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How Reliable are Income Data Collected with a Single Question?

John Micklewright[*], **Sylke V. Schnepf**[†‡]

Abstract. Income is an important correlate for numerous phenomena in the social sciences. But many surveys collect data with just a single question covering all forms of income. This raises questions over the reliability of the data collected. Issues of reliability are heightened when individuals are asked about the household total rather than own income alone. We argue that the large literature on measuring incomes has not devoted enough attention to single-question surveys. We investigate the reliability of single-question data using the ONS Omnibus survey and British Social Attitudes (BSA) survey as examples. We compare the distributions of income in these surveys individual income in the Omnibus and household income in the BSA — with those in two larger UK surveys that measure income in much greater detail. Distributions compare less well for household income than for individual income. Disaggregation by gender proves fruitful in much of the analysis. We also establish levels of item non-response to the income question in single-question surveys from a wide range of countries.

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1. Introduction

Income is an important correlate of numerous phenomena in the social sciences and information on income is thus often sought in social surveys. But in many surveys, income is not a principal focus of interest and limitations on the length of interview mean that detailed income questions cannot be asked. As a consequence, information is frequently collected with just a single question covering all forms of income received by an individual or by an entire household. This leads to the issue posed in the title of this paper: how reliable are data that are collected in this way?

'Single-question' surveys are very common. Information on income in the cross-national Eurobarometer and in the European Social Survey (ESS) is collected through a single question. The same is true of the International Social Survey Programme (ISSP), which includes such long-running enquiries as the US General Social Survey, the German ALLBUS, and the British Social Attitudes Survey. In the UK, the focus of our empirical analyses, other important single-question surveys include the Office for National Statistics (ONS) Omnibus Survey, the British Crime Survey, the British Election Study, the Citizenship Survey, the Health Survey for England, and the National Travel Survey. Information on where to find out more about these surveys is given in Appendix A. There is also perennial interest in the possibility of including a single question on income in the decennial UK population census (Collins and White 1996; ONS 2006, 2007).

Despite the existence of many single-question surveys in different countries, the large literature on measurement error in income data does not devote much attention to the special problems involved in collecting income data in this way. Nor does it say much about the degree of success with which the information is collected. We assess relevant literature in Section 2 and review existing evidence on single-question surveys to help formulate hypotheses to test in our own validation studies later in the paper. We also establish the extent of non-response to the income question in the ESS and ISSP.

Sections 4 and 5 investigate the validity of income data from two major UK single-question surveys, the ONS Omnibus Survey and the British Social Attitudes Survey. These widely used surveys are chosen to illustrate the two main forms of single question. The former collects information from respondents on their own *individual* income from all sources. The latter is even more demanding, asking respondents to report on the total income for their *household*. The distinction between the two types of question turns out to be of considerable importance.

In each case our validation involves comparing an estimate of the distribution of income in the single-question survey with that from a survey that has a major focus on income measurement, asking detailed questions about each form of income. These are 'macro-level' comparisons in the classification of validation study types provided by Bound et al (2001) – validating an income aggregate or a distribution with information from another source. This contrasts with what Bound et al label as 'micro-level' studies, which involve comparing respondents' answers with information for the same individuals taken from administrative sources or from different and presumed superior questions. As in any validation study, we are not comparing the results of the single-question surveys against the 'true' income distribution, which is unobserved. We are assessing how close the distributions in the single-question surveys come to the distributions in the other sources. The latter are assumed to be closer to the truth and to be a reasonable benchmark of what can be achieved with much more resources devoted to the collection of income data. But they provide imperfect measures, and the differences between their results and those from the single-question surveys may stem not only from the difference in the form of questioning about income.

Section 3 therefore paves the way by briefly describing and contrasting relevant features of both our two single question surveys and the two comparator surveys, the Family Resources Survey (FRS) and the Expenditure and Food Survey (EFS) (Department for Work and Pensions 2007; http://www.esds.ac.uk/government/efs/). The FRS is now the main source for official figures on the distribution of income and on the extent of poverty in the UK. The forerunner of the EFS, the Family Expenditure Survey (FES), had the same role until the mid-1990s. The FRS and EFS are the obvious benchmarks for the single question surveys. We use both surveys to benchmark individual income in the ONS Omnibus and the FRS alone to benchmark the household income in the British Social Attitudes survey

Section 6 concludes, summarising our findings and drawing lessons for design and use of single-question surveys.

2. Measuring income in surveys

There is a large body of evidence on measurement error in survey data on incomes, reviewed for example by Bound et al (2001) and Moore et al (2000). This evidence comes from both macro- and micro-level validation exercises in the Bound et al sense and from cognitive research into how survey respondents react to questioning on their incomes.

Macro-level validations often show aggregate earnings to be measured well. For example, in the US, grossed-up wages and salaries in the 1990 Current Population Survey (CPS) March Income Supplement were 97 percent of the total in National Accounts and tax records (Moore et al, Table 1). Similarly, in the UK, grossed-up wages and salaries in the FRS were 94 percent of National Accounts figure in 1994/5 (Frosztega 2000), and figures at about this level had been found for the FES since the early 1970s (Atkinson and Micklewright 1983, Johnson and McRae 1998). On the other hand, micro-level validations in the US with data from employer records show substantial errors at the level of the individual (e.g. Bound et al 1994). These errors are characterised by mean-reversion, the lower paid on average overstating their earnings in reply to surveys and the higher paid on average understating them. The same has also been found in Finland in comparisons of responses to earnings questions in the European Community Household Panel (ECHP) with information for the same individuals in administrative registers (Rendtel 2006).

Results for other sources of income are mixed. The macro-level validations for the US and the UK in the literature just cited show self-employment and investment income to be substantially under-reported. However, care is needed with differences in coverage between the surveys and the National Accounts. The timing of receipts can differ: survey figures may refer to the most recent 12 months for which the respondent has a figure available while National Accounts cover income earned in the year to which they refer. There may be differences in the treatment of expenses allowable for tax purposes and hence in the income concept. Allowing for these differences in coverage, FES totals for self-employment income averaged 78 percent of the National Accounts figure in the UK over both 1970-80 and 1985-92 (Atkinson and Micklewright 1983, Table 3; Johnson and McRae 1998, Table 2.15 and page 47). For the US, Moore et al (2000) report a figure of 67 percent for the CPS in 1990 although it is unclear whether any adjustments have been made to the data for the purposes of the comparison with the National Accounts. Private pension income totals are hard to compare across sources due to the different treatment of lump sum payments. In both countries, the sources given above show that grossed-up totals for state transfers correspond well with National Accounts in the case of retirement pensions but less well for income-tested benefits, both those paid to the elderly and to families below pension age. Micro-level validations show that confusion about the type of benefit can be an issue; respondents may report the right amount but under the wrong benefit programme heading (Bound et al 2001).

But as this summary indicates, the literature typically focuses on validating separate elements of income reported in surveys that collect information with a battery of questions on

different sources. Single-question data receive much less attention. Some issues with detailed-question data are not relevant with single-question data, such as respondent confusion over different types of state benefit. Nevertheless, there are lessons. For most employees, total income is made up largely of earnings, while state transfer income and occupational pensions are the key income sources for most non-employees. Given the evidence discussed in the previous paragraph, we might therefore expect responses to a single question on total individual income to be better answered on average by employees. Several of the problems of validation of detailed-question surveys are found also when validating single-question surveys, e.g. differences between the single-question survey and the benchmark source of income in the precise definition of income that is measured and in the time period to which that income refers.

What are the particular challenges for respondents in single-question surveys and how does this influence measurement error? Drawing in part on standard categorisations of the cognitive process for any survey question (e.g. Tourangeau 1984), Collins and White (1996) describe the task as follows:

> 'Firstly, the respondent has to interpret the question, specifically what is meant by gross [or net] income. Secondly, he or she must retrieve the information from memory, thirdly make a judgement about the information, and finally, find the appropriate answer category to tick….If respondents are paid at different intervals [time periods] to the intervals presented in the questions, they will have to convert their answers to the appropriate interval….For those with more than one source of income, the calculation of the amount becomes even more complex.' (p.3)

Collins and White were considering the problems faced by self-completion of a test questionnaire on income for the decennial UK population census. However, interviewers in face-to-face or telephone surveys can prompt respondents to think about different income sources. Reminders about possible sources may be given informally or, as is common, through questions that are administered immediately prior to the question on total income. These may be on whether respondents are in receipt of particular types of income. Interviewers can also help the choice of 'the appropriate answer category to tick' when, as is common in single-question surveys, respondents are asked to indicate an income band rather than an exact amount. Note too that some single-question surveys allow for different time periods for reporting, e.g. with showcards listing both equivalent monthly and annual income

categories. This may aid collection of data, although it does hinder their interpretation and validation since the time-period used by the respondent may not enter the final coding of the data, which are often standardised to a single basis, e.g. annual.

Even with these reminders, remembering and totalling all income received can be a major task. The task is even harder when the survey seeks information on the *household* total, rather than just the respondent's individual income. In these surveys, the typical design is that only one individual in the household is interviewed. Knowledge will be less for others' income than for one's own. Even where couples pool all income in a joint bank account, partners may have imperfect information on each other's gross, pre-tax figures since the account will receive net salaries, net benefit payments, net interest and dividends etc. Cognitive research in the US by Stinson (1997, cited in Moore et al 2000) into what respondents included in 'total family income' showed that minor contributions such as own or spouse's part-time earnings or interest payments could be left out. The same was true of income that was kept for individual own use – or given to other members of the extended family. In research of a similar kind in the UK, Collins and White (1996) found that some respondents interpreted income as just earnings from employment and excluded other sources, such as universal Child Benefit. Their conclusion was that income 'was being systematically underestimated'.

The extent of the task facing respondents means that some may decline to give an answer to the single-question. Others may simply not wish to give information on incomes irrespective of the questionnaire design, as in any survey. Our analysis of the microdata of the US General Social Survey (GSS) revealed that non-response to the question on total household income averaged 12 percent in the four waves during 2000-6. Similarly, our interrogation using the design weights at the website http://www.britsocat.com/ of data of the annual British Social Attitudes survey (BSA) used later in the paper, showed non-response to the single question on household income averaged 15 percent over the same period. This is relatively modest and the general view seems to be that an advantage of single-question surveys is that missing data are less frequent than in detailed-question surveys. Moore et al (2000) find item non-response in the detailed questions in the CPS to be 'severe across almost all income types', reporting that about a quarter of all responses – even on wages and salaries and state pensions – have to be imputed, with the figures for dividends as high as a half. However, not all detailed-question surveys suffer in this way. Over 99 percent of responses are valid (i.e. non-missing) in the UK FRS, although this figure appears to include non-income items (Department for Work and Pensions 2007, Table M.4). On the other hand, it can

be noted that unit response is far higher in the CPS at over 90 percent, compared to around 65 percent in the FRS. Interest from assets and savings is a traditional problem area in the FRS but in the 1998-9 survey it required imputation in only 13 percent of cases (Frosztega 2000).

The figures for item non-response in the GSS and BSA might suggest that 'about 10-15 percent' is a good rule of thumb for the prevalence of the problem in single-question surveys. However, as with the multi-question approach, the extent of item non-response can vary sharply from survey to survey. Figure 1 shows the average rate of item-non response to the single question on total household income in 17 countries participating in both the European Social Survey (ESS) and the International Social Survey Programme (ISSP) during 2002-6. We obtained these results by interrogating the website http://ess.nsd.uib.no/ for the ESS and by using the survey microdata for the ISSP. The Scandinavian countries and the Netherlands record very low or modest non-response rates in the ESS. Missing data is a minor problem here. On the other hand, there are four countries with rates of around 40 percent in the ESS – Portugal, Austria, Spain and Slovakia. Even the simplest analysis reveals differences between respondents and non-respondents. For example, our analysis of the pooled-sample microdata, all countries in ESS round 2, shows that the average age of persons responding to the income question exceeded that of persons not responding by 5 years. We also found that respondents were 1½ times more likely to have had tertiary education. Intriguingly, the variation across countries in Figure 1 in the ESS item non-response rates appears not dissimilar in the ISSP rates, although on average the ISSP rates are somewhat lower.

Figure 1 here

Further research is needed to shed light on whether the cross-country variation in response reflects differences in cultural attitudes towards income questions, differences in household composition (e.g. some countries have more households with extended families), or differences in survey design and conduct (e.g. use of computer assisted versus pen-and-paper interviews). But one message is already clear: users of any particular single-question survey should proceed with care. There is no rule of thumb for the level of item non-response that holds across countries. We investigate the problem in more depth for our two UK single-question surveys in the next section.

We now consider examples of validations of single-question data. Berthoud (2004, Appendix B) reports on comparisons of responses to a single question on current total

household income put to the head of household in the 1999 wave of the European Community Household Panel (ECHP) with figures for the same households for total income in the previous calendar year obtained from summing each household member's replies to detailed questions about income sources in each month. Comparisons were made only for households with complete data but the extent of non-response with the single-question income is not reported. This is a 'micro-level' study in the terminology of Bound et al (2001). Median single-question current income fell short of median detailed-question annual income in almost all countries – the opposite of any effect of inflation – but only by 6 percent on average. The correlation of the two concepts varied from just 0.29 in France to 0.88 in Spain, with an average of 0.67. Berthoud makes clear that the periods covered by the two income concepts differ, both incomes and household composition change over time, and there is a non-trivial degree of imputation in the detailed income data. Nevertheless, the results suggest modest understatement on average in the single-question data compared to detailed-question data, and some notable differences at the level of the individual household. However, he reports that single-question income is in fact more highly correlated with a measure of current household deprivation.

Validation of the ECHP single-question data is taken a step further by Jäntti (2004) in the case of Finland since in addition he has access to administrative registers on each respondent's annual income. He finds that mean single-question current household income falls short of mean detailed-question annual income by about 7 percent but that the latter also falls below the mean register figure by 8 to 12 percent depending on the survey year, implying an overall shortfall in mean single-question incomes relative to the register incomes of about 15 to 20 percent. Treating the register incomes as the 'true' measure, he detects understatement in both single- and detailed-question data predominating at all but very low levels of true income (about the bottom decile), the pattern being somewhat more pronounced for the former.

The UK provides a third example of micro-level validation in the comparison by Foster and Lound (1993) of results from single questions on both gross individual and gross household income with those from detailed questions on separate sources to the same respondents and to their households posed later in the interview. Results are presented in terms of placement in nine income bands. Response rates to the single-questions were 96 percent for individual income and 87 percent for household income. Relative to the detailed-question data, respondents understated their band of individual income when replying to the single question more often than they over-stated by a ratio of about 2:1, a figure that rose with

the level of detailed-question income. A similar pattern was found for household income when comparing the individual's response to a single question with the total income reported by all members of his or her household through the detailed questioning. Also it was noted that the more adults in the household there were the less likely were the two methods of collecting income to place an individual in the same band.

The literatures we have reviewed suggest the following lines of enquiry for our own validations of single-question data. First, we need to investigate the level and pattern of item non-response. Second, we should disaggregate our validations by employment status and age, given their association with different income sources. Partly for the same reason we also disaggregate by gender, particularly since universal Child Benefit in the UK is paid to mothers. Gender is a characteristic that has been relatively neglected in validation exercises. Third, we expect *individual* income to be measured better than *household* income. Finally, in carrying out our analyses, we need to recognise that detailed-question data – our yardstick – do not provide perfect measurement, and that similarity in frequency distributions in 'macro' level validations may mask substantial error at the individual level.

3. Single- and detailed-question surveys: OMN and BSA vs. FRS and EFS

The two single-question surveys that we use, the Omnibus survey (OMN) and the British Social Attitudes survey (BSA) are both long-running enquiries. The Office for National Statistics (ONS) conducts the former every month. In common with surveys of this type in other countries, the OMN is intended as 'a fast, cost-effective and reliable way of obtaining information on a variety of topics too brief to warrant a survey of their own' (ONS 2008) – a classic situation for using a single question on income. The BSA has surveyed attitudes on many topics since 1983 and like the OMN is drawn on heavily by a wide range of different users. As noted in Section 2, it forms part of the ISSP and thus is used in cross-country comparisons as well as in research focused on the UK.

Both surveys have conventional multi-stage probability designs. Both interview only one adult selected at random per sampled household. Adults are defined as aged 16 or over in the OMN and 18 or over in the BSA. We analyse OMN data pooled from the 12 surveys in the financial year April 2005 to March 2006. Response averaged 67 percent in this period. We use the BSA sample for 2005, which covers June to September. The response rate was 55 percent. Data collection in both surveys is through face-to-face interview. We analyse data for 2004-5 in Micklewright and Schnepf (2007), with similar results.

Our use of two comparator sources – the FRS and EFS – emphasises the point made in the Introduction that no one source provides 'the truth'. Indeed, estimates of the income distribution from these two surveys are known to differ somewhat (Department of Social Security 2000). The FRS and EFS share the same sampling frame as the OMN and BSA (the Royal Mail Postcode Address File), also have multi-stage designs, and again use face-to-face interviewing. However, both surveys interview all adults in responding households. They operate continuously through the year, with the interviews spread evenly, and they have far larger sample sizes. We analyse microdata in both cases for the financial year 2005/6 (April to March). The household response rates were 62 percent in the FRS and 57 percent in the EFS. By these standards, the levels of response in the OMN and BSA, albeit referring to individuals rather than households, seem reasonable.

Since the OMN and BSA cover Great Britain (the UK excluding Northern Ireland), we limit analysis of the FRS and EFS to the same basis. Again for reasons of both differing coverage and measurement, in all four surveys we analyse only people who are aged 20+. Imposing these criteria, we have unweighted sample sizes of 14,261 persons in the OMN, 4,185 persons in the BSA, 44,583 persons (in 26,043 households) in the FRS and 10,889 persons (in 6,248 households) in the EFS.

The four surveys have the same sampling frame and similar sample designs. The most important difference in design is the OMN and BSA restriction to one adult per household, which gives a higher probability of a person being interviewed in small households. Both surveys provide a design weight to adjust for this, which we apply throughout. All four surveys have weights that attempt to correct for differential non-response, which we apply. The OMN weight calibrates the data by age, sex and region to population control totals. The same procedure is followed in the BSA and in addition interviewer observation and census information about local areas of sampled households are used. The FRS also uses calibration to regional population totals for age-group and sex, together with other control variables such as marital status and housing tenure. The EFS weights are based first on results of a study linking survey respondents and non-respondents to Census microdata and then calibrated to regional population totals for age and sex as in the other surveys. The four surveys' non-response weights therefore differ somewhat but have major elements in common.

Appendix B shows differences in composition between the weighted survey samples for several variables correlated with income. The OMN compares very well with both the FRS and the EFS. None of OMN figures differ significantly at the 5 percent level from those in the EFS and only two in the comparisons with the FRS but with the substantive differences

only small. The picture is rather different for the BSA. Although composition by age and gender does not differ significantly from either the FRS or the EFS, this is not true of the other characteristics. The BSA tends to under-represent the employed, especially for women, and persons with degree level education. The differences are not big but the effect will be to reduce mean income somewhat in the BSA relative to the other surveys. With this proviso we think the four weighted samples provide an adequate basis for comparing income distributions. Note that neither the application of response weights nor the resulting similarity in composition in the weighted samples means that the four surveys are free of response bias that could damage inference to the true income distribution – the weights may be too simple to pick up any differential response by, for example, the very rich.

Measurement of income with a single question

Income data are collected in similar ways in the two single-question surveys. Respondents are reminded about different income sources and are then asked to indicate a band of total income. In both cases the question refers to gross income, before deductions for tax and social insurance. An important difference is that the OMN asks for information on *individual* income while the BSA seeks the total income of the *household*.

OMN respondents are shown a card listing 39 groups (i.e. bands) of annual income and 11 possible sources of income that are intended to be exhaustive: earnings from employment or self-employment, pension from former employer, personal/private pension, state pension, child benefit, income support, other state benefits, interest from savings, other kinds of regular allowance, other sources e.g. rent, and 'no source of income'. They are asked:

> 'Will you please look at this card and tell me which group [band] represents your total income from all these sources before deductions from income tax, National Insurance etc."

Although the card lists annual amounts, respondents seem free to give an annual equivalent of their current weekly or monthly income – and the band boundaries are all 'round number' weekly amounts (e.g. £50, £200, £400) multiplied by 52. The top unbounded band of £52,000+ contains 4 percent of the sample.

In the BSA, respondents are first asked whether they (or their partner) receive each of a large number of different state benefits. Next they are asked what is their main source of

income from a card listing a number of possibilities (including earnings, various forms of pension, student loans etc.). Finally they are shown another card with 17 letters indicating both bands of annual income and their weekly equivalents and are asked:

> 'Which of the letters on this card represents the total income of your household from all sources before tax?'

Note again the emphasis on 'all sources'. The provision of both annual and weekly amounts on the card again seems to imply that respondents are free to choose the time period to which their reported incomes refer. Note that most people in the UK do not need to submit annual tax returns, and hence do not have that aide-memoire for an annual figure that is considered important when surveying incomes in the US for example. The top unbounded band of £56,000+ of household income contains 13 percent of the sample. (The two sets of survey bands are shown in Tables 2 and 4 later in the paper.)

Non-response to the income question

We have noted the phenomenon of item non-response in single-question surveys. Thankfully, non-response is low in our data: 8.5 percent for individual income information in the OMN and 14.1 percent for the household income question in the BSA. Figure 1 showed the BSA to have the second lowest rate among the ISSP surveys. But in neither survey are the data missing at random. We analysed response to the income question in the two surveys by fitting a logistic regression model to the data. Let $Y_i = 1$ indicate that individual i responded to the income question and $Y_i = 0$ that the individual did not respond. Let $p_i = \Pr(Y_i = 1)$. A logistic regression model for response can be written as $p_i = 1/\{1 + \exp(-\boldsymbol{\beta}^T \boldsymbol{X_i})\}$ where $\boldsymbol{X}_\text{i}$ are observable characteristics of the individual. Estimates of the parameters, $\boldsymbol{\beta}$, were obtained by maximum likelihood and are reported in Table 1; the models are estimated with the same variables in each survey. The marginal effect on the response probability of any variable X_j is approximated by $p(1 - p)\beta_j$, the derivative of p with respect to X_j. We report below calculations of this expression when p is set to the proportion of individuals that respond in the survey in question.

Table 1 here

The results show that the probability of responding to the income question varies across individuals. They also underline the important distinction between response to a question on individual income and to one on the household total. Women are notably less likely to respond to the *household* income question in the BSA. The marginal effect on the response probability is about four percentage points. Each additional adult in the household reduces response in the BSA by a similar amount. But in the OMN, there is a small statistically insignificant gender difference in response to the *individual* income question and additional adults have a much smaller impact.

Additional adults make it harder for an individual to calculate total household income. Likewise, respondents who are the children of the household reference person have a much lower response probability to the household question in the BSA, ceteris paribus. They may be presumed to have less knowledge of the household's total income. By contrast, the estimated coefficient for this variable in the model for individual income in the OMN is small and completely insignificant. Our preliminary investigation of response rates for individual income in the OMN showed a decline with age – older persons are less able or willing to report their own total income in response to a single question. However, we hypothesised that the pattern would be different for total household income, with young persons finding it hard to respond since they often live with other adults – parents or other young people – about whose income they have only limited knowledge. We therefore included in the models a linear spline in age with a single knot at age 30 so as to allow the effect to be non-monotonic in the model for household income estimated with the BSA data. This strategy worked well with the results showing that age has a different impact on response for individual and household income questions. Increases in age are positively and sharply associated with response in the BSA for those in their 20s but negatively thereafter, whereas in the OMN age has a negative association throughout. In contrast to the BSA, we cannot reject the hypothesis that the parameters of the linear spline for the OMN are the same above and below age 30. In the BSA, an increase of 10 years for those aged 30+ has a similar sized impact to an additional adult or being female noted earlier. Finally, self-employed respondents are much less likely to respond to the individual question in the OMN but we find no such effect for household income in the BSA.

Several of the characteristics concerned are correlated with income itself, e.g. age. This implies that the pattern of response shown in Table 1 is likely to generate bias. We experiment below with weights that are the inverse of the response probabilities predicted from the models in Table 1. However, we do not expect them to have much impact: the level

of non-response is modest and the models explain only a small fraction of response outcomes as shown by the Pseudo-R^2 goodness of fit statistics. Micklewright and Schnepf (2007) adopts the alternative approach of imputation of the missing income data for non-respondents.

Measurement of income in the detailed-question surveys

Both FRS and EFS collect information on incomes in great detail, with batteries of questions on each possible income source, whether earned or unearned, and including all forms of state transfer. The questions cover all of the 11 main headings listed on the OMN showcard and in principle all four surveys we use include all forms of income. The detailed-question surveys collect exact amounts, rather than requesting information in banded form. The information provided by respondents is verified during interview where possible. For example, 60 percent of earnings data in the FRS was checked against payslips in 1998/9 (Frosztega 2000). For the FRS, we use the gross individual income variable ('indinc'), which is the sum of the totals for each separate income source. For the EFS, we use a variable that measures total 'normal' gross income ('P051'), where the definition of 'normal' by long-standing convention is left to the respondent. As in the FRS, it is the sum of all separate individual income sources. We measure household income as the sum across all individuals in the household of these variables. Some types of income are not strictly personal, notably Housing Benefit for low income households. In the FRS, this is attributed to the household reference person. We assume the analogous person in the OMN, if sampled within the household, would include this sort of income in his or her personal total, having seen it as being part of 'other state benefits'.

However, neither the FRS nor the EFS provide perfect yardsticks. First, despite the care and attention paid to collection of income in both surveys, both are known to measure income imperfectly. We have referred in Section 2 to item non-response and to macro-level validations of the income data from these detailed-question surveys. The latter show problems in particular with investment and self-employment income. Some income information in the FRS is in fact obtained by proxy from other household members – 14 percent in 1998/9 (Frosztega 2000). The EFS does not allow proxy responses.

Second, to the extent that OMN and BSA respondents do report incomes that relate to a 12 month period, one should recognise that most of the FRS and EFS data refer to a shorter period. ONS has long eschewed collecting annual income data in these surveys for most income sources in favour of weekly or monthly figures and respondents may provide earnings

figures on either basis. Data are then all coded as weekly figures. An annual time period is used only for self-employment income and some investment income, which is then transformed into weekly equivalent amounts by ONS. Annual income has a lower variance than weekly or monthly income (Böheim and Jenkins 2006). We convert all income variables in the FRS and EFS to their annual equivalents.

4. Comparisons of distributions of individual income

We now provide 'macro-level' validations of the OMN and BSA data by comparing the income distributions in these surveys with those from the FRS and EFS. We look first at individual income (OMN) before turning to household income (BSA) in Section 5.

Table 2 shows the cumulative frequencies of gross individual income in the OMN, FRS and EFS, distinguishing between men and women. As a summary, Table 3 gives estimates of selected quantiles; we assume a uniform distribution within the bands concerned to obtain the estimates for the OMN. This assumption is fairly innocuous given the band-widths and densities and we apply it for all estimates from the OMN and the BSA. We do not interpolate in the top unbounded interval, nor in the interval bounded by zero, and this determines the choice in each case of the highest and lowest percentiles to estimate.

Tables 2 and 3 here

Looking at the men, the first impression is of a high degree of similarity between the three sources. The differences in Table 2 between the OMN and EFS figures never reach 1½ percentage points; the OMN-FRS differences are slightly larger but exceed 2 points for only one band. Consider the tails of the distributions: the percentage of men with no income is 2.0 in the OMN, 2.4 in the FRS and 1.6 in the EFS, while the figures for the top group of £52,000 or more are remarkably similar, 6.3 percent, 6.4 percent and 6.3 percent respectively. The high degree of agreement is reflected in the closeness of most of the estimated quantiles in Table 3. The choice of yardstick – FRS or EFS – makes a difference only for the 5th percentile, where the OMN estimate comes between the other two.

The comparison is rather different for women. The OMN quantiles in Table 3 fall short of the corresponding FRS and EFS figures. The OMN percentages in Table 2 for the ten bands from £5,200 to £15,599 differ on average by over five points from the FRS figures and two points from the EFS. However, as for the men, the distributions converge at high levels of

income so that the estimated 90th and 95th percentiles in the three surveys are very close and the percentages in the top income group are again remarkably similar (about 1½ percent). The percentages with zero income also differ little.

Use of item response weights based on the logistic regression in Table 1 produces only slight changes in the OMN distributions, with small rises in estimates of the 5th and 10th percentiles and smaller falls in higher quantiles.

The figures in all three surveys are subject to sampling variation and we use two approaches to test for differences between the distributions. First, we consider differences in the cumulative percentages up to three bands containing the lower quartile, median and upper quartile in the OMN. For example, for the band containing the median we test whether the figure of 52.6 percent for men in the OMN with income up to £18,719 differs significantly from figure of 53.9 percent for the same band in the FRS. We estimate standard errors of these differences in the manner described in the Appendix. For men, we find no significant differences at the one percent level in any of the percentages for the three bands concerned in both the OMN-FRS and the OMN-EFS comparisons. For women, we reject the null at the one percent level for all three bands for the OMN-FRS comparisons and at the five percent level in the OMN-EFS comparisons for the bands containing the lower quartile and median. Our second approach focuses on the full distribution and exploits the ordering of the categories – we use the Kolgorov-Smirnov (K-S) test with adaptions for ordered categorical data suggested by Jann (2008). The K-S test has more power and rejects the null for both men and women in both OMN-FRS and OMN-EFS comparisons at the one percent level. However, as implemented in Jann (2008) this is a one-sample test in which we treat the FRS and EFS percentages as population figures, and in contrast to the first approach we are also unable in this case to exploit information on the OMN's complex survey design.

Figure 2 probes the different pictures for men and women in more detail, focusing on the comparison with the FRS and separating the samples by age and economic activity. 'Active' indicates that an individual is employed or unemployed while 'inactive' indicates that the individual is neither of these. The distributions for active men aged less than 65 are very similar in the two surveys. We fail to reject the null for each of the three bands containing the quartiles with our first approach and the K-S test of the full distribution does not reject at the one percent level. However, for inactive men of this age and for older men the graph shows the distributions differing, and we typically reject the null in the tests. For example, the estimated OMN medians and upper quartiles for these two groups are about 90 percent of the FRS figures and clearly below them. These results are consistent with the

hypothesis that a single question on income produces more accurate answers from people with earnings from employment than it does from those not in work and reliant on benefit income or pensions, as suggested by some of the literature on detailed-question surveys considered in Section 2. Age may also be a factor. However, for the women, the OMN and FRS distributions differ for all three sub-samples, including for active persons below retirement age.

Figure 2 here

We further disaggregated the active women aged less than 60 into those with dependent children present in the household and those without. Women cannot be linked with their own children in the OMN. Although we do not present the detailed results, they do show that distributions are much closer to each other for women in households without children: the OMN median is 98 percent of the FRS figure compared to 85 percent for the women with children. The distinction is not important for men. For the women in households without children, both the three two-sample tests for bands containing the quartiles and the one-sample K-S test fail to reject the null of no difference at even the ten percent level, while for women with children it is rejected with ease. We hypothesise that women with children are failing to include state benefit income associated with the children, such as child benefit which is a universal benefit received in respect of all children and paid to the mother.

5. Comparisons of distributions of household income

Section 2 noted that a single question on the total household income raises issues that go beyond the measurement of individual income alone. Section 3 illustrated how the pattern of non-response to a question on the household total differs from that to a question on individual income. Among those individuals who do respond, the greater problems faced when reporting a household total is likely to result in more under-reporting than over-reporting.

Table 4 gives the cumulative distribution of our BSA and FRS samples across the BSA income bands of gross household income. We do not consider the EFS in this case. These distributions are for total household income reported by the one male or female respondent interviewed in each household. It is immediately apparent that there are major differences between the two sources, and that this is true for both sexes. For example, the percentages below £12,000 and below £32,000 differ by 8 and 7 percentage points

respectively for men, and by 13 and 10 points for women. The BSA sample size is less than a quarter of the 12-month OMN sample used in Section 4, but these differences in the BSA and FRS income distributions are far too large to be explained by sampling error since all tests easily reject the null. Nor are the small compositional differences between the BSA and FRS samples shown in the Appendix and noted in Section 3 large enough to account for the pattern in Table 4. We experimented by adjusting the BSA weights by a factor so as to produce percentages employed, unemployed and inactive that for both sexes matched those in the FRS; for the women, where the compositional differences are larger, the figures for the BSA in Table 4 typically moved by about two percentage points towards those in the FRS, i.e. still leaving a large gap. As with individual income, the differences between the figures for the two surveys tend to be smaller towards the top of the distribution although it should be noted that the top income band in the BSA is broad, containing 1 in 6 men and 1 in 10 women. As with the OMN, the use of item response weights based on the logistic regression results in Table 1 does very little to change the BSA distributions.

Table 4 here

Our hypothesis is that people in multi-adult households have more difficulty answering a question on total household income. For people living on their own with no other adults present, the distinction between individual and household income hardly matters except for example small amounts of part-time earnings of any children present. Table 5 gives estimated quantiles of household income from the BSA expressed as a percentage of those from the FRS, distinguishing between respondents in multi- and single- adult households. If the BSA is simply weak at collecting income data, the estimates for the respondents in single-adult households should also show a big difference from the FRS figures. As another point of comparison, we also show estimated quantiles for *individual* income for the two types of respondent from the OMN, again expressed as a ratio of those in the FRS. If the problem is one of weak collection of income data in the BSA, we should see big differences between results for the BSA and the OMN for *both* types of respondent. If the problem lies more in the BSA's focus on the household total, then we should see sharp differences between the BSA and OMN for multi-adult households but not for single-adult households.

Table 5 here

Quantiles for household income for men in multi-adult households in the BSA are well below the analogous figures in the FRS (column 1), with larger differences in the bottom half of the distribution in proportionate terms. By contrast, the distribution of individual income for the same group of men in the OMN corresponds well with the distribution in the FRS (column 2), the 5th percentile excepted. For the men in single-adult households, the lower quantiles of the BSA household distribution again fall short of those in the FRS but we cannot reject the null of no difference for tests of the cumulative percentages in the bands containing the BSA median and upper quartile (column 3). Importantly, both this pattern and the extent of the differences is very similar for the estimated quantiles of the individual income distribution in the OMN relative to the FRS (column 4). That is, we do *not* find obvious differences between the BSA-FRS and OMN-FRS comparisons for men in single-adult households. To summarise: for men in multi-adult households, the 'switch' from individual income in the OMN to household income in the BSA, has a big negative 'impact' (column 2 to column 1) while for men in single-adult households this is not the case (column 4 to. column 3). The problem with income measurement in the BSA shown in Table 4 does indeed seem to lie with the focus on the household total.

The results for women are similar. Women in multi-adult households appear to report household income less well in the BSA – using the FRS distribution as a yardstick – than they do individual income in the OMN (column 5 vs. column 6) and the apparent shortfall in the BSA is again larger at lower points in the distribution. But for women in single-adult households, there is a different pattern. It is *not* the case that the BSA-FRS comparisons (column 7) produce figures that are all below the OMN-FRS comparisons (column 8). The broad pattern of differences between the two sets of figures is similar to that for men in single-adult households. The switch from individual income in the OMN to household income in the BSA produces the hypothesised effect for women in multi-adult households (column 6 to column 5) while there is no obvious systematic change for women in single-adult households resulting from the change in survey alone (column 8 to column 7). The results are consistent with the main cause of the apparent shortfall in the BSA figures for women relative to the FRS in Table 4 being the problems of collecting information on incomes from the women about their *households*, rather than some other problem with the BSA.

Finally, all the quantiles for the women in multi-adult households in the BSA, expressed relative to those in the FRS, are slightly below those for the men (column 5 vs. column 1). This suggests that on average women tend to understate household income

somewhat more than do men. The differences are small but this pattern repeats the result found for individual income in Section 4.

6. Conclusions

Single-question surveys of income are very common for the reasons given at the start of the paper. It is therefore important that the quality of single-question data are assessed. The literature focusing on single-question measurement of income turns out to be sparse and we began by drawing bits together and discussing some of the issues involved in the light of results from the much larger literature on measurement in detailed-question surveys.

There is an important distinction between a single question on individual income and one on the household total. We compared the data on *individual* income from a widely-used single-question survey, the UK Office for National Statistics' Omnibus survey, with data from what is believed to be the best although not perfect surveys on incomes in the UK. The results showed that a single question *can* result in a distribution that corresponds very closely to the distribution based on detailed questions, which is encouraging. An important qualification is that our results are from 'macro-level' validations of data from one survey against those from another, and more evidence from 'micro-level' studies are needed, in which single and detailed questions on income are put to the same people.

A question on the *household* total is likely to induce lower response. We also contrasted the correlates of response in the UK to questions on individual and household income. It is also likely to produce lower quality data from people who do respond. These disadvantages must be traded-off against the advantage of the focus on the household, which is a natural choice of income unit given the extent of pooling of incomes that takes place in many households. Our comparisons of single-question household income data from the British Social Attitudes survey – which provides the UK's contribution to the International Social Survey Programme (ISSP) – points to significant understatement on average, although not at a level that seems catastrophic. Our results imply that this understatement *is* indeed due to the question being concerned with the household total, rather than any other aspect of the survey.

While individual income appears better measured by a single question than is household income, we found notable differences between the sexes with understatement for women. Individual income was also understated for inactive persons and the elderly. Among active women, it was understated for those with children in the household.

Our analysis leads to messages for both survey designers and users. Designers could pay more attention to item non-response in single-question surveys. Although this non-response was modest in our two UK surveys, investigation of both the European Social Survey (ESS) and the ISSP showed item non-response rates for household income in some countries that are quite high – around 25 percent or more. The apparent similarity in the cross-country variation in the two sets of data merits further attention. The single-question approach does not therefore necessarily avoid the item non-response that affects some detailed-question surveys. Our results for the individual and household income data that are provided by respondents suggest that research into ways of improving the quality of the latter, in particular, could be fruitful. The differences in results for individual income between various groups of respondent may indicate where greater probing or reminding of possible income sources prior to the single question may be especially useful.

Users need to be aware of the potential problems faced with single-question data. The level and pattern of item non-response should be assessed and an appropriate solution to the problems chosen. Simple 'macro-level' validations of the type we have carried out here may often be feasible, including some disaggregation by individual characteristics. Users also need to confront the implications of single-question data being in banded form, which is the usual practice. For more discussion see Micklewright and Schnepf (2007). Compared to an ideal of collecting continuous data, the banding results in a loss of information; although the ideal may be difficult to reach with a single question, thus necessitating the banding. The loss may be quite small, although the verdict depends on which part of the distribution is of most interest. The loss will matter little to those users wanting a simple classificatory variable for a cross-tabulation, who may well collapse the bands further. Users who want to turn the banded data into a continuously measured variable to employ as a covariate in a regression model may need to be cautious see for example Hsiao (1993), Manski and Tanner (2002), and Rigobon and Stoker (2007).

Appendix

A. Surveys with single questions on income

Eurobarometer and ISSP are described at http://ec.europa.eu/public_opinion/index_en.htm and http://www.issp.org/ respectively. Questionnaires for both surveys can be found at http://www.gesis.org/en/services/data/survey-data/ and the same site also provides information and documentation for the German ALLBUS. The European Social Survey (ESS) is described at http://www.europeansocialsurvey.org/ and questionnaires are available at http://ess.nsd.uib.no/. Information on the British Social Attitudes Survey, together with its questionnaires, is available at http://www.britsocat.com/. The questionnaires and further information for other UK surveys listed in the Introduction that contain single questions on income can be found at http://www.data-archive.ac.uk/. The list of surveys using single questions is not exhaustive.

B. Composition of samples in the four surveys, individuals aged 20+ in Great Britain (% of individuals)

	OMN	BSA	FRS	EFS
All individuals				
Female	52.1	51.7	51.9	52.0
Degree education	19.5	17.4	19.9	-
In single adult household	*19.5	**21.9	20.2	18.7
Age 20-39	37.5	*†37.8	38.4	37.0
Age 40-59	38.1	38.0	38.2	38.7
Age 60-79	*24.4	24.1	23.4	24.3
Employed	60.9	**††57.3	60.6	60.5
Unemployed	2.1	**††3.8	2.4	2.1
Inactive	37.0	*38.9	37.0	37.4
Men				
Employed	68.4	65.8	67.3	67.3
Unemployed	2.6	**††5.0	3.0	2.6
Inactive	29.0	29.2	29.7	30.1
Women				
Employed	54.0	**††49.3	54.4	54.1
Unemployed	1.6	**†2.6	1.8	1.7
Inactive	44.4	**††48.1	43.8	44.2
Men aged under 65				
Employed	82.2	79.5	80.8	81.0
Unemployed	3.2	**††6.2	3.7	3.2
Inactive	14.7	14.3	15.4	15.8
Women aged under 60				
Employed	72.1	**††67.3	72.7	72.5
Unemployed	2.2	**††3.8	2.4	2.4
Inactive	25.8	**††28.9	24.9	25.2

Note: design and response weights applied. * (5 percent level) and ** (1 percent level) indicate significant differences in the OMN and BSA figures from those in the FRS and †† and † indicate differences from those in the EFS. We test differences by estimating the standard errors for the percentage in each survey (allowing for the stratification and clustering in the OMN design, which in this case we observe in the data) and then estimating the standard error for the difference between the surveys (setting the covariance to zero given the independence of the survey samples).

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Table 1: Parameter estimates from logistic regression models of response to the income question in OMN and BSA samples

	OMN individual income		BSA household income	
	β	(S.E)	β	(S.E)
Female	-0.091	(0.062)	-0.307	(0.095)
Number of adults in the household	-0.094	(0.042)	-0.332	(0.059)
Respondent is child of the household ref. person	-0.045	(0.224)	-1.469	(0.218)
Age1 (= age if age ≤ 30, = 30 otherwise)	-0.052	(0.026)	0.086	(0.025)
Age2 (= age–30 if age ≥ 30, = 0 otherwise)	-0.022	(0.002)	-0.029	(0.003)
Self-employed	-0.419	(0.088)	-0.198	(0.188)
Constant	4.719	(0.759)	0.837	(0.738)
Observations	14,250		4,171	
Pseudo-r squared	0.02		0.05	

Note: The table reports estimates of the parameters, $\boldsymbol{\beta}$, of the logistic regression model described in the text. Estimated standard errors are given in parentheses. The data were unweighted during estimation. 91.5 percent of the sample responded to the income question in the OMN and 85.9 percent in the BSA.

Table 2: Cumulative frequencies (percent), individual income, OMN, FRS and EFS

	Men			Women		
Income band (£s pa)	OMN	FRS	EFS	OMN	FRS	EFS
Zero	2.0	2.4	1.6	3.8	2.7	2.3
up to 519	2.6	3.3	2.3	4.6	3.9	3.7
520 up to 1,039	2.9	3.7	2.6	5.7	5.3	5.1
1,040 up to 1,559	3.2	4.0	2.8	7.0	6.8	6.7
1,560 up to 2,079	3.7	4.3	3.0	8.2	7.9	8.0
2,080 up to 2,599	4.4	5.1	3.7	11.5	10.1	10.1
2,600 up to 3,119	5.9	6.2	5.4	14.9	14.1	14.1
3,120 up to 3,639	6.9	6.9	6.3	17.2	16.5	16.7
3,640 up to 4,159	8.0	7.6	7.3	19.4	18.5	18.8
4,160 up to 4,679	9.3	8.6	8.7	22.3	20.7	21.6
4,680 up to 5,199	10.4	9.8	9.9	25.9	23.2	23.9
5,200 up to 6,239	13.9	12.2	12.8	34.2	28.6	31.3
6,240 up to 7,279	16.9	15.1	16.4	40.7	33.7	37.1
7,280 up to 8,319	20.1	18.7	19.7	45.5	38.7	42.5
8,320 up to 9,359	23.2	22.2	23.0	49.4	43.7	47.7
9,360 up to 10,399	26.5	26.1	26.4	54.5	48.9	52.5
10,400 up to 11,439	30.4	30.0	29.7	59.0	53.8	57.0
11,440 up to 12,479	34.0	33.4	32.8	63.1	58.2	61.4
12,480 up to 13,519	36.7	37.3	36.3	66.8	62.4	65.0
13,520 up to 14,559	40.1	40.7	39.6	70.0	66.2	68.2
14,560 up to 15,599	43.1	44.2	43.0	72.6	69.4	71.2
15,600 up to 16,639	46.3	47.4	46.3	75.2	72.5	73.8
16,640 up to 17,679	48.7	50.6	49.7	77.3	75.0	76.1
17,680 up to 18,719	52.6	53.9	52.7	79.5	77.3	78.8
18,720 up to 19,759	54.5	56.9	55.7	80.9	79.5	80.9
19,760 up to 20,799	58.1	59.7	58.7	83.0	81.5	82.5
20,800 up to 23,399	63.7	65.6	64.7	86.1	85.6	85.8
23,400 up to 25,999	69.6	71.1	70.3	88.8	88.5	88.7
26,000 up to 28,599	74.2	75.9	75.2	91.2	90.8	90.7
28,600 up to 31,199	79.3	79.7	79.3	93.2	92.7	92.6
31,200 up to 33,799	82.1	82.9	82.8	94.5	94.4	94.3
33,800 up to 36,399	85.8	85.5	85.5	95.5	95.6	95.7
36,400 up to 38,999	87.3	87.5	87.6	96.0	96.5	96.5
39,000 up to 41,599	89.6	89.2	89.1	96.9	97.2	97.2
41,600 up to 44,199	90.8	90.6	90.5	97.2	97.7	97.7
44,200 up to 46,799	91.9	91.7	91.5	97.6	98.2	98.0
46,800 up to 49,399	92.7	92.7	92.9	97.8	98.4	98.4
49,400 up to 51,999	93.7	93.6	93.7	98.2	98.7	98.6
52,000 or more	100.0	100.0	100.0	100.0	100.0	100.0

Note: design and response weights applied.

Table 3: Percentiles of individual gross income, OMN, FRS and EFS

Men	OMN (£s pa)	FRS (£s pa)	EFS (£s pa)	OMN as % of FRS	OMN as % of EFS
P5	2,806	2,444	3,000	115	94
P10	5,008	5,252	5,262	95	95
P25	9,934	10,088	9,975	99	100
P50	18,029	17,420	17,895	104	101
P75	28,999	28,028	28,493	104	102
P90	42,443	42,900	43,403	99	98

Women	OMN (£s pa)	FRS (£s pa)	EFS (£s pa)	OMN as % of FRS	OMN as % of EFS
P5	709	884	947	80	75
P10	2,358	2,548	2,579	93	91
P25	5,072	5,460	5,373	93	94
P50	9,475	10,556	9,819	90	97
P75	16,547	17,680	17,076	94	97
P90	27,310	27,664	27,731	99	99
P95	35,124	34,944	35,002	101	100

Note: OMN percentiles estimated with the assumption of a uniform distribution in the relevant range.

Table 4: Cumulative frequencies (percent), gross household income, BSA and FRS

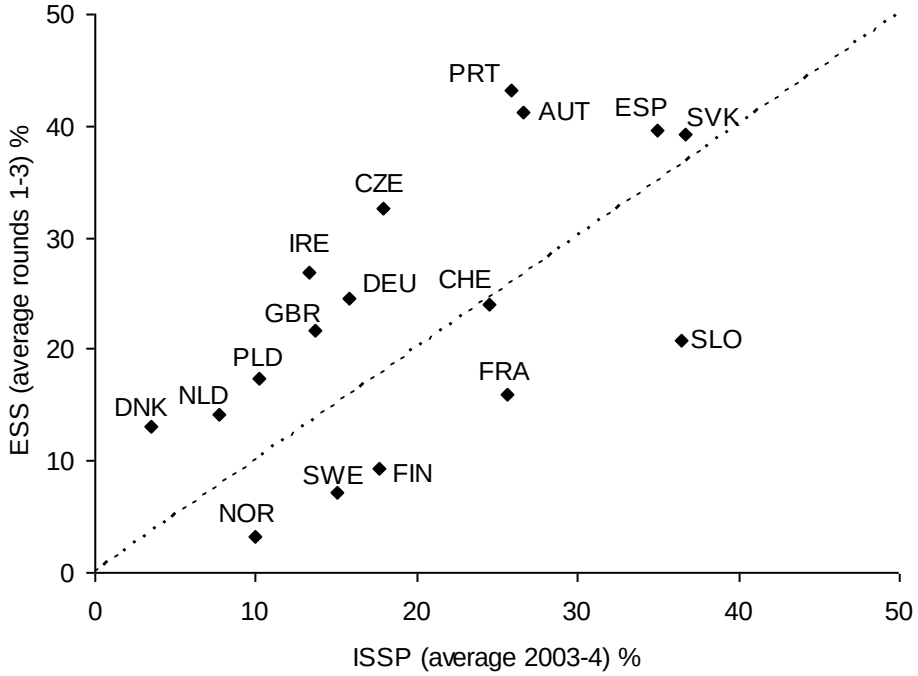
	Men		Women	
Income band (£s pa)	BSA	FRS	BSA	FRS
less than 4,000	2.5	1.3	2.1	1.0
4,000 to 5,999	5.3	2.6	9.5	2.5
6,000 to 7,999	8.9	4.8	16.7	5.6
8,000 to 9,999	14.5	8.0	22.7	10.5
10,000 to 11,999	20.0	12.1	28.8	16.1
12,000 to 14,999	26.4	18.8	35.9	24.2
15,000 to 17,999	32.8	25.4	42.5	31.7
18,000 to 19,999	36.4	29.3	46.3	35.9
20,000 to 22,999	41.7	35.4	52.2	42.1
23,000 to 25,999	48.3	41.0	57.8	47.6
26,000 to 28,999	54.6	46.7	62.5	53.1
29,000 to 31,999	58.9	52.0	67.6	58.0
32,000 to 37,999	67.3	61.5	74.2	66.6
38,000 to 43,999	73.5	69.6	80.1	74.0
44,000 to 49,999	79.4	76.1	84.8	79.8
50,000 to 55,999	84.1	81.3	89.5	84.2
56,000 +	100.0	100.0	100.0	100.0

Note: design and response weights applied. The distributions in the BSA are for total household income reported by the one male or female respondent interviewed in each household.

Table 5: Percentiles of individual and household gross income, BSA, OMN and FRS – respondents in multi- and single-adult households

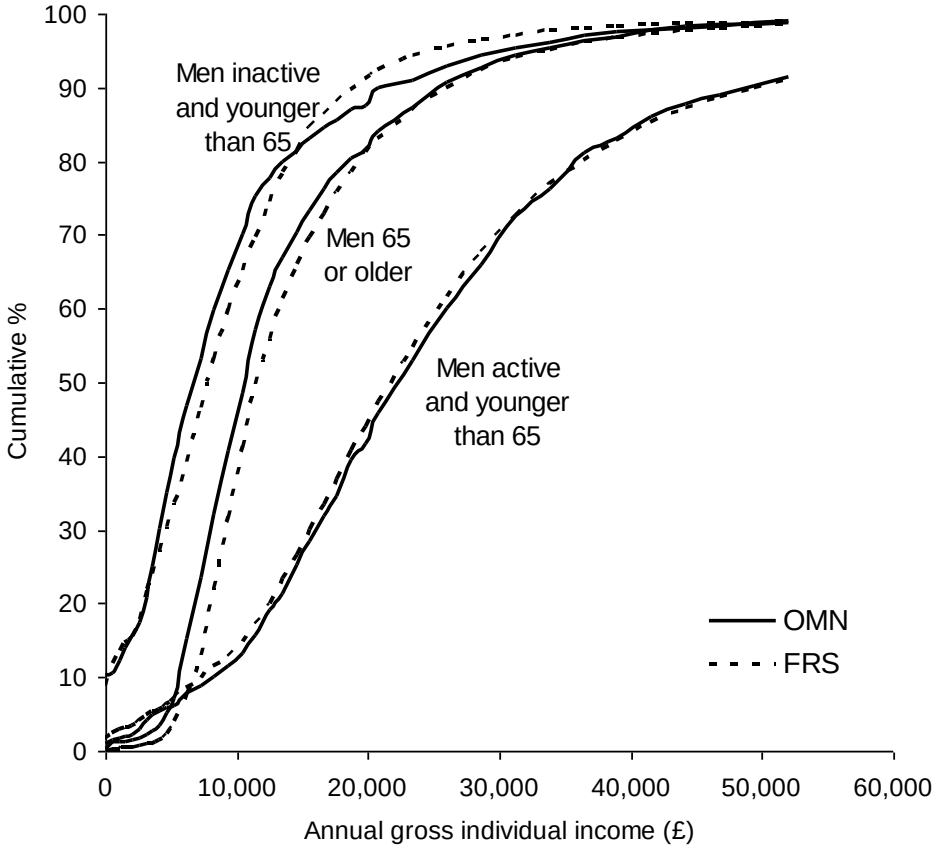
	respondents in multi-adult households		respondents in single-adult households	
	BSA as % of FRS	OMN as % of FRS	BSA as % of FRS	OMN as % of FRS
Income concept	household	individual	household	individual
Men	1.	2.	3.	4.
P5	75	120		
P10	75	103	76	75
P25	80	102	82	78
P50	85	103	100	97
P75	93	103	108	103
P80	93	102	109	103
Women:	5.	6.	7.	8.
P5			74	75
P10	69	100	67	75
P25	75	99	65	69
P50	82	98	73	78
P75	88	97	91	85
P80	88	99	98	88

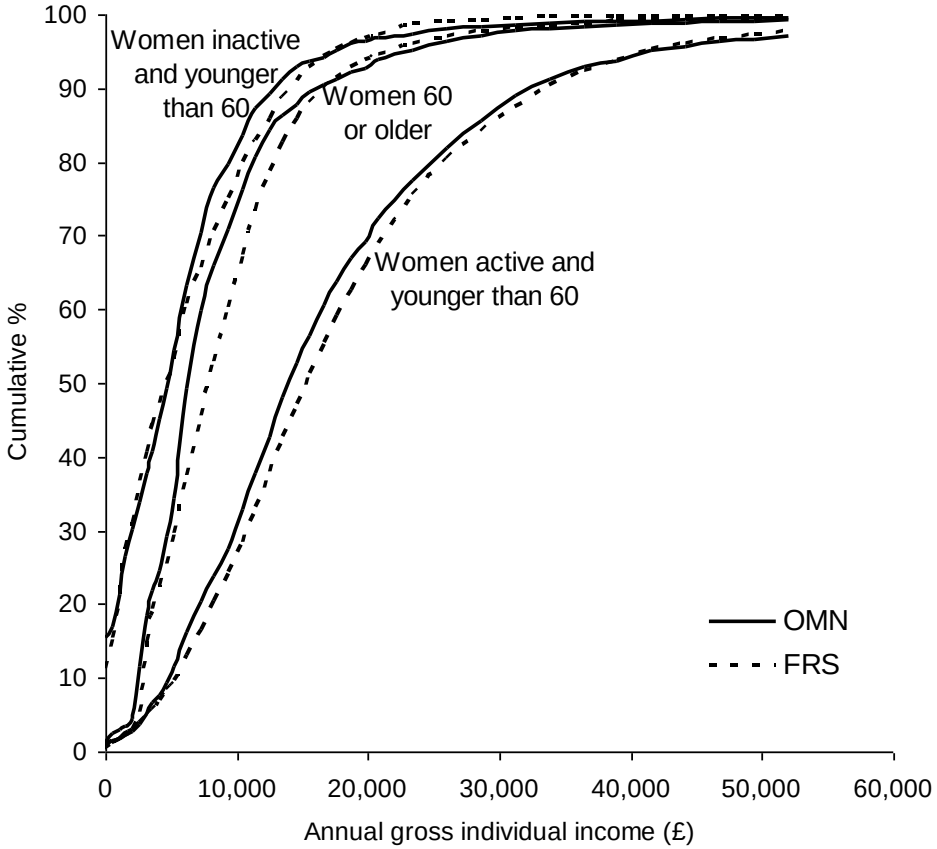
Figure 1: Item non-response to the household net income question in the European Social Survey (rounds 1-3) and the International Social Survey Programme (2003-4) (%)



Note: the ESS figures are averages across rates for rounds 1-3, including only those countries for which data are present for at least two rounds. We obtained them by interrogating the ESS database at http://ess.nsd.uib.no/. The design weights were used when generating tabulations with the software provided at this website. The ISSP figures are averages across figures for the 2003-4 rounds for countries present in both and were obtained from our analysis of the survey microdata, applying the design weights.
Key: AUT – Austria, CZE – The Czech Republic, CHE – Switzerland, DNK – Denmark, DEU – Germany, ESP – Spain, FRA – France, FIN – Finland, GBR – Great Britain, IRE – Ireland, NLD – The Netherlands, NOR – Norway, PLD – Poland, PRT – Portugal, SLO – Slovenia, SVK – Slovakia, SWE – Sweden.

Figure 2: Individual income distribution by economic activity and age, cumulative frequencies (percent), OMN and FRS





Note: OMN sample sizes for men are 701 inactive and aged under 65, 1,399 aged 65+, and 3,696 active and under 65. Sample sizes for women, for whom the age cut-off is 60, are 1,305, 2,371, and 3,580 respectively. ‘Active’ indicates that an individual is employed or unemployed while ‘inactive’ indicates that the individual is neither of these.