# 488

Annette Jäckle*
Emanuela Sala*
Stephen P. Jenkins**
Peter Lynn*

## Validation of Survey Data on Income and Employment

## The ISMIE Experience

Berlin, May 2005

* University of Essex, Institute for Social and Economic Research (ISER)

** University of Essex, Institute for Social and Economic Research (ISER) and DIW Berlin, stephenj@essex.ac.uk

Annette Jäckle*
Emanuela Sala*
Stephen P. Jenkins**
Peter Lynn*

# Validation of Survey Data on Income and Employment

The ISMIE Experience

\*      University of Essex, ISER

\*\*    University of Essex, ISER, and DIW Berlin, E-Mail: stephenj@essex.ac.uk

## Abstract

This report derives from the project "Improving survey measurement of income and employment (ISMIE)" which investigates measurement error in survey data on income and employment, using a UK sub-sample of the European Household Community Panel (ECHP). In this paper we describe the process of collecting validation data and the outcomes of the process. Validation data were obtained from two sources: employers' records and government benefit data from the Department for Work and Pensions (DWP). The former provided information on occupation and employment status, gross and net pay, membership of company pension schemes and industry sector. The latter provided histories of benefit receipt and tax credits, for example, child, disability, housing and unemployment benefits, pensions and income support.

In the survey interview, respondents were asked for written permission both to obtain their DWP records and to contact their employer. They were also asked to provide information that would facilitate the process of obtaining the validation data: National Insurance number (NINO) and employer contact details. Subsequently, DWP records were extracted using a non-hierarchical matching strategy, based on different combinations of identifying variables obtained in the survey (NINO, sex, date of birth, name and postcode), and a survey of employers was carried out (mail, with telephone follow-up).

The representativeness of the validation samples obtained depends on the co-operation of both survey respondents and providers of validation data, as well as errors in the matching process. We report permission rates, proportions providing matching items, match rates for the DWP data and response rates to the employer survey. We identify correlates of these measures of success at each stage of the validation process in terms of substantive characteristics of the survey respondents. Variation by subgroups is identified and implications for the representativeness of the validation sample are discussed.

# Inhaltsverzeichnis / Content

# Content of Tables

# 1    Introduction[1]

Income and employment are factors that are central to many important social policy issues including, *inter alia*, education, training, social status, social networks, social capital, participation, poverty (and affluence), mobility, and fertility. They are therefore concepts that form a cornerstone of the work of a broad range of researchers and policy analysts. For much of this work, analysts rely upon information from survey data. However derivation of accurate, valid and reliable information is notoriously difficult. Consequently, survey estimates of income and employment can be subject to considerable measurement error and this can affect the validity of findings (Bound et al., 1994; Duncan and Hill, 1985; Mathiowetz and Duncan, 1988; Mellow and Sider, 1983; Rodgers, Brown and Duncan, 1993).

There are many reasons why survey responses may not be perfect descriptions of the concept that the question was intended to measure. Response errors can be introduced at any one of the four stages to the question answering process – comprehension, recall, response construction, reporting (Tourangeau, 1984). The extent to which errors occur at each of the four stages, and the nature of those errors, will be influenced by the instrument design and by the survey context and will vary across interviewers and across respondents. Additional measurement errors may also creep in at the data production stage, e.g. via errors in coding or transcription.

Measurement error can affect survey estimates in a range of ways. Most of the implications have been derived using assumptions about the errors, however, rather than by direct observation of them, e.g. assuming errors are randomly and symmetrically distributed, and uncorrelated with the other variables of interest: measurement error in a variable leads to unbiased estimates of the mean but inflated estimates of the variance; errors in a dependent variable in a regression does not affect consistency of parameter estimates (but reduces efficiency); errors in an explanatory variable lead to downwardly biased and inconsistent coefficient estimates, and so on. Within a panel and longitudinal data context, it is commonly assumed that measurement errors are uncorrelated over time, implying that measures of change over time are

noisier than measures of levels. But all these convenient 'classical' assumptions need not hold. Measurement errors may be systematically associated with other factors, or asymmetrically distributed, or correlated over time. Such effects are not merely technical niceties – they can have potentially serious impacts on research findings leading to misleading results.

In sum, what is required is assessment of the size and character of the measurement error problem and the implications for substantive analyses, together with guidance for survey designers and analysts about how measurement error problems might be minimised. Few previous studies of this nature exist for Britain - most have been for the United States. In particular, validation studies have not previously been carried out on income and employment measures on a UK national study. Plewis et al. (2001) make the case for validation studies of this sort. Jenkins (2000) and Jenkins and Rigg (2001) point to a surprisingly large number of transitions into and out of low income associated with implausible changes in benefit income.

This report documents two validation studies carried out as part of a project on 'Improving survey measurement of income and employment (ISMIE)', funded by the ESRC Research Methods Programme. The studies are based on survey data from the former UK low income subsample of the European Community Household Panel (ECHP). The validation focuses on a number of key survey items: social security benefits (receipt per se and amount received) and employment situation (earnings, hours worked, occupation, industry, etc.). The design of the validation studies had distinct implications for the survey. Respondents were asked for permission to link their data to records on benefit receipt held by the Department for Work and Pensions (DWP) and to validate employment information directly with their employers. In order to facilitate the validation process, they were asked to provide their National Insurance Number and a contact address for their employer.

Following a brief review of validation studies in the literature (section 2), we describe the ISMIE data to be validated (section 3), in terms of characteristics of the sample and contents of the survey. The degree of co-operation from respondents is assessed, as well as the reactions to the request to provide National Insurance Numbers (NINOs). Sections 4 and 5 describe the methods used for the collection of validation data from employers and DWP records, respectively. A survey of employers was conducted (mail, with telephone follow-up), while DWP records were extracted using a non-hierarchical matching strategy, based on different combinations of identifying variables obtained in the survey (NINO, sex, date of birth, name, first line of address and postcode). The outcomes in terms of response or match rates

are assessed, as well as the representativeness of the final validation samples. Section 6 concludes and points to further output from the ISMIE project. The main components of the ISMIE project are summarised in Table 1, indicating key dates and the relevant sections of this report.

Table 1:
**Time line of the ISMIE survey and collection of validation data**

| Activities | Timing | Details |
|---|---|---|
| ISMIE Household Survey | | |
| Fieldwork | February – March 2003 | Section 3 |
| Selection of eligible cases for Employer Survey and DWP matching | June 2003 | |
| Data available for analysis | February 2004 | |
| | | |
| Employer Survey | | |
| Postal stage | July - September 2003 | Section 4 |
| Telephone follow-up | October 2003 - January 2004 | |
| | | |
| DWP Benefit Record Matching | | |
| Preparation of matching information / file sent to DWP | July 2003 | Section 5 |
| DWP matched survey respondents to benefit records | August - September 2003 | |
| | Revised November 2003 | |

## 2 Previous validation studies

Validation studies are few and far between, especially comparisons of survey data with micro-level data from other sources. In the UK, none of the major surveys have undergone such an investigation, although validation of census or biostatistical data is carried out routinely (see, for example, Heady, Smith and Avery, 1996). Most of the validation studies originate in the US. Bound, Brown and Mathiowetz (2001) provide a thorough review of the findings from validation studies examining survey information on benefit receipt, assets, employment related variables such as earnings, hours of work, unemployment, industry, occupation and others, health care and status, and education.

For the validation of employment and income data, the focus of this project, there are two main sources of validation data: employers' records and administrative records. Most studies using employers' records, most notably the Panel Study of Income Dynamics (PSID) Validation Study (Morgan, 1989) use a convenience sample of employees from a single firm.[2] The advantage of this design is that the co-operation by the employer reduces the problem of mat-

---

[2] See also Hardin and Hershey (1960) and Dreher (1977).

ching respondents to their validation data. In addition, direct access to the records ensures a virtually error-free validation of the survey data, where discrepancies can be verified. However, this comes at the cost of a non-representative sample, generating validation data specific to a particular context. For many items, the extent of measurement error is context dependent. Carroll, Ruppert and Stefanski (1995) therefore stress the importance of collecting validation data for a random subset of the primary data. For the data commonly used by economists, almost no such data exist.

An alternative design based on employers' records is used in a validation study of the Current Population Survey (CPS) (Carstensen and Woltman, 1979). Survey respondents were asked for written permission to contact their employers – who were then sent a mail questionnaire.[3] The benefit of this method is that it can be applied to a national sample of respondents. However, validation data can only be obtained where employees provide a valid contact address and the employer returns the questionnaire with the relevant information. The representativeness of the validation sample therefore depends on the effective response rate. In addition, collecting information from employers by mail survey may lead to a higher level of reporting error compared to other means of data collection.

A more common approach is the use of administrative records, in particular Tax Returns and Social Security records, as a source of validation data. Several studies of this type have been carried out for US surveys such as the CPS,[4] the Survey of Income and Program Participation (SIPP),[5] the Seattle-Denver Income Maintenance Experiments (SIME/DIME),[6] or the Canadian Survey of Labour Income Dynamics (SLID).[7] The validation subjects for record check studies can be selected by one of three methods. In 'reverse' record checks, individuals for whom the behaviour of interest (e.g. benefit receipt) is known are sampled from the administrative records and then interviewed. In 'prospective' studies respondents are first interviewed and records are then obtained for all respondents reporting the particular behaviour. Alternatively, in 'complete' record checks a random sample is interviewed and administrative records are obtained for all respondents, regardless of whether or not they report the behaviour of

---

[3] A similar procedure is used by Edwards, Levine and Allen (1989) in a study examining the design of hours of work questions in the CPS.

[4] See, for example, Oberheu and Ono (1975); Bound and Krueger (1991); Bollinger (1998).

[5] See, for example, Hoaglin (1978); Coder (1992); Marquis and Moore (1990); Moore and Marquis (1988); Moore, Marquis and Bogen (1996).

[6] See Halsley (1978); Greenberg and Halsley (1983).

[7] See Grondin and Michaud (1994); Dibbs et al. (1995).

interest. Complete record checks are therefore the best way of evaluating both underreporting and overreporting, as long as all relevant records can be identified (Bound, Brown and Mathiowetz, 2001; Moore and Marquis, 1988). However, relatively few complete record check studies exist, since they are only feasible if records for the population are held by a small number of (co-operative) organisations.

Most studies of benefit receipt based on US surveys focus on one or several of the state administered programmes (Aid to Families with Dependent Children (AFDC), Food Stamps, Unemployment Compensation, etc.) and/or the federally administered programmes (e.g. Social Security (OASDI) or Supplemental Security Income (SSI)). The range of potential benefits is small compared to the elaborate welfare system in the UK – for which no comparable studies exist.

Unlike studies based on employers' records, the representativeness of validation samples based on administrative records depends crucially on the quality of the matching process. People who wrongly report matching information (such as National Insurance Numbers) tend to be eliminated in the process. Consequently, those who tend to give wrong answers are likely to be underrepresented in the validation data (Bound and Krueger, 1991). Studies based on US Tax Records further face the problem that the records do not include people with earnings low enough to be exempt from payroll tax.

In conclusion, validation studies of survey data are typically limited to a very small number of survey items, to particular sub-populations for which access to records happens to be available (rather than random samples from major surveys), and to cross-sectional estimates. Issues concerning potential errors in the validation data, errors introduced via the matching of survey and record data, or the impact of definitional differences in the two sources of data are rarely discussed (Bound, Brown and Mathiowetz, 2001). Furthermore, questions of consent by respondents are seldom addressed. Indeed, as Cox and Boruch (1988) state, decisions about file linkage are often made once the original data has been collected, and therefore respondents do not give informed consent for the linkage. Finally, record linkage is routinely done to enhance survey data or for methodological purposes by agencies such as Statistics Canada, the US Bureau of the Census, Statistics Sweden and Statistics Finland, but is not common practice in the UK. In this context, the remainder of this paper describes the validation studies of income and employment data carried out as part of the ISMIE project.

# 3 The data to be validated

This section describes the survey data to be validated, in terms of the sample and question-naire content, documents the response and permission rates for the validation studies, and describes the characteristics of the respondent sample compared to both non-respondents and population estimates.

## 3.1 The ISMIE sample

The validation study is based on data from the 'low income' subsample of the UK part of the European Community Household Panel Survey (ECHP). This sample was interviewed annually from 1994 to 2001 – on eight occasions in total. Since 1997 it was administered by the Institute for Social and Economic Research (ISER) and undertaken jointly with the British Household Panel Survey (BHPS) activities.

The subsample was selected in 1997 from the ECHP Great Britain panel. Selection was based on characteristics associated with low income – direct income data was not available at that time. Households were eligible if all adult members had been interviewed in the previous wave, and one of the following applied: household reference person unemployed currently or in the last year; household reference person receiving lone parent benefit; rented housing; receipt of means-tested welfare benefits.

Funding for the ECHP expired in 2001, giving us the opportunity to interview wave eight respondents once more in early 2003 for purely methodological purposes. CAPI interviews were sought with all ECHP subsample members who responded at wave 8 (wave 11 of the BHPS), that is, with 1,163 individuals in 781 households. New entrants and those not inter-viewed at the previous wave were not interviewed; eligible movers were followed to their new address. Fieldwork took place in late spring 2003. Validation checks were carried out, and the data were fully coded and edited using standard procedures used in the main BHPS survey, so as to provide a realistic test.

In the following, we shall refer to the survey information for 2001 as 'wave 8' of the ECHP (corresponding to wave 11 of the BHPS). The experimental data collected in 2003 will be called the 'ISMIE' data – since it is not part of the ECHP.

## 3.2    The questionnaire

The interviews were based on the BHPS wave 12 questionnaires. Efforts were made to maintain the context of the interview as far as possible, although both the household and individual questionnaires were shortened by removing some sections or questions not needed for the project. In particular the sections on demographics, health and values and opinions were reduced considerably. Other instruments used in wave 12 of the BHPS, such as the self-completion questionnaire, youth questionnaire, telephone and proxy interviews, were also omitted. See Appendix 1 for an overview of the changes.

On the other hand, new questions were added to ask respondents for permission to contact their employers, to pass details on to the DWP for matching with administrative records, and to test dependent methods of questioning (see next paragraph). Respondents who gave permission for the employer survey were further asked to provide contact details for their employers. To aid the linkage with DWP data, respondents who gave permission were also asked for their NINO. This was partly to help with data matching but also to test the feasibility of collecting NINOs and the accuracy of the NINOs provided. Finally, respondents were asked to sign a consent form for each of the validation studies. See Appendix 2 for the wording of these additional questions.

Apart from analysing measurement errors in income and employment data, the ISMIE project also tested methods of reducing sources of error, so-called dependent interviewing (DI) techniques. DI involves 'feeding forward' data collected at a previous interview and using it in the current interview, either in formulating the question (proactive DI) or for in-interview post-response edit checks (reactive DI). The objective was to investigate the properties of data collected with DI techniques and contrast them with traditional independent interviewing, in terms of impact on validity and accuracy. This was done on five sets of questions: school-based qualifications, current occupation and industry, income from current employment, employment history since last interview and current sources of income. For each of these questions three versions were developed: proactive dependent interviewing (PDI), reactive dependent interviewing (RDI), and standard (independent – as BHPS wave 12) versions of the questions. Individuals were randomly allocated to the three treatment groups.[8]

---

[8] For a review of dependent interviewing, see Lynn et al. (2004).

## 3.3 Response and permission rates

The outcome of the ISMIE survey is shown in Table 2. Interviews were completed with 88.8% of the 1,163 eligible adults. Non-interviews were due to untraced moves (2.8%), refusals either by the individual (3.2%) or the entire household (3.5%), or other non-coded reasons (1.6%).

Table 2:
**Individual outcome of the ISMIE Survey**

|                              | Frequency | Percent |
| ---------------------------- | --------- | ------- |
| Eligible adults              | 1,163     | 100.0   |
| Refusal                      | 37        | 3.2     |
| Untraced mover               | 33        | 2.8     |
| Whole household non-response | 41        | 3.5     |
| Other non-interview          | 19        | 1.6     |
| Full interview               | 1,033     | 88.8    |

Permission rates for the validation studies are detailed in Table 3. Of the 1,033 respondents asked for permission to match their data to records held by the DWP, 77.4% consented. These respondents were in turn asked to provide their NINO to facilitate the matching. 88.6% gave their number, 1.5% refused, and 9.9% answered that they did not know their number.

All respondents currently in employment (434) were further asked for permission to contact their employers about their employment situation. 58.5% allowed us to do so and all, except for one, provided contact details for their employers.

Table 3:
**Permission for validation studies**

| Permission for matching with DWP data | 799 | 234 | - | 1,033 |
| --- | --- | --- | --- | --- |
| | (77.4) | (22.7) | | respondents |
| If yes: NINO given | 708 | 12 | 79 | 799 who gave permis- |
| | (88.6) | (1.5) | (9.9) | sion for DWP |
| Permission for contacting employer | 254 | 180 | - | 434 employees |
| | (58.5) | (41.5) | | |

Comparing the permission rates for the two studies suggests that respondents are more concerned about flows of information between the survey organisation and their employers, than about third parties accessing administrative records held about them.[9] The collection of NI-

---

[9] See the investigation of informed consent by Singer (2003), who concludes that the respondents' decisions to participate in research are rational, based on perceived risks and benefits.

NOs proved feasible, in the sense that only few of the respondents who had given permission for the DWP matching did not co-operate on this item; the main restriction was due to respondents not remembering their number. Jenkins et al. (2004a) provide an in-depth analysis of respondents' propensity to consent and to provide linking data for the two validation studies.

## 3.4     Composition of the ISMIE sample

As described in section 3.1, the ISMIE sample is not representative of the GB resident population in 2003, because low-income households are over-represented. Additionally, the sample is affected by attrition at each of the nine waves. However, since the sample represents a wide range of population subgroups, it should allow considerable generalisation of methodological findings. Indeed, the over-representation of particular groups of interest, such as those in receipt of benefit income, is a considerable advantage for this study. Additionally, the prior existence of eight waves of data for this sample provides very powerful auxiliary data for the analysis of measurement error. In particular, it allows us to investigate the impact of measurement error on estimates of change over time (between previous waves and wave 9).

In this light, the following section takes a brief look at key household and individual level characteristics of the survey sample, compared to population estimates from the 2001 Census.[10] For reasons of comparability, the characteristics of the wave 8 ECHP sample (2001) are used. The survey estimates are weighted to adjust for differential non-response.[11] Differences between the survey and population estimates could be due to the initial sample design or subsequent attrition. Therefore, we also compare the characteristics of wave 9 (ISMIE) respondents and non-respondents to get an idea of the characteristics associated with attrition from the sample.

Table 4 illustrates that only 26.6% of the wave 8 ECHP low-income respondent sample had bought the house they lived in, compared to an estimated 68.3% of the census population. Similarly, the majority (52.0%) did not have a car for their private use, compared to 27.4% of the population. In other words, members of the ECHP low-income sample are roughly half as

---

[10] Source of the census estimates: http://www.statistics.gov.uk/census2001/profiles/UK-A.asp [accessed 9.02.04].

[11] For details on the computation and use of weights in the BHPS, see section V.2 of the User Manual (Taylor et al., 2003).

likely to live in a household that owns a car, and less than half as likely to live in owner-occupied housing than the overall population.

Table 4:
**Car ownership and housing tenure: 2001 Census vs. ECHP sample**

|  | 2001 Census (%) | ECHP w8 (%) |
|---|---|---|
| Housing tenure |  |  |
|     Owner-occupied | 68.3 | 26.6 |
|  |  |  |
| Ownership of cars |  |  |
|     Households without car/van | 27.4 | 52.0 |
|     Household with 1 car or van | 43.8 | 37.1 |
|     Household with 2 or more cars/vans | 28.8 | 10.9 |

At the individual level, Table 5 shows the age distribution in the survey sample compared to the distribution of over 16-year-olds in the 2001 Census. Younger age groups, in particular the 20 to 29-year-olds, tend to be under-represented in the sample, while those above 70 are over-represented compared to the population estimates.

Table 5:
**Age distribution of UK population and ECHP respondents at wave 8**

| Age Range | Population (Census 2001)* | | ECHP respondents w8 (2001) | |
|---|---|---|---|---|
|  | Frequency | Percent | Frequency | Percent |
| 16 - 19 | 2,899,986 | 6.2 | 86.4 | 6.7 |
| 20 - 24 | 3,546,151 | 7.6 | 56.6 | 4.4 |
| 25 - 29 | 3,867,115 | 8.2 | 55.6 | 4.3 |
| 30 - 34 | 4,493,585 | 9.6 | 108.1 | 8.4 |
| 35 - 39 | 4,625,810 | 9.9 | 145.0 | 11.2 |
| 40 - 44 | 4,151,580 | 8.8 | 104.9 | 8.1 |
| 45 - 49 | 3,735,964 | 8.0 | 69.7 | 5.4 |
| 50 - 54 | 4,040,437 | 8.6 | 94.8 | 7.3 |
| 55 - 59 | 3,338,861 | 7.1 | 81.7 | 6.3 |
| 60 - 64 | 2,879,948 | 6.1 | 93.2 | 7.2 |
| 65 - 69 | 2,596,843 | 5.5 | 64.8 | 5.0 |
| 70 - 74 | 2,339,231 | 5.0 | 87.7 | 6.8 |
| 75 - 79 | 1,966,929 | 4.2 | 104.4 | 8.1 |
| 80 - 84 | 1,313,547 | 2.8 | 78.9 | 6.1 |
| 85 - 89 | 752,787 | 1.6 | 44.6 | 3.5 |
| 90 + | 371,269 | 0.8 | 15.7 | 1.2 |
| Totals | *46,920,043* | *100.0* | *1,292* | *100.0* |

Table 6 illustrates that a lower proportion of the survey sample is in employment (49.2%) than in the census population (60.2%).[12] In addition, only 10.3% of the sample have a degree or equivalent qualification (compared to 19.6% of the population) and 42.7% have no qualifications such as A-levels, O-levels or CSEs (29.8% of the population).

Table 6:
**Occupation and qualifications: 2001 Census vs. ECHP sample**

|  | 2001 Census (%) | ECHP w8 (%) |
|---|---|---|
| Occupation (all people aged 16-74) |  |  |
| Employed/self-employed | 60.2 | 49.2 |
| Unemployed | 4.5 | 6.6 |
| Student, ft school | 7.3 | 5.3 |
| Retired | 13.6 | 19.5 |
| Looking after home/family | 6.4 | 9.5 |
| Permanently sick or disabled | 5.8 | 8.9 |
| Other inactive | 3.2 | 1.1 |
|  |  |  |
| Qualifications (all people aged 16-74) |  |  |
| Qualifications at degree level or higher (incl. hnd, hnc, teaching qualification) | 19.6 | 10.3 |
| No A/O level, CSE, degree or higher | 29.8 | 42.7 |

To get an idea of the characteristics associated with attrition between waves, Table 7 compares ISMIE respondents with non-respondents, again using characteristics recorded at wave 8 of the ECHP. In short, men are significantly less likely to be interviewed, as are the younger age groups, those with A/O-levels/CSEs as their highest academic qualification, the self-employed, unemployed, and those receiving zero benefit payments. However, there are no significant differences by type of employment (full-time, permanent, type of organisation), firm size, receipt of key benefit types (job seeker's allowance, income support, family credit), or household characteristics such as housing tenure and the number of cars. It should be noted that the insignificance of the test statistics for the employment characteristics could be due to the small number of employees in the sample.

---

[12] Note that unemployment is self-reported in both the survey and the Census.

Table 7:
**Comparison of characteristics of ISMIE respondents and non-respondents[1]**

| Characteristics | | Base (Wave 8 respondents) | ISMIE response rate |
|---|---|---|---|
| All | | 1,163 | 88.8 |
| Sex * | male | 497 | 86.3 |
| | female | 666 | 90.7 |
| Age *** | 16-20 | 121 | 76.9 |
| | 21-35 | 245 | 81.2 |
| | 36-50 | 300 | 92.0 |
| | 51-65 | 219 | 94.5 |
| | 66-96 | 278 | 92.8 |
| Highest academic qualification * | degree | 110 | 89.1 |
| | a/o level/cse | 529 | 86.4 |
| | no degree/a/o level/cse | 520 | 91.4 |
| Economic activity * | (self-) employed | 517 | 87.6 |
| | Unemployed[2] | 71 | 81.7 |
| | econ. Inactive | 575 | 90.8 |
| Employment Situation | full-time (30 hrs +) | 398 | 85.9 |
| | part-time (< 30 hrs) | 151 | 90.7 |
| | permanent job | 510 | 87.3 |
| | not permanent job | 45 | 82.2 |
| | private firm/company | 362 | 85.4 |
| | civil serv/govt/nhs/hed | 131 | 89.3 |
| Size of employer's Organisation | <10 | 91 | 84.6 |
| | 10-24 | 105 | 85.7 |
| | 25-99 | 117 | 82.9 |
| | 100+ | 177 | 89.8 |
| Benefit receipt | job seeker's allowance | 36 | 86.1 |
| | income support | 173 | 88.4 |
| | family credit | 98 | 89.8 |
| Amount of benefits received in previous month * | £ 0 | 421 | 85.0 |
| | £ 0-179 | 248 | 90.3 |
| | £ 179-470 | 248 | 92.7 |
| | £ 470+ | 246 | 89.8 |
| Housing tenure | Owner-occupier HH | 430 | 89.8 |
| HH car ownership | None | 423 | 90.0 |
| | One car | 524 | 89.5 |
| | Two or more cars | 211 | 85.8 |

[1] The analysis of the response propensity of ISMIE sample members is based on characteristics from survey data collected at wave 8 of the ECHP.

[2] Self-reported employment status.

* The difference between survey respondents and non-respondents is tested using a two-tailed Pearson Chi$^2$ test for the independence of rows. The asterisks (*) denote the level of significance. * means the rows are independent at the 5%-level of confidence, ** at the 1%-level, and *** at the 0.1%-level.

To summarise, the survey sample over-represents the older population and under-represents younger age groups compared to population estimates. Employment rates and educational qualifications are lower in the survey sample, as are the proportions of owner-occupiers and consumption indicators such as the number of cars in the household. As to the causes of these differences, the age distribution is clearly affected by attrition: younger sample members are less likely to complete the interview. The survey also seems disproportionately to lose men, individuals with intermediate qualifications (A or O-levels, CSE), self-employed or unemployed, and those receiving zero benefits. For other employment and benefit characteristics the differences between respondents and non-respondents are not significant. Differences compared to the population estimates might therefore be attributed solely to the initial sampling process. However, the small number of employees may be masking differences caused by attrition.

Even though the experimental ISMIE sample is a national sample, it is clearly not representative of the population in 2003. Nonetheless, the over-representation of certain population groups is likely to be an advantage for our study and should provide useful insights.

# 4        Validation of employment data

The survey data on employment (for example, earnings, hours of work, occupation, industry, etc.) were validated using data reported by employers. Since the sample contained employees from the whole of the UK, obtaining direct access to records was not possible. Instead, employers were contacted and asked to provide information for the period corresponding to the survey interview.

## 4.1      Design of the employer survey

The employer survey was carried out in several stages. Employers were first sent a questionnaire by post, followed by a reminder letter and eventually a second questionnaire. Employers who had not replied by this stage were then contacted by telephone.

The mail questionnaire contained a subset of the questions on the respondent's employment situation used in the ISMIE interview. To ensure comparability, the original format of questions was maintained, although the wording was adapted to address the employer rather than the employee. The aspects covered included information on the employer (industry, plant

size), job characteristics (occupation, employee/self-employed, managerial duties, usual working hours, working hours arrangements) and income (last gross/net pay, hourly rates of pay, rates for overtime, pension schemes).

Each questionnaire was personalised in the sense that the questions referred to the employee by name, and the introduction mentioned the date of the ISMIE interview as the reference period for the information requested. To illustrate, the introductory phrase read: "This questionnaire is about the employment of 'Ms Respondent' in the period immediately prior to 'date of interview'. If any aspect of the firm/organisation has changed since then, please do not tell us about the current situation, but about the period immediately prior to 'date of interview'."

Questionnaires were sent with a cover letter explaining the purpose of the study and containing contact details for queries, a pamphlet introducing ISER, and a free-post return envelope. The first questionnaire, reminder letter and second questionnaire were sent out at two to three week intervals. Because we received the data from a small number of ISMIE interviews rather late, 16 employer questionnaires were sent out a month after the first mailing, with the second and third contact following at similar intervals.

After the third postal contact, 64% of the employers had completed the questionnaire or communicated their refusal. The remaining 91 cases were contacted by telephone between October 2003 and January 2004 (Table 8).

Originally, we intended to carry out the follow up entirely by telephone. However, in many cases we were asked to send another copy of the questionnaire either by post or by fax. The contact by telephone, therefore, was a useful means to get in touch with employers, explain the aims of the study, have them cooperate but not always to get information in a direct way.

For the telephone stage, the postal questionnaire was used, with the addition of a coversheet for interviewers to record details of the process of making telephone calls. The coversheet was divided into four sections. The first one was pre-printed with information about the previous mailings (dates in which the questionnaires and the reminder letter were sent), for the interviewer's reference. The second carried the employee and the employer details: name and date of birth of the employee, date when the ISMIE interview was carried out, name, address and telephone number of the employer, as provided by the employee. The third part was for interviewers to record the outcome of the attempts to gain an interview plus any comments that

they thought may be useful. In the last section the interviewers recorded in a structured way details about the contact attempts (number dialled and/or whether questionnaire or permission form sent by post or fax, date and day of the week, time, name/position of the person spoken to and outcome of the call).

Two interviewers carried out the telephone survey. They had little or no previous experience. This is the reason why before starting the interviews they went through an intensive training programme. For this purpose a short training manual was written. The training sections were divided into three different parts. The first one was a general introduction of our study (aims and research design of the study, the telephone follow-up stage, the structure of the questionnaire and the use of the coversheet), the second one was a discussion of different stages of telephone interviewing (introducing yourself, gaining trust and cooperation, how to carry out a telephone survey). The last section was a practical one (role playing). Each section ended with a discussion of the difficulties met.

In order to reduce the measurement error that could arise in the data entry process, the data were entered twice. In case of inconsistency, the data have been further checked and, if wrongly entered, corrected.

## 4.2    Outcome of the employer survey

The following describes the outcome of the employer survey, in terms of response rates and reasons for non-response at the different stages, it discusses some features of the response process in the telephone survey and finally it looks at the representativeness of the final validation sample.

### 4.2.1    Response rates and reasons for non-response

Table 8 shows the response rates for the employer survey. Of the 253 employers issued during the postal stage of the survey, 129 returned the questionnaires, 33 explicitly refused to take part in the study, and 91 did not reply at all. The response rate and the explicit refusal rate obtained in the first phase of the study are therefore respectively 51% and 13%.

The 91 employers from whom no reply was received at the postal stage of the survey were then contacted by telephone. Ultimately, 52 of these completed the questionnaire, 34 refused to take part in the study and 5 were not contacted. The response rate for the telephone stage

(conditional upon having not responded to the postal stage) is therefore 57% while the refusal rate is 37%. Thus, overall 72% of the eligible sample provided completed questionnaires.

Table 8:
**Response rates for employer survey by stages (frequency and column percentages)**

| *Stages of the survey* | *Freq.* | *Percent* | *Percent* | *Percent* |
|---|---|---|---|---|
| *1st stage: postal* | | | | |
| Total eligible | 253 | 100 | | |
| Questionnaires completed | 129 | 51.0 | 100 | |
|    After initial mailing | 60 | *23.7* | 46.5 | |
|    After first reminder mailing | 44 | *17.4* | 34.1 | |
|    After second reminder mailing | 25 | *9.9* | 19.4 | |
| Questionnaires not completed | 124 | 49.0 | | 100 |
|    Refused | 33 | *13.0* | | 26.6 |
|    No reply | 91 | *36.0* | | 73.4 |
| *2nd stage: telephone* | | | | |
| Total issued | 91 | 36.0 | 100 | |
| Questionnaires completed | 52 | *20.6* | 57.1 | |
| Questionnaires not completed | 39 | *15.4* | 42.9 | 100 |
|    Refused | 34 | *13.4* | 37.4 | 87.2 |
|    Non-contact | 5 | *2.0* | 5.5 | 12.8 |
| *Overall* | | | | |
| Questionnaires completed | 181 | 71.5 | | |
| Questionnaires not completed | 72 | 28.5 | | 100 |
|    Refused | 67 | *26.5* | | 93.1 |
|    Non-contact | 5 | *2.0* | | 6.9 |

Table 8 also presents a breakdown of response by each mailing within the postal stage of the survey. Almost half of the questionnaires that were ultimately received at the postal stage were received in response to the first mailing, before any reminders had been sent. Another third were received after the reminder letter and around one in five were received after the second reminder mailing. The overall response rate was therefore 24% after the first mailing, 41% after the first reminder mailing, 51% after the second reminder mailing and 72% after

the telephone stage. We can conclude that each attempt to contact the sample members was successful in increasing the overall response rate. Furthermore, each postal reminder was successful in reducing the size of the sample that proceeded to the (more expensive) telephone stage. Nearly two-thirds of the sample (64%) reached a final outcome at the postal stage.

Some indication of the reasons for refusal is presented in Table 9. It should be noted that during the postal stage, these reasons were not collected in a systematic way. However, 33 employers communicated their reasons and we have coded those reasons to the categories presented in Table 9. During the telephone stage, reasons were requested and recorded systematically. Despite this caveat, a general picture about the causes of refusal emerges. Four main types of refusals are identified: issues related to the employees (difficulties in chasing up/checking consent with the employees; problems in checking the records of the employees), issues related to the employers (no time, lack of motivation), company policies in relation to confidential matters, and general or non-specific refusals. Company policy issues appear less prevalent at the telephone stage. This may be because most companies where this applies had already refused at the postal stage and therefore did not enter the telephone stage. However, it could also be the case that concerns of the employers in relation to confidentiality were easier to overcome in the telephone mode. In 18% of the cases that entered the telephone stage, as we discuss in the next section, we provided the employers with the permission form signed by the employees during the ISMIE survey.

Table 9:
**Reasons for refusals by stage of the survey (frequency)**

|  | Postal stage | Telephone stage |
| --- | --- | --- |
| General refusal/No specific reasons | 9 | 11 |
| Company policy and confidentiality issues | 10 | 2 |
| Issues related to the employees (no permission from employees, employees unknown) | 10 | 13 |
| Issues related to the employers (no time, no incentives) | 4 | 5 |
| Others | - | 3 |
| *Total = All explicit refusals* | *33* | *34* |

### 4.2.2    The response process

In this section we give a brief overview of the response process of the telephone survey.[13] We first consider the overall number of contact attempts made, then we look at the number of questionnaires sent by post or faxed and at the number of permission forms provided and finally we describe the sequence of the response process.

Table 10 and Table 11 show respectively the total number of contacts attempts by all modes and the total number of attempts by telephone.

A considerable amount of effort was required to make contact and reach a final outcome with each sample member. It can be seen that the mean number of contact attempts (by all modes) to each sample member was 7.8 (Table 10), of which 6.1 were telephone calls (Table 11): a total of 553 calls were made to the 91 employers. Less than one quarter of the employers required fewer than four contact attempts while one in eleven required 14 or more attempts (Table 10) – the maximum being 30 contact attempts. Two thirds of the sample (64%) required at least four telephone calls and one third (33%) required at least ten calls (Table 11).

The complexity of the contact process is associated with the mode by which the questionnaire was ultimately completed (though note the small sample sizes). Cases in which the questionnaire was completed by post or fax required a longer and more complex contact process. For example, 41% of the employers who answered the questions on the telephone required three or fewer contact attempts, compared with only 9% of those who answered by post or fax (Table 10).  The median number of contact attempts was 5 for telephone responders and 7 for post or fax responders (means 7.2 and 8.4 respectively), while the median number of contact attempts by phone was 5 and 4 respectively.

---

[13] A detailed analysis of the contact and response process in the employer survey is presented in Lynn and Sala (2004).

Table 10:
**Total number of contact attempts by all modes (column percentages)**

| | Total number of contact attempts by all modes | | | |
| --- | --- | --- | --- | --- |
| | Total sample | Respondents | | |
| | | Total | Responded by phone | Responded by post or fax |
| 1-3 | 23 | 23 | 41 | 9 |
| 4-6 | 22 | 25 | 18 | 31 |
| 7-9 | 22 | 23 | 18 | 25 |
| 10-13 | 24 | 17 | 12 | 22 |
| 14-30 | 9 | 12 | 12 | 13 |
| Mean | 7.8 | 7.8 | 7.2 | 8.4 |
| Median | 7 | 7 | 5 | 7 |
| Total | *91* | *52* | *17* | *32* |

Note: Questionnaires with missing sections are excluded from the last two columns, as is the one sample member who completed the questionnaire partly by telephone and partly by fax.

Table 11:
**Total number of attempts by telephone (column percentages)**

| | Total number of telephone attempts | | | |
| --- | --- | --- | --- | --- |
| | Total sample | Respondents | | |
| | | Total | Responded by phone | Responded by post or fax |
| 1-3 | 36.3 | 40 | 41 | 38 |
| 4-6 | 30.8 | 31 | 18 | 38 |
| 7-9 | 16.5 | 10 | 18 | 6 |
| 10-13 | 11.0 | 14 | 12 | 16 |
| 14-30 | 5.5 | 6 | 12 | 3 |
| Mean | 6.1 | 6.0 | 7.2 | 5.7 |
| Median | 5 | 4.5 | 5 | 4 |
| Total | *91* | *52* | *17* | *32* |

Note: Questionnaires with missing sections are excluded from the last two columns, as is the one sample member who completed the questionnaire partly by telephone and partly by fax.

The extent of the contact attempts that were made by modes other than telephone is summarised in Table 12. It can be seen that 43% of the employers asked for the questionnaire to be faxed, of which almost half required it to be faxed more than once, and in several cases the

questionnaire was faxed three times or more.[14] Questionnaires were posted to one third (34%) of the employers, and in most of these cases the questionnaire only needed to be posted once.

The sample members to whom the questionnaire was faxed and those to whom it was posted were not mutually-exclusive subsets. In 11 cases (12%) both modes were used.[15] As mentioned previously, the permission forms signed by the employees during the ISMIE survey were provided upon request to 17.6% of the employers (by fax on 11 occasions and by post on 7 occasions).

Table 12:
**Use of fax and post for sending questionnaires and permission forms (row percentages)**

|  | No | Once | *Twice* | *Three times or more* | *Total* |
|---|---|---|---|---|---|
| Questionnaires faxed | 57.1 | 23.1 | 11.0 | 8.8 | *91* |
| Questionnaires posted | 65.9 | 30.8 | 3.3 | - | *91* |
| Permission forms provided | 82.4 | 15.4 | 2.2 | - | *91* |

The extensive use of fax and post as contact modes is reflected in the variety of sequences of contacts                                    presented                                    in

---

[14] There were some problems with transmission from the fax machine to which the researchers had access, and this may have contributed to the number of cases in which the fax had to be sent more than once. The reliability and capability of the machine had not been checked in advance, as sending questionnaires by fax had not been anticipated.

[15] In 9 cases the questionnaire was faxed once and posted once, in one case it was faxed once and posted twice, and in one case it was faxed twice and posted once.

Table 13.  Only in a minority of cases (34%) were employers contacted solely by phone. In the other cases a mixed sequence of telephone contacts and questionnaires faxed or posted ensued. In 13% of cases, all 3 contact modes were employed. The combinations of contact modes were not very different for respondents compared with the whole sample, suggesting that a request to fax or post a questionnaire is not necessarily a good indicator that the sample member is likely to complete it.

Table 13:
**Sequences of the contact attempts (numbers and column percentages)**

|  | Total sample | | Respondents | |
|---|---|---|---|---|
|  | Frequency | Percent | Frequency | Percent |
| Just telephone | 31 | 34 | 17 | 33 |
| Telephone and fax | 27 | 30 | 14 | 27 |
| Telephone and post | 20 | 22 | 12 | 23 |
| Telephone and fax and post | 8 | 9 | 6 | 12 |
| Telephone and post and fax | 4 | 4 | 2 | 4 |
| Telephone and fax and tele-phone | 1 | 1 | 1 | 2 |
| Total | *91* | *100* | *52* | *100* |

### 4.2.3      Representativeness of employee validation sample

The characteristics of the validation sample for employment data are presented in Table 14. Comparing employees who gave permission for this study with those who did not, does not show any significant differences in terms of composition of the groups by gender, age, education, marital status, sector, size of employer's organisation, type of occupation, hours of work and net pay. At the permission stage of the validation process, it therefore seems that the sample is unbiased compared to the entire respondent sample.

At the second stage, the survey of employers, there are no differences in characteristics between employees for whom the questionnaire was returned and those for whom it was not. However, the size of the employing organisation (in terms of numbers of workers) emerges as a significant determinant of success. Larger organisations were much more likely to complete the survey: the questionnaire was returned for 78% of employees working in organisations with 100 or more employees, while only 60% of organisations with less than 25 employees co-operated. Finally, looking at the effective validation sample as a proportion of all employed respondents (regardless of whether or not they gave permission) shows the same results.

Table 14:
**Characteristics of employees by consent and completion of employer survey (numbers and row percentages)**

| Characteristics | | Total employees in ISMIE sample (Frequency) | Permission rate (Row %) | Conditional response rate (Row %) | Unconditional response rate (Row %) |
|---|---|---|---|---|---|
| All | | 434 | 58.5 | 71.3 | 41.7 |
| Sex | Male | 190 | 56.3 | 74.8 | 42.1 |
| | Female | 244 | 60.2 | 68.7 | 41.4 |
| Age | 16-35 | 152 | 53.3 | 71.6 | 38.2 |
| | 36-50 | 181 | 63.0 | 71.1 | 44.8 |
| | 51 + | 101 | 58.4 | 71.2 | 41.6 |
| Education | Any qualification listed | 223 | 59.2 | 73.5 | 43.5 |
| | None of these | 210 | 58.1 | 68.9 | 40.0 |
| Marital status | Married / widowed | 209 | 60.3 | 68.3 | 41.2 |
| | Separated / divorced | 68 | 61.8 | 81.0 | 50.0 |
| | Never married | 157 | 54.8 | 70.9 | 38.9 |
| Sector | Private company | 314 | 55.7 | 70.9 | 39.5 |
| | Civil service. | 120 | 65.8 | 72.2 | 47.5 |
| Size of Organisation | < 25 | 159 | 51.6 | 59.8 ** | 30.8 ** |
| | 25-99 | 111 | 63.1 | 75.7 ** | 47.8 ** |
| | 100 + | 161 | 62.1 | 78.0 ** | 48.5 ** |
| Type of occupation | Manager, administrator, professional | 54 | 57.4 | 83.9 | 48.2 |
| | All other | 375 | 58.4 | 69.9 | 40.8 |
| Hours of work | < 25 | 111 | 54.1 | 65.0 | 35.1 |
| | 25-36 | 95 | 68.4 | 73.9 | 50.5 |
| | 37-40 | 171 | 56.7 | 75.3 | 42.7 |
| | 41 + | 53 | 58.5 | 67.7 | 39.6 |
| Take home Pay | < £300 | 148 | 53.4 | 65.8 | 35.1 |
| | £300-899 | 144 | 66.7 | 70.8 | 47.2 |
| | £900 + | 128 | 59.4 | 79.0 | 46.9 |

\* Differences in characteristics between groups are tested using a two-tailed Pearson $Chi^2$ test. None of the differences are significant at the 5%-level, except for those marked (\*\*) which are significant at the 1%-level; listed qualifications include youth training certificates, apprenticeships, clerical and commercial qualifications, nursing qualifications, teaching qualifications, university diploma, degree, higher degree; rates are defined as follows. Let $A_i$ = the total number of employees in the ISMIE sample with characteristics i; $B_i$ = the number who gave permission; $C_i$ = the number for whom the employer survey was completed. Permission rate = $B_i/A_i$; Conditional response rate = $C_i/B_i$; Unconditional response rate = $C_i/A_i$.

## 4.3    The employer contact information: a core issue

The completeness and correctness of the contact data base are crucial issues in any survey, as the quality of the contact database can influence the response rate obtained. In our case, be-

cause of the small number of observations in our sample (254 employers), the quality of the address database plays a decisive role. In this section we mainly focus on issues related to the completeness of the employer contact information. First we briefly describe how we have generated the contact data base and we provide a general outline of its completeness, and then we look in detail at the different characteristics of the employer contact information (the reference person, the address of the firms, the postcodes, and the telephone numbers). In the last section we look at the accuracy of the address database used in the telephone follow up.

The contact data base was created on the basis of the information provided by the ISMIE respondents. As we have already explained in the previous sections, during the ISMIE survey we asked the interviewees who gave permission for information about the contact details of their employers. In particular, we asked for the name of the person/office holding the records on the respondents' employment situation, for the complete address and  telephone number of the firm in which the respondents worked at the time of the interview. In Table 15 we give a general outline of the completeness of the employer contact information. Almost all the respondents indicated the name of the firm and, in particular, 61% pinpointed a precise reference person to whom to address the questionnaire and ask for information about their employment situation. Even though a minority indicated the complete address of the firm (street and street number), 44% provided complete postcodes. Finally, 82% gave complete phone numbers (either of the reference person or of the switchboard).

Issues related to the completeness of the employer contact database are addressed in Table 16. We discuss first the information about the reference person/office stated. As we said in the previous paragraph, 61% identified a precise person inside the firm to whom the questionnaire could be addressed to. In most of these cases (94%) respondents gave complete information – specifying name and surname – of the contact person. 29% of the respondents, on the other hand, were unable to identify a specific person and indicated the personnel department, human resources or the pay department as the offices to which to address any request about their employment situation. Finally, 10% did not provide information on a contact person or department. In those cases we addressed the questionnaire to "Human Resources".

The choice of addressing the questionnaire to the reference person has pros and cons. On the one hand, if the questionnaire is addressed to a specific person rather than to a more generic "human resources office", it is more likely to be answered. On the other hand, if this person does not work in the firm any more or if the person indicated by the respondent does not actu-

ally have the information we require, it is more likely that the questionnaire will not be returned. Given the short amount of time between the ISMIE survey and the employer survey, we decided to address the questionnaire to the person named as the reference person.

A complete address – both street name and street number – was provided by 23% of respondents (Table 17). In most cases (70%) we had just partial information - street without street number or institutions/industrial estates without any indication of the address – or no address information at all (8%). With respect to the postcodes (Table 18), 44% gave a complete postcode (6 or 7 digits), 18% provided partial postcodes (3-5 digits). 21% of the postcodes are missing, while 17% have got information just for one or two digits.

In most cases, as described above, the information on the addresses was incomplete. In order to complete the missing data we applied two different strategies. If we had enough information about the firm (city, county) we looked for the address in the Postal Address Book of the Royal Mail. Otherwise, we checked on the Internet website of Yellow Pages or used Google.

Data about the telephone numbers are shown in Table 19. Most of the respondents (82%) provided a complete telephone number for their employer. Only in 15% of cases they did not give a number. Also in this case, in order to carry out the telephone survey, we looked for the missing and incomplete information using the Internet websites of Yellow Pages, British Telecom and Google.

During the telephone survey we were able to check the accuracy of the address database (Table 20). On the whole, the contact information shows a high degree of accuracy: around 85% of the employees gave a correct telephone number and address of their employer. The table also shows that the information about the reference persons was not as accurate: only in around half of the cases the employees were able to identify the correct reference person. Some of these differences may, however, be due to the time lag between the ISMIE survey and the employer survey. It is clear that the need to complete and correct the contact information has resource implications.

Table 15:
**The completeness of the address database. A general outline (numbers and percentages)**

|  | Frequency | Percent |
|---|---|---|
| Reference person | 155 | 61.0 |
| Name of the firm | 253 | 99.6 |
| Address of the firm (street and street number) | 59 | 23.2 |
| Postcodes of the firm (6 or 7 digits) | 111 | 43.7 |
| Telephone numbers | 207 | 81.5 |

Table 16:
**The completeness of the address database. Information about the reference person[16] (numbers and column percentages)**

|  | Frequency | Percent |
|---|---|---|
| Reference person | 155 | 61 |
| - of which with complete information (name and surname) | *146* | *94.2* |
| - of which with incomplete information (just names or names and departments) | *9* | *5.8* |
| Human resources, personnel department, etc. | 74 | 29.1 |
| No information provided | 25 | 9.8 |
| Total | *254* | *100* |

Table 17:
**The completeness of the address database. Information about the addresses of the firms (numbers and column percentages)**

|  | Frequency | Percent |
|---|---|---|
| Complete address (street and street number) | 59 | 23.2 |
| Partial address (street without street number) | 108 | 42.5 |
| Others | 68 | 26.8 |
| Missing | 19 | 7.5 |
| Total | *254* | *100* |

Note: Others refer to institutions such as schools, "Town Hall", industrial estates.

Table 18:

**The completeness of the address database. Information about the postcodes
– number of digits of the postcodes (numbers and column percentages)**

|        | Frequency | Percent |
|--------|-----------|---------|
| 1-2    | 44        | 17.3    |
| 3-5    | 45        | 17.7    |
| 6      | 62        | 24.4    |
| 7      | 49        | 19.3    |
| Missing | 54       | 21.3    |
| Total  | *254*     | *100*   |

Table 19:

**The completeness of the address database: telephone numbers (numbers and column
percentages)**

|                              | Frequency | Percent |
|------------------------------|-----------|---------|
| Complete telephone numbers   | 207       | 81.5    |
| Incomplete telephone numbers | 9         | 3.5     |
| Missing telephone numbers    | 38        | 15.0    |
| Total                        | *254*     | *100*   |

Table 20:

**Accuracy of the address database (numbers and percentages)**

|                          | Frequency | Percent |
|--------------------------|-----------|---------|
| Correct reference person | 31        | 51.7[17] |
| Correct telephone numbers | 75       | 82.4    |
| Correct address          | 78        | 85.7    |
| Total                    | *91*      |         |

Note: The accuracy of the address database refers only to the data of the telephone survey, i.e.
employers who had just responded to the postal survey.

---

[16] During the interview we asked the respondents who agreed to take part in the employer survey to
provide the name of a person inside the firm (the "reference person") who could release the data about
his/her employment conditions.

[17] 31 employers did not indicate any reference person. They were, therefore, excluded from the calculation of the
percentage.

# 5        Validation of benefit data

The following section describes the process of matching the survey data with administrative records on benefit receipt held by the DWP. The design was a 'complete' record check, in other words validation data was obtained for all respondents regardless of whether or not they had reported benefit receipt. The ISMIE researchers supplied identifying variables for the consenting ISMIE respondents and suggested a procedure for matching (described in section 5.1). The DWP used these to scan several of their records and compile benefit histories. Section 5.2 discusses the outcome of the matching strategy, and section 5.3 analyses the characteristics of the validation sample obtained.

## 5.1        Matching survey data with DWP benefit records

This section describes the DWP records used as validation sources and discusses the characteristics of the matching variables and the strategy used to perform the data linkage. Note that in this section we use the term 'survey respondents' to refer to those ISMIE respondents who gave permission to match their answers with DWP records.

### 5.1.1        DWP data

The matching was done by the Information Centre of the DWP Information and Analysis Directorate (IAD). Various sources of data were used:

- Generalised Matching Service (GMS) data scans (at week 13/10/03) of:

  - Primary Data,

  - Benefit Details,

  - Benefit History.

- Housing Benefit Customer Detail Scans (1999-2003).

- Tax Credit Data Scans (1999 – April 2003).

These records contain information about the receipt of 17 types of state benefit listed in Appendix 3. These include child benefit, housing benefit, working families' tax credit, different types of disability allowances, income support, job seekers' allowance and state pensions.

The relationship between the records held by the Generalised Matching Service warrants some explanation. As will be detailed in section 5.1.3, the survey respondents were first matched to the GMS Primary Data, to obtain an accurate key for linkage with the remaining files. The following description of the GMS records is based on correspondence with the IAD.

*GMS Primary Data: the main linking file*

This record contains one line of personal details per unique NINO. The details are the most-up-to-date available from the latest scan[18] of the "most reliable" benefit, based on a hierarchy of benefits (Job Seekers Allowance, Income Support, ..., Retirement Pension, Child Benefit...). Personal fields are updated whenever there is a change on a new benefit scan.

The file contains both current and historical claims. For example, if an individual at one time had a claim for income support (IS), but that claim ended and they never claimed another benefit, the personal details of this old claim will still be shown in the Primary Data. If their claim for IS re-started, then the personal details in the Primary Data would be updated (if necessary) when the next scan arrives.

If a person is claiming more than one benefit, their personal details on the Primary Data will be selected from the most reliable benefit.

*GMS Benefit Details*

This file contains one line per NINO for a particular benefit, record type (type of claim processed), customer type (alias or real name of claimant), and claim start date.

If an individual is claiming more than one benefit, the information about each benefit appears on a different line. If an individual stops a claim, then restarts again with a new claim start date, both these claims are shown on the Benefit Details table. The record therefore holds current and past claims.

The Benefit Details are updated regularly with the arrival of new scans. If the claim start date for a particular NINO claim has changed, a new line is inserted in the Benefit Details table

---

[18] A 'scan' is a 100% data extract of all current claims, taken as a snapshot at a particular date. Benefit scans are received by the IAD at varying dates and frequencies. Income Support and Job Seekers Allowance data are extracted every two weeks; Child Benefit, Disability Living Allowance, Attendance Allowance, Industrial Injuries Disablement Benefit, Invalid Care Allowance and Tax Credit data are extracted every four weeks; Retirement Pension, Widows Benefit, Bereavement Benefit, Severe Disablement Allowance and Incapacity Benefit data are extracted every six weeks.

showing the new claim start date as the data extract date. The old claim's 'effective to date' is changed to the date of extract minus 1.

*GMS Benefit History*

If a new scan arrives where the claim start date is the same, but another field has changed, such as 'Total Weekly Benefit', then the old details of the claim are moved from Benefit Details into the Benefit History table. The 'effective to date' is set as the data extract date minus 1. The line in the Benefit Details table is then updated with an 'effective from date' as the data extract date and the 'total weekly benefit' details are changed to the new information. Benefit History therefore contains any old details of a claim where there has been a change in details. It does not hold all historic claims that have ended.

Appendix 4 details the relationship between the GMS Benefit Details and History tables, and provides additional information on how the claim start and end dates are determined in these records.

## 5.1.2 Matching variables

The variables used to identify respondents in the DWP records were NINO, sex, date of birth, surname, first name, postcode and first line of address (see section 5.1.3 for the matching algorithm). While the NINO was collected during the last wave of the survey, information on the remaining variables stemmed from the sample information held by ISER.

Since the sample information is verified and updated with every wave of the survey, the quality of these variables is likely to be better than if they had been collected solely during the last wave of the survey (for related issues see section 4.3 on the quality of addresses collected for employers). However, the NINOs and consent variables were extracted from the survey data before this was cleaned, to minimise the time between interviews and linkage with DWP records. Therefore, if the interviewer made an error and, for example, swapped individuals within households, the NINO and consent questions could have the wrong name, date of birth, sex, etc. attached to them. However, these cases would be very few (10-20 in 1,000 approx) as many checks are built in to the CAPI script to keep this type of error to a minimum.

The fact that the personal information data supplied by ISER may not be error-free (nor indeed may the DWP data) has key implications for the record linkage (see section 5.1.3). The

following section therefore describes the variables used for matching, their characteristics and potential problems associated with them.

### 5.1.2.1   National Insurance number (NINO)

This section discusses the process of collecting NINOs in the survey, focusing on the degree of co-operation from respondents and the completeness and plausibility of NINOs reported. Plausibility is assessed by visual inspection of the NINOs (section 5.2.2 then examines the quality of NINO reports using information obtained through the matching exercise).

After asking for permission to perform the matching with DWP held records, respondents were asked for their NINO to facilitate this process (see Appendix 2 for the question wording). The interviewers were then asked to code whether the NINO was taken from a document, whether it was remembered and the respondent was certain it was correct, or whether it was remembered and the respondent was not certain it was correct.

Note that the NINO was not a necessary requirement for the matching with DWP data. If a respondent had given permission but not reported a NINO, the linkage was done using other variables. Indeed, part of the reason for asking for NINOs was to assess the feasibility of obtaining complete and accurate reports, since NINOs are not routinely collected in surveys in the UK.[19] Reported NINOs are subject to several potential sources of errors: the interviewer may have keyed the NINO incorrectly, or the respondent may have given the wrong number, usually unintentionally.[20]

---

[19] In the United States, the Social Security Number is the most important linking variable, since it is a nearly universal and unique identifier on its own and it is well reported in surveys and on official records. According to Jabine and Scheuren (1986), error rates in survey settings lie around 2 to 3%, depending to a large extent on whether respondents are asked to use records to report the number.

[20] Kasprzyk (1983) describes the procedures developed to maximise the completeness and accuracy of Social Security numbers reported in the US Survey of Income and Program Participation (SIPP).

Table 21 summarises the outcome of asking respondents for their NINO. Of the 799 respondents who gave permission to do the record linkage, 88.6% also provided their NINO. 9.9% reported that they did not know their number and 1.5% were not willing to report it.

Table 21:
**Response to request for National Insurance Number (NINO)**

|  | Frequency | Percent |
|---|---|---|
| NINO provided | 708 | 88.6 |
| NINO not given: don't know | 79 | 9.9 |
| NINO not given: refused | 12 | 1.5 |
| Total | *799* | *100* |

Note: Only respondents who gave permission for data linkage with
the DWP were asked to provide their NINO.

As Table 22 illustrates, most respondents (67.4%) consulted a payslip or other document in order to retrieve their NINO, 30.8% recalled theirs from memory and were positive it was correct, and a mere 1.8% relied on their memory, although they were not sure they could trust it. Section 5.2 takes a look at whether this check question provided any reliable information about the quality of reported NINOs.

Table 22:
**Source of National Insurance Number**

|  | Frequency | Percent |
|---|---|---|
| Taken from payslip or other document | 477 | 67.4 |
| Remembered and the respondent was sure it was correct | 218 | 30.8 |
| Remembered and the respondent was NOT sure it was correct | 13 | 1.8 |
| Total | 708 | 100 |

Note: This question was designed as an interviewer check.

NINOs in the UK consist of two letters, followed by a six-digit number and a suffix letter. These three components were entered separately into CAPI by the interviewer. Since NINOs in the UK are unique without the suffix, the DWP performed the match without this component. Table 23 summarises the completeness and plausibility of reported NINO components (excluding the suffix). In 98.9% of cases, all components of the reported NINO were complete and took plausible values. Only in one case was the middle number missing. In a further seven cases the middle number consisted of six nines. In the BHPS CAPI script, nines are usually used as a code for 'don't know'. Here this option was not given. Nonetheless, the use of 999999 looks as though the interviewer had intended to code 'don't know'. Indeed, only two of these seven numbers are matched with an identical number in the DWP records – and even in the matched cases, these are respondents for whom two different numbers are found in the DWP records (one of which was 999999). It therefore seems that in at least five of the seven cases, the reported nines are wrong.

There appears to be no strong association between the completeness and the source of the reported NINO. Respondents who recalled their number from memory but were not sure it was correct have all reported complete and plausible components. That is, the missing and questionable values are from respondents who either checked a document, or were sure they remembered correctly. In the cases where NINOs were verified, this points to keying errors on the part of the interviewer.

In summary, collecting NINOs seemed to work, in the sense that 88.6% of respondents asked did provide them. Of those who did not, only 1.5% explicitly refused to report, while 9.9% did not remember theirs. Furthermore, 98.2% of reported numbers were complete and plausible. On the other hand, the interviewer check question about the source of the reported NINO does not seem to provide reliable information about the quality of the NINOs collected (see also section 5.2.2).

Table 23:
**Completeness and source of National Insurance Number**

|  | Completeness of NINO components* | | | |
| NINO source | AB123456 | AB . | AB999999 | Total |
| --- | --- | --- | --- | --- |
| From payslip/document | 471 | 1 | 5 | 477 |
| Remembered: sure correct | 216 | 0 | 2 | 218 |
| Remembered: NOT sure correct | 13 | 0 | 0 | 13 |
| Total | 700 | 1 | 7 | 708 |

\* Excluding suffix letter.
(AB123456) means both the leading letters and the six-digit number were complete and took plausible values; (AB .) means the six-digit number was missing; (AB999999) means six nines were reported.


### 5.1.2.2    Non-unique matching variables

Apart from the NINO, other non-unique identifiers based on demographic information were used.

Sex – This variable is well documented in the survey sample files. However, since the DWP files do not contain this information,[21] sex was derived from the title of the benefit recipient (male if title = Mr, female if title = Ms, Mrs, Miss). The accuracy of DWP titles therefore determines the quality of this matching variable.

Date of birth – may have been reported wrongly in either source.

---

[21] Jabine and Scheuren (1986) confirm that information about sex is not always recorded in administrative records.

First name – Potential problems are caused by the common use of nicknames or aliases. For example, Bill instead of William, or someone using their first name for official documents like benefits (hence also in DWP), but their second name in general use (hence in ISMIE data). The survey data only contains a single reported given name, whereas DWP records can also contain alias fields.

Surname – Although everyone has a surname at birth, this may change over time, for example due to marriage, divorce, remarriage, adoption, or the personal choice of having the name changed. This may result in the update being incorporated in one database but not the other. In addition, names are not necessarily consistent in the structure of a surname and first name(s). Indeed, the structure of names is related to the ethnicity of their bearers: some ethnic groups have multiple last names, with varying order of use. Finally, problems may also be caused by different methods of handling characters like hyphens, apostrophes or accents.[22]

First line of address and postcode – There is great scope for differences either through different coding/keying conventions, e.g. "Road" versus "Rd", "St." versus "St", "Isaac's St" versus "Isaacs St", or whether or how flat numbers are recorded (e.g. 1/25 Whitehall Gardens versus 25 Whitehall Gardens, Flat 1). There is also scope for different elements of addresses being entered in different fields. More importantly, genuine differences in addresses can occur, for example, if former benefit recipients move house. The survey data will contain the current address of the respondent, while the DWP records will contain the address recorded at the time of the last benefit receipt.

In an attempt to minimise the impact of this type of difference, only the postcode and the first line of the address were used for the matching. The DWP data are cleaned using the 'Quick Address System'. However, for the purpose of this study, it was decided to use the survey addresses in their original format, to be able to assess the feasibility of matching with potentially unclean survey data.

### 5.1.3    Matching strategy

In order to minimise the impact of potential errors in the matching variables on the success of linking individuals to their DWP records, a non-hierarchical strategy was used. In essence, the DWP picked out candidates for a match using several different criteria, and produced a mat-

ched data set for all the candidates picked according to any of the criteria. The ISMIE researchers were then able to use judgement about which are 'true' matches, by pooling information from variables summarising the different selection criteria and other checks.

In a first step, the validation sample was matched with the GMS Primary Data to obtain an accurate NINO for each of the sample members. Generating an accurate key for matching with the remainder DWP records was essential for two reasons mentioned above: (1) the NINOs obtained in the survey were potentially erroneous and partially missing (see section 0), and (2) personal details are potentially less accurate in the remainder DWP records compared to the Primary Data (see section 5.1.1).

The matching exercise was undertaken five times, using exact matches with the following combinations of variables: (1) NINO (without suffix), (2) Sex, Date of Birth and Postcode, (3) Surname, First Name, Sex and Date of Birth, (4) Surname, First Name, Sex and Postcode, and (5) Surname, First Name, Sex and First Line of Address.

This strategy was chosen based on judgements about the relative accuracy of different personal details, and how well they identify individuals uniquely. The first matching criterion uses the NINO information. All the other matching criteria use sex on the assumption that this information is of high accuracy. The second matching criterion uses (in addition to sex) date of birth and postcode, conjecturing that they are relatively accurate. The final three matching criteria utilise name or address information – which might be more error-prone than the other variables.

Once the linkage with the GMS Primary Data was made, the obtained NINO was used as the key variable to link to the following records (described in section 5.1.1):

- GMS Benefit Details: to find details of all unique claims that the sample individuals have had.

- GMS Benefit History: to get information on changes of details in claims.

- Housing Benefit Customer Detail Scans (1999-2003).

- Tax Credit Data Scans (1999 – April 2003).

---

[22] Armstrong (2000) describes different encryption methods which can be used to minimise potential problems with names as identifying variables.

Note that for sample individuals who have been matched to more than one person in the Primary Data, (i.e. the different matching criteria produced more than one possible NINO) a separate benefit linking exercise was done for each of the NINOs. This is the main difference compared to hierarchical selection criteria: a larger number of cases were included who later turn out to be mismatches.[23]

On the other hand, the inclusion of multiple potential matches has some important advantages. For each combination of matching variables, we can assess how many individuals are matched, as well as the quality of matches. We are therefore able to discuss issues such as "How many matches would we have found if we had only used NINOs?" or "How many matches would we have found if we only had names and addresses, and dates of birth?, etc. Jenkins et al. (2004b) investigate how well each of the matching criteria operated in practice and derive lessons for future matching exercises.

## 5.2 Outcome of benefit record linkage

### 5.2.1 Match rates

Of the 799 consenting respondents,[24] the DWP matched 589 (73.7%) with the Primary Data, using the five matching criteria outlined in section 5.1.3. This produced 604 unique NINOs. There were 15 cases where two NINOs were obtained for one sample person. 210 cases (26.3%) could not be matched with the Primary Data.

Table 24 shows the outcome of the non-hierarchical matching procedure for the Primary Data, indicating how many individuals matched on each combination of the criteria. A value of 10011 means the individual matched on criteria 1, 4 and 5, but not 2 and 3, for example.

The majority (53.5%) matched on at least NINO and the combination of sex, date of birth and postcode (criteria 1 and 2), which were the criteria expected to be most reliable.

---

[23] If the first criterion (here: NINO) in a hierarchical matching strategy produced a match, this would be considered successful. The next criterion in the hierarchy would then only be applied to those individuals who could not be matched with the first criterion, and so on. Hierarchical strategies therefore produce at most one match per individual.

[24] An early version of the data sent to the DWP contained 802 respondents who had given permission. However, for 3 respondents valid survey data could not be produced subsequently.

Table 24:
**Outcome of matching with GMS Primary Data**

| Match | Freq. | Percent |
|-------|-------|---------|
| 00000 | 210 | 26.3 |
| 00100 | 7 | 0.9 |
| 00101 | 2 | 0.3 |
| 01000 | 16 | 2.0 |
| 01110 | 20 | 2.5 |
| 01111 | 49 | 6.1 |
| 10000 | 10 | 1.3 |
| 10010 | 1 | 0.1 |
| 10011 | 1 | 0.1 |
| 10100 | 46 | 5.8 |
| 10101 | 10 | 1.3 |
| 11000 | 68 | 8.5 |
| 11110 | 74 | 9.3 |
| 11111 | 285 | 35.7 |
| Total | *799* | *100* |

The 604 NINOs obtained from the match with the Primary Data were then linked with the Benefit Details, Benefit History, Housing Benefit and the Tax Credit Scans to obtain details of all DWP benefits claimed by these individuals. The matched data contains 7,615 observations and covers records held for the period 1999 to 2003.

The 210 non-matched cases can be either (1) respondents with benefit records but who could not be matched due to errors (or missing values) in the matching variables, or (2) individuals who genuinely did not receive any benefits during the observation period, and so have no DWP record to be matched to. Distinguishing the two causes is impossible, due to the design of the study as a 'complete' record check (see section 2).

However, the matching variables supplied to the DWP were complete for all respondents. In addition, 181 (86%) of the non-matched respondents supplied a complete and plausible NINO.[25] Only 29 (14%) did not provide their number. This might suggest that the matching information from the survey was not of lower quality for non-matched respondents than for those for whom the linkage was successful.

On the other hand, one would not expect a 100% match, since not everyone in the sample will have received benefits in the period of interest. As a point of comparison, in the 1999-2000

---

[25] In three cases the suffix took unusual values. However, since the suffix was not used for the matching, this could not have had any impact.

Family Resources Survey 59% of benefit units[26] in Great Britain received one or more types of benefit (Ellerd-Elliott et al., 2001).

Considering the above, a match rate of 74% seems a respectable outcome. Jenkins et al. (2004b) look at the quality of matches obtained and assess which can be considered 'true' or 'false' matches.

### 5.2.2    Quality of National Insurance Numbers

The matched information can be used to get an idea of the accuracy of the NINOs reported in the survey. Since the DWP matching was performed without the suffix letter, the following section only considers the first eight characters.

For the 708 respondents who reported a NINO, Table 25 examines whether the probability of achieving a match with the DWP records varied by the source of the reported number. The table distinguishes respondents by the outcome of the linkage: (1) respondents for whom no match was achieved (25.6%), (2) those for which record linkage was successful and where the NINOs in both the survey report and the DWP records corresponded (69.9%), and (3) successful matches, but with non-corresponding NINOs (4.5%).

Table 25:
**Outcome of matching by source of National Insurance Number**

| Source of NINO reported in survey | Outcome of survey and record linkage | | | |
| | No match | Match: same NINO | Match: diff. NINO | Total |
| --- | --- | --- | --- | --- |
| NINO Taken from payslip or other document | 123 | 330 | 24 | 477 |
| | (25.8) | (69.2) | (5.0) | (100.0) |
| NINO Remembered: sure correct | 56 | 156 | 6 | 218 |
| | (25.7) | (71.6) | (2.8) | (100.0) |
| NINO Remembered: not sure | 2 | 9 | 2 | 13 |
| Total | *181* | *495* | *32* | *708* |
| | *(25.6)* | *(69.9)* | *(4.5)* | *(100.0)* |

The results indicate that the probability of achieving a match with a corresponding NINO is around 70%, regardless of the retrieval strategy used by the respondent. It therefore seems that whether or not the respondent checked a document to verify his number, did not impact on the probability of a match by NINO. However, it should also be said that the numbers

---

[26] A benefit unit is defined as "a single adult or couple living as married and any dependent children" (Ellerd-Elliott et al., 2001, p. 161).

reported in the survey or recorded by the DWP may be erroneous. This means that there are potentially cases where we have a match with corresponding numbers, but in fact are referring to different persons.

In order to get an idea of potential sources of error in the reported NINOs, the next set of tables takes a look at how the numbers from the survey and the DWP records differ.

Table 26 shows that in 17 of the 32 matches with non-corresponding numbers, in fact only one character differs.

Table 26:
**Number of non-corresponding characters between NINOs reported in survey and DWP records (excluding suffix letter)**

| Number of non-corresponding characters | Frequency | Percent |
|---|---|---|
| 1 | 17 | 53 |
| 3 - 5 | 7 | 22 |
| 6 - 7 | 8 | 25 |
| Total | *32* | *100* |

Base: 32 respondents who were matched with a person in the DWP records, but where the NINOs did not correspond.

Table 27 shows the number of non-corresponding characters by the source of the NINO. Across all sources half, or more, of the divergence is only in one character. In the cases where documents were checked, this points to keying errors on the side of the interviewer.

On the other hand, 11 of the 24 respondents who consulted a document have numbers where five, six or seven characters do not correspond. What's more, in the other two, potentially more dubious groups, the proportion of numbers with more than five non-corresponding digits appears lower.

Table 27:
**Number of non-corresponding characters by source of NINO**

| Source of NINO in survey data | Number of non-corresponding characters | | | |
| | 1 | 3 - 5 | 6 - 7 | Total |
|---|---|---|---|---|
| Taken from payslip or other document | 13 | 4 | 7 | 24 |
| Remembered: sure correct | 3 | 2 | 1 | 6 |
| Remembered: not sure correct | 1 | 1 | - | 2 |
| Total | *17* | *7* | *8* | *32* |

Not only do certain patterns of differences occur more frequently than others, but the differences are also concentrated at certain positions in the NINO. As Table 28 shows, most divergence occurs in the numbers, in particular the first of the six digit number. Divergence of the leading letters is less frequent.

Table 28:
**Frequency of non-correspondences by position of character**

| Character | A | B | 1 | 2 | 3 | 4 | 5 | 6 | Total |
|---|---|---|---|---|---|---|---|---|---|
| Number of non-correspondences | 4 | 9 | 19 | 14 | 15 | 14 | 13 | 10 | 98 |

In conclusion, the interviewer check question about the source of the NINO is not a reliable indicator of the quality of reports. The proportion of what looks like typographical errors (divergence in only one character) is the same for all sources of the NINO. In fact, a higher proportion of NINOs retrieved from documents diverge in more than half the characters.

## 5.3 Representativeness of DWP validation sample

Table 29 compares respondents who gave permission for the DWP linkage with those who did not consent. The results indicate that the two groups are comparable in terms of composition by gender, age groups, marital status, qualifications, economic activity, earnings, housing tenure and receipt of benefits recorded in the survey. At the permission stage of the validation process, there is therefore no evidence that the sample is biased compared to the entire respondent sample.

Table 29:
**Characteristics of respondents by permission for benefit validation**

| Characteristics | | Total (Frequency) | Permission for DWP linkage * (row %) |
|---|---|---|---|
| All | | 1,033 | 77.4 |
| Sex | Male | 429 | 77.6 |
| | Female | 604 | 77.2 |
| Age | 16-35 | 242 | 78.9 |
| | 36-50 | 292 | 73.6 |
| | 51-65 | 216 | 77.3 |
| | 66 + | 283 | 79.9 |
| Marital status | Married/widowed | 600 | 77.8 |
| | Separated/divorced | 164 | 76.8 |
| | Never married | 268 | 76.9 |
| Highest academic qualification[1] | Any qualifications listed | 384 | 75.0 |
| | None of these | 647 | 79.0 |
| Economic activity | (Self-) employed | 489 | 76.7 |
| | ILO unemployed | 27 | 63.0 |
| | Econ. inactive | 517 | 78.7 |
| Total pay | < £299 | 148 | 76.4 |
| | £300-899 | 145 | 81.4 |
| | £900 + | 128 | 78.1 |
| Housing tenure | Owned or mortgage | 411 | 78.4 |
| | Rented | 575 | 77.9 |
| | Rent free/other | 31 | 64.5 |
| Benefit receipt[2] | NI retirement pension | 317 | 80.8 |
| | Incapacity benefit | 77 | 79.2 |
| | Income support | 179 | 81.0 |
| | Job seeker's allowance | 35 | 77.1 |
| | Child benefit | 208 | 77.9 |
| | Family credit | 94 | 80.9 |
| | Housing benefit | 273 | 78.4 |
| | Council tax benefit | 323 | 77.7 |

\* Differences in characteristics between consenting and non-consenting respondents are tested using a two-tailed Pearson Chi$^2$ test. At the 5%-level none of the differences are significant.

[1] Listed qualifications include youth training certificates, apprenticeships, clerical and commercial qualifications, nursing qualifications, teaching qualifications, university diploma, degree, higher degree.

[2] For all other benefit types recorded in the survey, differences are not significant either.

# 6        Conclusions

This concluding section provides a summary comparison of the different issues arising in the collection of validation data from employer records and DWP benefit data, focusing on how the representativeness of the effective validation samples depends on the processes of obtaining permission from respondents, gaining access to validation data, and matching survey and validation data. Table 30 reports the samples obtained at the different stages.

The validation sample obtained for the employment data (181 employees) is much smaller than that obtained for the benefit data (589 recipients). This is due, first of all, to the small number of employees in the ECHP low-income sample (434). For the benefit record check, all respondents, regardless of whether or not they had reported benefit receipt, were included in the validation study (1,033 respondents). Secondly, respondents seemed to be more reluctant to give permission to contact their employers (58.5%) than to match their data to records held by the DWP (77.4%), reducing the potential validation samples to 254 employees and 799 benefit recipients. For both studies, it seems that respondents who gave permission to do the validation exercise were happy to provide the necessary matching information. All but one of the employees provided contact details for their employers; 88.6% of those who gave permission to do the DWP matching also provided their NINO, while a further 9.9% said they did not remember their number. Only 1.5% explicitly refused to report their NINO. Respondents' propensity to consent to the validation studies and provide matching information is analysed in detail by Jenkins et al. (2004a).

Collecting NINOs as part of the survey proved feasible. The quality of NINOs reported seems reasonable: 93.9% of respondents who supplied a NINO were matched to a DWP record with the same NINO, and only three of these were identified as definite mis-matches. The main source of errors in the NINOs collected appears to be typographical errors on the part of the interviewer. Jenkins et al. (2004b) provide an in-depth analysis of the NINOs reported in the survey.

The next stage, gaining access to the validation data, was easy for the benefit records, since they are all held by the DWP. For the employment information, we depended on the co-operation of nearly 253 employers in completing the survey ('nearly' because there are some respondents, particularly couples, who work for the same firm). Non-response by employers

reduced the size of the final validation sample to 71.3% of the employees who had given permission – or 41.7% of employees in the respondent sample.

The main barrier to accessing information from employers' records were concerns about data protection – from both respondents, who were much less likely to give permission to contact their employers than to access their DWP records, and employers. Many employers refused to provide information due to their 'company policy', or would not do so without a consent form signed by the employee. This written consent form therefore proved crucial.

The design of the employer survey to include several contacts by mail, followed-up by telephone proved a successful combination. In fact, of the 129 questionnaires completed at the postal stage, 69 were only returned after the second or third contact was made. On the other hand, the telephone follow-up proved invaluable, in particular to achieve contact with employers who had not received the previous mailings. However, most employers were reluctant to provide information about employees over the phone, so effectively the postal questionnaires had to be faxed or sent again, once contact had been established by telephone. The mailings were complicated by the limited quality of contact details collected in the survey. On the other hand, the telephone stage proved more time consuming to administer, since it often took many calls and additional faxes or letters until a questionnaire was completed. The contact process for the employer survey is examined by Lynn and Sala (2004).

The matching of survey and validation data was straightforward for the employment data, but critical for the DWP records, depending largely on the quality of matching variables and the matching strategy employed. 73.7% of the permission sample (57.0% of all respondents) were matched to benefit records. For the non-matched cases, however, it is impossible to know whether they were 'true non-matches' (respondents who had never received a benefit), or 'false non-matches' (respondents who should have been matched, but could not be due to errors in the matching variables).

The main issue in obtaining validation data from DWP records were potential errors in the matching variables, either in the survey data or the DWP records. The non-hierarchical matching strategy employed yielded duplicate matches for 15 respondents, allowing the research team subsequently to decide which matches were the correct ones. Jenkins et al. (2004b) analyse the quality of matches and implications of using different combinations of matching variables for the success of matching survey and administrative data.

As far as the representativeness of the validation samples is concerned, the first hurdle of obtaining permission did not appear to introduce bias in terms of key substantive characteristics of respondents in either of the validation studies. However, gaining co-operation from employers introduced some bias as far as characteristics of the data holder (employer) are concerned. Nonetheless, the validation sample remained representative of respondents' characteristics.

Table 30:
**Samples obtained for the employer and benefit record checks**

| Samples | Employer survey | DWP record check |
|---|---|---|
| Respondent sample | 434 (employees) | 1,033 (all respondents) |
| Permission sample | 254 | 799 |
| % of respondent sample | 58.5% | 77.4% |
| Matching information given | 253 (employer's address) | 708 (NINO) |
| % of permission sample | 99.6% | 88.6% |
| % of respondent sample | 58.3% | 68.5% |
| Validation sample | 181 | 589 |
| % of permission sample | 71.3% | 73.7% |
| % of respondent sample | 41.7% | 57.0% |

# References

Armstrong, M. (2000) 'An Overview of the Issues Related to the Use of Personal Identifiers': HSMD Statistics Canada.

Bollinger, C. R. (1998) 'Measurement error in the current population survey: a nonparametric look', *Journal of Labor Economics,* 16: 576-594.

Bound, J., Brown, C., Duncan, G. J. and Rodgers, W. L. (1994) 'Evidence on the validity of cross-sectional and longitudinal labor market data', *Journal of Labor Economics,* 12: 345-368.

Bound, J., Brown, C. and Mathiowetz, N. (2001) 'Measurement Error in Survey Data', in J. J. Heckman and E. Leamer (eds) *Handbook of Econometrics*. Vol. 5.

Bound, J. and Krueger, A. (1991) 'The extent of measurement error in longitudinal earnings data: do two wrongs make a right?' *Journal of Labor Economics,* 12: 345-368.

Carroll, R., Ruppert, J. and Stefanski, L. A. (1995) *Measurement Error in Nonlinear Models*, London: Chapman and Hall.

Carstensen, L. and Woltman, H. (1979) 'Comparing earnings data from the CPS and employer's records', Alexandria, VA: American Statistical Association.

Coder, J. (1992) 'Using administrative record information to evaluate the quality of the income data collected in the survey of income and program participation', *Statistics Canada Symposium 92,* Statistics Canada, Ottawa.

Cox, L. H. and Boruch, R. F. (1988) 'Record Linkage, Privacy and Statistical Policy', *Journal of Official Statistics,* 4(1): 3-16.

Dibbs, R., Hale, A., Loverock, R. and Michaud, S. (1995) 'Some effects of computer assisted interviewing on the data quality of the survey of labour and income dynamics' *SLID Research Paper*, Ottawa: Statistics Canada.

Dreher, G. (1977) 'Nonrespondent characteristics and respondent accuracy in salary research', *Journal of Applied Psychology,* 62: 773-776.

Duncan, G. J. and Hill, D. H. (1985) 'An Investigation of the Extent and Consequences of Measurement Error in Labor-Economic Survey Data', *Journal of Labor Economics,* 3(4): 508-532.

Edwards, W. S., Levine, R. and Allen, B. (1989) 'Research on Hours of Work Questions in the Current Population Survey, Final Report': Bureau of Labor Statistics.

Ellerd-Elliott, S., Horsfall, E., Butt, N., Dhanecha, N. and Pickering, E. (2001) 'Family Resources Survey Great Britain 1999-2000': DSS.

Greenberg, D. and Halsley, H. (1983) 'Systematic misreporting and effects of income maintenance experiments on work effort: evidence from the Seattle-Denver experiment', *Journal of Labor Economics,* 1: 380-407.

Grondin, C. and Michaud, S. (1994) 'Data quality of income data using computer-assisted interview: the experience of the Canadian survey of labour and income dynamics', *Survey Research Methods Section,* Alexandria, VA: American Statistical Association.

Halsley, H. (1978) 'Validating income data: lessons from the Seattle and Denver income maintenance experiment', *Proceedings of the Survey of Income and Program Participation Workshop, Survey Research Issues in Income Measurement: Field Techniques, Questionnaire Design, and Income Validation,* Washington, DC: U.S. Department of Health, Education, and Welfare.

Hardin, E. and Hershey, G. (1960) 'Accuracy of employee reports on changes in pay', *Journal of Applied Psychology,* 44: 269-275.

Heady, P., Smith, S. and Avery, V. (1996) '1991 Census Validation Survey: quality report', London: HMSO.

Hoaglin, D. (1978) 'Household income and income reporting error in the housing allowance demand experiment', *Survey of Income and Program Participation Workshop, Survey Research Issues in Income Measurement: Field Techniques, Questionnaire Design, and Income Validation,* Washington, DC: U.S. Department of Health, Education, and Welfare.

Jabine, T. B. and Scheuren, F. J. (1986) 'Record Linkages for Statistical Purposes: Methodological Issues', *Journal of Official Statistics,* 2(3): 255-277.

Jenkins, S. P. (2000) 'Modelling household income dynamics', *Journal of Population Economics,* 13: 529-567.

Jenkins, S. P., Cappellari, L., Lynn, P., Jäckle, A. and Sala, E. (2004a) 'An analysis of survey respondents' consent-to-match propensities': ISER Working paper, University of Essex, Colchester, forthcoming.

Jenkins, S. P., Lynn, P., Jäckle, A. and Sala, E. (2004b) 'Linking survey responses and administrative records: what should the matching variable(s) be?': ISER Working paper, University of Essex, Colchester, forthcoming.

Jenkins, S. P. and Rigg, J. A. (2001) 'The Dynamics of Poverty in Britain', Leeds: Department for Work and Pensions.

Kasprzyk, D. (1983) 'Social Security Number Reporting, the Use of Administrative Records and the Multiple Frame Design in the Income Survey Development Program. Technical, Conceptual, and Administrative Lessons of the Income Survey Development Program': Social Science Research Council.

Lynn, P., Jäckle, A., Jenkins, S. P. and Sala, E. (2004) 'The effects of dependent interviewing for questions on income sources': ISER Working paper, University of Essex, Colchester, forthcoming.

Lynn, P. and Sala, E. (2004) 'The contact and response process in business surveys: lessons from a multimode survey of employers in the UK': ISER Working paper No. 2004-12, University of Essex, Colchester.

Marquis, K. H. and Moore, J. C. (1990) 'Measurement errors in survey of income and program participation (SIPP) program reports', *Sixth Annual Research Conference,* Washington, DC: U.S. Bureau of the Census.

Mathiowetz, N. A. and Duncan, G. J. (1988) 'Out of work, out of mind: response errors in retrospective reports of unemployment', *Journal of Business and Economic Statistics,* 6: 221-229.

Mellow, W. and Sider, H. (1983) 'Accuracy of Response in Labor Market Surveys: Evidence and Implications', *Journal of Labor Economics,* 1(4): 331-344.

Moore, J. C. and Marquis, K. H. (1988) 'Using administrative record data to describe SIPP response errors', *SIPP Working Paper No. 8827,* U.S. Bureau of the Census, Washington, DC.

Moore, J. C., Marquis, K. H. and Bogen, K. (1996) 'The SIPP cognitive research evaluation experiment: basic results and documentation, unpublished report', U.S. Bureau of the Census, Washington, DC.

Morgan, J. N. (1989) 'Panel Study of Income Dynamics, 1968-1987 Validation Study'

Oberheu, H. and Ono, M. (1975) 'Findings from a pilot study of current and potential public assistance recipients included in the current population survey', *Social Statistics Section,* Alexandria. VA: American Statistical Association.

Plewis, I., Smith, G., Wright, G. and Cullis, A. (2001) 'Linking child poverty and child outcomes: exploring data and research strategies', London: Department for Work and Pensions.

Rodgers, W. L., Brown, C. and Duncan, G. J. (1993) 'Errors in survey reports of earnings, hours worked and hourly wages', *Journal of the American Statistical Association,*(88): 1208-1218.

Singer, E. (2003) 'Exploring the Meaning of Consent: Participation in Research and Beliefs about Risks and Benefits', *Journal of Official Statistics,* 19(3): 273-285.

Taylor, M. F., Brice, J., Buck, N. and Prentice-Lane, E. (2003) 'British Household Panel Survey User Manual Volume A: Introduction, Technical Report and Appendices', Colchester: University of Essex.

Tourangeau, R. (1984) 'Cognitive sciences and survey methods', in B. Jabine Thomas (ed) *Cognitive Aspects of Survey Methodology: Building a Bridge between Disciplines*, Washington DC: National Academy Press.

# Appendix

## Appendix 1: Changes to ISMIE questionnaire compared to BHPS wave 12

**Coversheet**

1. As per LIB, no changes.

**Household Questionnaire**

2. Shortened but similar to LIB (cut H5, H16, H17, H40, H41, H44, H46 – 49, H54, H58, H59, H62, H63).

**Individual questionnaire**

*Demographics:*

3. Cut D29 – D66 (new entrant questions that will not apply), D79 – D96, D107 – D114.

4. Includes different versions of the school level qualifications questions for groups B and C using data from the previous interview.

*Health*

5. Majority of the section has been cut (M9 – M52), only two questions remain.

*Employment*

6. Usual content.

7. Includes different versions of the occupational description and pay questions for groups B and C using data from the previous interview.

8. Everyone is asked for their National Insurance number at the end of the employment section.

*Employment History*

9. Usual content.

10. Includes different versions of the questions for groups B and C using data from the previous interview.

*Values and Opinions*

11. Majority of the section has been cut (V2, V3, V5 – V8, V10 – V71), only a few questions.

*Household Finances*

12. Cut F53, F53a.

13. Includes different versions of the finance grid questions for groups B and C using data from the previous interview.

14. Questions asking for consent to link the respondent's survey data to Department of Work and Pensions data are included at the end of the section.

15. A question asking for consent to contact the respondent's employer to check details of their employment is included at the end of the section.

**No self-completion**

**No proxy**

**No youth questionnaire**

**No telephone interviews**

## Appendix 2: Permission questions

*Data Linkage with the DWP.*

F53_intro

This is a special year for the survey as we have gained funding to carry out additional analysis to assess the quality of the data we collect on the survey. This work is especially important as data from the survey are used by many policy makers and government departments. So it is important that we can say with certainty that the data we provide is accurate and giving the correct information.

To ensure that our records are complete and accurate, we would like to use information held by the Department for Work and Pensions and Inland Revenue about your benefits and tax credits (but NOT about your income tax).

F53

Are you happy to give us your permission to link your answers with the administrative records held by these government departments?

      Yes           GO TO E137

      No           GO TO F55

      Don't know/respondent queries why      GO TO F53_Prompt

F53_Prompt

IF RESPONDENT ASKS 'WHY'

"Researchers want to check accuracy and completeness of the survey answers about benefits and tax credits"

IF RESPONDENT ASKS ABOUT THE CONSEQUENCES OF SAYING 'YES'

"Like everything else you have told us, this information will be completely confidential and will be used solely for research purposes. No information that can identify you will be made available to the Department for Work and Pensions, the Inland Revenue, or anyone else outside the research team. Taking part in this study will not affect your benefit or tax credit entitlements or dealings with any Government Departments now or in the future".

IF RESPONDENT ASKS HOW THE LINK WILL BE DONE

"To link the information from the Department for Work and Pensions and Inland Revenue with your answers, we shall pass them your name, address, sex and age. These personal details will be removed as soon as the information has been linked".

GO TO F54

F54 Are you happy to give us your permission to link your answers with the administrative records held by these government departments?

  YES   GO TO E137

  NO    GO TO F55

  DK/Can't say GO TO F55

**National Insurance Number**

E137 To help us make this link to the administrative data, can you tell me your National Insurance number please?

ASK RESPONDENT TO CONSULT A PAYSLIP OR OTHER RECORDS SUCH AS A PENSION OR BENEFIT BOOK OR NATIONAL INSURANCE NUMBER CARD
IF RESPONDENT ASKS 'WHY DO YOU WANT THIS?'

"This is just to endure our records are accurate."

IF RESPONDENT QUERIES 'WHY?'

"This will be used for research purposes when checking the data and will not be released to anyone outside the research team"

IF RESPONDENT IS STILL UNWILLING TO PROVIDE THE INFORMATION CODE 'REFUSED' BELOW

ENTER NUMBER:        GO TO E138

  Don't Know   GO TO F55

  Refused    GO TO F55

E138 INTERVIEWER CODE FOR ALL CASES WHERE A NUMBER GIVEN

1  NINO taken from payslip or other document

2  NINO remembered and respondent certain correct

3  NINO remembered but respondent not certain

*Employers details*

ASK IF EMPLOYEE ONLY

F55    Another part of the work on checking the accuracy of the data we collect involves contacting your current employer for some details about your current job, pay and conditions.


Would you give us your permission to contact your employer?

        Yes             GO TO F55_Details
        No              GO TO F55_W11

F55_Details

        WRITE IN

Contact name .........................................................................

Employer/Firm name.............................................................

Address details:
Number and street ................................................................

Town.....................................................................................

County ..................................................................................

Postcode ...............................................................................

Telephone number inc. STD code.........................................


GO TO F55_W11

## Appendix 3: DWP benefits included in the record check

AA = Attendance Allowance

BB = Bereavement Benefit

CHB = Child Benefit

DLA = Disability Living Allowance

DPT = Disabled Persons Tax Credit (replaced in April 2003 by Working Tax Credit *)

DWA = Disability Working Allowance (Replaced by DPTC in October 1999)

FAM = Family Credit (Replaced by WFTC in October 1999)

HB = Housing Benefit

IB = Incapacity Benefit

ICA = Invalid Care Allowance (now known as Carer's Allowance)

IID = Industrial Injuries Disablement Benefit

IS = Income Support

JSA = Job Seekers Allowance

RP = Retirement Pension

SDA = Severe Disablement Allowance

WB = Widows Benefit

WFT = Working Families Tax Credit (replaced in April 2003 by Working Tax Credit *)

* Information about Working Tax Credits is not held by the DWP.

## Appendix 4: Relationship between GMS Benefit Details and History tables: Claim start and end dates

Existing cases are updated in the Benefit Details table where the NINO, Benefit, Record Type, Customer Type and CLAIM START DATE is the same. If the CLAIM START DATE changes a new row is inserted into the Details table.

For example, if a NINO for benefit IS (Income Support) enters the system, a row will be inserted into the Details tables (both Benefit and Personal). The 'Effective From Date' being DATE 1 and the 'Effective To Date' being 01-jan-2525.

If on the next extract (extract date = DATE 2) a field value changes, e.g. 'Total Weekly Benefit', and the 'Claim Start Date' has not changed, then

- The original row from the Benefit Details table will be inserted into the HISTORY table, with 'Effective From Date' being DATE 1 and the 'Effective To Date' being Date 2 minus 1 day.

- The row in the DETAILS table will be updated with the new information, the 'Effective From Date' being DATE 2 and the 'Effective To Date' being 01-jan-2525.

If the 'Claim Start Date' has changed on the next extract (extract date = Date 2), then

- The original row in the DETAILS table will have the 'Effective To Date' updated to Date 2 minus 1 day.

- A new row will be added to the DETAILS table, the 'Effective From Date' being DATE 2 and the 'Effective To Date' being 01-jan-2525.

The 'Maximum Claim Date' will be set when a case does not appear on a future extract, e.g. a NINO for benefit WB (Widows Benefit) enters the system on Extract 10, but disappears on extract 15, the maximum claim end date would be set to Extract Date 15 minus 1 day.

[Source: communication with IAP]