensate for differing sampling fractions, non response and to gross up to the overall population. Non response rates were higher in the smaller size classes.

Data Analysis – NES 2009/2010

1.1 Distribution of employees (%) by educational attainment in the public and private sectors, October 2009

Educational attainment

% of employees

1.2 Distribution of employees (%) by occupation in the public and private sectors, October 2009

Occupation
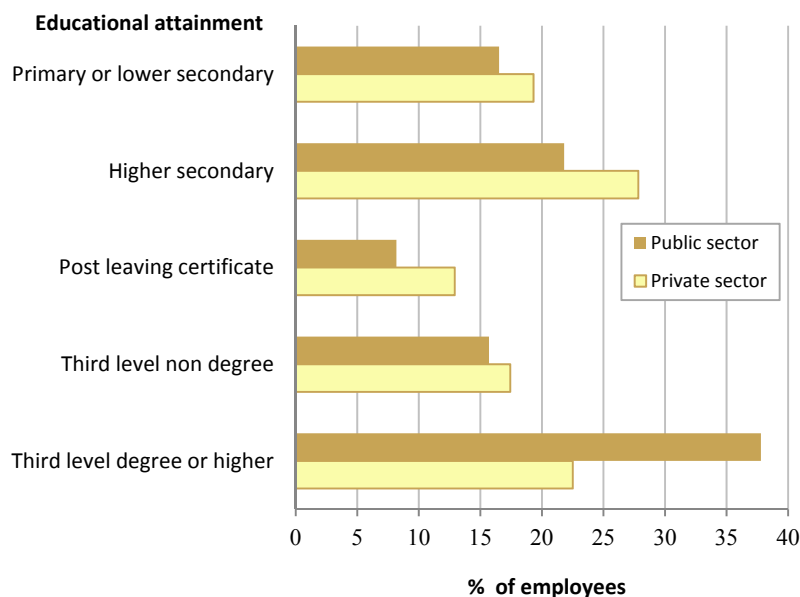
% of employees

- The characteristics of people working in the public and private sectors differ. An analysis of educational qualifications in the public and private sectors in 2009 showed that 37.8% of public sector employees had a third level degree or higher qualification compared with 22.5% in the private sector.

- Almost 19.3% of private sector employees had a primary or lower secondary qualification while in the public sector this figure was 16.5%.
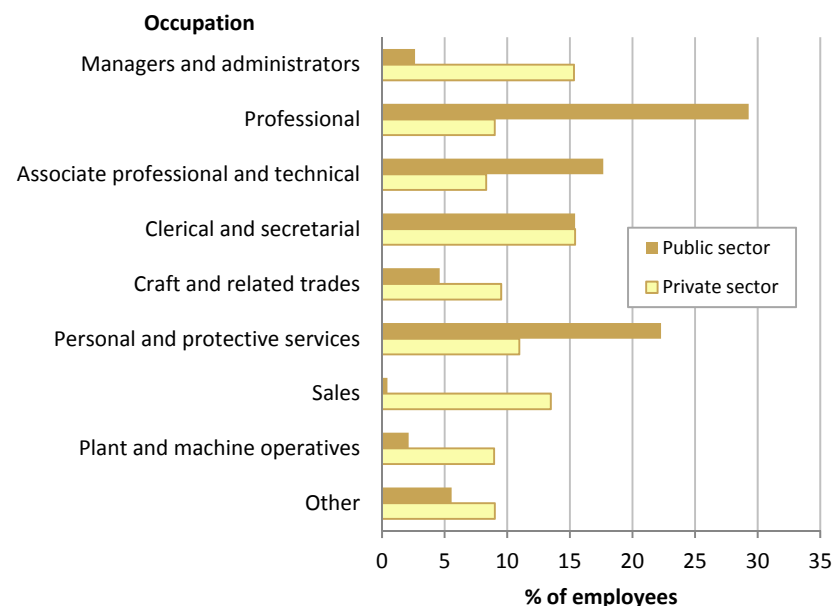
- There was also a noticeable difference in the structure of employment in the two sectors. In the private sector 15.3% of employees were Managers compared with 2.6% in the public sector.

- Almost 30% of public sector workers described themselves as Professional, compared with 9% in the private sector.

- In contrast, only 0.4% of public sector employees were categorised in Sales occupations whereas this figure was 13.5% in the private sector.

**1.3 Distribution of employees (%) by hourly earnings (€),
classified by occupation, October 2009**

Occupation

■ Less than €10 ■ €10 - €20 ■ €20 - €30 ■ €30 - €40 ■ €40 - €50 ■ €50 or more

**1.4 Distribution of employees (%) by mean weekly earnings (€),
classified by occupation, October 2009**

Occupation

■ Less than €400 ■ €400-<€800 ■ €800-<€1200 ■ €1200-<€1600 ■ €1600-<€2000 ■ €2000 or more
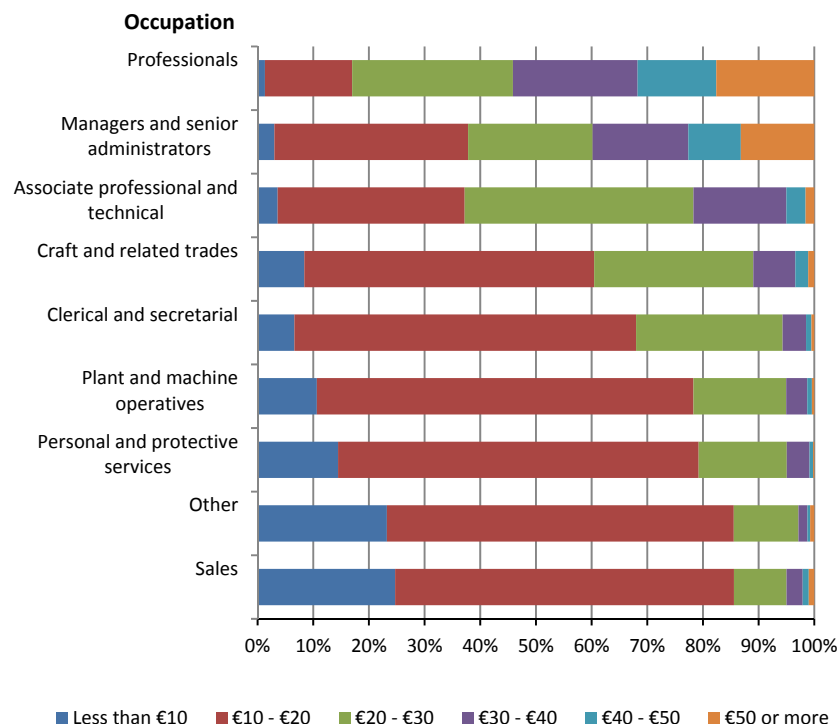
- Figure 1.3 illustrates how employees' hourly earnings were distributed by occupation. Professionals recorded the highest hourly earnings (€37.27) in October 2009. Almost a third of professionals earned €40 or more per hour, while only 1% earned less than €10 per hour.

- This contrasts with Sales occupations where a quarter of sales employees earned less than €10 per hour and only 2% earned over €40 per hour.
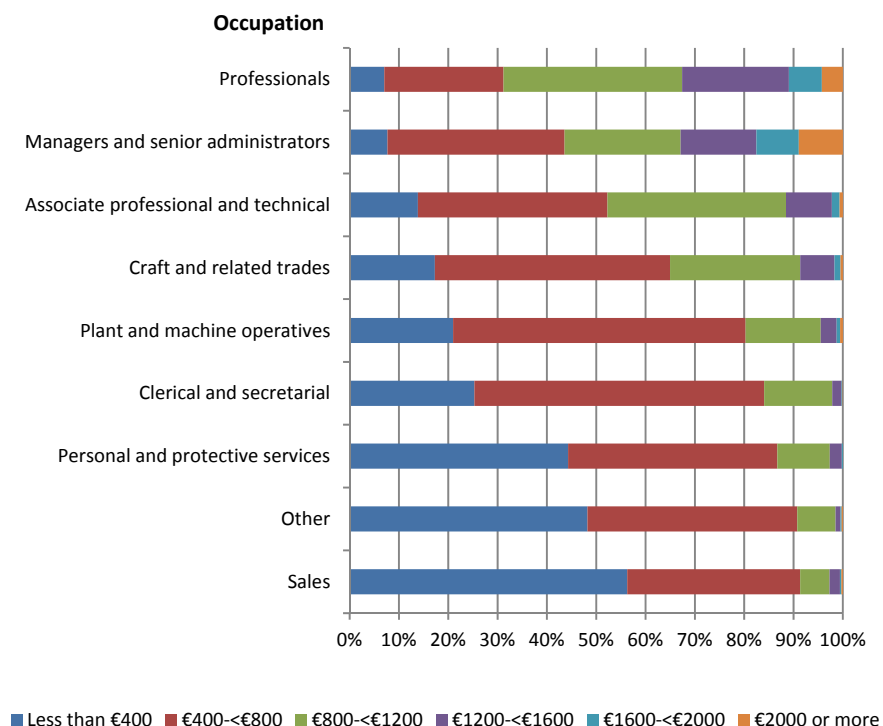
- Managers had the highest percentage of employees (8.9%) earning over €2,000 per week. Only 7.7% earned less than €400 per week.

- Professionals had the lowest percentage of employees (7%) earning €400 or less per week. However 4.2% of Professionals earned more that €2, 000 per week.

- Sales occupations had the highest percentage of employees (56.3%) earning less than €400 per week while less than 1% earned €2,000 or more per week.

1.5 Distribution of employees (%) by mean hourly earnings (€), classified by economic sector, October 2009

1.6 Distribution of employees (%) by mean weekly earnings (€), classified by economic sector, October 2009
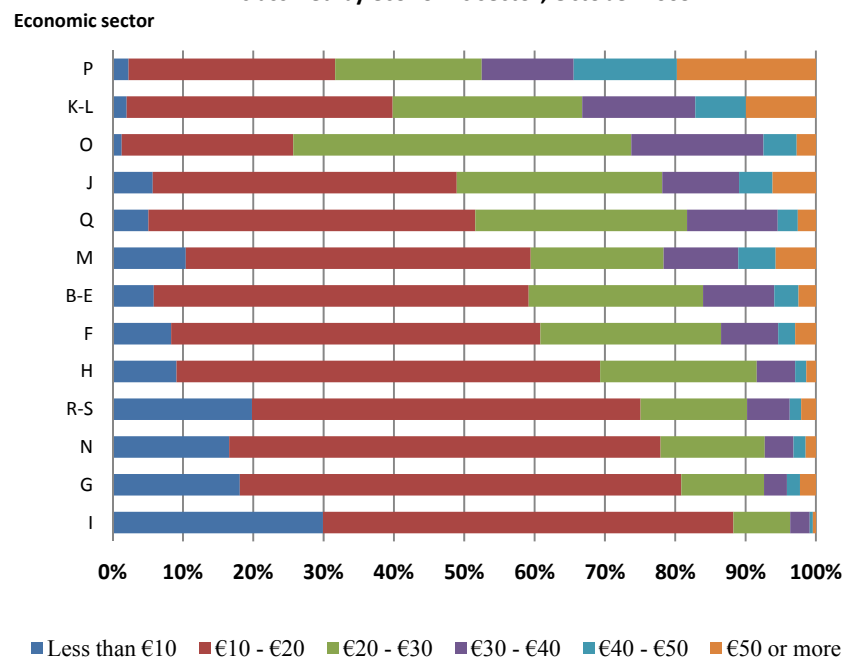
- Mean hourly earnings varied significantly across the economic sectors reflecting structural differences such as educational qualification, occupation, economic sector etc.

- The Education sector recorded the highest average hourly earnings (€34.55), followed by the Financial sector (€28.68). Both sectors along with the Public Administration and Defence sector had the lowest percentage of employees (2% or less) earning less than €10 per hour. This contrasts with the Accommodation and Food sector where around 30% of employees earned less than €10 per hour and less than 1% earned €50 or more per hour.
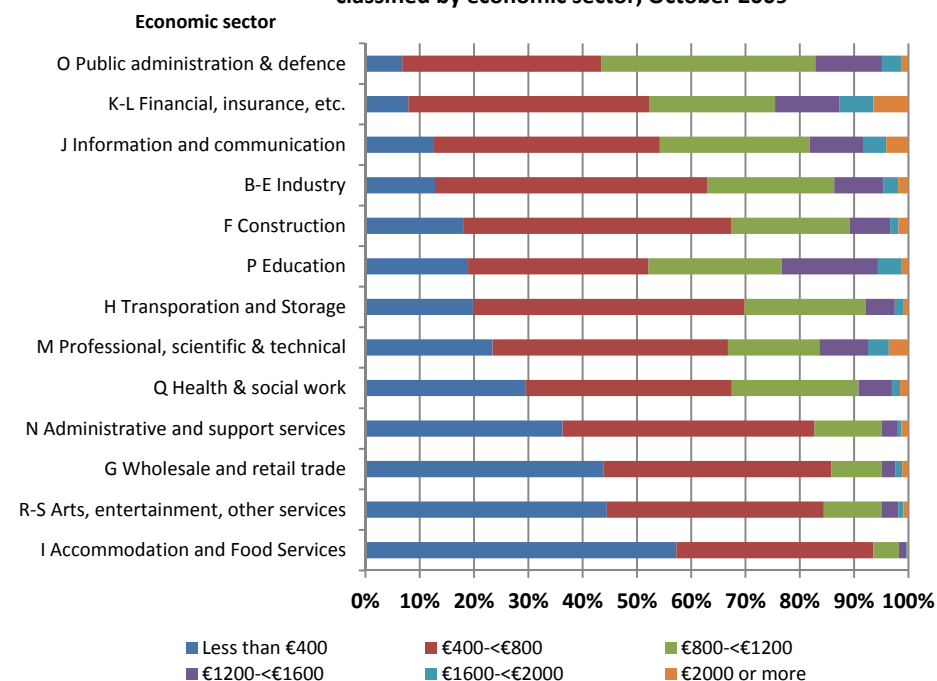
- Public administration & defence sector had the lowest percentage of employees (almost 7%) earning less than €400 per week. Almost 1.4% of employees earned over €2,000 per week.

- The Financial sector had the highest percentage of employees earning over €2,000 per week (6.4%).

- Accommodation and Food Services sector had the highest percentage of employees earning less than €400 per week. (57.3%).

1.7 Mean hourly earnings (€) classified by educational attainment and age, October 2009

Earnings per hour (€)

Age group (years)

Legend:
- Primary or lower secondary
- Higher secondary
- Post leaving certificate
- Third level non degree
- Third level degree or higher

1.8 Mean weekly earnings (€) classified by educational attainment and age, October 2009

Earnings per week (€)

Age Group (years)

Legend:
- Primary or lower secondary
- Higher secondary
- Post leaving certificate
- Third level non degree
- Third level degree or above

- The impact of higher qualifications on earnings is apparent when educational qualifications are combined with employee's age. Figure 1.7 shows that employees aged under 25 years with degrees or higher qualifications can expect their hourly earnings to increase by 2.5 times by the time they are in the 50-59 years age group.

- Employees aged under 25 years with non-degree third level qualifications can expect their earnings to almost double by the time they are aged 50-59 years.

- Employees with lower secondary education aged 50 – 59 years earned almost 30% more than similar employees aged under 25 years.
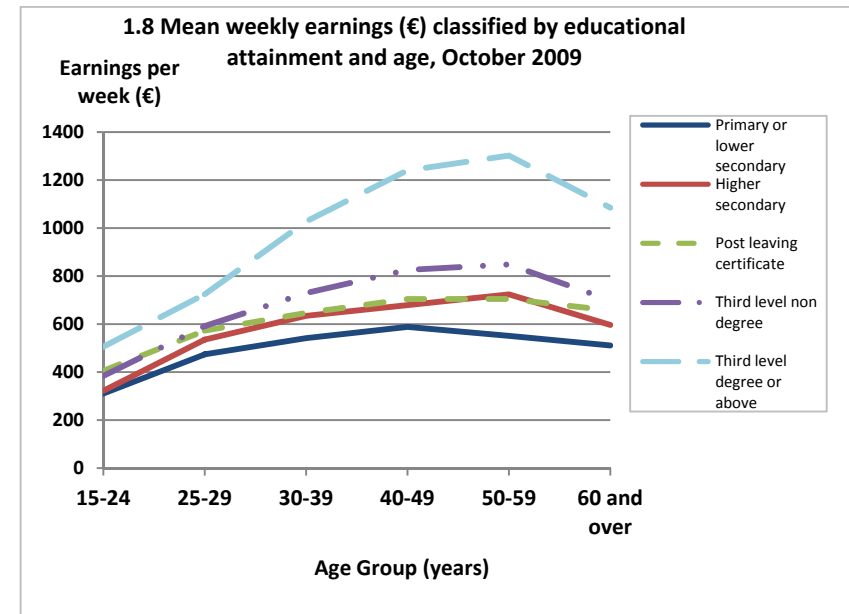
- Employees with third level degree or higher qualification aged 50-59 years, earned more than double the mean weekly earnings of those aged under 25 years.

- Employees with primary or lower secondary qualification aged 50-59 years earned approximately 80% more than the average weekly earnings of those aged under 25 years.

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1.9 Public Sector workforce classified by sex and employment status, 2009

18%

34%

46%

2%

- Male Full-time
- Male Part-time
- Female Full-time
- Female Part-time

1.10 Private Sector workforce classified by sex and employment status, 2009

18%

45%

30%

7%

- Male Full-time
- Male Part-time
- Female Full-time
- Female Part-time
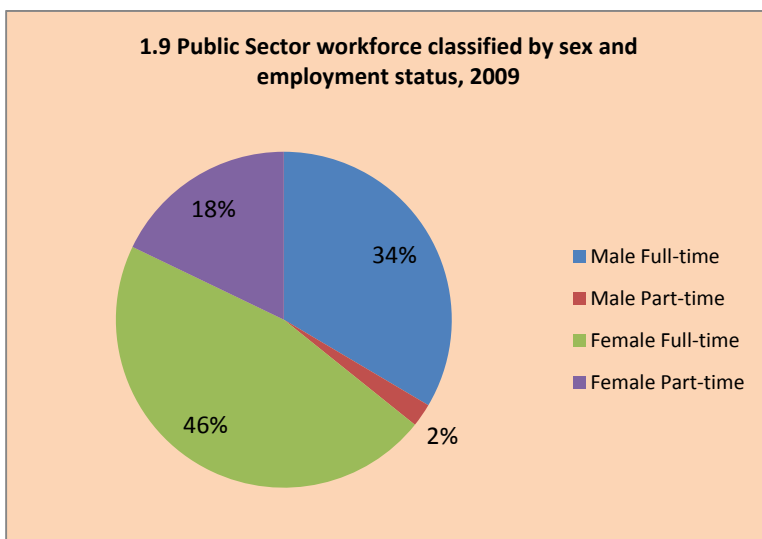
- The majority of employees in the public sector workforce were female in 2009. This is illustrated in Figure 1.9 showing the gender composition of public sector employees.

- Around two thirds (64%) of the public sector employees were female and around one third (36%) were male.

- Full-time females accounted for 46% of the public sector workforce, and 18% were part-time female.
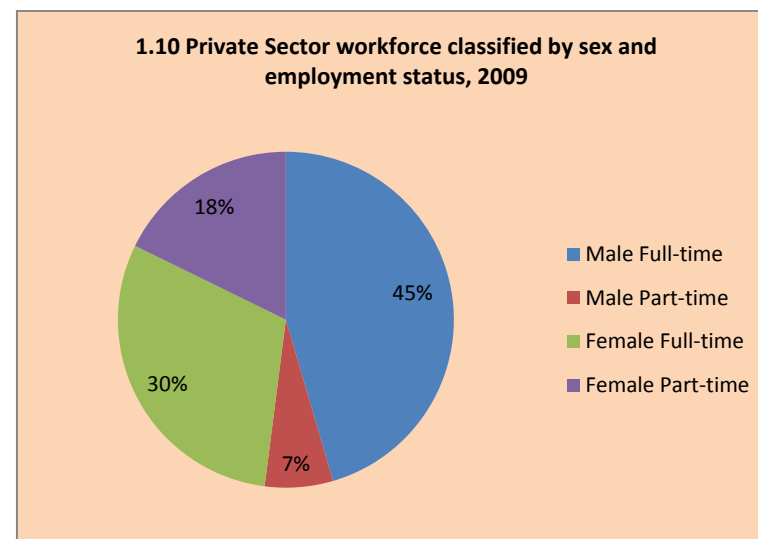
- The majority of employees in the private sector workforce were male in 2009.

- In the private sector 52% of the workforce were male and 48% were female.

- Full-time males accounted for 45% of private sector employees and full-time females accounted for 30%.

- Part-time females accounted for 18% of the private sector and part-time males accounted for 7%.

1.11 Descriptive Statistics NES 2009 - Weight data - All employees

Summary Data Means

	Male			Female			Total		
	Public	**Private**	**Total**	**Public**	**Private**	**Total**	**Public**	**Private**	**Total**
Earnings per week (€)	1,046.39	767.39	822.57	775.23	513.47	598.42	872.16	645.56	705.40
Earnings per hour (€)	31.79	21.61	23.63	27.58	17.26	20.61	29.09	19.53	22.05
Age (Years)	43.6	37.2	38.4	41.7	36.5	38.2	42.4	36.9	38.3
Length of service with current employer (Years)	16.4	8.3	9.9	12.1	6.9	8.6	13.6	7.6	9.2
Total time in all paid employment (Years)	23.6	16.9	18.2	18.0	13.8	15.1	20.0	15.4	16.6
Hours worked per week	34.9	35.6	35.4	28.8	29.7	29.4	31.0	32.7	32.3
Trade-union membership (%)	70.3	20.5	30.4	70.5	17.8	34.9	70.4	19.2	32.8
Professional body membership (%)	20.2	11.2	13.0	21.5	9.3	13.2	21.1	10.3	13.1
Working shifts (%)	30.9	25.3	26.4	18.7	22.5	21.2	23.0	24.0	23.7
Percentage supervising staff (%)	28.2	31.7	31.1	21.1	25.0	23.7	23.7	28.5	27.2

- Apart from differences in personal characteristics between public and private sector employees, there are also differences in occupations between the two sectors. For example it is not possible to match Gardaí, prison officers or members of the defence forces with equivalent jobs in the private sector. Similarly, occupations such as those associated with sales are not found in the public sector. This analysis does not attempt to match jobs across the sectors.

- The above table summarises the key estimates from the NES. These estimates are based on the weighted data.

- The average public service weekly earnings were €872.16 in 2009, compared with €645.56 in the private sector; over 35% higher.

- The corresponding pay gap for hourly earnings was almost 49%, with hourly earnings in the public sector at €29.09 and €19.53 in the private sector.

- The average pay differential for male hourly earnings was 47.1% (€31.79 in the public sector compared with €21.61 in the private sector) and for females it was 59.8% (€27.58 in the public sector compared with €17.26 in the private sector).

- Public sector earnings were on average 13.2% higher for males than for females, compared with 20.1% higher in the private sector.

- Employees in the private sector worked on average a longer week than those in the public sector. The average number of hours worked per week in the public sector was 31 hours compared with 32.7 hours in the private sector.

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1.12 Descriptive Statistics NES 2010 - Weighted data - All employees

Summary Data Means

	Male				Female				Total		
	Public	Private	Total		Public	Private	Total		Public	Private	Total
Earnings per week (€)	1,016.72	800.06	847.77		777.41	556.28	634.96		867.56	688.33	740.10
Earnings per hour (€)	29.62	21.37	23.19		26.03	16.86	20.12		27.38	19.30	21.64

*N.B. NES 2010 refers to employees working more than 10 hours per week and 50 or more weeks per year.

- Earnings data for the NES 2010 Survey were constructed by applying the Revenue Commissioners percentage change in annual earnings between 2009 and 2010 to the NES 2009 data. The NES 2010 data showed public sector weekly earnings of €867.56, 26% higher than the private sector weekly earnings (€688.33).

- The corresponding pay gap for hourly earnings was 41.9% with hourly earnings in the public sector at €27.38 compared to private sector earnings of €19.30.

- The public sector hourly earnings pay gap for males was 38.6% and for females was 54.4% in 2010.

- The gender pay gap was smaller in the public sector where hourly earnings were on average 12.1% higher for males than females, compared with 21.1% higher in the private sector in 2010.

1.13 Descriptive Statistics- NES 2009, 2010* - Weighted data - All employees

Summary Data Medians

	Male			Female			Total		
	Public	**Private**	**Total**	**Public**	**Private**	**Total**	**Public**	**Private**	**Total**
Earnings per week (€) - NES 2009	932.03	640.00	701.67	736.00	443.75	522.33	809.25	539.25	607.60
Earnings per week (€) - NES 2010	921.61	665.88	727.70	729.34	473.50	564.67	798.55	573.18	644.36
Earnings per hour (€) - NES 2009	25.81	17.31	18.87	23.93	14.15	16.83	24.63	15.59	17.82
Earnings per hour (€) - NES 2010	24.78	17.39	19.09	22.76	14.17	17.13	23.56	15.82	18.11

* The NES 2010 refers to employees working more that 10 hours per week and 50 or more weeks per year

- The median values are considered more robust measures where there are outliers, i.e. skewed distributions. The median value is the point which divides the distribution into two equal parts, i.e. 50% of employees are above this value, and 50% are below.

- The median value in the private sector in 2009 was €539.25 per week, compared with a value of €809.25 in the public sector.

- In 2010 the median value in the private sector was €573.18 per week, compared with a value of €798.55 in the public sector.

1.14 Distribution of Weekly Earnings (€), 2009

Percentiles of Earnings by Sector

Percentile	Public	Private	All
90%	1409.60	1180.50	1268.32
75%	1099.75	800.60	899.75
50%(Median)	809.25	539.25	607.60
25%	588.00	350.00	389.60
10%	336.50	189.75	210.00

1.15 Distribution of Weekly Earnings (€), 2010[*]

Percentiles of Earnings by Sector

Percentile	Public	Private	All
90%	1,347.11	1,230.68	1,279.60
75%	1,061.99	849.02	929.77
50%(Median)	798.55	573.18	644.36
25%	603.06	380.83	429.01
10%	425.89	231.70	264.40

* The NES 2010 refers to employees working more that 10 hours per week and 50 or more weeks per year

- The distribution of earnings also differs between sectors. This is apparent from the percentiles of the distribution of weekly earnings. The difference between the 75th and the 25th percentiles is commonly referred to as the Interquartile Range. It corresponds to the range of earnings into which the middle 50% of earners fall.

- In the public sector in 2009, 50% of employees earned weekly wages in the range €588.25 to €1,099.75, and in the private sector, 50% of employees earned weekly wages in the range €350.75 to €800.60.

- The 10% highest paid employees earned over €1,180.50 per week in the private sector and over €1,409.60 per week in the public sector in 2009.
- The 10% lowest paid earned €189.75 or less per week in the private sector and €336.50 or less per week in the public sector in 2009.

- The NES 2010 Interquartile Range for weekly earnings in the public sector was €603.06 to €1,061.99, and in the private sector the range was €380.83 to €849.02.

- The 10% highest paid employees earned over €1,230.68 per week in the private sector and over €1,347.11 per week in the public sector in 2010.

- The 10% lowest paid earned €231.70 or less per week in the private sector and €425.89 or less per week in the public sector in 2010
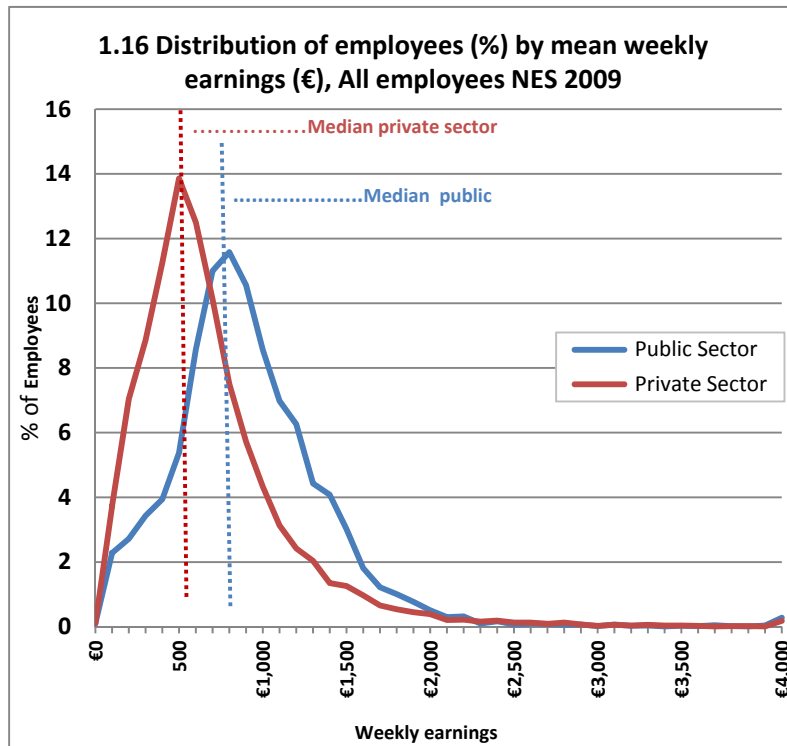
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1.16 Distribution of employees (%) by mean weekly earnings (€), All employees NES 2009

- - - - Median private sector

- - - - Median public

Public Sector
Private Sector

% of Employees

Weekly earnings

1.17 Distribution of employees (%) by mean weekly earnings, all employees - NES 2009

	a) Less than €400	b)€400- <€800	c)€800- <€1,200	d)€1,200- <€1,600	e)€1,600- <€2,000	f)€2,000 or more	Total
Public Sector	12.37	36.53	32.36	13.34	3.51	1.89	100
Private Sector	30.87	43.99	15.59	5.62	2.04	1.88	100

- The graph shows the distribution of weekly earnings in both the public and private sectors, for all employees. It is clear from the graph that the earnings distribution for the private sector was more positively skewed than that for the public sector. There was a higher concentration of employees from the private sector at the lower end of the earnings distribution.

- Almost 31% of employees in the private sector earned less than €400 per week in 2009, compared with 12% in the public sector.

- Three quarters (74.9%) of employees in the private sector earned less than €800 per week in 2009 compare with just under half (48.9%) of public sector employees.

- 9.5% of employees in the private sector earned €1,200 or more per week compared with 18.7% of employees in the public sector.

1.18 Distribution of employees (%) by mean hourly earnings (€) by NACE economic sector NES 2009

Earnings per hour (€)

Legend:
- P90-Highest 10% of earners
- Q3-Highest 25% of earners
- Mean
- Median
- Q1-Lowest 25% of earners
- P10-Lowest 10% of earners

1 B-E Industry
2 F Construction
3 G Wholesale and retail
4 H Transporation and Storage
5 I Accommodation and Food Services
6 J Information and communication
7 K-L Financial, insurance,
8 M Professional, scientific & technical
9 N Administrative and support services
10 O Public administration & defence
11 P Education
12 Q Health & social work
13 R-S Arts, entertainment, other services

NACE Rev.2 Economic Sector

- In the Education sector the highest 10% of earners earned over €68 per hour. Median earnings per hour were the highest in this sector with 50% of employees' earnings over €36 per hour.

- In the Financial sector the highest 10% of earners earned over €50 per hour. Median earnings per hour were highest in this sector with 50% of employees' earnings over €22 per hour.

- Employees in the Accommodation & Food sector showed the lowest median earnings of all sectors at €11.04 per hour.

1.19 Distribution of employees (%) by mean weekly earnings (€) by NACE economic sector NES 2009

Earnings per week (€)

Legend:
- P90-Highest 10% of earners
- Q3-Highest 25% of earners
- Mean
- Median
- Q1-Lowest 25% of earners
- P10-Lowest 10% of earners

1 B-E Industry
2 F Construction
3 G Wholesale and retail
4 H Transporation and Storage
5 I Accommodation and Food Services
6 J Information and communication
7 K-L Financial, insurance,
8 M Professional, scientific & technical
9 N Administrative and support services
10 O Public administration & defence
11 P Education
12 Q Health & social work
13 R-S Arts, entertainment, other services

NACE Rev.2 Economic Sector

- In the Financial sector the highest 10% of earners earned over €1,400 per week.

- The 25% highest paid employees in the Education sector earned over €1,100 per week.

- The highest average weekly earnings of €989 per week were in the Financial sector.

- Employees in the Education sector had the highest median earnings of all sectors at approximately €975 per week.

- In the Public administration & defence sector the lowest 25% of employees earned €478 per week or less.

22

Multivariate Analysis

Determinants of Earnings within Sector

Given the structural differences in employment between the sectors, it is helpful to look at each sector separately to examine the determinants of earnings. An analysis looking at the public sector only found that some of the main determinants of earnings were educational attainment, job occupation, full-time/part-time status, etc. These particular determinants were also found to be important in the private sector (although the contributions of these characteristics varied across the two sectors). In the public sector almost all organisations are large in size. In the private sector, the size of the enterprise was found to be a significant determinant of earnings, with people who work in large (250 or more employees) enterprises earning a pay gap over those working in small to medium enterprises.

Multivariate Analysis

Simple comparisons of weekly earnings, as presented earlier, do not take account of the differing composition of private sector and public sector employees with regard to education, gender, experience etc. It is important to control for all of these characteristics when drawing comparisons between public and private sector pay. This report presents a typical multivariate model which controls for relevant factors such as age, gender and education. This analysis did not attempt to match individuals across the two sectors, or to control for differences in job "types" etc. between the sectors. There may be other factors which impact on earnings for which we have no measures.

In accordance with the standard approach in the literature, the public-private wage differential was estimated in this analysis using the log of weekly earnings as the dependent variable. Weekly earnings are defined as gross earnings (before the deduction of tax, PRSI and superannuation) payable by organisations to its employees. It includes normal wages, salaries and overtime, taxable allowances, regular bonuses[5] and commissions, holiday and sick pay. It does not include benefit in kind, irregular bonuses and commissions, employer's PRSI, employer's pension contributions, redundancy payments or back pay.

The analyses were carried out on both weighted and unweighted data. For comparability with the recent publication by Foley and O'Callaghan (2009), the main results presented in this report were based on weighted data. Some results on analyses based on unweighted data are presented for comparison purposes in the Appendices.

It should be noted that there are issues surrounding the use of survey weights in multivariate analysis. Survey weights are designed to make the sample representative of the population so that summary statistics such as means and cross-tabulations will be unbiased. Their use in multivariate analyses involving correlations between variables is not straightforward. There are numerous problems associated with constructing accurate survey weights for use in regression analysis, see Gelman (2007), Fazio et al (2006) and Winship and Radbill (1994). The survey weights associated with the NES October 2009 were constructed based on NACE sector, education group, public-private sector, occupation, gender, full-time/part-time status and age group, and as most of these variables were already controlled for in the models presented here, the use of these survey weights may be problematic. For this reason, unweighted regression results are also presented in this report.

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[5]A regular bonus is defined as a bonus received every pay period although the amount may vary from period to period.

Three types of analyses are used:

    (a) Ordinary least squares regression (OLS)
    (b) Blinder-Oaxaca decompositions
    (c) Quantile regression

(a) OLS regression

An ordinary least square (OLS) regression was used to model the natural log of weekly earnings on a set of explanatory variables that account for some of the variation in earnings. Details of the OLS methodology are available in Appendix C. This standard OLS model is widely used in the analysis of gender and public-private wage gaps in both the national and international literature. The approach adopted in this report is similar to that used in Belman and Heywood (2004) and used the following explanatory variables:

(i) occupation, (ii) educational attainment, (iii) full-time status, (iv) gender, (v) public or private sector, (vi) nationality, (vii) membership of a trade union, (viii) membership of a professional body, (ix) age, (x) age-squared[6], (xi) size of enterprise, (xii) permanent/non-permanent job status, (xiii) length of service with current employer, (xiv) total length in employment, (xv) log [9]of overtime hours (38+) worked, (xvi)log7 of hours worked, (xvii) shift work and (xviii) supervisory status.

The approach is sometimes referred to as a hybrid approach (Belman and Heywood (1996), Bender and Elliott (2007)) in that it accounts both for differences in the characteristics of the employees in the two sectors, and for differences in the characteristics of the workplace. Models both including and excluding size of enterprise[8] as an explanatory variable were considered in this analysis, and while we focus on the results including size, full details of the models excluding size are included in Appendix C. In an analysis of the determinants of earnings (see Appendices) in the private sector the size of enterprise is found to be a significant factor in explaining earnings. Since public sector organisations are generally large (250 or more employees) organisations, and there is evidence that workers in large private organisations are paid more, the expectation is that including the size of enterprise as an explanatory variable will decrease the public sector pay gap. According to Chatterji and Mumford (2007) it is important to include workplace specific variables in the model to account for potential gains in the marginal product of labour arising from these variables, particularly in the private sector.

The analysis focuses on permanent full-time employees aged 25 – 59, which is a well established cohort in the published literature. Separate OLS regression equations were also estimated for males and females on each of these sub-groups.

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[6] Age-squared was used as an explanatory variable to capture the non-linear relationship between earnings and age.
[7] In line with Murphy and Ernst & Young (2007).
[8] Boyle, McElligott and O'Leary (2004) include firm size as an explanatory variable in their analysis of European Community household Panel (ECHP) 1994-2001 data. Murphy and Ernst & Young (2007) analyse models that include and exclude size separately. Kelly et al. (2009) exclude size as an explanatory variable.

(b) The Blinder-Oaxaca Decomposition

The public-private sector wage differential calculated using the OLS regression method, described above, is limited in the information it provides about the differential. While it takes account of individual characteristics, it assumes that the return on these characteristics is the same for both the public and private sectors.

In the Blinder-Oaxaca[9] method, separate OLS equations are calculated for the public and private sectors. Using the estimated parameters from the two models, the differential can be decomposed into the part that can be explained by the different attributes of individuals and the characteristics of their workplace in the public and private sectors with the remainder representing the unexplained part of the differential. This unexplained part of the decomposition can be interpreted as the public-private pay differential. For further details on the Blinder-Oaxaca decomposition, see Appendix C.

Although developed for analysis of gender earnings differentials, the Blinder-Oaxaca decomposition is currently considered the preferred method of calculating the public–private wage differential in the literature. In keeping with Foley and O'Callaghan (2009) and with Kelly et al (2009), the reference category[10] used for the Blinder-Oaxaca decompositions was the private sector.

(c) Quantile Regression

OLS regression is limited in the information that it can provide about earnings as it only estimates average earnings corresponding to the various explanatory variables. In Section 1 earlier, the differences in the distribution of earnings between public and private sectors were shown. Quantile regression is used when an estimate at various points in the distribution is required (quantiles or percentiles) rather than simply estimating the mean. It is widely used in the literature on the public-private sector wage gap as it allows us to examine how the public sector differential varies across the earnings distribution.

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[9]Blinder (1973), Oaxaca (1973).
[10]The Blinder-Oaxaca decomposition is not unique and the choice of reference group affects the results. Results were also calculated for the NES 2007 using the public sector as the reference group but these results negate the effect that size of enterprise has an explanatory variable. See NES 2007 Supplementary Analysis.

Results

2.1 Estimates of the Public Sector Wage gaps - Weekly earnings

(Size of enterprise included as an explanatory variable)

Weighted Results		Males & Females	Males	Females
All employees				
Blinder-Oaxaca Decomposition	2007	19.1%	14.8%	22.9%
	2009	14.0%	10.5%	16.4%
	*2010	11.1%	7.6.%	14.0%
Permanent Full-time Employees aged 25-59				
Blinder-Oaxaca Decomposition	2007	12.6%	10.4%	15.1%
	2009	12.1%	7.1%	13.9%
	*2010	7.3%	3.5%	11.8%
Permanent Full-time Employees aged 25-59				
OLS Regression	2007	13.8%	13.0%	13.9%
	2009	11.9%	10.4%	13.7%
	*2010	8.5%	5.4%	12.0%

*Only includes employees working 10 or more hours per week and 50 or more weeks per year

- The OLS regression results and the Blinder-Oaxaca decompositions are summarised in Tables 2.1a to 2.2b. Only the estimated public sector wage gaps[11] are presented in the tables. More detailed results including and excluding size of enterprise as an explanatory variable, are provided in Appendices.

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[11] The estimated wage gaps presented were derived from the estimated OLS regression coefficients and the unexplained component of the Blinder-Oaxaca decompositions. The wage gaps were calculated as the antilog of the coefficient minus 1.

- The figure shows that, on average, an employee in the public sector earned a higher wage, holding all other explanatory variables constant, compared with an employee in the private sector.

- The public sector pay gap differed for males and females, with males receiving a smaller pay gap than females in all of the instances modelled. The use of weighted data rather than unweighted data had the effect of increasing the estimated public sector wage gaps.

- If the size of enterprise is *included* as an explanatory variable then the Blinder-Oaxaca results show that for *all* employees the public sector there was a 14% earnings pay gap over those working in the private sector in 2009. The earnings pay gap for *all* males working in the public sector was on average 10.5% with a pay gap of 16.4% for *all* females in 2009.

- The NES 2010 results showed the public sector pay gap had reduced to 11.1% for all employees, 7.6% for males and 14% for females.

- In keeping with other published analyses on previous NES data, this report also looked at permanent, full-time employees aged 25–59. In 2009 the average wage received by public sector employees in this cohort was 12.1% higher than wages received in the private sector. The earnings pay gap for males in this cohort was on average 7.1%, and 13.9% for females.

- The NES 2010 results show that the pay gap for males and females had reduced to 7.3%.For males in this cohort it had reduced to 3.5% and 11.8% for females.

- The 2009 OLS regression results show a similar pay gap of 11.7% for permanent fulltime employees aged 25-59 years to that of the Blinder-Oaxaca. In 2010 the OLS pay gap of 8.5% is higher than the Blinder-Oaxaca pay gap.

2.2 Estimates of the Public Sector Wage gaps -Weekly earnings
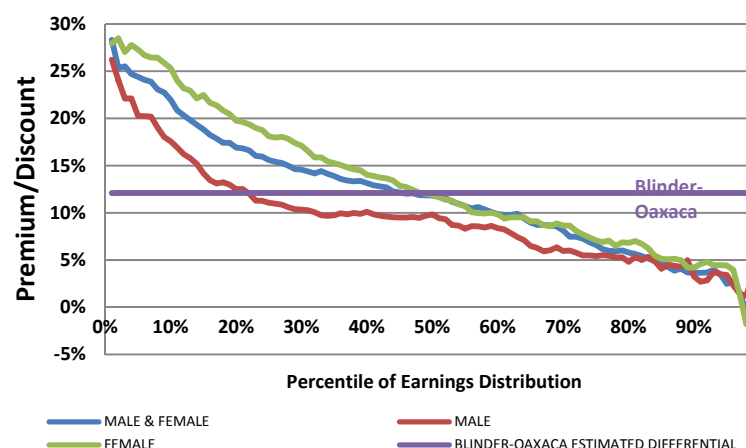**(Size of enterprise excluded as an explanatory variable)**

Weighted Results		Males & Females	Males	Females
All employees				
Blinder-Oaxaca Decomposition	**2007**	**25.1%**	**20.8%**	**29.6%**
	2009	**21.1%**	**17.8%**	**23.8%**
	*2010	**18.9%**	**16.0%**	**21.5%**
Permanent Full-time Employees aged 25-59				
Blinder-Oaxaca Decomposition	**2007**	**18.3%**	**16.2%**	**21.2%**
	2009	**17.2%**	**12.2%**	**20.3%**
	*2010	**14.1%**	**10.9%**	**18.2%**
Permanent Full-time Employees aged 25-59				
OLS Regression	**2007**	**20.1%**	**19.1%**	**21.4%**
	2009	**19.1%**	**17.2%**	**21.1%**
	*2010	**17.0%**	**14.5%**	**20.4%**

*Only includes employees working 10 or more hours per week and 50 or more weeks per year

- The above table shows that if the size of enterprise is *excluded* as an explanatory variable then the Blinder-Oaxaca decomposition results for 2009 show that for *all* employees, the difference received by the average public sector employee was 21.1% (reducing to 18.9% in 2010).

- The earnings pay gap in 2009 for *all* males working in the public sector was on average 17.8% (reducing to 16% in 2010) with a pay gap of 23.8% (reducing to 21.5% in 2010) for *all* females.

- When size of enterprise is excluded as an explanatory variable and permanent, full-time employees aged 25–59, were analysed for NES 2009 data, the difference received by the average public sector employee was 17.2% reducing to 14.1% in 2010. (See Appendices for unweighted results).
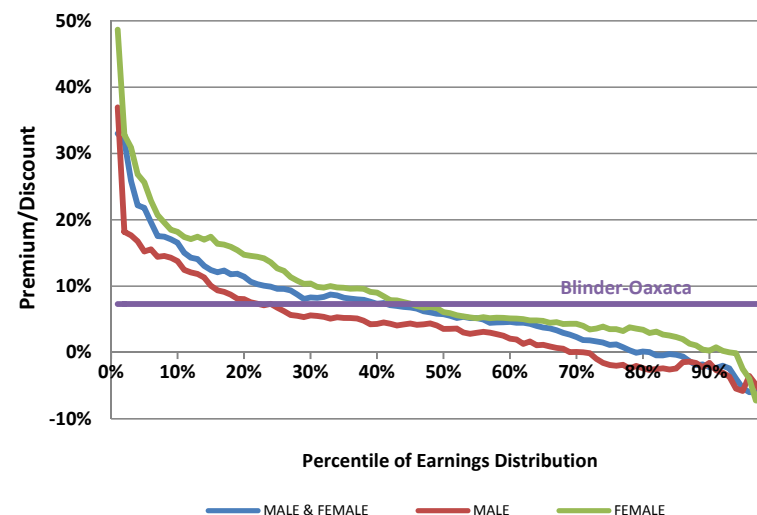
Quantile Regression Results 2009

2.3 Public service premia (%) across weekly earnings distribution for Permanent Full-time Employees aged 25-59 years- including size as an explanatory variable (weighted) 2009

MALE & FEMALE — MALE
FEMALE — BLINDER-OAXACA ESTIMATED DIFFERENTIAL

Quantile Regression Results 2010

2.4 Public sector wage gap (%) distribution - weekly earnings , permanent full-time employees aged 25-59 years - including size as an explanatory variable (weighted) 2010[*]

MALE & FEMALE — MALE — FEMALE

- This analysis was based on a regression model that included the size of enterprise as an explanatory variable. The quantile regression results show that the public sector pay gap was highest for those at the lower end of the earnings distribution.
- For males and females combined, the pay gap decreased consistently as earnings increased in 2009. At the 10th percentile of earnings the pay gap was 22%. At the 98th percentile the pay gap became a discount (i.e. private sector earnings were higher) of –0.6%. There was a pay gap of 1.3% at the 99th percentile.
- In 2009 for males the pay gap also decreased, from 17.6% at the 10th percentile to 3.2% at the 90th percentile. The public sector pay gap was higher for females at each of the percentiles across the earnings distribution (except the 89th, 97th to 99th percentile). The pay gap for females was 25.3% at the 10th percentile and 4.2% at the 90th percentile

- Results for 2010 show that the public sector pay gap for permanent full-time employees aged 25-59 was 16.5% at the 10th percentile and became a discount (-0.4%) at the 82nd percentile (i.e. employees earning over €60,900 per annum).

- For males in this cohort the pay gap at the 10th percentile was 13.8% and was a discount (-0.1%) at the 72nd percentile (i.e. employees earning over €55,900 per annum) in 2010.

- The pay gap for females in this cohort was 18.2% at the 10th percentile and became a discount (-0.1) at the 94th percentile (i.e. employees earning over €72,100 per annum) in 2010.

_____

[*] Only includes employees working 10 or more hours per week and 50 or more weeks per year

2.5 Public sector wage gap (%) distribution - weekly earnings , permanent full-time employees aged 25-59 years - incl. and excl. size as an explanatory variable (weighted) 2009
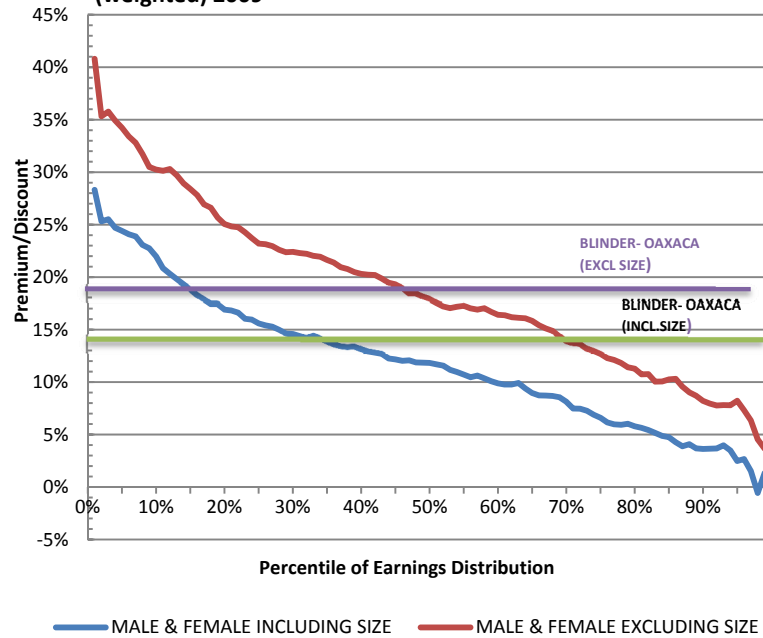

2.6 Public sector wage gap (%) distribution - weekly earnings , permanent full-time employees aged 25-59 years -incl and excl size as an explanatory variable (weighted) 2010

- The 2009 weighted quantile regression analysis, excluding size as an explanatory variable is shown in the graph. The pay difference for the public sector at the 10th percentile for permanent full-time employees aged 25-59 years was 30.3%, decreasing to 3.7% at the 99th percentile.

- In 2010 the pay gap, excluding size as an explanatory variable, for permanent full-time employees aged 25-59 years was 28.6% at the 10th percentile. This decreased to 2.5% at the 95th percentile and became a discount of -0.1% at the 96th percentile.

- Quantile regression results are given in the tables D5.1 and D6.1 in Appendix D.

Limitations

This analysis attempts to explain the different components that account for the public-private pay differential in weekly earnings in the NES October 2009. It is acknowledged that the estimated , is sensitive to the methodology adopted as well as to the specification of the model used. This report attempts to be transparent in the approach adopted.

While trade-union membership was statistically significant in explaining some of the variation in earnings, there are issues to be considered; firstly, there is a tendency for workers with a trade union presence to benefit from a company pay-policy influenced by trade-unions for all workers regardless of whether they are members or not, so the model here may understate the trade-union factor. Secondly, membership of trade-unions is considerably more prevalent in the public sector so there may be issues of collinearity between trade-union membership and sector. Similarly, within the private sector, non union membership is not necessarily coterminous with low rates of pay. However, according to Greene (2003) one has to counter this concern with the more serious issue of omitted variable bias; excluding this variable from the model may have the effect of biasing the public sector pay gap upwards. Trade union membership was included as an explanatory variable in all the models covered in this report.

This analysis did not attempt to match individuals across the two sectors, or to control for differences in job "types" etc. between the sectors.

Weekly earnings, as mentioned earlier, are gross earnings and only include normal wages, salaries and overtime, taxable allowances, regular bonuses and commissions, holiday and sick pay. This analysis does not take into account or make any allowances for benefit in kind, irregular bonuses and commissions, employer's PRSI, employer's pension contributions, redundancy payments or back pay.

Conclusions

The results presented in this report suggest that, on average, holding other characteristics and attributes constant, employees in the public sector earned more than employees in the private sector. The public sector pay gap varied for males and females with males having a smaller pay gap than females. The estimation of the public sector pay gap is influenced by the model selection, with the exclusion of the size of enterprise as an explanatory variable increasing the gap.

Including the size of enterprise as an explanatory variable, the Blinder-Oaxaca decomposition results for 2009 showed that the public sector received 14% above those working in the private sector (this pay gap had reduced to 11.1% in 2010). The earnings pay gap for all males working in the public sector in 2009 was on average 10.5% (in 2010 the figure was 7.6%), with a pay gap of 16.4% in 2009 for all females (reducing to 14% in 2010). This analysis also focused on permanent, full-time employees aged 25-59 years and yielded a public/private sector pay gap of 12.1% (7.1% for males and 13.9% for females). The corresponding 2010 figure for permanent full-time employees age 25-59 was 7.3% (3.5% and 11.8% for males and females, respectively).

The data was also modelled using quantile regression. These results showed that the 2009 pay gap was highest at the lower end of the earnings distribution and, in general, decreased as earnings increased. For permanent full-time employees aged 25-59 the figure was 22% at the 10th percentile (reducing to 16.5% in 2010). The differential became negative (-0.6%) at the 90th percentile in 2009 and became negative (-0.4%) at the 82nd percentile in 2010.

Background Notes

<u>NES 2009</u>

Only employers with more than three employees were surveyed. Employers were required to have been trading in the reference month of October in 2009. Sampled employees were required to have been employed in the reference month of October in 2009.

The NES sample of employers was selected from the CSO Central Business Register. The sample was selected based on the proportion of companies in each economic sector (NACE Rev 1.1 two digit sector) and in each size class. The employers were asked to select a systematic sample of employees from their payrolls. The table below outlines the number of employers and employees sampled for each size group of business unit:

Size of Enterprise	No of employers sampled	No. Employees sampled
3-9	1 in 20	All
10-19	1 in 10	All
20 - 49	1 in 7	1 in 2
50 - 99	1 in 4	1 in 3
100 - 249	1 in 2	1 in 7
250 - 999	All	1 in 10
1000 +	All	1 in 20

The responding employers returned the employer questionnaire that contained a list of the names of sampled employees to the CSO who were then contacted and asked to return a questionnaire directly to the CSO.

<u>NES 2010</u>

 The NES 2009 survey was used to construct the NES 2010 data by applying Revenue Commissioners income changes to the NES 2009 data. An analysis of employees' net incomes from Revenue Commissioners data was carried out to calculate the percentage change in incomes between 2009 and 2010. This percentage change was then applied to the 2009 NES data to create the NES 2010 data. Therefore the NES 2010 hours worked are unchanged from the 2009 NES data, but the earnings have been adjusted to follow Revenue Commissioners income trends.

The standard approach for comparisons is to match the data for employees who work for 10 or more hours per week and work for 50 or more weeks per year. Also employees whose Revenue Commissioners net income in 2010 were outside a 40% range of their 2009 Revenue Commissioners net income were excluded.This is the criteria under which the NES 2010 data is analysed.

Table (IV) NES 2010[*] - Annual Percentage change in earnings compared with NES 2009[*]

Public/Private Sector	Average hourly earnings	Average weekly earnings	Average Gross annual earnings
	%	%	%
Private Sector	-4.3	-3.7	-4.5
Public Sector	-7.1	-6.7	-7.5
Total	-5.1	-4.6	-5.4

[*]Only includes employees working 10 or more hours per week and 50 or more weeks per year

NES 2009[*] - Average Earnings

Public/Private Sector	Average hourly earnings	Average weekly earnings	Average Gross annual earnings
	€	€	€
Private Sector	20.16	714.81	38,216
Public Sector	29.48	930.09	49,217
Total	22.8	775.8	41,333

[*]Only includes employees working 10 or more hours per week and 50 or more weeks per year

NES 2010[*]- Average Earnings

Public/Private Sector	Average hourly earnings	Average weekly earnings	Average Gross annual earnings
	€	€	€
Private Sector	19.3	688.33	36,508
Public Sector	27.38	867.56	45,532
Total	21.64	740.1	39,114

[*]Only includes employees working 10 or more hours per week and 50 or more weeks per year

Key for NACE codes Economic Sectors (NACE Rev.2)
B-E Industry
F Construction
G Wholesale and retail trade; repair of motor vehicles and motorcycles
H Transportation and Storage
I Accommodation and Food Services
J Information and communication
K-L Financial, insurance and real estate
M Professional, scientific & technical
N Administrative and support services
O Public administration & defence
P Education
Q Human health & social work
R-S Arts, entertainment, recreation and other service activities

Appendix A

Summary Statistics for Permanent Full-Time Employees Aged 25-59 Years

- As well as earnings data, the NES 2009 contained a wide range of data on the background characteristics of each individual employee (see Appendix B for more details and definitions of the variables collected). The profiles of the public sector and private sector permanent full-time employees aged 25-59 years differed in a number of ways.

- An analysis of educational qualifications in the public and private sectors showed that 41.1% of public sector employees had a third level degree or higher qualification compared with 27.2% in the private sector.

- In the private sector 16.7% of employees had a primary or lower secondary qualification while in the public sector, this figure was 13.7%.

A.1 Distribution of permanent full-time employees aged 25-59 years (%) classified by educational attainment in October 2009
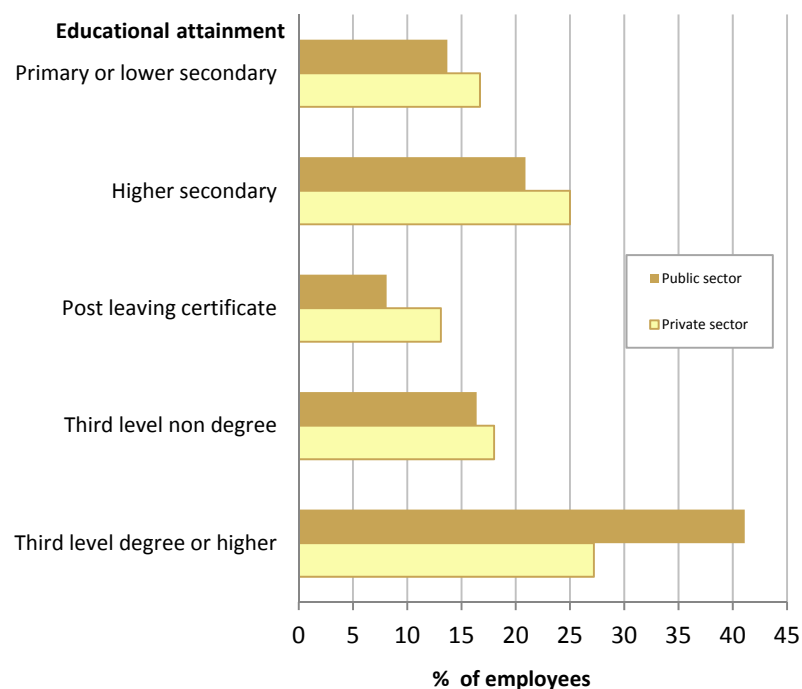
A.2 Distribution of permanent full-time employees aged 25-59 years (%) classified by occupation in the public and private sectors, October 2009

Occupation
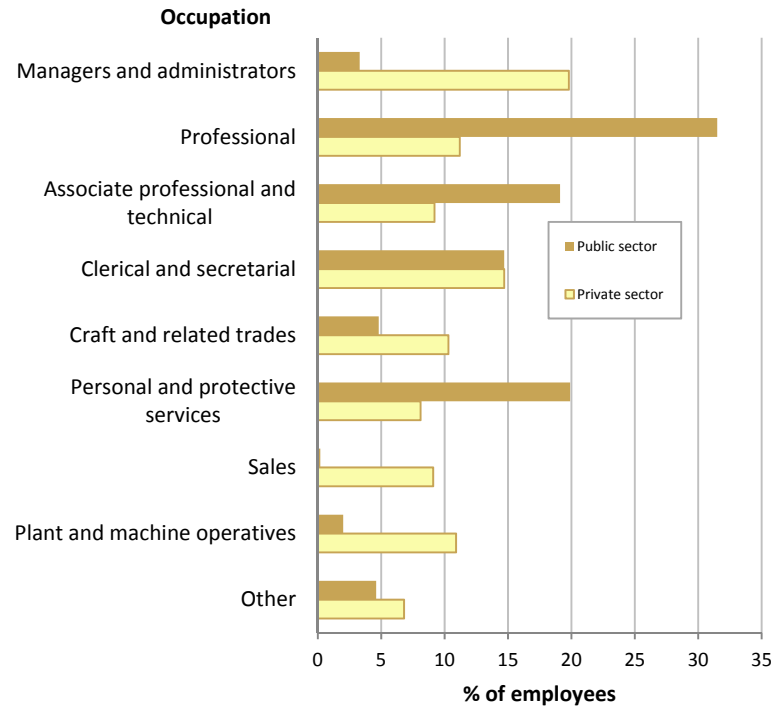
% of employees

- There was also a noticeable difference in the structure of employment between the public and private sectors, for permanent, full-time employees aged 25-59 years.

- In the private sector 19.8% of employees were Managers compared with 3.3% in the public sector.

- Around 32% of public sector workers described themselves as Professional, compared with 11.2% in the private sector.

- In contrast, only 0.2% of public sector employees were categorised in Sales occupations whereas this figure was 9.1% in the private sector.

A.3 Descriptive Statistics- NES 2009 - Permanent, full time employees aged 25-29 years – Weighted data

Summary Data - Means

	Male			Female			Total		
	Public	**Private**	**Total**	**Public**	**Private**	**Total**	**Public**	**Private**	**Total**
Earnings per week (€)	1,120.67	884.20	934.63	926.11	696.31	784.90	1,004.74	811.09	867.37
Earnings per hour (€)	33.34	23.65	25.71	29.65	19.78	23.58	31.14	22.14	24.76
Age (Years)	43.4	38.0	39.2	40.5	36.5	38.0	41.7	37.4	38.7
Length of service with current employer (Years)	17.4	9.1	10.9	13.0	7.8	9.8	14.8	8.6	10.4
Total time in all paid employment (Years)	24.1	18.1	19.4	18.5	15.0	16.4	20.7	16.9	18.0
Hours worked per week	35.8	38.1	37.6	32.6	35.9	34.6	33.9	37.2	36.3
Trade-union membership (%)	73.3	22.7	33.5	75.3	20.2	41.4	74.5	21.7	37.1
Professional body membership (%)	21.8	13.0	14.9	23.5	13.1	17.1	22.8	13.0	15.9
Working shifts (%)	32.5	23.7	25.6	17.8	20.2	19.3	23.7	22.3	22.7
Percentage supervising staff (%)	31.4	37.3	36.0	24.8	34.7	30.9	27.5	36.3	33.7

- This table presents a summary of some of the information collected in the NES 2009. The summary statistics are based on the weighted sample data.

- For permanent full-time employees aged 25-59 years the average public sector weekly earnings were over 23.9% higher than the private sector. The corresponding pay gap for hourly earnings was almost 40.7%. The male public sector pay gap for hourly earnings was 41% and for females it was 49.9% in 2009. The average hourly earnings for males was €25.71 and €23.58 for females.

- In 2009 the gender pay gap was smaller in the public sector where the average hourly earnings were on average 11.1% higher for males than for females, compared with 16.4% higher in the private sector.

- Public sector employees tended to be older that those in the private sector; in 2009 the average age in the public sector was 41.7 years, compared with 37.4 in the private sector.

- In 2009 employees in the public sector had spent on average 14.8 years with their current employer. This figure was 8.6 years for the private sector. Similarly, public sector employees had more overall experience than those in the private sector, with 20.7 years in total paid employment compared with 16.9 years for the private sector.

- Employees in the private sector worked on average a longer week than those in the public sector. The average number of hours worked per week in 2009 in the public sector was 33.9 hours compared with 37.2 hours in the private sector.

A.4 Descriptive Statistics- NES 2010 - Permanent, full time employees aged 25-29 years – Weighted data

Summary Data - Means

	Male			Female			Total		
	Public	Private	Total	Public	Private	Total	Public	Private	Total
Earnings per week (€)	1,058.10	874.01	915.88	871.84	691.95	764.18	948.48	803.81	847.98
Earnings per hour (€)	30.89	22.90	24.71	27.55	19.04	22.46	28.92	21.41	23.70

- For permanent full-time employees aged 25-59 years the average public sector weekly earnings were 18.0% higher in 2010 than in the private sector.   The corresponding pay gap for hourly earnings was 35.0% in 2010.

- The public sector pay gap for hourly earnings for males was 34.9% and for females it was 44.7% in 2010.

- In 2010 the gender pay gap was 10.8% in the public sector, but in the private sector it was 16.9%.

A.5 Descriptive Statistics- NES 2009,2010 - Permanent, full time employees aged 25-29 years – Weighted data

Summary Data - Medians

	Male			Female			Total		
	Public	Private	Total	Public	Private	Total	Public	Private	Total
Earnings per week (€)-NES 2009	1,002.75	735.60	797.00	873.00	600.00	699.75	927.00	678.00	755.40
Earnings per week (€)-NES 2010	962.68	727.00	786.70	817.38	593.54	693.88	872.64	672.60	739.87
Earnings per hour (€)-NES 2009	27.84	19.23	20.82	25.87	16.43	19.74	26.57	18.12	20.31
Earnings per hour (€)-NES2010	26.06	18.81	20.51	24.17	16.07	19.24	24.91	17.62	19.89

- For permanent full-time employees aged 25-59 the median public sector weekly earnings (€927) were 36.7% higher than the private sector (€678) in 2009. This difference had reduced to 29.7% in 2010.

- The difference in median hourly earnings between the public (€26.57) and private (€18.12) sectors was 46.6 % in 2009. This figure for 2010 was 41.4%.
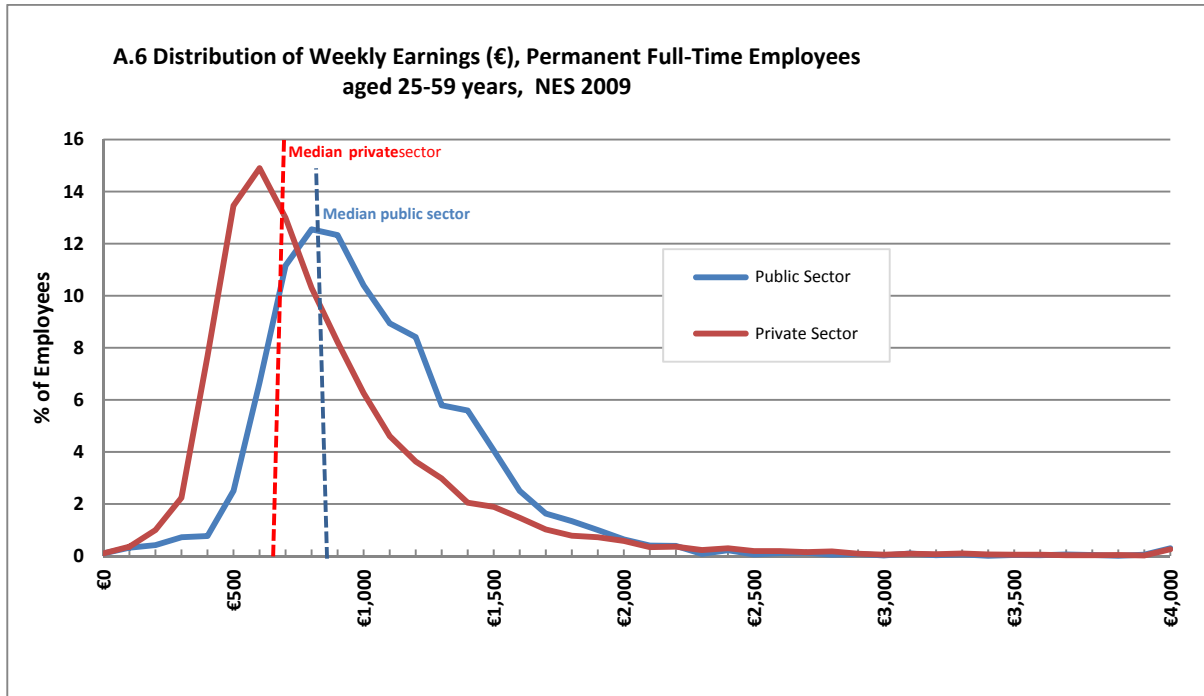
A.6 Distribution of Weekly Earnings (€), Permanent Full-Time Employees aged 25-59 years, NES 2009

- The graph shows the distribution of weekly earnings in both the public and private sectors in 2009 for permanent, full time employees aged 25-59 years. It is clear from the graph that the earnings distribution for the private sector was more positively skewed than that for the public sector. There was a higher concentration of employees from the private sector at the lower end of the earnings distribution.

Appendix B

Variable Definitions & Interpretation of Regression Results

Earnings

This is defined as gross earnings (before the deduction of tax, PRSI, superannuation) payable by organisations to its employees. It includes normal wages, salaries and overtime, taxable allowances, regular bonuses and commissions, holiday and sick pay. It does not include irregular bonuses and commissions, employer's PRSI, redundancy payments and back pay.

Hours

This is defined as total paid contracted hours plus paid overtime hours. It includes paid leave and excludes unpaid leave and unpaid overtime.

Nationality

Irish: Republic of Ireland.

EU15 excluding Ireland: Great Britain and Northern Ireland, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Netherlands, Italy, Luxembourg, Portugal, Spain, and Sweden.

Accession States EU15 to EU27: Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, and Slovenia.

Other nationalities: All other nationalities not included in the above three groupings as well as those who could not be coded (the uncoded employees represented approximately 1.2% of all employees).

Public Sector

The Public Sector includes:

- Civil Service;
- Defence Forces;
- Garda Síochána;
- Local Authorities;
- Education (excluding private institutions)
- Regional Bodies
- Health (excluding private institutions)
- Semi-State Bodies (excluding their subsidiary companies)

Appendix C – Detailed Regression Results

C.1 Estimates of the Public Sector Wage gaps *(Size of enterprise included as an explanatory variable)*

Unweighted

Estimated Public Sector Pay gap (weekly earnings)		Males & Females	Males	Females
All employees				
Blinder-Oaxaca Decomposition	**2007**	16.1%	10.5%	21.3%
	2009	14.4%	10.2%	17.2%
	*2010	10.4%	7.1%	13.1%
Permanent Full-time Employees aged 25-59				
Blinder-Oaxaca Decomposition	**2007**	10.8%	8.1%	14.3%
	2009	11.6%	7.9%	14.8%
	*2010	6.1%	2.3%	10.4%

*Only includes employees working 10 or more hours per week and 50 or more weeks per year

C.2 Estimates of the Public Sector Wage gaps *(Size of enterprise excluded as an explanatory variable)*

Unweighted

Estimated Public Sector Pay gap (weekly earnings)		Males & Females	Males	Females
All employees				
Blinder-Oaxaca Decomposition	**2007**	21.7%	16.6%	26.5%
	2009	20.2%	16.1%	23.4%
	*2010	16.7%	13.4%	19.7%
Permanent Full-time Employees aged 25-59				
Blinder-Oaxaca Decomposition	**2007**	16.0%	13.7%	19.2%
	2009	16.5%	12.7%	20.1%
	*2010	11.6%	7.8%	16.2%

*Only includes employees working 10 or more hours per week and 50 or more weeks per year

C.3 OLS Regression estimates of the Public Sector Wage gaps NES 2007, 2009,2010[*]

Permanent, Full-time employees aged 25-59 years

	Males & Females							
	Weighted				Unweighted			
	Including Size		Excluding Size		Including Size		Excluding Size	
Year	Pay gap	t-value	Pay gap	t-value	Pay gap	t-value	Pay gap	t-value
2007	13.8%	21.38	20.1%	32.51	10.1%	16.56	15.1%	25.79
2009	11.9%	21.37	19.1%	35.04	11.0%	19.35	16.6%	29.97
2010	8.5%	11.49	17.0%	23.73	6.3%	8.62	12.6%	17.85

	Males							
	Weighted				Unweighted			
	Including Size		Excluding Size		Including Size		Excluding Size	
Year	Pay gap	t-value	Pay gap	t-value	Pay gap	t-value	Pay gap	t-value
2007	13.0%	14.02	19.1%	21.58	7.3%	8.7	12.6%	15.42
2009	10.4%	12.7	17.2%	21.45	8.3%	10	13.5%	16.84
2010	5.4%	5.12	14.5%	14.04	3.7%	3.56	10.0%	9.97

	Females							
	Weighted				Unweighted			
	Including Size		Excluding Size		Including Size		Excluding Size	
Year	Pay gap	t-value	Pay gap	t-value	Pay gap	t-value	Pay gap	t-value
2007	13.9%	15.32	21.4%	24.54	12.9%	14.79	17.9%	21.47
2009	12.8%	17.1	21.1%	28.78	13.5%	17.63	19.9%	26.68
2010	12.0%	11.73	20.4%	20.5	9.2%	9.09	16.0%	16.18

[*]Only includes employees working 10 or more hours per week and 50 or more weeks per year

C.4 OLS Regression estimates of the Public Sector Wage gaps: NES 2009, 2010[*]
Commercial Semi State Sectors included with the Private Sector

Permanent, Full-time employees aged 25-59

	Males & Females							
	Weighted				**Unweighted**			
	Including Size		**Excluding Size**		**Including Size**		**Excluding Size**	
Year	**Pay gap**	**t-value**	**Pay gap**	**t-value**	**Pay gap**	**t-value**	**Pay gap**	**t-value**
2009	10.8%	19.73	17.2%	31.51	10.5%	18.45	15.5%	27.84
2010	6.7%	9.29	14.1%	19.82	5.1%	7.08	10.8%	15.23

	Males							
	Weighted				**Unweighted**			
	Including Size		**Excluding Size**		**Including Size**		**Excluding Size**	
Year	**Pay gap**	**t-value**	**Pay gap**	**t-value**	**Pay gap**	**t-value**	**Pay gap**	**t-value**
2009	10.2%	12.28	16.0%	19.17	8.2%	9.85	12.9%	15.6
2010	4.1%	3.93	11.6%	10.97	2.7%	2.59	8.2%	7.99

	Females							
	Weighted				**Unweighted**			
	Including Size		**Excluding Size**		**Including Size**		**Excluding Size**	
Year	**Pay gap**	**t-value**	**Pay gap**	**t-value**	**Pay gap**	**t-value**	**Pay gap**	**t-value**
2009	10.7%	14.73	18.6%	25.81	12.1%	16.08	18.3%	24.61
2010	9.7%	9.7	17.6%	18.07	7.7%	7.69	14.1%	14.39

[*] Only includes employees working 10 or more hours per week and 50 or more weeks per year

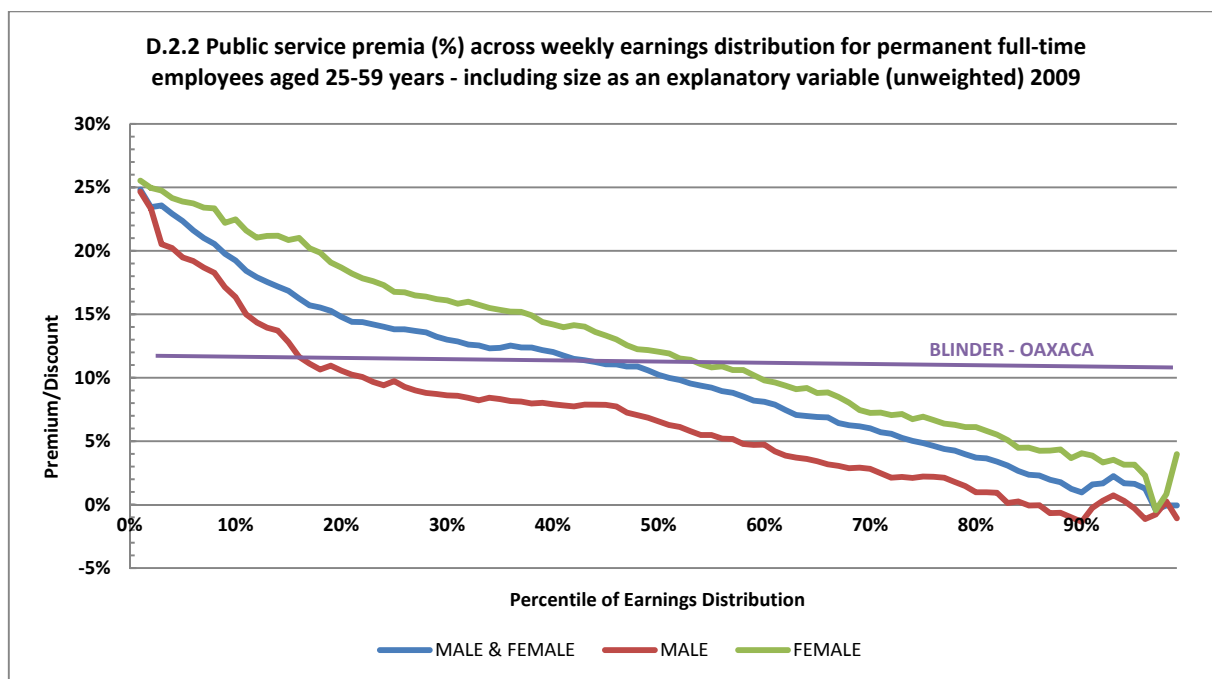# Appendix D – Quantile Regression Results

Public Sector Pay gap/Discount

DATA 2009

D.1 Quantile regression model: Including size of enterprise as an explanatory variable NES 2009
Permanent full-time employees aged 25-59 (weighted results) 2009

Percentile	Males & Females		Males		Females	
	Estimate	t Value	Estimate	t Value	Estimate	t Value
10%	0.22	18.70	0.18	11.99	0.25	16.18
20%	0.17	22.71	0.13	10.07	0.20	17.5
30%	0.15	19.24	0.10	9.87	0.17	15.71
40%	0.13	18.09	0.10	9.95	0.14	13.74
50%	0.12	14.61	0.10	9.05	0.12	12.3
60%	0.10	12.09	0.08	6.9	0.10	9.68
70%	0.08	9.28	0.06	5.15	0.09	7.59
80%	0.06	6.02	0.05	3.04	0.07	6.54
90%	0.04	3.74	0.03	1.61	0.04	2.9

D.2.1 Quantile regression model: Including size of enterprise as an explanatory variable – NES 2009
Permanent full-time employees aged 25-59 (unweighted results) 2009

Percentile	Males & Females		Males		Females	
	Estimate	t Value	Estimate	t Value	Estimate	t Value
10%	0.192	22.90	0.164	14.45	0.225	20.16
20%	0.148	27.31	0.106	12.04	0.187	22.33
30%	0.130	22.37	0.086	10.36	0.161	18.97
40%	0.120	22.51	0.079	8.79	0.142	19.68
50%	0.102	17.69	0.066	7.53	0.121	17.03
60%	0.081	15.04	0.047	5.35	0.098	12.87
70%	0.060	10.59	0.028	3.53	0.072	9.75
80%	0.037	5.82	0.010	0.94	0.061	8.11
90%	0.010	1.24	-0.013	-1.01	0.040	3.81

D.2.2 Public service premia (%) across weekly earnings distribution for permanent full-time employees aged 25-59 years - including size as an explanatory variable (unweighted) 2009

DATA 2010

D.3 Quantile regression model: Including size of enterprise as an explanatory variable - NES 2010[*]

Permanent full-time employees aged 25-59 (weighted results) 2010

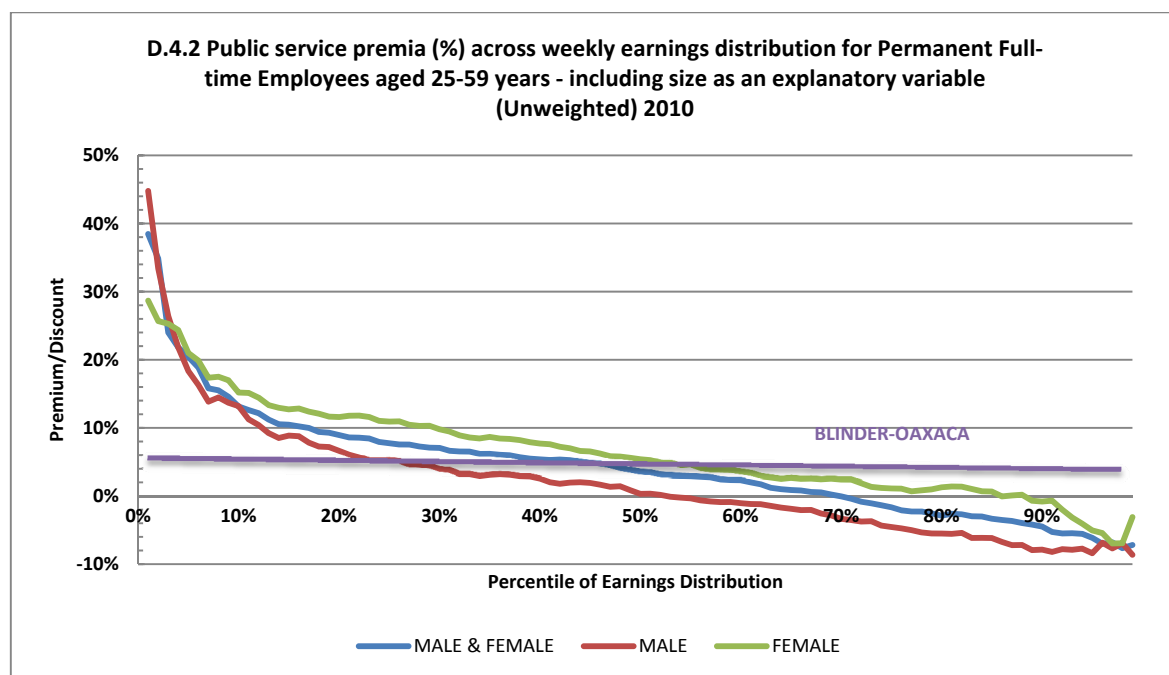| Percentile	Males & Females		Males		Females	
	Estimate	t Value	Estimate	t Value	Estimate	t Value
10%	0.165	11.52	0.138	7.42	0.182	8.22
20%	0.114	10.67	0.080	6.33	0.147	10.41
30%	0.083	9.32	0.056	4.75	0.104	7.87
40%	0.073	8.99	0.043	4.06	0.090	7.68
50%	0.058	7.04	0.036	3.31	0.061	6.01
60%	0.046	5.26	0.021	1.9	0.051	4.69
70%	0.023	2.99	0.001	0.06	0.043	3.97
80%	0.001	0.14	-0.024	-1.68	0.034	2.50
90%	-0.022	0.170	-0.016	-0.76	0.003	0.15

[*]Only includes employees working 10 or more hours per week and 50 or more weeks per year

D.4.1 Quantile regression model: Including size of enterprise as an explanatory variable - NES 2010[*]

Permanent full-Time employees aged 25-59 (unweighted results) 2010

Percentile	Males & Females		Males		Females	
	Estimate	t Value	Estimate	t Value	Estimate	t Value
10%	0.131	11.72	0.132	8.71	0.152	9.6
20%	0.089	11.16	0.066	6.43	0.116	11.29
30%	0.071	9.36	0.039	4.73	0.098	9.5
40%	0.054	8.34	0.026	2.98	0.077	8.64
50%	0.035	6.17	0.003	0.38	0.054	6.67
60%	0.023	3.92	-0.010	-1.19	0.036	4.36
70%	0.000	-0.08	-0.033	-3.77	0.024	3.07
80%	-0.029	-4.24	-0.055	-5.14	0.013	1.27
90%	-0.045	-5.29	-0.079	-5.3	-0.008	-0.73

[*] Only includes employees working 10 or more hours per week and 50 or more weeks per year

D.4.2 Public service premia (%) across weekly earnings distribution for Permanent Full-time Employees aged 25-59 years - including size as an explanatory variable (Unweighted) 2010

D5.1 Quantile regression model: Excluding size as an explanatory variable NES 2009 and NES 2010[*]

Permanent Full-time Employees aged 25-59 (weighted results)

| | | Excluding Size | | | | | | | |
| | | Males & Females | | | Males | | | Females | |
	Quartile	Estimate	tValue		Estimate	tValue		Estimate	tValue
2009	25%	23.2	30.8		18.7	17.4		28.1	25.3
	50%	17.9	24.0		14.6	15.8		19.6	20.4
	75%	12.7	15.2		10.7	9.3		13.9	13.6
2010	25%	20.3	20.2		17.2	12.3		22.6	16.5
	50%	13.7	19.3		11.1	11.1		15.2	15.3
	75%	7.4	10.0		5.6	4.6		9.4	8.8

[*]Only includes employees working 10 or more hours per week and 50 or more weeks per year

D6.1 Quantile regression model: Excluding size as an explanatory variable NES 2009 and NES 2010[*]

Permanent Full-time Employees aged 25-59 (unweighted results)

| | | Excluding Size | | | | | | | |
| | | Males & Females | | | Males | | | Females | |
	Quartile	Estimate	tValue		Estimate	tValue		Estimate	tValue
2009	25%	19.9	32.6		15.2	20.0		24.7	31.9
	50%	15.3	27.7		11.5	15.4		17.8	26.7
	75%	9.1	16.1		5.8	6.6		11.3	15.0
2010	25%	15.2	22.3		12.4	13.2		19.3	19.9
	50%	9.7	18.5		6.7	9.1		11.8	16.4
	75%	3.6	5.9		0.7	0.7		6.1	7.6

[*]Only includes employees working 10 or more hours per week and 50 or more weeks per year

Appendix E – Methodology

(a) OLS Basic weekly earnings regression

An ordinary least square (OLS) regression was used to model the natural log of weekly earnings on a set of explanatory variables. The semi-log hedonic earnings equation may be represented as follows:

$$\ln w_i = \alpha + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_p x_p + \varepsilon_i$$

Where w_i is the weekly earnings of individual i, and $x_1, x_2, \ldots x_p$, are a set of p explanatory variables, capturing individual and work-place characteristics. The intercept term is denoted by α, , and the ε_i term is the random error term.

(b)The Blinder-Oaxaca Decomposition

The Blinder-Oaxaca decomposition of earnings is often represented in the literature as follows:

$$\ln \overline{w}^{pub} - \ln \overline{w}^{pri} = \Sigma_p \left(\bar{x}_p^{pub} - \bar{x}_p^{pri} \right) \hat{\beta}_p^{pri} + \Sigma_p\ \bar{x}_p^{pub} \left(\hat{\beta}_p^{pub} - \hat{\beta}_p^{pri} \right) + \left(\hat{\alpha}^{pub} - \hat{\alpha}^{pri} \right)$$

Where, $\Sigma_p \left(\bar{x}_p^{pub} - \bar{x}_p^{pri} \right) \hat{\beta}_p^{pri}$ represents the difference in the log of earnings that is explained by the explanatory variables and $\Sigma_p \bar{x}_p^{pub} \left(\hat{\beta}_p^{pub} - \hat{\beta}_p^{pri} \right) + \left(\hat{\alpha}^{pub} - \hat{\alpha}^{pri} \right)$ estimates the unexplained earnings gap, i.e. the public–private wage differential.

In keeping with Kelly et al (2009), the reference category[12] used for the Blinder-Oaxaca decompositions was the private sector.

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[12] The Blinder-Oaxaca decomposition is not unique and the choice of reference group affects the results. Results were also calculated using the public sector as the reference group but these results negates the effect that size of enterprise has as an explanatory variable. Results based on calculations that used public as the reference group are available from the CSO on request.

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