Public-private sector pay differential in UK: A recent update

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Preliminary work

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Abstract

This document updates and extend our previous analysis on the public-private sector wage differential using six new quarters of Labour Force Survey (LFS) data. The data are split into two sub-samples – 2009Q1-2010Q4 and 2011Q-2012Q3. The results presented are based on a linear regression of log-hourly earnings against independent variables. The measure of pay we use is the natural log of reported usual hourly wages. Quantile regression has been used to examine whether the estimated pay premium varies across the distribution of pay.

Evidence from the Office for National Statistics (ONS) in 2011 revealed a public/private sector pay premium of around 7.3 per cent. More recent evidence which included organisation size in the model reduced this estimate to 2.2 per cent[1]. A similar result were found by Blackaby et al. (2012) [2]. Whilst these papers give an estimate of the pay gap for the UK, another feature is that the pay gap varies between men and women. The estimated public sector premium has consistently been estimated as higher for women than for men. The public-private wage differential also tends to be sensitive to change in specification. When a number of other factors on relative pay are included pay differences are reduced significantly. Finally, the pay gap varies at different points of the pay distribution. Blackaby et al. (2012) find that the public-private wage differential falls for both males and females as earnings increase being significantly negative at the top of the earnings distribution for males. Using a model including organisational size, the ONS estimate that public sector employees at the lower part of the wage distribution earned 11.3 per cent more than private sector employees in 2011. At the top of the distribution, public sector workers earned 10.3 per cent less than private sector workers.

This document updates and extend our previous analysis on the public-private sector wage differential using six new quarters of Labour Force Survey (LFS) data. The data are split into two sub-samples – 2009Q1-2010Q4 and 2011Q-2012Q3. The results presented are based on a linear regression of log-hourly earnings against independent variables. The measure of pay we use is the natural log of reported usual hourly wages. Quantile regression has been used to examine whether the estimated pay premium varies across the distribution of pay.

[1]ONS (2012) 'Estimating differences in public and private sector pay at the national and regional level, 23 November 2012.
[2] See Blackaby, Murphy, O'Leary and Staneva (2012) 'An investigation of the IFS public-private sector pay differential: A robust check, Swansea University, Discussion Paper Series N 2012-09.

● In a fairly basic wage specification, when controlling for the differences like age, age left full time education and interactions between age with age left full time education, the hourly pay premium for a public sector workers in 2011/2012 is 7.8 per cent for men and 15.6 per cent for women[3].

● As our previous work has found there is a reduction in the public sector differential when controlling more fully for additional characteristics. Using a regression model to account for a full range of control variables, it has been estimated that the wage differential for men is insignificant in 2011/2012 and the differential is reduced in size, but remains positive for women (see Table 1).

Table 1 Public-private wage differential at aggregate level by gender

	2009Q1-2010Q4		**2011Q1-2012Q3**	
	Men	**Women**	**Men**	**Women**
1. Controlling for age, age squared, age left full time education and interactions	0.0692***	0.1448***	0.0785***	0.1558***
	(0.0084)	(0.0070)	(0.0102)	(0.0089)
Sample size	18242	19075	12438	12606
2. Controlling for education, age, qualification and regions of work	0.0325***	0.1040***	0.0475***	0.1207***
	(0.0080)	(0.0068)	(0.0098)	(0.0086)
Sample size	18242	19075	12438	12606
3. Full specification	-0.0368***	0.0592***	-0.0117	0.0346***
	(0.0072)	(0.0059)	(0.0088)	(0.0077)
Sample size	18242	19075	12438	12606

Notes: Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The data are weighted. The wage differentials are estimated by OLS regressing log hourly wages on control variables for public sector, age and age squared, age left full time education, interactions between age and age squared with age left full-time education. The second row additionally controls for qualification (degree, A-level, O-level and others with the omitted group being with no qualification) and 12 regions in the UK (omitted category North Ireland); The full specification controls for age and age squared, age left full time education, interactions between age and age squared with age left full-time education, qualification, job tenure, married, divorced, managerial responsibilities, plant size, part time, white ethnicity, region of work and NSSEC occupational controls. *Source:* Author's calculations using data from the quarterly LFS (2011Q1-2012Q3);

● As Melly (2002) points out, the dummy-based approach has an important shortcoming: implicitly, it assumes that the returns to individual attributes and job characteristics are equal in the public and the private sectors and limits the effect of the sector of employment to a single coefficient[4]. An alternative approach to investigate the wage gap between sectors is a variant of the familiar decomposition framework of Oaxaca and Ransom (1994)[5]. Within such a framework, the differences in average earnings can be decomposed into a part attributable to differences in measured characteristics and a part attributable to differences in coefficients (where this latter component include the effects of discrimination).

● Table 2 reports the results of earnings decomposition. The raw wage gap estimates (differences in means) are calculated as the difference in log hourly wages between public and private sector workers. Over the examined period, the disadvantage faced by men in the public sector has changed from -3.6 per cent in 2009/2010 to -1.8 per cent in 2011/2012, which is very similar to the estimates

[3] There is no statistically significant difference between estimated coefficients in the base specification over the two sub-periods as the t-test does not reject the null hypothesis that the coefficients are equal.

[4] Melly, B. (2005) 'Public-private sector wage differentials in Germany: Evidence from quantile regression', *Empirical Economics*, 3, (2), p.505-520.

[5] Oaxaca, R. and Ransom, M. (1994) 'On discrimination and the decomposition of wage differentials', *Journal of Econometrics*, 61, p.5-21.

given in Table 1 (-3.7 per cent in 2009/2010 and -1.2 per cent in 2011/2012). The decomposition results reveal that the more favourable wage enhancing characteristics of public sector workers would suggest they would earn 20.5 per cent more than private sector workers and so more than accounts for the 16.8 per cent earnings differential.

Table 2 Public-private wage differential, Oaxaca-Ransom decomposition

	Men			**Women**		
	Difference in means	Due to coefficients	Due to characteristics	Difference in means	Due to coefficients	Due to characteristics
2009Q1/2010Q4	0.1682***	-0.0367***	0.2050***	0.2443***	0.0477***	0.1965***
	(0.0088)	(0.00607)	(0.0069)	(0.0071)	(0.0047)	(0.0056)
2011Q1/2012Q3	0.1885***	-0.0182**	0.2067***	0.2639***	0.0266***	0.2373***
	(0.0107)	(0.00748)	(0.0083)	(0.0090)	(0.0057)	(0.0070)

Notes: The full specification controls for age and age squared, age left full time education, interactions between age and age squared with age left full-time education, qualification, job tenure, married, divorced, managerial responsibilities, plant size, part time, white ethnicity, region of work and NSSEC occupational controls. Hourly wages are computed using usual hours reported by survey respondents.
Source: Author's calculations using data from the quarterly LFS;

● Table 3 shows the estimated public/private wage differential at aggregate level by every year since 2009. When controlling for the difference like age, qualification and region of work, the hourly pay premium for a public sector men was 6.2 per cent in 2011 and it decreased to 3.1 per cent in the first three quarters of 2012. However, once all control variables had been accounted for, the estimated differential for men tends to be insignificant in the last two years.

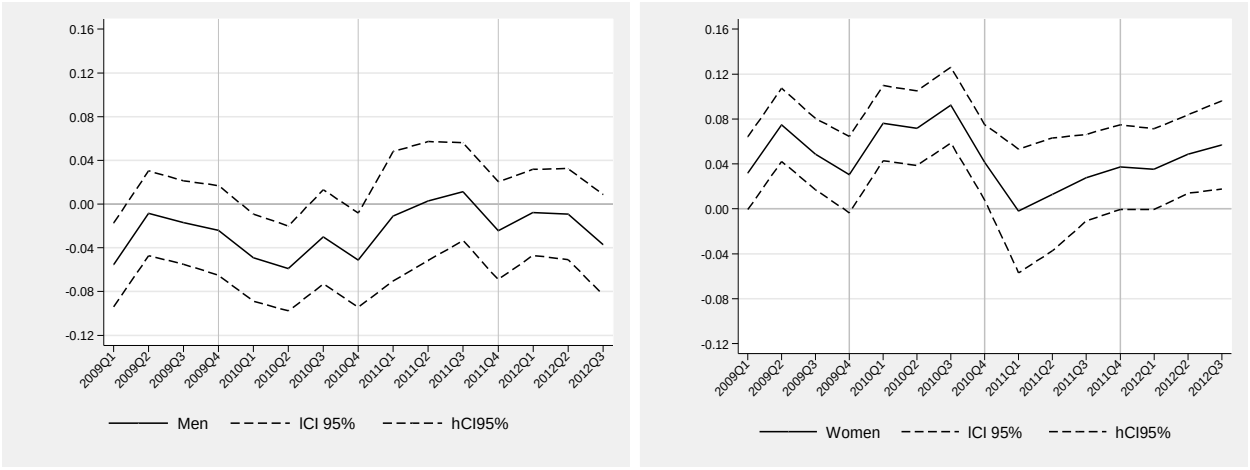
Table 3 Public-private wage differential by gender and years, OLS

	1. Base specification		2.Base & qualification and region		3.Full specification	
	Men	**Women**	**Men**	**Women**	**Men**	**Women**
2009	0.0937***	0.1286***	0.0507***	0.0882***	-0.0251**	0.0475***
	(0.0116)	(0.0098)	(0.0111)	(0.0095)	(0.0099)	(0.0083)
Sample size	9398	9816	9398	9816	9398	9816
R^2	0.237	0.249	0.334	0.327	0.507	0.512
2010	0.0442***	0.1614***	0.0140	0.1204***	-0.0489***	0.0712***
	(0.0121)	(0.0101)	(0.0116)	(0.0098)	(0.0105)	(0.0085)
Sample size	8844	9259	8844	9259	8844	9259
R^2	0.259	0.247	0.346	0.324	0.524	0.524
2011	0.1041***	0.1582***	0.0618***	0.1227***	-0.0035	0.0217**
	(0.0144)	(0.0127)	(0.0139)	(0.0124)	(0.0126)	(0.0110)
Sample size	6474	6359	6474	6359	6474	6359
R^2	0.243	0.267	0.331	0.335	0.510	0.523
2012	0.0505***	0.1536***	0.0314**	0.1185***	-0.0202	0.0472***
	(0.0144)	(0.0125)	(0.0137)	(0.0121)	(0.0124)	(0.0107)
Sample size	5964	6247	5964	6247	5964	6247
R^2	0.266	0.255	0.359	0.330	0.533	0.519

Notes: Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The data are weighted. The base specification controls for age and age squared, age left full time education, interactions between age and age squared with age left full-time education. The second specification additionally controls for qualification (degree, A-level, O-level and others with the omitted group being with no qualification) and 12 regions in the UK (omitted category North Ireland); The full specification controls for age and age squared, age left full time education, interactions between age and age squared with age left full-time education, qualification, job tenure, married, divorced, managerial responsibilities, plant size, part time, white ethnicity, region of work and NSSEC occupational controls. Hourly wages are computed using usual hours reported by survey respondents. *Source:* Author's calculations using data from the quarterly LFS;

● Figure 1 shows the variation in estimated public/private sector wage differential (full specification) for men and women separately by every quarter since 2009. Each point estimate relate to public as a dummy variable in OLS regression and is based on one quarter LFS sample. The vertical lines in the graph indicate year endings. The dashed lines represents 95% confidence intervals.

Figure 1 Estimated public-private wage differentials by gender and quarters (2009Q1-2012Q3)



Notes: The specification controls for age and age squared, age left full time education, interactions between age and age squared with age left full-time education, qualification, job tenure, married, divorced, managerial responsibilities, plant size, part time, white ethnicity, region of work and NSSEC occupational controls. *Source:* Author's calculations using data from the quarterly LFS;

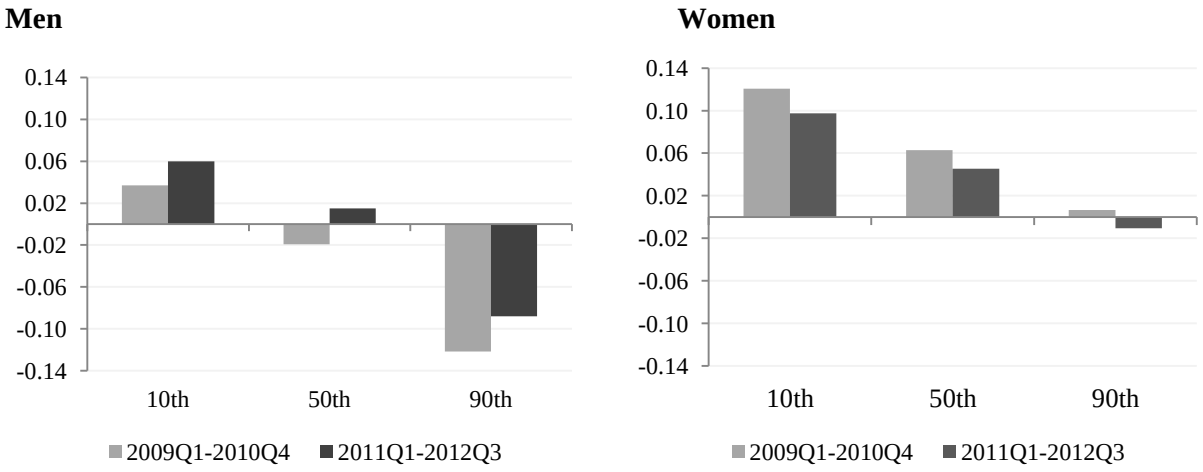
● Table 4 and Figure 2 compares how the public/private wage differential varies across the earnings distribution over the two time periods. Accounting for a full range of control variables, the pay disadvantage for men at the top of the earnings distribution has changed from 12 percent in 2009/2010 to nearly 9 per cent in 2011/2012. However, the pay premium at the bottom of the distribution increased between 2009/2010 and 2011/2012. For women at the bottom and median of the distribution, the premium has decreased since 2010 and the differential is found to be not significant at the 90th percentile[6].

Table 4 Public-private wage differential at the 10th, 50th and 90th percentile by gender

	Men			**Women**		
	10th	50th	90th	10th	50th	90th
			2009Q1-2010Q4			
Full specification	0.0369***	-0.0192**	-0.1215***	0.1205***	0.0629***	0.0066
	(0.0112)	(0.0077)	(0.0125)	(0.0101)	(0.0057)	(0.0096)
Sample size	18242	18242	18242	19075	19075	19075
			2011Q1-2012Q3			
Full specification	0.0600***	0.0149	-0.0881***	0.0974***	0.0453***	-0.0107
	(0.0162)	(0.0093)	(0.0161)	(0.0129)	(0.0082)	(0.0144)
Sample size	12438	12438	12438	12606	12606	12606

[6] Statistical test of the difference between the coefficient at the 10th, 50th and 90th percentile strongly reject the null hypothesis that the coefficients are equal.

Figure 2 Public-private wage differentials by percentile in the wage distribution



Notes: The specification controls for age and age squared, age left full time education, interactions between age and age squared with age left full-time education, qualification, job tenure, married, divorced, managerial responsibilities, plant size, part time, white ethnicity, region of work and NSSEC occupational controls. *Source:* Author's calculations using data from the quarterly LFS;

● The means of the variables used in the full specification for the two periods 2009/2010 and 2011/2012 are reported in Table 5 and Table 6. They show that public sector workers tend to be older (with mean age of 44 years for men compared to a private sector mean of 42 years); have longer job tenure than do private sector workers. They also tend to be better qualified (with 60 per cent of men in 2009/2010 having a degree qualification compared to just 38 per cent in the private sector) and less likely to work in small establishments than private sector workers.

Table 5 Descriptive statistics of control variables used in the analysis - Men

	2009/2010				2011/2012			
	Public		Private		Public		Private	
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
log of hourly wage	2.643	0.481	2.475	0.604	2.688	0.483	2.500	0.591
age	44.288	11.007	41.998	11.885	44.385	10.822	42.239	11.946
agesq	2082.603	960.518	1905.047	998.869	2087.116	952.106	1926.816	1005.062
edage2	829.411	234.840	744.242	219.220	839.633	231.702	751.334	221.768
age complete education	18.878	3.287	17.887	2.822	19.072	3.285	17.940	2.774
tenure <=1 year	0.087	0.282	0.129	0.336	0.058	0.234	0.132	0.339
tenure1-2 years	0.078	0.268	0.109	0.311	0.057	0.233	0.098	0.297
tenure 2-5 years	0.170	0.376	0.242	0.428	0.173	0.378	0.218	0.413
tenure 5-10 years	0.211	0.408	0.206	0.405	0.209	0.407	0.216	0.412
tenure 10-20 years	0.216	0.411	0.182	0.386	0.257	0.437	0.202	0.402
tenure >20 years	0.239	0.426	0.132	0.339	0.245	0.430	0.133	0.339
Married	0.770	0.421	0.731	0.443	0.748	0.434	0.709	0.454
Divorced	0.069	0.253	0.069	0.254	0.065	0.247	0.065	0.247
White	0.934	0.249	0.930	0.256	0.924	0.265	0.930	0.255
Degree	0.598	0.490	0.380	0.485	0.630	0.483	0.406	0.491
A-level	0.201	0.401	0.303	0.460	0.195	0.396	0.294	0.456
O-level	0.109	0.311	0.134	0.341	0.099	0.299	0.139	0.346
Other	0.069	0.253	0.134	0.340	0.052	0.221	0.115	0.319
No qualification	0.023	0.151	0.049	0.215	0.024	0.152	0.045	0.208
Managerial	0.497	0.500	0.454	0.498	0.497	0.500	0.441	0.497
Part time	0.082	0.274	0.070	0.255	0.083	0.275	0.073	0.260
plant size 1-10	0.055	0.228	0.207	0.405	0.060	0.237	0.206	0.404
plant size 11-20	0.036	0.187	0.089	0.285	0.036	0.186	0.085	0.279
plant size 20-24	0.026	0.160	0.044	0.205	0.022	0.148	0.043	0.204
plant size under 25	0.002	0.043	0.011	0.104	0.002	0.045	0.010	0.101
plant size 25-49	0.093	0.290	0.130	0.336	0.107	0.309	0.132	0.338
plant size>50	0.788	0.409	0.519	0.500	0.774	0.419	0.524	0.499
Higher manager & profess	0.262	0.440	0.215	0.411	0.228	0.420	0.212	0.408
Lower manager & profess	0.402	0.490	0.269	0.444	0.396	0.489	0.250	0.433
Intermediate occupations	0.124	0.329	0.057	0.233	0.179	0.384	0.081	0.273
Lower supervisory & techn	0.079	0.269	0.183	0.387	0.055	0.228	0.155	0.362
Semi-routine occupations	0.090	0.286	0.121	0.326	0.086	0.280	0.141	0.348
Northern	0.056	0.230	0.051	0.220	0.055	0.229	0.053	0.225
Yorkshire	0.089	0.285	0.091	0.288	0.089	0.284	0.093	0.291
East Midlands	0.066	0.248	0.081	0.273	0.063	0.243	0.080	0.272
East Anglia	0.047	0.211	0.047	0.213	0.047	0.212	0.046	0.209
London	0.124	0.330	0.117	0.321	0.127	0.333	0.116	0.321
South East	0.155	0.362	0.192	0.394	0.162	0.368	0.191	0.393
South West	0.099	0.298	0.090	0.286	0.080	0.272	0.087	0.281
West Midlands	0.082	0.275	0.086	0.280	0.079	0.270	0.089	0.284
North West	0.106	0.308	0.103	0.304	0.106	0.308	0.105	0.307
Wales	0.051	0.221	0.038	0.191	0.060	0.238	0.040	0.196
Scotland	0.105	0.307	0.088	0.283	0.104	0.306	0.084	0.278
North Ireland	0.020	0.138	0.016	0.126	0.028	0.164	0.016	0.125
N	*4351*		*14672*		*2941*		*10100*	

Table 6 Descriptive statistics of control variables used in the analysis - Women

	2009/2010				2011/2012			
	Public		Private		Public		Private	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
log of hourly wage	2.450	0.469	2.206	0.531	2.505	0.481	2.241	0.537
age	42.755	9.781	40.009	10.978	43.329	9.750	40.179	11.002
agesq	1923.666	815.054	1721.260	870.615	1972.405	818.549	1735.345	873.586
edage2	787.648	191.210	705.538	193.600	806.163	192.839	713.637	194.571
age complete education	18.606	2.852	17.819	2.574	18.793	2.856	17.958	2.607
tenure <=1 year	0.089	0.285	0.150	0.357	0.075	0.263	0.159	0.366
tenure1-2 years	0.087	0.282	0.122	0.327	0.062	0.240	0.110	0.313
tenure 2-5 years	0.199	0.399	0.264	0.441	0.195	0.396	0.241	0.427
tenure 5-10 years	0.239	0.427	0.216	0.412	0.238	0.426	0.216	0.412
tenure 10-20 years	0.237	0.425	0.175	0.380	0.264	0.441	0.198	0.399
tenure >20 years	0.149	0.356	0.073	0.260	0.167	0.373	0.075	0.264
Married	0.729	0.444	0.672	0.469	0.708	0.455	0.639	0.480
Divorced	0.127	0.333	0.125	0.331	0.134	0.341	0.123	0.329
White	0.936	0.245	0.933	0.250	0.938	0.241	0.936	0.244
Degree	0.633	0.482	0.381	0.486	0.662	0.473	0.419	0.493
A-level	0.157	0.364	0.229	0.420	0.154	0.361	0.239	0.426
O-level	0.128	0.334	0.209	0.406	0.119	0.324	0.198	0.399
Other	0.063	0.242	0.122	0.327	0.046	0.211	0.089	0.285
No qualification	0.020	0.139	0.060	0.238	0.018	0.134	0.055	0.227
Managerial	0.385	0.487	0.346	0.476	0.375	0.484	0.327	0.469
Part time	0.390	0.488	0.403	0.491	0.398	0.490	0.411	0.492
plant size 1-10	0.065	0.247	0.262	0.440	0.062	0.242	0.269	0.443
plant size 11-20	0.059	0.236	0.111	0.315	0.054	0.227	0.108	0.311
plant size 20-24	0.046	0.210	0.046	0.209	0.044	0.205	0.043	0.204
plant size under 25	0.008	0.092	0.010	0.101	0.008	0.088	0.011	0.106
plant size 25-49	0.177	0.382	0.137	0.344	0.167	0.373	0.134	0.341
plant size>50	0.644	0.479	0.434	0.496	0.664	0.472	0.434	0.496
Higher manager & profess	0.117	0.322	0.103	0.304	0.127	0.333	0.104	0.305
Lower manager & profess	0.462	0.499	0.295	0.456	0.466	0.499	0.252	0.434
Intermediate occupations	0.183	0.387	0.201	0.401	0.259	0.438	0.252	0.434
Lower supervisory & techn	0.040	0.195	0.092	0.289	0.015	0.122	0.053	0.225
Semi-routine occupations	0.155	0.362	0.220	0.414	0.084	0.277	0.242	0.428
Northern	0.057	0.232	0.053	0.223	0.063	0.243	0.055	0.228
Yorkshire	0.095	0.293	0.092	0.289	0.096	0.295	0.095	0.294
East Midlands	0.075	0.264	0.079	0.270	0.075	0.263	0.073	0.261
East Anglia	0.043	0.203	0.047	0.212	0.044	0.204	0.048	0.213
London	0.095	0.293	0.107	0.309	0.094	0.291	0.105	0.306
South East	0.167	0.373	0.204	0.403	0.170	0.376	0.209	0.406
South West	0.089	0.285	0.095	0.294	0.088	0.283	0.090	0.286
West Midlands	0.086	0.280	0.081	0.273	0.079	0.270	0.075	0.264
North West	0.115	0.319	0.099	0.299	0.110	0.313	0.100	0.301
Wales	0.053	0.224	0.039	0.194	0.055	0.228	0.044	0.204
Scotland	0.102	0.303	0.086	0.280	0.103	0.304	0.088	0.283
North Ireland	0.024	0.152	0.017	0.130	0.022	0.148	0.018	0.134
N	*8400*		*11248*		*5423*		*7618*	