

Micro-data Analysis and User Support Data Brief: Summer 2008

Linking the Workplace Employment Relations Survey

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The Workplace Employment Relations Survey (WERS) 2004 is the fifth in a series of surveys that collects information about the state of employment relations in workplaces throughout Britain. The surveys are jointly sponsored by the Department for Business Enterprise & Regulatory Reform (BERR), the Economic and Social Research Council (ESRC), the Advisory, Conciliation and Arbitration Service (ACAS) and the Policy Studies Institute (PSI). The main aim of the survey is to provide systematic evidence on aspects of employment relations across Great Britain.

This Data Brief provides a summary of the WERS data available in the Virtual Micro-data Laboratory (VML). Firstly we will provide an overview of the content of the 2004 WERS data set. We then discuss innovations in the 2004 WERS survey that enabled the WERS data set to be deposited in the VML for the purpose of data linking. We then provide an overview of links that have so far been made between WERS and other sources of business data held in the VML. Initial exercises have focused upon linking WERS to the ONS Annual Business Inquiry and Annual Survey of Hours and Earnings. Mechanisms for linking WERS to the FAME database have also been developed. We then consider the potential for further data linking exercises. Finally we provide an overview of research conducted so far in the VML that utilises WERS data.

1. The WERS survey¹

The 2004 Workplace and Employment Relations Survey (WERS) is the fifth in a series of surveys aimed at presenting information about the state of employment relations in workplaces in the UK. The purpose of the WERS is to provide a statistically accurate account of UK workplace relations in order to

¹ 'The 2004 Workplace Employment Relations Survey (WERS 2004): An Introduction', available at:
[http://www.wers2004.info/pdf/An%20Introduction %20to%20WERS%202004%20April07.pdf](http://www.wers2004.info/pdf/An%20Introduction%20to%20WERS%202004%20April07.pdf)

examine and track changes in workplace relations over time, and to assist in generating research and stimulating policy studies in this area. WERS collects information on management of personnel, employment relations, and employee representation, workplace flexibility, payment processes, wage determination, grievances, equal opportunities and workplace performance.

The sampling frame for WERS 2004 was based on the Inter-Departmental Business Register (IDBR), maintained by the Office for National Statistics (ONS). The scope of WERS 2004 extends to cover all workplaces in Great Britain with 5 or more employees and operating in Sections D-O of the *Standard Industrial Classification (2003)*. The survey covers workplaces in both private and public sectors. The principal unit of analysis is the establishment or workplace. A workplace is defined as comprising the activities of a single employer at a single set of premises.

WERS 2004 collected information from approximately 2,300 workplaces. The survey consisted of 5 component parts. The first stage of data collection is based upon a self-completion questionnaire for the main management respondent about the composition of the workforce. The majority of the survey data is collected subsequently via a face-to-face interview the senior manager at the workplace who has responsibility for personnel or employment relations issues. Face-to face interviews are conducted with union and non-union employee representatives, where present. Self-completion questionnaires are also distributed to a random selection of up to 25 employees at the workplace. Finally, an important innovation within the 2004 survey was the introduction of a self-completion questionnaire about the financial performance of the establishment. This questionnaire was issued to a financial manager or somebody else who was best placed to comment on issues surrounding financial performance.

2. Innovation for WERS 2004 – Data Linkage

An important innovation in the WERS 2004 survey was the inclusion of a question which asked respondents to the managerial questionnaire to give consent for subsequent data linking. Specifically, respondents were asked the following:

'It is sometimes possible to link the data we have collected from you with other surveys or datasets, to which we have authorised access. Would you be content for us to do this, as it can provide us with the potential for further analysis? In doing this, we assure you that your confidentiality will be respected and the linked data will be anonymised and used for statistical and analytical purposes only, with only authorised researchers having access to the linked data.'

Of the 2295 firms interviewed for the WERS survey, 2166 (approximately 94 percent) agreed that their collected data for WERS could be used for other

surveys. Table 1 and 2 show how gaining consent for data linking varied according to key establishment characteristics, such as industry and company status.

Table 1: Consent by Industry (classified with SIC 2003)

Industry	% giving consent
Manufacturing	92.9
Electricity, gas	97.8
Construction	96.5
Wholesale and retail	94.4
Hotels and restaurant	93.7
Transport and communication	98.6
Financial services	92.3
Other business services	92.5
Public administration	93.4
Education	97.1
Health	94.6
Other community services	93.0
Total	94.4

It can be seen on Table 1 that the percentage of respondents giving consent for data linking varies by industry. For example the ‘financial service sector’ has the lowest share of consent with 92.3%, followed by ‘other business services’ with 92.5%. The highest level of consent was achieved in the ‘transport and communication’ industry, where 98.6% of respondents agreed to the data linking question. Smaller differences in levels of consent can be seen with respect to the type of organisation. ‘Private limited companies (inc. limited by guarantee)’ show only 93.63% of, whereas 96.83 % of respondents of ‘other’ types of organisations gave consent to linking the data. Those organisations classified to this category include trusts, charities, co-operatives and mutual societies.

Table 2: Consent by Type of Organisation

Type of Organisation	% giving consent
Public limited company	94.1
Private limited company (inc. ltd. by guarantee)	93.6
Partnership (inc. limited liability partnership), self-proprietorship	93.9
Local/central government (inc. NHS and local education authorities)	95.6
Other	96.8
Total	94.4

As a result of gaining the consent of survey respondents for data linking, the WERS 2004 data has been deposited within the Virtual Micro-data Laboratory (VML) to enable linking between WERS 2004 and other ONS business data sets. 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 data set 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 other ONS business data sets held in the VML.

2.1. WERS linked to the Annual Business Inquiry (ABI)

The largest and most comprehensive ONS business survey is the Annual Business Inquiry. Due to the size and content of this survey, the ABI generally forms the spine against which most linking activity within the VML takes place. The ABI has been conducted in two parts, one dealing with employment data (ABI/1), and one dealing with accounting data (ABI/2). To reduce compliance costs, the ABI is not a census of all businesses. Only reporting units with more than 250 employees are sent an ABI form every year, with smaller reporting units being sampled. The selected sample of small firms rotates to prevent the excessive sampling of SMEs.

Responses to the Annual Business Inquiry are held in the Annual Respondents Database. Within the ARD there are essentially two types of enterprise. Information collected directly from the ABI is held on the 'selected files' of the ARD. Major variables included within the ARD relate to employment, turnover/output, capital expenditure, intermediate consumption, gross value added (derived), owner nationality, acquisitions and disposals of capital goods. Information on those organisations included within the ABI survey universe but which are not included within the actual survey during a given year is held on the 'non-selected' files. By including information from the 'non-selected' ARD files, the coverage of the ARD is broadened considerably. However, the range of data items held on the non-selected files is much more limited. Measures of employment and turnover derived directly from the data sources used to construct the IDBR (VAT, PAYE plus information from the Annual Register Inquiry) are available.

Within the Annual Respondents Database, the unit of analysis is the reporting unit. The reporting unit holds the mailing address for the business and is the unit for which businesses report their survey data to ONS. For single site enterprises, the reporting unit is the same as the enterprise. Indeed, the "reporting unit" level is equivalent to the enterprise level in a large majority of enterprises. This means that the observations in the ARD typically relate to whole organisations, rather than for single workplaces as in WERS (although

as noted above, reporting units can also refer to part of an organisation). An 'ideal' match between the two sources would occur where a single site establishment in WERS is matched to a reporting unit within the ARD which corresponds to the same single site establishment. The information held at the reporting unit level within the ARD would relate to the same unit of analysis as that recorded within WERS.

Finally, within WERS a Financial Performance Questionnaire was left with the respondent to the Management Survey. This short questionnaire was left to be completed by somebody who was responsible for financial matters at the workplace. Of the 1070 workplaces who responded to the financial questionnaire, 1029 (96%) came from workplaces who agreed that their data could be linked to other data sources.

In light of these issues, matches between WERS and the ARD can be summarized according to the following criteria:

- whether the WERS respondent completed the Financial Performance Questionnaire (FPQ vs. Non FPQ);
- whether the match to the ARD was made to a reporting unit that appeared in the selected or non-selected file of the ARD (ARD vs. ABI);
- whether the match to the ARD was an exact match in terms of whether the local unit in WERS represents all the local units of that reporting unit (essentially whether or not the WERS workplace represents a single site establishment).

Matching WERS to the 2004 ARD, we observe that matches to the ARD were achieved for 86% (1855) of the 2166 workplaces where the respondent agreed that their data could be linked to other sources of information. Details of the matching exercise are provided in Table 3. Of those workplaces that were matched to the ARD, 48% were matched to reporting units that responded to the ABI during that year. However, only 23% of matched workplaces responded both to the ABI and the WERS FPQ. In terms of providing an exact match to the ARD, only 5% of matches were made to workplaces that both responded to the ABI, the FPQ and where the workplace information held within WERS was synonymous with the reporting unit information held within the ABI/ARD.

Forth and McNabb (2008) use the linked WERS-ARD data set to examine the relationship between subjective and objective measures of firm the analysis was conducted based upon productivity and profitability variables available from the WERS2004 and the Annual Business Inquiry (ABI). The WERS FPQ collects subjective evaluations of both financial performance and labour productivity. The question for financial performance was preceded by another asking the manager to state the measure that corresponded most closely to their interpretation of financial performance (profit, sales etc). For both

measures, respondents were asked to assess how the performance of their workplace compared to other establishments in the same industry .

Table 3: Matching WERS to the ARD: 2004

Total Matches	1,855
	86%
Of which:	
ABI-Exact -FPQ	5%
ABI-Exact -Non FPQ	3%
ABI-Non Exact -FPQ	18%
ABI-Non Exact -Non FPQ	22%
ARD-Exact -FPQ	11%
ARD-Exact -Non FPQ	12%
ARD-Non Exact -FPQ	16%
ARD-Non Exact -Non FPQ	14%
Total	2166

Table 4 presents the results for tests of convergent validity for the subjective and objective measures of *profitability* undertaken by Forth and McNabb (2008). They find that objective and subjective measures of profitability show more evidence of equivalence compared to productivity (not presented here). It can be seen that the mean values of both the absolute and relative measures of profitability are monotonically increasing across all the subjective categories. The same is true of almost all of the percentile values so that, in a very general sense, establishments that have higher (lower) levels of objectively-measured profitability are also those that tend to have been subjectively rated as more (less) profitable in the Management Interview. Further analysis revealed that both types of performance measures produce similar results when used in structural models of the determinants of workplace performance. The authors conclude that objective and subjective measures can give valuable perspectives on workplace performance, although most weight should be given to findings that can be replicated across both objective measures and subjective ratings.

In both cases, the respondent was given a show-card displaying five response options: A lot better than average; better than average; about average for industry; below average; a lot below average.

Table 4: Convergent Validity Test: Subjective and Absolute Objective Measures Of Profitability

	<i>Subjective Measure</i>				
	Total	Below/Lot Below Average	About Average	Above Average	A lot Above Average
<i>Objective Measure: Profit per head (£'000s)</i>					
N	280	31	110	107	32
Mean	17.30	-0.15	13.78	20.97	34.07
25 th	0.43	-3.65	0	2.14	6.64
50 th	7.38	0.42	5.70	8.28	15.83
75 th	21.18	8.78	20.76	23.44	39.90
<i>Objective Measure: Relative profitability</i>					
N	256	28	102	98	28
Mean	1.72	0.82	1.42	1.82	3.37
25 th	0.03	-0.25	0.03	0.09	-0.21
50 th	0.69	0.06	0.73	0.71	1.29
75 th	2.27	0.82	1.97	2.72	3.41

Source: Forth and McNabb (2008)

2.2. WERS linked to the Annual Survey of Hours and Earnings (ASHE)

Davies and Welpton (2008) outline 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 Annual Survey of Hours and Earnings (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. 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.

The aim of the merged dataset is therefore to expand upon the information contained within the original ASHE and WERS data sources. Within WERS, employees are only asked to provide details of their hourly and weekly wages within banded categories, contributing to a loss of precision in terms of understanding true variations in wages between individuals. The detailed continuous information on the hours and earnings of employees collected by ASHE therefore provides a richer picture of the earnings of those employed at WERS workplaces. Secondly, ASHE also collects information on topics not covered by the WERS survey, including leave, pension contributions and benefits in kind. Thirdly, ASHE contains relatively little information on workplace characteristics. 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. Finally, the panel nature of the ASHE data set provides the opportunity to track the careers of people employed in WERS workplaces in subsequent years. Individuals who change job within an organisation can be identified and those who move to a new employer can be traced.

A linked WERS-ASHE data set has been constructed that contains information on 5,922 subjects from the 2004 ASHE originating from 785 workplaces that responded to the WERS 2004 Management Questionnaire. Table 5 provides an overview on a selection of characteristics of the ASHE data, which indicates the representativeness of the linked ASHE/WERS dataset. It can be seen that there is relatively little difference between the matched and the full ASHE data set 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 data set are more likely to have an employer provided pension and have their pay set by collective agreement. Average hourly earnings in the matched ASHE/WERS sample are higher, reflecting the characteristics of the matched sample where employment is relatively concentrated within more highly skilled, non-manual occupations within the public sector.

Davies and Welpton (2008) undertake an illustrative analysis WERS-ASHE data set to consider whether workplace monitoring arrangements are associated with the size of the gender wage gap. Analysis reveals that whilst women employed at workplaces that implement gender monitoring arrangements earn more than those employed at workplaces which do not, being employed at a monitoring workplace is also associated with higher earnings among males. The net effect is that the presence of such monitoring arrangements is not associated with a smaller gender wage gap.

Table 5: Characteristics of Individuals in the ASHE and Matched Datasets

	ASHE 2004	ASHE/WERS
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):	18502	18708
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 organisations	0.1	0.0
Average Hourly Earnings (£)	11.47	13.14
Number of observations	166794	5922

Source: ONS ASHE, 2004 WERS

2.3. Other potential links

2.3.1. Detailed Geographical Information

In order to facilitate research that takes into account characteristics of the local area in which the establishment is located, a small number of external labour market variables at Travel to Work Area (TTWA) level are included in the WERS data. These data items – which include unemployment and vacancy rates along with the ratio of unemployment to vacancies - were made available through the Economic and Social Data Service in October 2007. However, data from this source contains banded variables to prevent deduction of TTWA identities via unique variables. Data deposited at the VML contains unbanded versions of these variables, plus the postcodes of each individual surveyed workplace. This means that the WERS data within the VML can be combined with the National Statistics Postcode Directory in order to append different geographical identifiers to the WERS data.

2.3.2. WERS linked to the Financial Analysis Made Easy (FAME)

Work has also been undertaken in the VML to establish matches between IDBR identifiers and Company's House Reference Numbers (CRNs). This work provides the opportunity to link data from WERS with information held on the FAME database. FAME is a database that provides financial and descriptive information on companies in the UK and Ireland. It is noted that FAME database only includes information on enterprises operating within the commercial sector and so relatively few links can be established among those WERS workplaces operating within the Education, Health and Public Sectors.

In total, 59% (n=1,266) of the 2,166 establishments in WERS have been matched with FAME CRNs for 2004. The links between the IDBR and CRNs have been made at the enterprise level. As a result, those WERS workplaces that belong to the same enterprise will be allocated the same CRN. Approximately a quarter of the linked WERS establishments (n=568) can be mapped to a single CRN. However, it can be seen that for almost a third of WERS workplaces (n=698), WERS workplace may match to more than a single CRN. As with the case of matching to the ARD, researchers linking to FAME would have to consider issues surrounding different units of analysis if attempting to link WERS to FAME.

Table 6: Number of FAME CRNs matched with WERS enterprise numbers

Number of CRNs per ENTREF	Frequency	Percent	Cumulative
0	900	41.6	41.6
1	568	26.2	67.8
2-5	330	15.2	83.0
6-19	201	9.3	92.3
20+	167	7.7	100.0
Total	2,166	100.0	

2.3.3. Other potential matches with the WERS Managerial Questionnaire

As noted above, researchers using the VML have the flexibility to the information collected from WERS with other sources of information collected on these organisations by ONS. The matching exercises described above have outlined some of the issues that need to be considered by researchers in undertaking such matching exercises. These include different units of analysis, sampling fractions used on ONS surveys and the coverage of these samples. It is therefore important for researchers to consider the representativeness of any matched sample created by merging WERS with other ONS business surveys.

There remain a number of potential innovative ways that researchers can combine WERS data with ONS business data sets. The linking exercises described above have focussed upon matching WERS data to contemporaneous data collected from the ABI and ARD. However, both of these data sources contain longitudinal data on enterprises and employees providing the opportunity for dynamic analyses in both cases. Opportunities also exist for linking WERS to other sources of ONS business data. Table 7 focuses on linking with the Business Expenditure on Research and Development survey (BERD), the Community Innovation Survey (CIS) and the Ecommerce Survey, providing brief summary of these data sets and the indicative sizes of the matched samples.

Table 7: Potential matches between WERS Managerial Questionnaire

Data set	Description	WERS Matches
Business Expenditure on Research & Development (BERD)	<p>This annual survey is designed to measure research and development expenditure and employment in businesses. Coverage also includes sources of funding, and types of R&D. The VML holds the data of the years 1995 to 2004. The latest year has been used for the data linking.</p> <p>The matching exercise resulted in 160 WERS workplaces being matched to BERD. Due to the fact that some workplaces may belong to the same BERD enterprise, some WERS workplaces were matched to the same enterprise reference number (ENTREF) in BERD. Almost half of the linked workplaces (n=75) were matched to a single ENTREF.</p>	<p>Total matches 160</p> <p>Single matches 75</p>
The Community Innovation Survey (CIS)	<p>The CIS is a one-off survey, investigating various aspects of innovation, such as factors hampering innovation, types of innovation, and the costs and benefits of innovative practices. Datasets deposited in the VML refer to the year 94/96, 98/00 and 02/04. The WERS/CIS sample contains 317 WERS workplaces matched to an ENTREF in</p>	<p>Total matches 317</p> <p>Single matches 227</p>

	the CIS data set. Around 70 % (n=227) were exclusively matched to only one ENTREF.	
E-Commerce Survey (Ecom)	The annual E-Commerce survey captures various aspects of e-commerce amongst British firms, including internet access, other ICT, value and volume of electronic ordering. By linking WERS with the Ecom data, a matched sample of 574 workplaces was achieved, which represents 26.5% of WERS workplaces. Almost 57% (n=326) of these matches refer to only one enterprise reference number in the Ecom data set.	Total matches 574 Single matches 326

3. Examples of WERS Based Research Conducted in the VML

Finally, the following paragraphs provide an overview of some of the research that has been completed or is currently carried out in the VML.

Training, Job Satisfaction and Establishment Performance

Sloane P.J., Jones M.K. (2007), Jones R.J., Latreille P.L., 'Training, job satisfaction and establishment performance', SSDA research report no.22

This report focuses on understanding the link between skills and performance with job satisfaction acting as a mediating influence. With the analysis based on three data sets, the British Household Panel Survey, the UK Skills Survey and WERS2004, the paper combines information on training and job satisfaction as well as the new WERS financial performance data, to establish whether there is a link between training and establishment performance.

The Role of Management Practices in Closing the Productivity Gap

Siebers P.O., Aikeling U., Battisti G., Celia H., Clegg C., Fu X., De Hoyos R., Iona A., Petrescu A., Adriano P. (2008), 'The Role of Management Practices in Closing the Productivity Gap', <http://arxiv.org/abs/0803.2995>

This report examines some of the key reasons for the relatively poor productivity of selected parts of the UK service sector, compared to the USA. It focuses in particular on the role of management practices in the productivity gap. The project adopts an inter-disciplinary approach and involves a mix of case study and survey methods. The distinctive feature of this work is that the authors tried to model the reasons for this productivity shortfall by incorporating variables from different levels of analysis - including national, sector, firm and workgroup variables.

Knowledge Sharing Through Face-To-Face Communication and Labour Productivity in UK Trading Workplaces

Salis S., Williams A.M., Allan M. (2007) Knowledge sharing through face-to-face communication and labour productivity in UK trading workplaces. In: WERS 2004 User Group: Third Meeting, 26 Oct 2007, University of Warwick.

The paper discusses the question how modern organisation can manage their knowledge flows effectively to become predominant on the market. The authors' main objective is to investigate whether workplaces enhancing face-to-face communication in their HRM practices are more productive than those that do not. In the framework of this observation the WERS 2004 data has been used to observe the HRM practices, as well as objective measures of labour productivity through the linked WERS-ARD data.

High Commitment or just High Performance?

Sheehan M., Michie J., Zubanov N. (2007), 'High Commitment' Or Just 'High Performance', conference paper for EUROAM 2007

The main objective of this research project is to observe the impact of Human Resource (HR) practices and employee attitudes, which is the main focus of the research, on several measures of corporate performance using WERS 2004, including financial results. By comparing the two effects of HR practices on performance the authors determine the relative importance of 'high commitment' work systems, based on encouraging positive employee attitudes, and 'high performance' work systems, acting through explicit HR practices.

The business case for Equal Opportunities: An econometric investigation

Riley, R., Metcalf, H., Forth, J., (2008), "The business case for Equal Opportunities: An econometric investigation", Report to: Department for Work and Pensions, Research Report No. 483

This DWP funded study determines to provide more-robust evidence on the relationship between Equal Opportunities policies and practices and business benefits. The authors established a link between Equal Opportunities policies and productivity using WERS and empirically investigate this connection.

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