WERS 2004 Information and Advice Service
Technical Paper No. 5

The Analysis of Change using WERS

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June 2008

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Introduction

The series of Workplace Employment Relations Surveys spans over almost one quarter of a century. The first cross-section survey in the series took place in 1980 and four further cross-sections have followed, with the most recent having taken place in 2004. Accompanying these five snapshots of workplace employment relations have been four panel surveys which have provided an insight into how employment relations may change within an establishment over time. Together, these surveys provide a rich and unrivalled set of survey data on changes in workplace relations over the past 25 years.

The purpose of this paper is to briefly outline how these data may be utilised to analyse change. Section 2 introduces the available datasets, focusing first on the series of cross-section surveys and then on the four panel surveys. Section 3 then goes on to present some illustrative analyses, first using the cross-sectional data and then the panel data. Section 4 concludes by indicating where users may get further assistance.

Data Resources

Cross-sectional data

As noted above, there are now five surveys in the WERS series, with cross-sectional surveys having taken place in 1980, 1984, 1990, 1998 and 2004. The surveys have been conducted using a design that has remained unchanged in its core elements over the series, being focused on individual workplaces (rather than organisations), being centred around an interview with the senior workplace manager with responsibility for personnel issues and having achieved a sample of around 2,000 workplaces in each year. The management questionnaire has been revised to greater or lesser extents at each wave, with the most extensive revision coming in 1998. The management survey has also expanded to include smaller workplaces. And other elements of the survey design have changed (worker representatives have been interviewed using different selection criteria across the series, and an employee survey was introduced in 1998). But there has been sufficient continuity in both the design and administration of the main management interview to allow the incidence of many features of workplace employment relations to be charted using these cross-section management interview data for the period between 1980 and 2004 .

A WERS Time-Series Dataset has thus been formed from the interviews with the **main management respondent** in each of the five cross-section surveys (1980, 1984, 1990, 1998 and 2004). The dataset contains a wide range of data items from throughout the 1998 or 2004 management questionnaires for which there are also comparable items in at least one other previous cross-section survey in the WERS series. The Time-Series Dataset is available from the UK Data Archive (study number 4511 in the UKDA on-line catalogue: http://tinyurl.com/5k864y).

This time-series dataset makes the most of the continuity present within the survey series by providing direct comparisons of employment relations practice at five

specific points in time over the past two decades. It is therefore possible to investigate the degree of change or stability in the incidence of specific practices over time, both in aggregate and within particular sectors of the economy or types of workplace. One can also assess the extent to which historical relationships – such as that between workplace size and union presence, for example - have changed over the period of observation.

It should be noted that none of the information obtained from interviews with worker representatives or from employees' self-completion questionnaires is currently incorporated in the dataset. However, the dataset does draw upon the responses from the 1990 survey of financial managers, in which selected questions from the main interview were asked of this respondent instead of the personnel manager.[1] It also draws upon the 1991 Employers' Manpower and Skills Practices Survey (EMSPS), which returned to 88% of the workplaces in WIRS 1990 to ask additional questions about recruitment practices, training and other activities.

It should also be noted that the dataset is not guaranteed to be complete. The compilation of the time-series dataset has focused primarily on the core questions that have featured in the management questionnaires. Accordingly, there are undoubtedly some consistent data items which have not yet been included.

The basic properties of the time-series dataset are as follows:

	Number of workplaces		Variables with non-missing data
	25 or more employees	10 or more employees	
1980	2,040		145
1984	2,019		186
1990	2,061		246
1998	1,929	2,191	300
2004	1,648	2,062	279

Note: the additional 233 workplaces from the 2004 cross-section that have 5-9 employees are not included in the time-series dataset

Panel Survey data

It is important to note that each cross-section sample is essentially independent. In other words, it is not possible to track individual workplaces from one survey year to the next in the time-series dataset. Instead, the WERS Panel Surveys have been specifically designed to provide information on how workplace relations change within individual establishments from one period to the next. Each is a two-wave panel in which the respondents to the cross-section survey in wave *i* of WERS are recontacted at wave *i+1*. So the 1998-2004 Panel Survey, for example, returned in 2004 to those workplaces that had responded to the 1998 cross-section survey.

[1] The purpose of this was to reduce the burden on personnel managers. In workplaces where the respondent was identified as a personnel specialist and a financial manager could also be identified, certain questions which, elsewhere, were asked of the personnel manager were instead directed to the financial manager. This occurred in 454 workplaces in total.

There are four panel surveys in all:

Panel Survey	Features	UK Data Archive Study Number
1980-1984	Experimental	2204
1984-1990	Trading sector only	2060 + 2938
1990-1998	All workplaces with 25 or more employees	4026
1998-2004	All workplaces with 10 or more employees	3955 + 5294

As noted in the table, the 1980-1984 panel survey was experimental and it is not advisable to use the data for analysis. The 1984-1990 panel survey may be used, but is less well documented than the two most recent panel surveys. It should also be noted that the panel data vary in the way in which they have been deposited. The 1990-1998 panel survey is contained within a single deposit that includes the data from both the 1990 and 1998 waves. However the 1984-1990 and 1998-2004 panel surveys each require the merging of two separate deposits: that relating to the original cross-section (wave one) and that relating to the follow-up interview (wave two).

Each of the panel surveys generally provide two types of data. First, they provide details about whether each of the workplaces that participated in the original cross-section (wave one) survived over the intervening period between wave one and wave two. Second, for those workplaces that did survive, they provide information – collected via a management interview – about employment relations at the workplace at wave two. This second set of data can then be compared with the data on employment relations collected at wave one in order to identify changes in employment relations practice among those workplaces that continued in operation between waves one and two.

At this point it is worth saying a little more about what is meant by 'survival'. This is defined as the workplace having offered a continuous employment relationship with its staff over the period between wave 1 and wave 2. In other words, if there is any point at which the workplace ceases to employ any employees, then the workplace is considered to have closed down (not survived), even if it later re-opens under the same ownership.[2] It should also be noted that not all survivors are pursued for interview at wave 2. The panel surveys have only pursued wave 2 interviews in those workplaces who continue to meet the employment threshold used at wave 1. These workplaces that have survived and which continue to be in-scope have tended to be referred to as 'continuing workplaces', as a shorthand. Also, budgetary constraints have meant that only a subset of these continuing workplaces are pursued for interview: for instance, the 1990-1998 panel survey pursued a randomly-selected 63 per cent of workplaces from the original cross-section.

[2] The WERS technical reports provide further details on the rules used to adjudicate in complex cases.

The following table indicates the numbers of observations that are available in each of the three most recent panel surveys:

Panel Survey	Survival status at wave 2	Interview data at waves 1 and 2
1984-1990	704	537
1990-1998	2,061	846
1998-2004	2,191	938

Illustrative analyses

In the section which follows we provide some illustrative examples of analyses using the time-series and panel data. Further analyses using these datasets have been published in each of the WERS sourcebooks, however the most fulsome analysis to date appears in *All Change at Work*?.[3]

Time-Series Data

The sorts of questions that one might typically seek to address using the time-series dataset include the following:

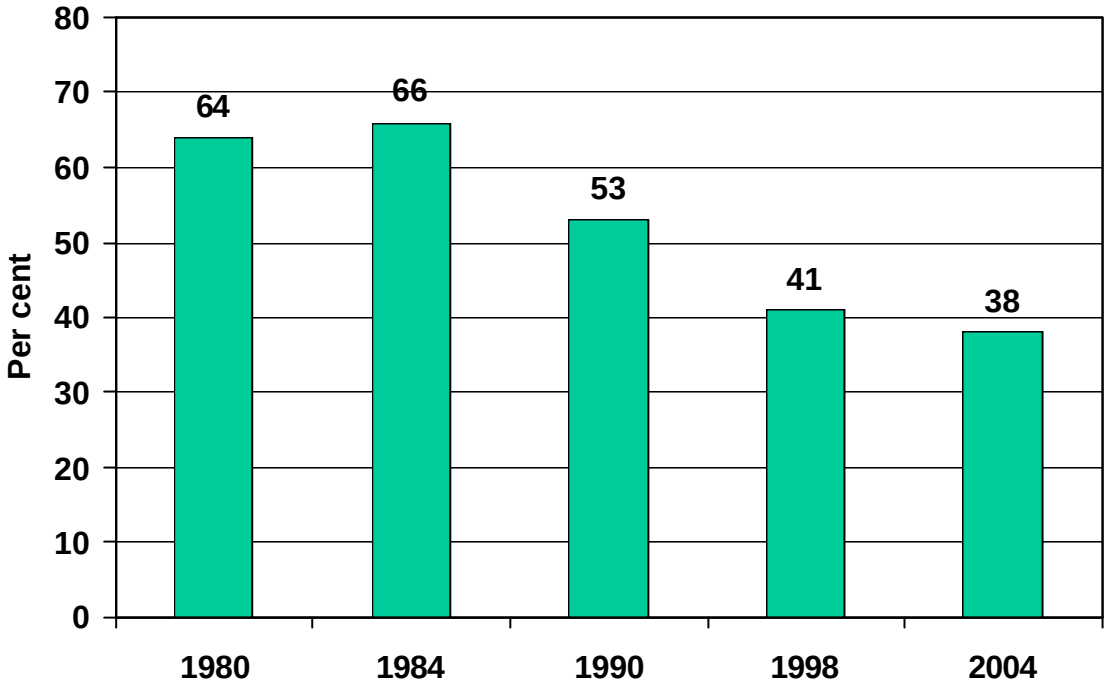
- To what extent have employment relations practices changed between year X and year Y?
- Does the degree of change over time vary for different types of workplace?

We provide illustrations of how one might answer these questions by taking the example of union recognition, or more specifically: the percentage of all workplaces that recognise at least one trade union for the purposes of negotiating pay and conditions for some employees.

The first question is addressed by a simple cross-tabulation of the workplace recognition variable (TRECOG) by the year indicator (YEAR), after weighting the data by the workplace weight variable (WEIGHT). We include all five time points, thereby producing a tabulation that is based on all workplaces with 25 or more employees. The results are shown in the following figure. One observes a precipitous decline in the rate of union recognition between 1990 and 1998, after which time the decline levelled off.

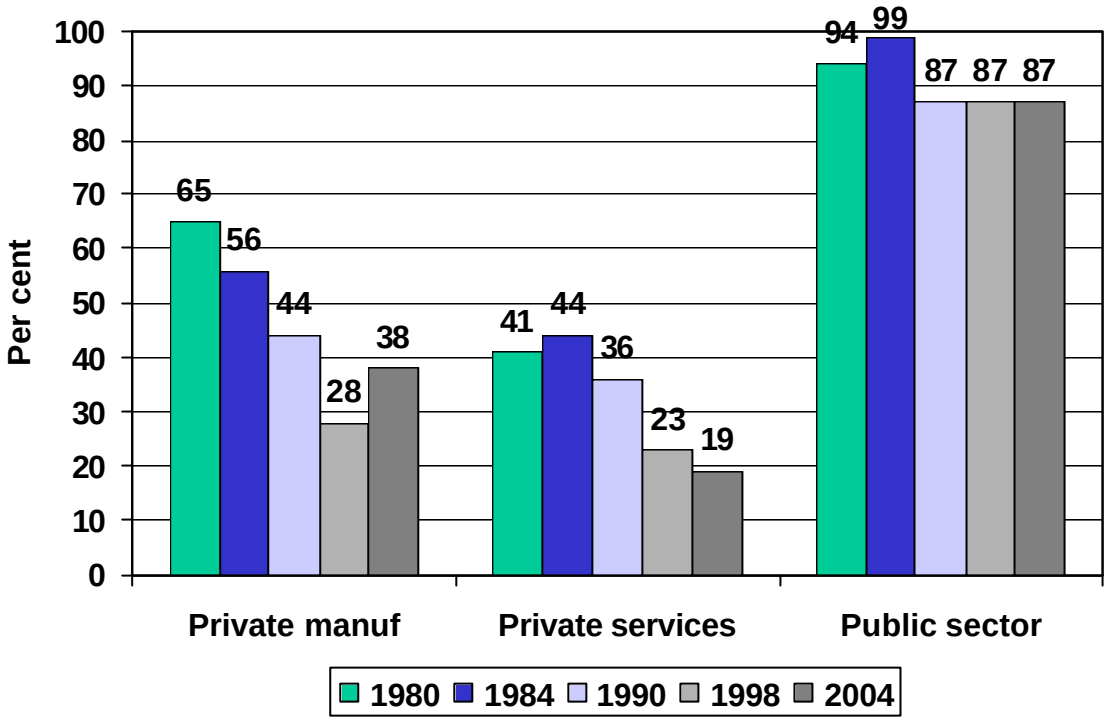
[3] Millward N, Bryson A and Forth J (2000) *All Change at Work? British Employment Relations 1980-1998, as portrayed by the Workplace Industrial Relations Survey series*, London: Routledge.

Incidence of trade union recognition among workplaces with 25 or more employees, 1980-2004



One may take this a step further by investigating how the rate of decline varied in different sectors of the economy. In this example, we divide the economy into three sectors: private manufacturing, private services and the public sector. Rates of recognition for each sector may be obtained from a three-way cross-tabulation of the workplace recognition variable (TRECOG) by the year indicator (YEAR) by the relevant sector indicator (TSECTOR3), again after weighting the data by the workplace weight variable (WEIGHT). One obtains the following, which shows that the aggregate picture of approximate stability between 1998 and 2004 was only repeated in the public sector. Rates of recognition continued to decline in private services, but actually rose between 1998 and 2004 in private manufacturing.

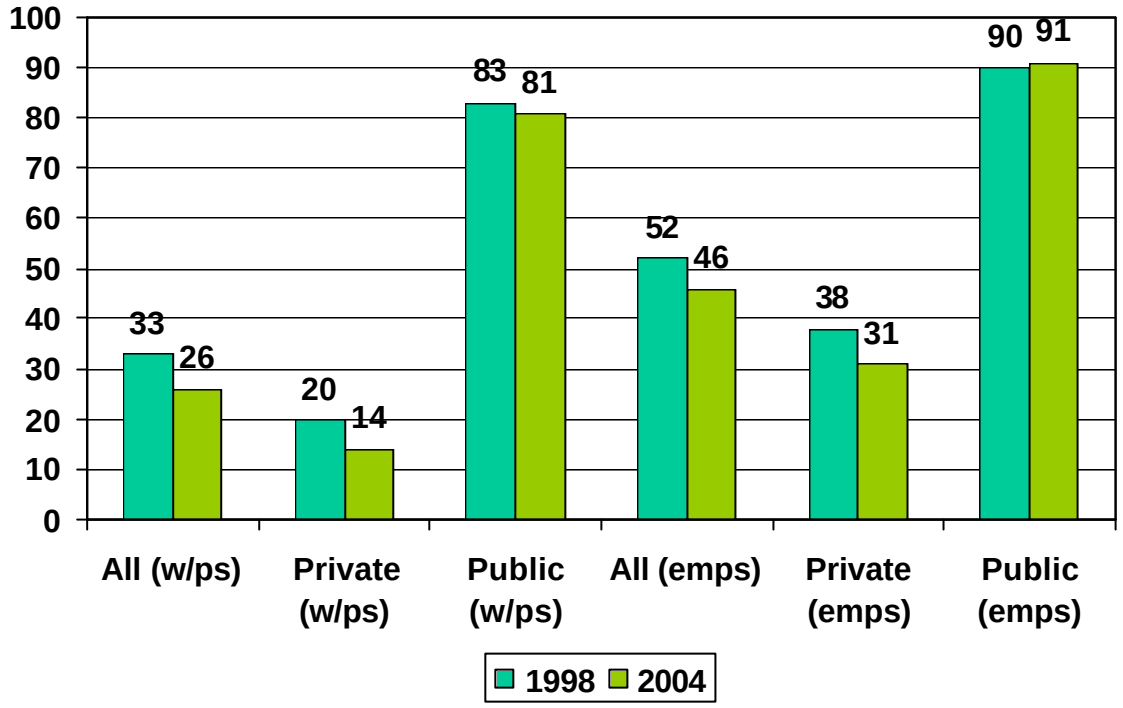
Incidence of trade union recognition among workplaces with 25 or more employees, by sector, 1980-2004



A further take on changes in recognition might involve looking at the changing share of employment in workplaces that recognise trade unions. Our third illustration focuses solely on 1998 and 2004, and so the figures are based on all workplaces with 10 or more employees. The figure below shows the proportions of all workplaces that recognise unions: (a) across the whole economy; (b) in the private sector; and (c) in the public sector. It then goes on to show the proportions of all employees who work in establishments that recognise unions, using the same private/public sector classification.

One can see, first, that the overall decline between 1998 and 2004 in the proportion of workplaces that recognise unions, from 33 per cent to 26 per cent, is greater than the decline in either of the private or public sectors, and so one can infer that the overall rate of decline was in part raised by an increase in the proportion of all workplaces that belong to the private sector as opposed to the public sector. One can also see that the decline in the proportion of all private sector employees who work in establishments that recognise unions (from 52 per cent to 46 per cent) is marginally smaller than the decline in the equivalent workplace proportion, indicating that the decline was most substantial among smaller workplaces (since these dominate the population of workplaces to a greater degree than the population of employment).

Incidence of trade union recognition among workplaces with 10 or more employees, by sector of ownership, 1998-2004 (workplaces and employment)



Panel Survey Data

The sorts of questions that one might typically seek to address using the panel survey data include the following:

- To what extent do employment relations practices change in individual workplaces over time?
- Are specific employment relations practices associated with business survival or employment growth?
- To what extent do these dynamics account for overall changes in employment relations practice observed within the time-series?

Again, we use the case of union recognition in the private sector to provide illustrations of how one might answer these questions. Our illustrations use the 1998-2004 panel survey.

The first question is addressed by using the 1998 and 2004 interview data from continuing workplaces. We have interview data on 938 workplaces but, as noted earlier, these data must be compiled from two separate deposits (UKDA SNs 3955 and 5294). This procedure is discussed in FAQ 3.2 on the WIAS web-site (http://tinyurl.com/67gzaj) and the FAQ also provides SPSS and Stata syntax to combine the data. The data may be combined to produce a dataset in wide form (one record per workplace) or long form (one record per workplace per year): we use the wide form in this illustration.

In the 'wide form' panel dataset, each workplace occupies a single record (row) in the

resulting data file. One block of variables contains data from 1998 and another block contains data from 2004. The 1998 variables are prefixed with the letter X and the 2004 variables by the letter Y. So **XVAR1** contains the data arising from a hypothetical VAR1 in 1998, whilst **YVAR1** contains the data from the equivalent question VAR1 in 2004, as follows:

	1998		2004	
SERNO	XVAR1	XVAR2	YVAR1	YVAR2
12345	1	2	2	1
12346	1	1	1	2

The dataset formed from the available syntax includes all 2,191 cross-section workplaces from 1998, and so some rows will be largely empty for 2004, with the exception of those variables identifying the workplace's survival status. One easy means of selecting only those 938 workplaces with interview data in 2004 is to select workplaces for which both XZALLEMPS and YZALLEMPS are non-missing, since a response to ZALLEMPS is mandatory in any WERS interview. Alternatively, one can select cases in which PQWTNR (the weight variable for the 938 interview cases) is non-missing.

The data on union recognition are held in differently-named variables in the 1998 cross-section and 2004 panel interviews, and so a simple recode is required in order to construct consistent a binary indicator that identifies workplaces with and without recognised unions. This can be done in SPSS as follows:

```
compute xrec=(xetotrec>0) .
compute yrec=(yenumrec>0) .
recode xrec yrec (sysmis=0) .
```

Similarly, one needs to follow the same procedure to create consistent filters for private sector workplaces:

```
compute xpriv=(xastatus<=2) .
compute ypriv=(yacomp01<=7) .
```

The incidence of recognition in each year among continuing workplaces may then be obtained from a simple cross-tabulation of the 1998 workplace recognition variable (YREC) by the 2004 recognition variable (YREC) after selecting private sector workplaces (XPRIV=1 and YPRIV=1) and weighting the data by the panel interview weight variable (PQWTNR).

Cell percentages

		Unions recognised in 2004		All
		.00 No	1.00 Yes	workplaces
Unions recognised in 1998	.00 No	74	4	78
	1.00 Yes	2	20	22
All workplaces		76	24	100

One can then see that, among those private sector workplaces that continued in operation with 10+ employees, there was approximate stability in the overall rate of recognition when comparing 1998 and 2004. A small percentage of workplaces (6 per cent in total) did switch status, however, and those adopting recognition slightly outnumbered those renouncing it. It would be straightforward to construct a new variable that identified workplaces in each cell of the table, so as to examine the characteristics of workplaces that took different paths between 1998 and 2004, although this would obviously be more profitable when looking at a characteristic on which there was a greater degree of change.

Our second illustration addresses the question of whether union recognition is associated with business survival. Here we use the same 'wide form' dataset described above but, instead of selecting those workplaces that were interviewed in both 1998 and 2004, we use all of the 1998 cross-section and look to the variable YOUT3 to identify which of these workplaces did / did not survive to 2004. YOUT3 shows the following for the full sample (including public sector workplaces):

Yout3 Outcome in 2004 - summary

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 Closed down	273	12.5	12.5	12.5
	2 Continuing in 2004 with less than 10 employees	59	2.7	2.7	15.2
	3 Continuing in 2004 with 10 or more employees	1847	84.3	84.8	100.0
	Total	2179	99.5	100.0	
Missing	-8 Cannot determine continuity	12	.5		
Total		2191	100.0		

If we ignore the 12 workplaces for which continuity could not be determined, a total of 1,906 workplaces in the WERS 1998 cross-section sample (87.5 per cent) thus continued in operation through to 2004 whilst 273 (12.5 per cent) closed down. If we restrict our attention to workplaces that were in the private sector in 1998 and apply the 1998 cross-section weights (ESTWTNR), we find that 18.8 per cent of private sector workplaces with 10+ employees in 1998 had closed by 2004. Our interest is in whether this 'closure rate' varied between workplaces that did / did not recognise unions. The question is addressed by a simple cross-tabulation of YOUT3 by XREC (see above for derivation) after selecting workplaces that were in the private sector in 1998 and applying the 1998 cross-section weights. We obtain the following:

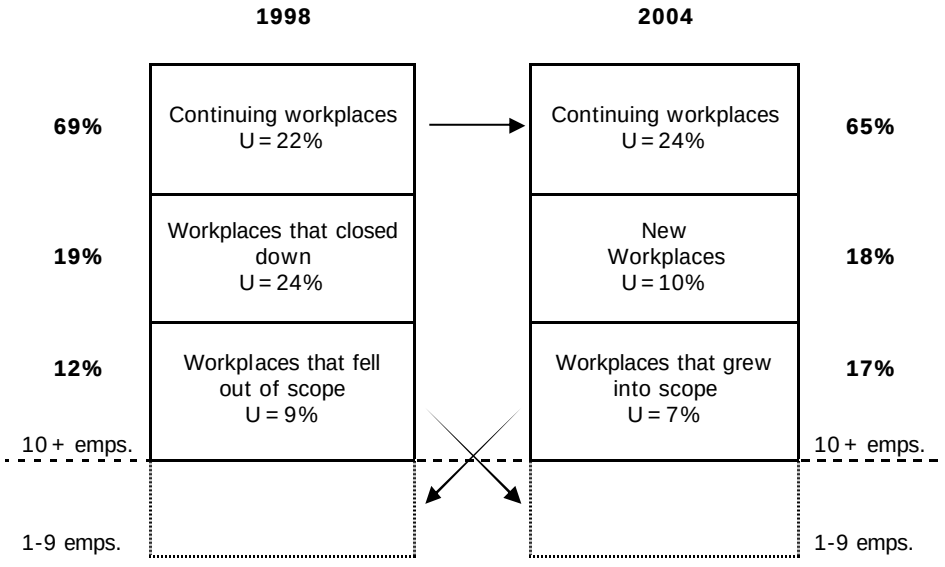
Row percentages

		Outcome in 2004 - summary			
		1 Closed down	2 Continuing in 2004 with less than 10 employees	3 Continuing in 2004 with 10 or more employees	All workplaces
Unions recognised in 1998	.00 No	18	14	68	100
	1.00 Yes	24	5	71	100
All workplaces		19	12	69	100

We can therefore see that private sector workplaces in 1998 that recognised unions were more likely to close than private sector workplaces that did not recognise unions. This is, of course, only a bivariate association and multivariate analysis would be required to investigate whether the association between union recognition and closure was independent of other factors. However, this is straightforward to achieve having come this far.

Our third illustration addresses the question of the extent to which the dynamics that we have already uncovered (changes in recognition among continuing workplaces and the higher rate of recognition among closures) account for the overall decline in the private sector recognition rate from 20 per cent in 1998 to 14 per cent in 2004. The following figure first provides a more detailed indication of the component parts of the population of workplaces at two time points, in order to show how the panel data on survival and the interview data from continuing workplaces fits into an understanding of the dynamics of change in workplace practice.

Population shares and rates of recognition for continuing workplaces and other workplaces, 1998 and 2004



1998 shares obtained from YOUT3 in 1998-2004 Panel Survey dataset
2004 shares obtained from AHOWLONG and ZEMP6AGO in 2004 Cross-Section dataset

The population in wave 1 (1998) is comprised of:

- workplaces that continue in operation through to the time of wave 2 (2004) and which continue to remain above the employment threshold for the survey (labelled continuing workplaces in the figure);
- workplaces that close down between wave 1 and wave 2; and
- workplaces which, although they survive between wave 1 and wave 2, nonetheless fall below the employment threshold for the survey.

The population shares for each of the three groups are obtained from YOUT3 in the 1998-2004 Panel Survey dataset. The panel survey dataset also provides interview data to indicate the rate of recognition among continuing workplaces (as per illustration 1), whilst the wave 1 cross-section provides interview data to indicate the rates of recognition in the other two groups although, as we saw in the second illustration, the panel survey data is needed in order to classify the workplaces into the three groups, since this depends on their status at wave 2.

The population in wave 2 (2004) is comprised of:

- continuing workplaces (see above);
- new workplaces set up between wave 1 and wave 2; and
- workplaces which, although they were in existence in wave 1, only came above the employment threshold for the survey in wave 2.

The population shares for each of the three groups are obtained using questions in the wave 2 cross-section that ask about the age of the workplace and the number of staff it employed at the time of the previous wave (in this case AHOWLONG and AHOWEST in the 2004 cross-section). Again, the panel survey dataset provides interview data for continuing workplaces, whilst in this instance the wave 2 cross-section provides interview data for the other two groups.

Having obtained the population shares and rates of recognition for each of the three groups, a technique called shift-share analysis can be used to identify the contribution of each element in bringing about the aggregate change in the rate of recognition in the private sector. The technique of shift-share analysis is described in detail in a WERS98 Technical Paper and so is not discussed further here.[4] Essentially, it allows one to identify the proportion of the aggregate change that can be attributed to:

- changes in behaviour within continuing workplaces;
- differences in behaviour between closures / workplaces leaving the population and new workplaces / those joining the population;
- changes in the composition of the population (i.e. changes in the population shares).

If we conduct such an analysis, we find that the aggregate decline in the rate of recognition in private sector workplaces from 20 per cent in 1998 to 15 per cent in 2004 is largely driven by the lower rate of recognition in new workplaces when compared with workplaces that closed down. One might ordinarily expect this to be compensated by a rise in recognition among continuing workplaces (since recognition is positively associated with workplace age), however the actual rise in recognition among this group of workplaces was so small as to provide only a minor

[4] Forth J (2000) "Compositional versus behavioural change: combined analysis of the WERS98 Panel Survey, closures and new workplaces", WERS98 Data Dissemination Service Technical Paper, London: NIESR. Available on-line at: http://www.niesr.ac.uk/research/wers98/Forthpap.pdf

compensatory effect. The third factor, which made only a minor contribution to the overall decline, was the fall in the share of continuing workplaces.

Summary and sources of further assistance

This paper has provided a description of the data resources that are available from the WERS series to facilitate analyses of changes in employment relations over the period 1980-2004. It has introduced both the time-series dataset, compiled from the five cross-section surveys in the WERS series, and the four panel surveys. It has also presented some illustrative analyses to indicate how each may be used in practice.

Users wishing to obtain further advice and assistance on the analysis of WERS data are recommended to consult the web-sites of the WERS 2004 Information and Advice Service (WIAS) and the WERS98 Data Dissemination Service.

WERS 2004 Information and Advice Service: http://www.wers2004.info

WERS98 Data Dissemination Service: http://www.niesr.ac.uk/research/wers98/