

How Does Workplace Monitoring Affect the Gender Wage Differential? Analysis of the Annual Survey of Hours and Earnings and the 2004 Workplace Employment Relations Survey — A Research Note

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Abstract

This paper outlines the development of a new data source that combines workplace information from the Workplace Employment Relations Survey (WERS) with employee data from the Annual Survey of Hours and Earnings (ASHE). Illustrative analysis of the gender wage differential demonstrates how the inclusion of additional workplace characteristics collected from WERS can be utilized to understand better-observed patterns in earnings within ASHE. Analysis reveals that monitoring gender equality at the workplace is not associated with a reduction in the gender wage gap. Matching WERS/ASHE provides the opportunity to investigate a wider range of workplace phenomena than would be possible based only upon the WERS Survey of Employees.

1. Introduction

The 2004 Workplace and Employment Relations Survey (WERS 2004) is the fifth in a series of surveys that collect information about the state of employment relations in workplaces throughout Britain.¹ WERS 2004 collects information on a variety of workplace characteristics and practices, including

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recruitment, disciplinary procedures, employee representation and establishment performance. Researchers can gain access to a suitably anonymized version of the WERS dataset from the Economic and Social Data Service (ESDS) at <http://www.esds.ac.uk>.

The Office for National Statistics (ONS) collects a large amount of data on individuals and businesses and uses this to produce statistics about all aspects of the economy and society. Most of this information is presented in a highly aggregated form to maintain the confidentiality of those supplying the data. Anonymization of business data is rarely feasible because the distribution of characteristics for these types of data means that anonymization tends to destroy all of the data of interest for statistical research purposes. It is therefore difficult to deposit such data at the ESDS. The Virtual Microdata Laboratory (VML) was therefore launched in January 2004 to provide secure access to confidential business survey data for research purposes.

The WERS 2004 data has been deposited within the VML in order to facilitate linking between WERS and the other ONS business datasets. So far, this work has focused on developing links between the WERS 2004 data and the Annual Business Inquiry (see Forth and McNabb 2008). This article outlines the development of a new innovative data source developed within the VML that combines detailed information on workplace characteristics from WERS, with employee characteristics collected from the ONS Annual Survey of Hours and Earnings (ASHE). The matched ASHE/WERS sample offers a number of key improvements including more detailed information on the earnings of those employed at WERS workplaces; additional information on leave, pension contributions and benefits in kind, and provides the opportunity to track the careers of people employed in WERS workplaces in subsequent years.

The remainder of this article is structured as follows. Section 2 provides a brief overview of the ASHE data. Section 3 outlines the methodology utilized to match approximately 6,000 observations from the 2004 ASHE dataset to the characteristics of 800 WERS workplaces. Section 4 describes the characteristics of the ASHE/WERS sample and considers the representativeness of the matched sample. Section 5 presents an illustrative analysis of how workplace-monitoring arrangements affect the size of the gender wage differential, which utilizes the matched ASHE/WERS sample. Section 6 concludes by providing examples of further applications of matching WERS to ASHE.

2. Overview of the Annual Survey of Hours and Earnings

The ASHE is the largest regular survey of pay in Great Britain, providing detailed information about the levels, distribution and make-up of earnings paid to employees and their hours of work. ASHE replaced the New Earnings Survey in 2004. The survey is conducted in April of each year. The

sample frame has been based largely upon a 1 per cent sample of employees selected on the basis of the last two digits of their national insurance numbers. Details of the methodology for ASHE are provided in Bird (2004). ASHE is regarded as an accurate source of information on earnings as data are provided directly by employers from their administrative records and are less prone to recall errors associated with self-reported data or information provided by proxy respondents (see Dickens *et al.* 1999). However, ASHE does not collect information about unpaid overtime.

Within WERS, randomly selected employees at surveyed workplaces are interviewed for a Survey of Employees. Information is collected on wages and hours, as well other information about their job, attitudes towards their work and personal characteristics. However, employees are only asked to provide details of their hourly and weekly wages within banded categories. The banded nature of wage data leads to a loss of precision in terms of understanding true variations in wages between individuals. In contrast, ASHE contains detailed continuous information on the hours and earnings of employees; but it contains relatively little information on workplace characteristics. The aim of the merged dataset is therefore to expand upon the information contained within the original ASHE and WERS data sources.

3. Matching 2004 WERS to ASHE

Managers responding to the WERS Managerial Questionnaire were asked whether the data that had been collected could be linked to other surveys or datasets. Assurances were given to respondents regarding the confidentiality of the linked data and that the linked data would be anonymous and used only for statistical or analytical purposes. Some 2,166 workplaces (approximately 94 per cent) agreed that the data collected in WERS could be linked with other surveys or datasets. This consent has allowed WERS data for these respondents to be linked to ONS business datasets held in the VML, including ASHE.

Within the ASHE survey, each record includes a unique Inter-Departmental Business Register (IDBR) reference number that identifies the employing enterprise. The IDBR is the key sampling frame used in ONS business surveys. IDBR reference numbers enable the responses of particular enterprises to ONS surveys to be linked both across surveys and over time. The IDBR was also used as the sampling frame for WERS (2004) and therefore IDBR reference numbers are available on the WERS dataset deposited in the VML. These IDBR enterprise reference numbers therefore provide a common variable that can be used to link information between the WERS and ASHE datasets, as employers who serve as the respondents to both surveys can be traced back to the IDBR.

IDBR reference numbers therefore make it possible to identify the firm that each ASHE employee works for and the firm that each WERS work-

place belongs to. In the case of single site enterprises, information from WERS and ASHE can be linked solely on the basis of IDBR enterprise reference numbers. However, enterprise reference numbers do not uniquely identify workplaces within multi-site enterprises. In such cases, the inclusion of workplace postcodes in the matching criteria enables us to confirm that an employee within the ASHE dataset actually works in the WERS workplace and not at another site owned by that enterprise. Inaccuracies in the matching process could potentially occur where a WERS establishment consists of different buildings with different postcodes. However, the great majority of units drawn from the IDBR for the purpose of WERS sampling relate a single address (see Chaplin *et al.* 2005).

Finally, it should be noted that it is not possible to identify or match individuals who appear in both ASHE and the WERS Survey of Employees because the respondents to the WERS Employee Survey are anonymous and cannot be identified. Those individuals in ASHE whose details have been matched to a particular workplace in WERS are not necessarily the same people who responded to the WERS Employee Survey. The detailed information on earnings collected from ASHE can therefore not be combined with detailed information on job and personal characteristics collected from the WERS Survey of Employees.

4. The characteristics of the matched sample

An ASHE/WERS matched sample has been constructed by combining information on individuals contained within the 2004 ASHE dataset with workplace information collected from the WERS 2004 Management Questionnaire. The matched dataset contains 5,922 observations. These observations were linked to the characteristics collected for some 785 workplaces from the Management Questionnaire. Many individuals within the matched dataset therefore work at the same WERS workplace. In such cases, information relating to one particular workplace from WERS is associated with multiple observations in ASHE. Larger workplaces in WERS are more likely to be linked to ASHE because large workplaces employ a disproportionate share of all employees.

How does the subset of ASHE employees that have matching WERS records compare with the full sample of ASHE records? The sample of 5,922 observations in the matched dataset represents 3.6 per cent of the total number of observations contained in the ASHE data. Table 1 compares observations in the matched dataset with those in the full ASHE sample. It can be seen that there is relatively little difference between the matched and the full ASHE dataset in terms of gender composition, age or hours worked. In terms of occupation, we see that those employees in the matched sample are more likely to be employed in Professional Occupations, Associate Professional and Technical Occupations and Administrative and Secretarial Occupations. We also observe that those in the matched dataset are more

TABLE 1
 Characteristics of Individuals in the ASHE and Matched Datasets

	<i>ASHE 2004</i>	<i>ASHE/WERS</i>
Gender (% female)	50.1	51.4
Age (mean years)	39.9	40.6
Total hours in pay period (mean hours)	33.1	33.3
Occupation (% in SOC Major Groups)		
1. Managers and Senior Officials	11.9	9.7
2. Professional Occupations	11.1	16.5
3. Associate Professional and Technical Occupations	13.4	21.4
4. Administrative and Secretarial	17.1	18.2
5. Skilled Trades	7.5	6.3
6. Personal Service Occupations	7.6	8.1
7. Sales and Customer Service	9.7	4.3
8. Process, Plant and Machine Operatives	7.5	6.0
9. Elementary Occupations	14.2	9.6
Employer provided pension (%)	52.5	77.9
Pay set under collective agreement (%)	57.0	82.9
Enterprise employment (IDBR)	18,502	18,708
Legal status (IDBR) (%)		
Private company	60.5	44.3
Sole proprietor	2.2	0.0
Partnership	3.9	0.4
Public corporation	2.0	4.1
Central government	10.3	29.4
Local authority	14.2	9.6
Non-profit serving households	7.1	12.1
Sector		
Agriculture, Fishing, Mining	0.8	0.0
Manufacturing	13.7	15.8
Utilities	0.4	1.1
Construction	3.7	1.5
Wholesale/retail	16.9	6.2
Hotels and restaurants	4.0	0.5
Transport	6.0	9.2
Financial intermediation	4.9	6.0
Real estate	12.6	4.5
Public administration	6.0	6.4
Education	15.5	19.3
Health	11.6	26.9
Community	3.8	2.6
Other organizations	0.1	0.0
Number of observations	166,794	5,922

Source: ONS ASHE, WERS 2004.

likely to have an employer-provided pension and have their pay set by collective agreement. These differences will be related to the higher incidence of employees that work in the public sector and specifically within Health and Education.

We now focus on the earnings information collected from the WERS and ASHE datasets. Within the WERS Survey of Employees, employees are asked to provide details of the weekly wages within banded categories, with annual equivalences being provided for guidance.² Details of these bandwidth categories are provided in Table 2. Respondents to ASHE can specify

TABLE 2
Earnings Distributions Derived from WERS, ASHE and the Matched Sample

<i>Pay bands</i>	<i>WERS</i>	<i>ASHE</i>	<i>ASHE/WERS</i>
Hourly earnings			
£0–£5.00	12.1	13.5	7.8
£5.01–£7.50	27.2	27.6	18.3
£7.51–£10.00	21.8	19.6	17.8
£10.01–£12.50	13.1	12.5	16.0
£12.51–£15.00	7.6	8.4	11.9
£15.01+	18.2	18.4	28.3
Average hourly earnings (£)	11.47	10.77	13.14
Weekly earnings			
£51–£80	3.3	3.7	1.9
£81–£110	4.0	4.3	2.4
£111–£140	4.6	4.2	3.0
£141–£180	5.8	5.8	3.8
£181–£220	7.8	6.9	5.4
£221–£260	9.5	7.7	6.0
£261–£310	11.4	9.8	8.1
£311–£360	9.5	8.8	8.5
£361–£430	11.3	10.1	11.4
£431–£540	11.3	11.9	14.9
£541–£680	9.1	9.4	12.3
£681–£870	4.9	5.5	8.5
£871+	4.6	5.3	8.5
Average weekly earnings (£)	378.8	375.4	459.6
Number of observations	21,620	16,6794	5,922

Source: ONS ASHE, WERS 2004.

the pay period for which they can provide information on earnings of an employee who has been selected for inclusion into the survey. Employers are asked to provide information on employees for a pay period including the survey reference date and to state the length of this pay period. Respondents are then informed that answers to remaining questions on earnings, hours and pension contributions should relate to the specified pay period. Derived estimates of hourly and weekly earnings are then provided in the ASHE dataset.

In Table 2 we consider how the distributions of earnings compare between individuals in the WERS Survey of Employees, the full ASHE sample and the matched ASHE/WERS sample. Hourly earnings have been derived for the WERS Survey of Employees by dividing the mid-points of the banded weekly earnings categories by total hours worked reported by respondents.³ In the absence of a mid-point for the top category, we estimated the average gross weekly earnings from ASHE for those earnings were above the uppermost bandwidth as utilized by WERS. Average earnings and the distribution of hourly earnings are relatively similar when comparing the full WERS and ASHE samples. By comparison, the distribution of hourly earnings in the matched ASHE/WERS sample is skewed towards higher earners, reflecting the characteristics of the matched sample where employment is relatively concentrated within more highly skilled, non-manual occupations.

In the lower half of the table, we compare the distribution of gross weekly earnings between these three data sources, thereby avoiding measurement errors associated with the derivation of hourly earnings from mid-points of weekly bandwidths. The earnings information from ASHE refers to average gross weekly earnings over the survey reference period and includes additional overtime payments, shift premiums and incentive payments. This is comparable to the WERS Survey of Employees, which asks respondents to provide an average estimate of gross weekly earnings that takes into account variations in pay due to overtime payments. A similar pattern emerges to that observed for hourly earnings. Average gross weekly earnings reported within WERS (based upon mid-points of bandwidths) and ASHE are very similar and significantly lower than that of the matched sample.

5. Workplace monitoring and the gender wage differential

The creation of the matched ASHE/WERS sample now means that the limited information on establishments contained in ASHE can be supplemented with the rich detail collected by WERS. In the remainder of this article, we demonstrate how the matched sample can help provide a better understanding of patterns of earnings within the ASHE data by undertaking an illustrative analysis of how workplace policies are associated with the size of the gender wage differential. This topic has been chosen as an example of how information about workplaces that was not previously available in ASHE can contribute to our understanding of the gender wage gap estimated with this source. It is noted at the outset that this research question could have been addressed, based solely upon data from the WERS survey. However, an important aspect of this illustration is to compare results of analysis based upon WERS data and the matched ASHE/WERS sample, and how the absence of human capital measures in ASHE may bias results of key interest to researchers.

For a variety of reasons, including the decline of heavy manufacturing, the growth of service sector employment, the rise in educational participation and equal opportunity policies, there has been a significant increase in the participation of women in paid employment. Despite these developments, evidence of a persistent gender pay differential remains and has been extensively documented. Recent analyses of the gender gap in pay have estimated differentials of 12 per cent (Manning and Swaffield 2005), 17.5 per cent (Olsen and Walby 2004) and 18.6 per cent (Arulampalam *et al.* 2005) after controlling for other observable characteristics between men and women.

There are several possible reasons for the gender differential in pay.⁴ Wages are dependent on individuals' human capital (Becker 1965). Women who have had career breaks during periods of family formation may have acquired less human capital than their colleagues or could have suffered a depreciation of their professional skills. Women may also be relatively constrained in terms of searching for suitable employment, and therefore have

preferences for jobs that are compatible with family life (Becker 1985). They may therefore be willing to trade off higher earnings to find employment in jobs that offer flexible working arrangements. Related to this, women display substantial downward mobility during periods of family formation, with often only limited recovery (Dex and Shaw 1986; Elias 1988). A variety of studies have also estimated a penalty in pay associated with motherhood. Davies and Pierre (2005) estimate those women in the UK with 2 and 3 or more children exhibit penalties in pay of 12 per cent and 18 per cent, respectively. Recovery in earnings following periods of family formation was also found to be lower among women who had a career break, indicating that women returns may be treated less fairly by employers compared to those who remained continuously employed. Finally, segmented market theory suggests that certain areas of employment become identified as 'male' or 'female' work (Crompton and Sanderson 1990). While the causes of segmentation are debatable (sex typing of job content, organization of working arrangements or discrimination), 'crowding' in gender segmented labour markets can contribute to an excess supply of labour, in turn contributing to lower earnings among females.

Narrowing the gender differential is regarded as a high priority for the UK Government, with the gender pay gap being one of the performance indicators in the Public Service Agreement for the Equalities Office. The Equality Act (2006) has introduced a general duty on public authorities to promote gender equality. Subsequent legislation has imposed specific duties on central and local government, including the requirement to establish, monitor and evaluate gender equality schemes. Against this background, it is important to understand what effects existing workplace-monitoring practices have had on the gender wage differential. The WERS Management Questionnaire asks respondents about equal opportunity policies and practices at their establishment. Respondents are asked whether their workplace has a formal written policy on equal opportunities or managing diversity and whether this policy explicitly mentions equality of treatment or discrimination on the grounds of gender. Five questions are then posed to determine whether workplaces monitor or review different procedures by gender. These are:

- Do you monitor recruitment and selection by gender?
- Do you review recruitment and selection procedures to identify indirect discrimination by gender?
- Do you monitor promotions by gender?
- Do you review promotion procedures to identify indirect discrimination by gender?
- Do you review relative pay rates by gender?

Table 3 compares the average hourly earnings of employees according to the presence of workplace policies outlined above. Women based in workplaces that have policies that monitor gender equality earn more than those based at workplaces that do not. However, men employed in workplaces with

TABLE 3
Hourly Earnings and Gender Monitoring Procedures

<i>Monitoring and review procedures undertaken</i>		<i>Male</i>	<i>Female</i>	<i>Male/Female</i>
Do you have a formal equal opportunities policy that explicitly mentions gender?		ASHE/WERS		
	Yes	£15.53	£11.17	139.0
	No	£11.72	£8.59	136.4
		WERS		
	Yes	£13.62	£10.37	131.3
	No	£11.04	£8.65	127.6
Do you monitor recruitment and selection by gender?		ASHE/WERS		
	Yes	£16.40	£13.21	124.1
	No	£12.80	£9.79	130.7
		WERS		
	Yes	£14.50	£11.57	125.3
	No	£12.12	£9.52	127.3
Do you review recruitment and selection procedures to identify indirect discrimination by gender?		ASHE/WERS		
	Yes	£16.63	£11.80	140.9
	No	£13.74	£10.02	137.1
		WERS		
	Yes	£15.23	£11.13	136.8
	No	£12.12	£9.52	127.3
Do you monitor promotions by gender?		ASHE/WERS		
	Yes	£17.56	£12.21	143.8
	No	£13.79	£10.06	137.1
		WERS		
	Yes	£16.16	£11.87	136.1
	No	£12.40	£9.59	129.3
Do you review promotion procedures to identify indirect discrimination by gender?		ASHE/WERS		
	Yes	£17.54	£12.29	142.7
	No	£13.63	£10.00	136.3
		WERS		
	Yes	£15.82	£11.34	139.5
	No	£12.39	£9.59	129.1
Do you review relative pay rates by gender?		ASHE/WERS		
	Yes	£18.15	£12.76	142.2
	No	£13.06	£9.90	131.9
		WERS		
	Yes	£17.35	£12.55	138.2
	No	£12.21	£9.67	126.3

Source: ONS ASHE, WERS 2004.

gender monitoring procedures also earn more than men who do not. The gender differential in hourly earnings is actually greater in workplaces with monitoring procedures in place than it is in workplaces without such procedures. For instance, the gender wage differential in the matched ASHE/WERS sample is 10 percentage points higher in workplaces that say they review relative pay rates by gender than those that do not (42 per cent compared to 32 per cent). The gender wage differential is only observed to be narrower within workplaces that explicitly monitor recruitment and selection by gender.

The differences in earnings observed in Table 3 may be due to a variety of confounding factors other than the presence of gender monitoring arrangements. These could relate to differences in other characteristics of these

establishments or differences in the personal characteristics of those people who chose to work in these establishments. To identify the separate and additional effect of monitoring procedures on the gender wage differential, we undertake multivariate analyses that introduce variables to identify the presence of such procedures at the workplace in a wage regression. We estimate models of the following general form:

$$\ln W = \beta_0 + \beta_1 Q_i + \beta_2 \Delta_j + e_i$$

where the natural logarithm of gross wages (W) is modelled as a function of individual (Q_i) and workplace characteristics (Δ_j). Standard ordinary least squares (OLS) techniques are used to estimate models based upon the continuous hourly wage data available in the matched ASHE/WERS sample, and for the WERS dataset where hourly earnings is derived from the banded weekly earnings information. Robust standard errors are used to account for clustering of observations within workplaces. Due to the banded nature of wage data from WERS, we also repeat the analysis using interval regression techniques (see Stewart 1983). Separate models for each of the six reported methods of monitoring are estimated.

The disadvantage of the matched ASHE/WERS sample is the limited number of variables that can be introduced to control for personal characteristics within a wage equation. In the ASHE/WERS analysis, the personal characteristics for which we introduce controls include gender, age, hours worked, tenure, organization size, whether wages are set by collective agreement and occupation. In the WERS-based analysis, richer information about personal characteristics can be included. Controls can be included for marital status, family status (dependent children), ethnicity, highest level of educational attainment and trade union membership. Both models include the same control variables for workplace characteristics, as derived from questions included in the WERS Managerial Questionnaire. Specifically, we control for size of workplace, whether the workplace is part of a multi-site enterprise, ownership status, the nature of negotiations with trade unions, the frequency of pay reviews, region and industry.

The absence of information on skills, education and training within ASHE is potentially problematic for analyses of earnings based upon the matched ASHE/WERS sample. We instead control for the occupations held by individuals in the matched sample. The Standard Occupational Classification (SOC) provides a national standard for categorizing occupational information in a variety of surveys including ASHE (see Elias *et al.* 2000). The structure of SOC brings together occupations that are similar in terms of their skill level and skill content into groups. The concept of 'skill' is operationalized in terms of the nature and duration of qualifications, training and work experience required to become competent to perform the work tasks in a particular job. We therefore utilize this conceptual basis of SOC to control for human capital and introduce occupational dummy variables into ASHE-based regressions.

Results from the regression analyses are presented in Table 4. We begin by simply estimating the overall gender differential based upon these data sources. In the matched data, it is estimated that the hourly earnings of women are 14.5 per cent less than those of men having controlled for other observable personal and workplace characteristics. This is consistent with a gender wage gap based upon the full ASHE sample (not reported) of 14.7 per cent. Utilizing the WERS data, we estimate the size of the gender wage gap to be 17.5 per cent. This larger differential is consistent with previous multivariate-based estimates (e.g. 18.6 per cent, Arulampalam *et al.* 2005 and 17.6 per cent, Olsen and Walby 2004).

To consider the validity of using occupational dummy variables to control for human capital within the ASHE-based analyses, we repeated the WERS-based analysis by replacing explanatory variables used to control for educational attainment (based upon National Vocational Qualification equivalents) with occupational dummy variables relating to 22 sub-major groups of SOC. The overall explanatory power of the regression fell from 0.36 (as reported in Table 4) to 0.35. The estimated size of the gender wage gap increased from 17.5 per cent to 20 per cent. It is therefore observed that the absence of educational attainment measures in ASHE does lead to a potential upward bias in the absolute size of the estimated gender wage differential, although little loss in explanatory power. However, the primary interest of this analysis is in the relative size of these differentials according to whether or not workplaces have gender monitoring arrangements in place.

In the remaining regressions, individuals are assigned to one of four dummy variables to indicate men and women who are or are not employed at workplaces that actively engage in gender monitoring. The dropped reference category in each case is men who are employed at workplaces that do not monitor gender equality. The results of the multivariate analysis again suggest that while women employed in workplaces that monitor gender equality earn more than those employed in workplaces that do not, men employed in these workplaces also earn more. While the descriptive analysis revealed that the size of the gender differential was actually larger in workplaces that monitored gender equality, the multivariate analysis reveals that the scale of the gender differential in both types of workplace is similar. Additional analysis (available from the authors on request) revealed that women employed in workplaces that monitored gender equality were more likely to have dependent children, possibly attracted by increased entitlements to term time working, nursery provision and financial help with childcare that were also found to characterise these establishments. The multivariate analysis is therefore controlling for a number of confounding factors that are associated with the differential selection of men and women into workplaces that monitor gender equality that were not taken into account within the descriptive analysis.

Table 5 summarizes the percentage differentials in hourly earnings between men and women derived from the earnings regressions. It is only among workplaces that monitor recruitment and selection and among those

TABLE 4
Regression Results: Coefficients on Gender Dummy Variables

<i>Monitoring and review procedures undertaken</i>	<i>Coefficient</i>	<i>ASHE/WERS (N = 5,586)</i>		<i>WERS (N = 18,420)</i>	
		<i>OLS</i>	<i>Interval (hourly)</i>	<i>Interval (hourly)</i>	<i>Interval (weekly)</i>
Basic model	Female	-0.173* (0.010)	-0.145* (0.014)	-0.166* (0.009)	-0.155* (0.009)
Do you have an equal opportunities policy that explicitly mentions gender?	R ²	0.36	0.64	NA	NA
	Male-Yes	0.050* (0.022)	0.043 (0.031)	0.049* (0.21)	0.043* (0.020)
	Male-No	Ref	Ref	Ref	Ref
	Female-Yes	-0.122* (0.022)	-0.099* (0.031)	-0.116* (0.021)	-0.126* (0.021)
Do you monitor recruitment and selection by gender?	Female-No	-0.178* (0.023)	-0.167* (0.039)	-0.176* (0.022)	-0.189* (0.021)
	R ²	0.360	0.640	NA	NA
	Male-Yes	0.038* (0.018)	0.001 (0.021)	0.036* (0.018)	0.027† (0.017)
	Male-No	Ref	Ref	Ref	Ref
Do you review recruitment and selection procedures to identify indirect discrimination by gender?	Female-Yes	-0.118* (0.018)	-0.131* (0.021)	-0.114* (0.017)	-0.106* (0.016)
	Female-No	-0.184* (0.013)	-0.175* (0.022)	-0.177* (0.013)	-0.170* (0.012)
	R ²	0.36	0.640	NA	NA
	Male-Yes	0.038* (0.019)	0.020 (0.018)	0.036* (0.018)	0.030† (0.0176)
Do you review recruitment and selection procedures to identify indirect discrimination by gender?	Male-No	Ref	Ref	Ref	Ref
	Female-Yes	-0.129* (0.018)	-0.121* (0.019)	-0.124* (0.017)	-0.112* (0.016)
	Female-No	-0.175* (0.012)	-0.148* (0.021)	-0.168* (0.011)	-0.160* (0.011)
	R ²	0.36	0.640	NA	NA

Table 4 (contd)

	Coefficient	ASHE/WERS (N = 5,586)		WERS (N = 18,420)	
		OLS	Interval (hourly)	Interval (hourly)	Interval (weekly)
Do you monitor promotions by gender?	Male-Yes	0.055* (0.023)	0.033† (0.018)	0.054* (0.022)	0.042* (0.215)
	Male-No	Ref	Ref	Ref	Ref
	Female-Yes	-0.102* (0.018)	-0.102* (0.018)	-0.099* (0.017)	-0.091* (0.017)
	Female-No	-0.175* (0.018)	-0.152* (0.018)	-0.168* (0.011)	-0.160* (0.010)
	R ²	0.36	0.640	NA	NA
Do you review promotion procedures to identify indirect discrimination by gender?	Male-Yes	0.046* (0.022)	0.030* (0.019)	0.045* (0.021)	0.036* (0.020)
	Male-No	Ref	Ref	Ref	Ref
	Female-Yes	-0.119* (0.018)	-0.113* (0.019)	-0.114* (0.018)	-0.103* (0.017)
	Female-No	-0.174* (0.018)	-0.145* (0.018)	-0.167* (0.011)	-0.158* (0.010)
	R ²	0.36	0.640	NA	NA
Do you review relative pay rates by gender?	Male-Yes	0.100* (0.023)	0.085* (0.018)	0.098* (0.022)	0.086* (0.021)
	Male-No	Ref	Ref	Ref	Ref
	Female-Yes	-0.078* (0.022)	-0.067* (0.019)	-0.076* (0.020)	-0.069* (0.018)
	Female-No	-0.170* (0.018)	-0.138* (0.018)	-0.163* (0.010)	-0.153* (0.010)
	R ²	0.36	0.643	NA	NA

* Statistically significant at the 5% level.

Source: ONS ASHE, WERS 2004.

TABLE 5
Percentage Differentials in Hourly Earnings Between Men and Women

<i>Monitoring and review procedures undertaken?</i>	<i>Male earnings differentials (%)</i>			
	<i>ASHE/WERS</i>	<i>OLS</i>	<i>WERS</i>	
		<i>Interval (hourly)</i>	<i>Interval (weekly)</i>	
Is gender explicitly mentioned in this workplace's policy on equal opportunities?	Yes	17.2	16.5	16.9
	No	17.8	17.6	18.9
Do you monitor recruitment and selection by gender?	Yes	16.2	15.0	13.3
	No	18.5	17.7	17.0
Do you review recruitment and selection procedures to identify indirect discrimination by gender?	Yes	17.3	16.0	14.2
	No	17.6	16.8	16.0
Do you monitor promotions by gender?	Yes	16.0	15.3	13.3
	No	17.8	16.8	16.0
Do you review promotion procedures to identify indirect discrimination by gender?	Yes	16.9	15.9	13.9
	No	17.7	16.7	15.8
Do you review relative pay rates by gender?	Yes	18.1	17.4	15.5
	No	17.3	16.3	15.3

Source: ONS ASHE, WERS 2004.

that monitor promotion by gender, where the differential in earnings between males and females is consistently narrower compared to those workplaces that do not undertake such monitoring. However, Wald tests revealed that these differences were not statistically significant. This result was found across each of the six dimensions of gender monitoring and for both analyses based on the WERS data and the matched ASHE/WERS sample.

There are a number of caveats to this analysis. First, this analysis is based upon cross-sectional data and as such, we are not comparing men and women who work in the same workplace. From a policy perspective, this empirical result could have been obtained in a fully segregated labour market, where men and women work in completely different workplaces. Within such a labour market, the introduction of equal opportunities monitoring would not be expected to reduce wage discrimination within the workplace. However, they may lead to a reduction in the overall gender wage differential if their presence encouraged the recruitment of women into high wage workplaces, altering the composition of female employment. Panel data techniques would be required to accurately determine whether the introduction of equal opportunities monitoring policies had a causal impact on the workplace gender differential.

6. Conclusions and further applications of the matched sample

This article has outlined the development of a new innovative data source that enables information on workplace characteristics from WERS to be included in analyses of ASHE data. The analysis has also demonstrated that despite the absence of direct measures of human capital within the ASHE data, the specification of a wage equation that utilizes control variables for occupation within the matched ASHE/WERS sample yields comparable results to those provided by a WERS-based analysis. Merging workplace data on to ASHE means that a variety of workplace characteristics documented in WERS can now contribute to our understanding of wage patterns in ASHE.

ASHE also provides information on additional data items that are not included in the WERS Survey of Employees. ASHE explicitly asks for information about basic pay, overtime pay, shift premiums, variations in pay due to absence and bonus and incentive payments. As well as providing a more detailed picture of earnings, ASHE also collects information on pension arrangements and contributions, the value of benefits in kind and annual leave entitlement. The matched WERS–ASHE dataset therefore provides the opportunity to research a wider range workplace phenomena than would be possible based only on the WERS Survey of Employees.

Finally, an important component of ASHE is that it is a panel dataset with the same individuals being followed up for each survey. Table 6 shows how the careers of individuals in 2004 ASHE who were employed in WERS

TABLE 6
Following the Careers of those Employed at WERS Workplaces

Year	Follow-up sample	Employed at WERS workplace	Occupational mobility among workplace movers*		
			Upward	No change	Downward
2004	5,396				
2005	4,391	3,852	69	425	45
2006	4,114	3,125	176	704	109
2007	2,950	2,072	115	561	202

* Defined as those moving to a different SOC Major Group (1 digit level).

Source: ONS ASHE, WERS 2004.

workplaces can be followed. Individuals drop out of the ASHE sample if they become unemployed, self-employed or become economically inactive. It can be seen that it has been possible to follow 4,391 matched sample employees in 2005, 4,114 employees in 2006 and 2,950 employees in 2007.⁵ The relatively high rate of attrition in 2007 relates to the reduction in the ASHE sample size of 20 per cent during this year.⁶ Individuals who change job within an organization can be identified and those who move to a new employer can also be traced. ASHE can provide a detailed picture of the jobs that these individuals subsequently hold, providing a valuable opportunity to consider how a range of workplace characteristics relate to subsequent earnings, hours, retention, occupational choice and geographical mobility.

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Notes

1. See Kersley *et al.* (2006) and Chaplin *et al.* (2005) for a description of WERS.
2. Limited hourly information is collected to provide additional detail for those at the bottom end of the income distribution.
3. Estimated hourly earnings will therefore vary for individuals within the same bandwidth of weekly earnings due to differences in the continuous measure of total hours worked across individuals.
4. For a full discussion of the causes of the gender pay gap and their relative importance, see Forth *et al.* (2001).
5. Note that the lower sample size in 2004 reflects the availability of the unique panel data identifier in ASHE, which allows the same individual to be traced

over time. We have also excluded those with second jobs from the construction of the panel.

6. This was in response to a requirement for ONS to achieve efficiency savings and to meet overall government targets to reduce the administrative burden on business. Further information about changes to the ASHE methodology during 2007 are available at http://www.statistics.gov.uk/downloads/theme_labour/ASHE/ChangeInASHE07.pdf

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