UK Time Use Survey 2000 – imputed net income and childcare expenditure variables

User Guide

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1. Background

This dataset contains variables for use in conjunction with SN 4504: UK Time Use Survey 2000 (TUS). Users should refer to the documentation associated with the TUS for details on the original data collection, structure and content of the survey, weighting and validation of results.

The variables in this dataset are designed to enhance the usefulness of the TUS for research on earnings, income inequality, and poverty. In particular, the TUS itself contains information on gross but not net household incomes; this dataset uses information provided in TUS combined with information derived from the 2000/1 Family Resources Survey (SN 4498) and the Households Below Average Income dataset for the same year to impute individual net earnings and household net incomes for households containing at least one person of working age (16-59 for women, 16-64 for men). In addition, the TUS provides detailed information on use of childcare but not on childcare expenditure; this dataset uses information from the Department for Education and Skills' Surveys of Parents' Demand for Childcare to derive estimates of childcare expenditure. Household net incomes can then be calculated net or gross of childcare expenditure.

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2. Dataset description and variable list

The dataset contains 17 variables on 10,127 individuals. The individuals are a sub-sample of the TUS, namely, all individuals in households containing at least one person of working age (16-59 for women, 16-64 for men). It is an individual-level dataset although some of the variables relate to household characteristics. The variables are three linking variables, to enable users to match the income and childcare expenditure variables provided in this dataset to the main TUS, nine variables in relation to net income, and five variables in relation to childcare.

All amounts are in £ per week in prices contemporary to the survey, i.e. 2000/1.

Variable list

`sn1`	sample point number	the combination sn1 sn2 sn3 uniquely identifies individuals.
`sn2`	household number	
`sn3`	person number	

`ihincnlm`	imputed hh net non-labour market weekly income
`nterneep`	weekly net earnings employee precise amount given
`nterneeb`	weekly net earnings employee estimated from range given
`nternsep`	weekly net income from self employment precise amount given
`nternseb`	weekly net income from self employment estimated from range given
`ntern`	weekly net earnings emp'ee and s-emp (precise and banded combined)
`hntern`	hh wkly net earnings emp'ee and s-emp (precise and banded combined)
`nethinc`	estimated total net household weekly income BHC
`hernmiss2`	num indivs in hh aged 18-59/64 whose poss earnings are missing
`cchhol`	ref week is school holiday for 1+ children in hh
`cchpd`	total paid childcare hours by hh (all types all children)
`cchunpd`	total unpaid childcare hours by hh (all types all children)
`cch`	total all childcare hours by hh (all types all children)
`ccwcost`	estimated total weekly childcare cost by hh (all types all children)

The imputation and derivation of the income variables, and the robustness checks which have been carried out, are described in detail section 3 below.

The variables `nterneep nterneeb nternsep nternseb` report individual earnings for those who have some earnings (missing otherwise).

`ntern` combines the various sources of information about individual earnings in a single variable, and takes the value 0 if the individual has no earnings.

`hntern` sums across individuals to provide total household earnings.

ihincnlm reports imputed income for the household from all non-labour market sources.

nethinc is the sum of hntern and ihincnlm. It represents the total net weekly income of the household. This is a 'before housing costs' measure, in other words, no deduction has been made for rent, mortgage payments or local taxes, and any housing benefit is included as part of household income.

hernmiss2 is a flag to indicate households in which a member who is of working age (16-59 for women, 16-64 for men) and who may be in employment has supplied no information about earnings. This variable takes values ranging from 0 (no members in the households with missing potential earnings) to 5 (five members in the household with missing potential earnings). This variable may be used in conjunction with nethinc, for example, to filter out cases where the income of the household is less reliable because of potentially missing data.

The estimation of childcare expenditure, and robustness checks which were carried out, are described in detail in section 4 below.

All the variables relating to childcare report household characteristics.

The variables cchpd cchunpd cch report the total number of hours of paid, unpaid and all childcare respectively used by the household in a reference week for children aged 0 – 14. These variables take a value of 0 for households which do not have any children in this age range, or who use no childcare, or who do not respond to the childcare questions. These various categories of household can be distinguished using variables in the main TUS, not included in this dataset.

cchhol flags whether the reference week was in the school holidays for any of the children in the household (value 1 if yes, 0 if no, irrelevant or missing).

ccwcost provides an estimate of the weekly expenditure of the household on all types of childcare for all children in the household aged 0-14. Users may wish to subtract this variable from nethinc in order to obtain weekly household income net of childcare costs.

3. Research note on income data in the UK Time Use Survey 2000

1. Introduction

The UK Time Use Survey (TUS) 2000 was designed to be representative of the household population in the UK. The survey comprised four main survey instruments:

- household questionnaire
- individual questionnaire
- worksheet
- diary.

The household questionnaire collected information from the household head or his or her partner, including questions on household composition, sources of household income, and gross total household income (in bands). All members of sample households aged 8 or over were asked to complete an individual questionnaire. As part of this questionnaire, those aged 16 or over who had any paid work were asked about their net (take-home) earnings. detailing their activities in 10-minute slots for two days (one weekday and one weekend day). All respondents aged 16 or over were also asked about which state benefits they were receiving and some other sources of income. The worksheet and diary collected detailed information about time use, but no additional information about income. For further details about the TUS, see ONS (2003a, b).

The achieved sample size was 6,414 households, representing a response rate of 61 per cent. Within these households, 11,664 individuals aged 8 or over completed an individual questionnaire (81 per cent of those eligible). This represents a reasonable response rate for a complex household survey but nevertheless means the overall response rate for individuals from the target sample is just under half, at 49 per cent.

The survey is unparalleled in the quality and depth of information it provides about time use in the UK. For some research questions it is important to know about household income as well. This note examines the quality of the income data in the UK TUS and describes the process of imputing net household incomes for the TUS sample using another dataset, namely the 2000/1 Households Below Average Income (HBAI) dataset. The HBAI is based on the Family Resources Survey (FRS), which is nationally representative household survey specifically designed to collect information about incomes. The HBAI is regarded as the ‘gold standard’ for household income data in the UK. It has a sample size of 23,752 households. For further details of the HBAI, see DWP (2002).

2. Income data in the TUS

Gross household income

The overall measure of household income available in the TUS derives from a question in the household questionnaire which asks respondents to indicate into which of 11 bands their total gross household income falls (Question 10b). This has three limitations from the point of view of analysing standards of living or poverty:

(i) it describes pre-tax income rather than disposable income;
(ii) it takes no account of differences in household size and cannot be equivalised because the information is collected in bands;
(iii) it is of doubtful precision.

The second limitation can be addressed by attributing the income at the mid-point of each band to respondents and applying a standard equivalisation scale for household composition (for example, the Modified OECD scale). However, there is no mid-point for the top band ("£80,000 or more per year"), and using mid-points distorts the distribution of incomes within each band.

The third limitation is illustrated by Figure 1 (with corresponding data given in Appendix 1). The lower bar shows the percentage of households in TUS falling into each of the gross household income bands, as given in the questionnaire. The top bar shows the corresponding distribution of households by gross household income from the HBAI for the same year, 2000/1. Although the proportions in the top few income bands are quite similar in the two surveys, the proportions in TUS reporting low gross household incomes are considerably higher than in HBAI.

One possibility is that the achieved sample for TUS is not representative of the population as a whole. Analysis by ONS (Elliot, in ONS 2003a) indicates that household income may be a significant predictor of household non-cooperation in TUS for certain family (household) types, but lower income households are *less* likely to respond than higher-income households. This cannot therefore explain the over-representation of low gross household incomes observed in Figure 1. Moreover, as described in more detail below, net earnings data in TUS provide a good match to HBAI data, suggesting that the representativeness of the TUS sample, at least among households with someone in work, is good. Applying the weights calculated by ONS to account for non-response bias (based on age, gender and region) in TUS and the appropriate grossing factor in HBAI improves the match between the two distributions of gross household income only slightly.

Another possibility is that the broad question asked in TUS about gross income produces skewed responses, in comparison with the much more detailed questions used in the FRS. The majority of income in richer households consists of individuals' earnings, which are often thought of in terms of gross salary. At the opposite end of the distribution, where money is tight and may come from multiple sources, one can speculate that individuals are more likely to think in terms of disposable income. Hence, individuals in richer households may be able to give a reasonably accurate estimate in response to a general question about household gross income,while individuals in poorer households are more likely to report something closer to disposable income.

Net earnings

As part of the individual questionnaire, TUS respondents who have some paid work are asked to report their net earnings:

> For employees: "What was your take home pay after all deductions the last time you were paid?" [Question 10]

> For the self-employed: "For the self-employed, it is sometimes difficult to work out monthly income. But perhaps you can give an approximate net monthly income based on what you earned last month. Net monthly income is the amount left each month after deducting all expenses and all tax contributions. What is your approximate net monthly income?" [Question 13c]

Employees are also asked to specify what period their last pay covered. For both employees and the self-employed, if respondents are unable or unwilling to give a precise figure for their earnings, the interviewer offers a showcard with 11 bands of earnings and asks respondents to indicate into which band their earnings fall.

If responses for employees and the self-employed are combined, the mean value of earnings within each band is used to represent earnings for those unable to give a precise figure, and all amounts are converted to a weekly figure, the resulting distribution of net earnings can be compared with the corresponding distribution in HBAI, as shown in Table 1.[1]

Table 1: Individual weekly net earnings distribution

	TUS	HBAI
Mean	264	265
Median	210	214
Inter-quartile range	116 to 321	129 to 322
Standard deviation	291	611
Number of observations	4,806	24,008

The averages and inter-quartile ranges are close, which gives confidence in the TUS net earnings data. The main difference between the two surveys is the much higher standard deviation in HBAI. This is partly because HBAI permits negative earnings (reflecting losses for the self-employed, or deductions exceeding gross earnings for employees), which do not arise in TUS, and partly because HBAI includes a small number of extreme outliers at the top of the distribution.

Sources of income

TUS collects information through both the household and the individual questionnaire about regular sources of household income. The sources identified include:

from household questionnaire Question 10a:

- pension from a former employer
- interest from savings etc
- other kinds of regular allowance from outside the household
- other source eg rent

from individual questionnaire Questions 21a, 21b, 21d, 21hi and 21hiii:

[1] For both surveys, the figures shown are for respondents with some earnings, based on unweighted data. Applying weights generates very similar results. The HBAI earnings variables used are enternhd and enternsp, i.e. based on FRS without the Survey of Personal Incomes adjustment. See DWP (2002) for further details.

- Child Benefit
- Guardian's Allowance
- Invalid Care Allowance
- Retirement Pension (National Insurance) or Old Person's Pension
- Widow's Pension or Widowed Mother's Allowance (National Insurance)
- War Disablement Pension or War Widow's Pension (and any related allowances)
- Severe Disablement Allowance
- Disability Working Allowance
- Disability Living Allowance – care component
- Disability Living Allowance – mobility component
- Attendance Allowance
- Jobseekers' Allowance
- Income Support
- Incapacity Benefit
- Industrial Injuries Disablement Benefit
- Maternity Allowance
- Working Families' Tax Credit
- Disabled Person's Tax Credit

This information provides a comprehensive picture of the sources of non-labour market income for the household but does not indicate the *amount* of income derived from these sources, thus making it difficult to estimate total household net income directly.

3. Imputing non-labour market incomes in TUS using HBAI

In the absence of direct information about total non-labour market income in TUS, it was decided to impute non-labour market incomes from HBAI, based on the characteristics of respondents' households, and the sources of income they identify. The imputation was implemented for all households containing at least one person of working age, since this was the sub-sample of interest for the research question in hand. A similar procedure could in principle be followed for pensioner households.

The imputation was carried out as follows:

(i) select/create variables in FRS and HBAI corresponding to the sources of income identified in TUS;
(ii) using the HBAI, estimate an Ordinary Least Squares regression on total household net non-labour market income, using sources of income and household composition and tenure as explanatory variables;
(iii) refine the estimation, dropping variables which are not statistically significant or for which the cell size is less than 30;
(iv) estimate non-labour market income for each household in TUS, applying the coefficients from the final regression produced at step (iii);
(v) verify the validity of the imputation by comparing distribution of imputed non-labour market incomes in TUS and original non-labour market incomes in HBAI.

Fortunately the match between sources of income identified in TUS and corresponding variables in FRS/HBAI was good, because the design of the benefits section of TUS was based on FRS. The final regression used as the basis for the imputation is reported in Appendix 2. It has an adjusted R^2 value of 0.55, indicating that over half of the total variation in non-labour market income can be accounted for by the explanatory variables included in the model. This is a reasonable degree of fit for a cross-sectional regression of this kind. Of the sources of income listed in section 2 above, income from rent, Guardian's Allowance, Maternity Allowance and Disabled Person's Tax Credit were being received by too few households to be retained in the estimation. Receipt of Child Benefit was picked up by the number and ages of children in the household rather than as an independent variable. All other sources and household characteristics were statistically significant at the 95 per cent level or above.

The results produced at step (v) are summarised in Table 2 below.

Table 2: Household weekly net non-labour market income distribution

	TUS – imputed	HBAI
Mean	63	72
Median	26	23
Inter-quartile range	4 to 115	-10 to 135
Standard deviation	84	119
Number of observations	4,277	17,418

The mean value in HBAI is higher than in TUS, while the median value is slightly lower. The HBAI includes a higher proportion of very low, including negative, net non-labour market incomes. This is because the definition used in HBAI includes deductions for maintenance and child support payments, parental contributions to students living away from home, and student loan repayments, which cannot be modelled in TUS. The HBAI also includes a higher proportion of very high non-labour market incomes. This may be because households with high non-labour market incomes receive large incomes from savings and investments; this can be imputed in TUS only on the basis of the binary variable 'whether receives any income from savings'.

Overall, however, the distribution of imputed non-labour market income in TUS and the original distribution in HBAI are sufficiently similar, especially in the middle of the range, to merit using the imputed values in further analysis.

4. Comparison of TUS total net household incomes and HBAI

Total net household income in TUS can be computed by adding net earnings to imputed non-labour market income. One difficulty is that some households (N=1,275) have missing or potentially missing earnings data. This may arise either because the household contains an individual who does not supply sufficient information about his or her earnings for a weekly figure to be calculated, or because it contains individuals of working age who have not completed an individual questionnaire, and who may or may not be contributing earnings to the household income. In Table 3 below, results including and excluding these households are compared with results from HBAI.

The table indicates that the exclusion of households with missing or potentially missing earnings data in TUS gives a better approximation to the HBAI distribution, despite the reduction in effective sample size. The mean and median of the TUS distribution fall short of the HBAI distribution by about £20 per week. Once again the standard deviation in HBAI is higher than in TUS, although the inter-quartile ranges are similar, suggesting that HBAI is better at capturing the extremes of the distribution.

Table 3: Household weekly total net income distribution

	TUS – all	TUS – excluding households with potentially missing earnings	HBAI
Mean	353	408	427
Median	273	329	348
Inter-quartile range	147 to 460	195 to 509	219 to 525
Standard deviation	365	360	783
No. of observations	4,277	3,094	17,601

Figure 2 compares the TUS distribution (excluding households with potentially missing earnings) and the HBAI distribution. It confirms that there is a good overall match between the two distributions, although the TUS allocates a slightly higher proportion than HBAI to the £0-99 range (6.7 per cent compared to 4.2) and the £100-199 range (18.8 per cent compared to 15.9), with the position reversed for the £300-399 range (15.6 per cent compared to 17.8). The match in the top half of the distribution is almost exact. Full data for the figure are given in Appendix 3.

5. Conclusion

Comparisons with a larger survey specifically designed to measure household incomes (Family Resources Survey 2000/1 and the derived Households Below Average Income dataset) have shown that the gross household income data in the UK Time Use Survey 2000 must be treated with caution. Any future versions of the TUS could consider asking respondents to report their *net* household incomes - which would be more useful for analysis of poverty and standards of living - and begin with an open question, offering a showcard with income bands only if the respondent is unwilling or unable to give a precise figure (as is done for the individual questionnaire questions on net earnings). This approach would increase the kinds of analysis which could be carried out without adding significantly to questionnaire time.

Individual net earnings data in TUS are good. The distribution corresponds closely to that in the HBAI. The only difficulty comes in summing individual earnings to compute total household earnings, because a relatively high proportion of households have incomplete response to the individual level questionnaire. There is no simple way round this limitation. Other household members could be asked to provide proxy information for missing members, but this information is not always reliable and takes time to collect.

Imputation of non-labour market incomes in TUS is feasible because of the detailed questions included about sources of income. Adding these imputed values to net earnings, for those households where all earners have responded to the individual questionnaire, gives a good approximation of the net household income distribution. Although imputed incomes cannot reflect the full complexity of individual households' circumstances, it provides a fuller measure of a household's disposable income than either approximate gross incomes or net earnings alone and thus provides the best basis for analysis of poverty and standards of living in the TUS.

Appendix 1: Comparison of TUS and HBAI gross household income distribution

See also Figure 1.

Income range £ per year	TUS %	HBAI %
up to 2,610	4.6	0.9
2,610 to < 5210	16.1	3.7
5,210 to < 10,430	18.1	21.1
10,430 to < 15,640	13.7	17
15,640 to < 20,860	11.7	12.2
20,860 to < 33,800	18.7	22
33,800 to < 41,000	5.5	7.4
41,000 to < 46,000	2.8	3.6
46,000 to < 55,000	2.5	4.5
55,000 to < 80,000	3.3	5
80,000 or more	3.1	2.7
All	100.0	100.0

Notes:
Sample selection: all households.
Table shows distribution of households.
TUS column shows figures for gross household income, given in these bands (variable hq10b).
HBAI column shows figures for gross household income (variable egrinchh) adjusted to an annual figure.
Unweighted.

Appendix 2: Final regression on net non-labour market income in HBAI used as basis for imputation in TUS

Sample selection: households containing at least one person aged 16 or over and under state pension age (60 for women, 65 for men).
Observations are households.

Dependent variable = weekly net household non-labour market income (derived variable entnlmhhx).
This made up of the following components:

- state benefit income (variable ebeninhh)
- private benefit income (epribnhh)
- net occupational pension income (hntocchh)
- net investment income (hntinvhh)
- children's income (inchilhh)
- miscellaneous income (emiscihh)
- *minus* other deductions (eothdehh).

'Other deductions' include: council tax, contributions to personal pensions, maintenance and child support payments, parental contributions to students living away and student loan repayments.
Negative incomes are allowed. The distribution was truncated symmetrically by 1 per cent (i.e. at the 0.5 percentile and the 99.5 percentile) before estimation to omit extreme outliers.

Annotated output from the OLS regression, estimated in Stata 9.1, is shown below.

```
xi: regress entnlmhhx anyoccpen anysave anyallow numben1q3x-numben3q3x numben3q5x-
numben4q1x nage02 nage34 nage59 nage1015 nage1617 i.nage18pen nagepen i.tenure2 if
wkagehh == 1

      Source |       SS       df       MS              Number of obs =   17418
-------------+------------------------------          F( 31, 17386) =  698.17
       Model |   135995671    31  4386957.13          Prob > F      =  0.0000
    Residual |   109244889 17386   6283.4976          R-squared     =  0.5545
-------------+------------------------------          Adj R-squared =  0.5537
       Total |   245240560 17417  14080.5282          Root MSE      =  79.269
```

```
------------------------------------------------------------------------------
   entnlmhhx [net non-lab mkt income]
             |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   anyoccpen |   142.0649    2.19595    64.69   0.000     137.7606    146.3692
[any occupational pension]
     anysave |   4.778766   1.530255     3.12   0.002     1.779311     7.77822
[any savings or investments]
    anyallow |   65.22443   2.788746    23.39   0.000      59.7582    70.69065
[any regular payment from outside household]
  numben1q3x |   50.65707   4.889532    10.36   0.000      41.0731    60.24104
[Invalid Care Allowance]
  numben1q4x |   40.72585   5.057536     8.05   0.000     30.81257    50.63912
[State Retirement Pension]
  numben1q5x |   80.04479   5.437467    14.72   0.000     69.38681    90.70278
[Widows Pension etc]
  numben1q6x |   53.84003   9.343325     5.76   0.000     35.52617    72.15388
[War Disablement Pension etc]
  numben1q7x |   30.90355    6.25105     4.94   0.000     18.65086    43.15624
[Severe Disablement Allowance]
  numben2q1x |   39.27039    3.60369    10.90   0.000     32.20679    46.33398
[Disability Living Allowance – care]
  numben2q2x |   35.36549   3.595157     9.84   0.000     28.31862    42.41236
[Disability Living Allowance – mobility]
  numben2q3x |   25.83477   7.355672     3.51   0.000     11.41691    40.25262
[Attendance Allowance]
  numben3q1x |   75.53846   3.268339    23.11   0.000     69.13219    81.94474
[Jobseekers’ Allowance]
  numben3q2x |   103.9174   2.256928    46.04   0.000     99.49364    108.3413
[Income Support]
  numben3q3x |   67.59275   2.453143    27.55   0.000     62.78434    72.40115
[Incapacity Benefit]
  numben3q5x |   31.09607    6.66976     4.66   0.000     18.02267    44.16947
[Industrial Injuries Disablement Benefit]
  numben4q1x |   51.43178   2.797529    18.38   0.000     45.94834    56.91521
[Working Families Tax Credit]
      nage02 |    20.7759   1.747546    11.89   0.000     17.35053    24.20126
[number of children aged 0-2]
      nage34 |   20.00427   2.127565     9.40   0.000     15.83403    24.17451
[number of children aged 3-4]
      nage59 |   20.03227   1.195838    16.75   0.000      17.6883    22.37623
[number of children aged 5-9]
    nage1015 |   20.53797   1.062365    19.33   0.000     18.45563    22.62031
[number of children aged 10-15]
    nage1617 |   25.69742   2.157377    11.91   0.000     21.46874    29.92609
[number of people aged 16-17]
_Inage18pen0 |  -32.52579   17.49122    -1.86   0.063    -66.81034    1.758766
[no adults aged 18-pension age in hh]
_Inage18pen1 |   reference category      ---     ---           ---         ---
[1 adult household]
_Inage18pen2 |  -10.72918   1.516217    -7.08   0.000    -13.70112   -7.757242
[2 adult household]
_Inage18pen3 |  -3.466856    2.46576    -1.41   0.160    -8.299992     1.36628
[3 adult household]
_Inage18pen4 |   14.06345   4.259042     3.30   0.001     5.715303     22.4116
[4 adult household]
_Inage18pen5 |   95.54406   14.30588     6.68   0.000      67.5031     123.585
[5 adult household]
_Inage18pen6 |    127.182   29.99501     4.24   0.000      68.3888    185.9753
[6 adult household]
_Inage18pen7 |   328.2672   56.17565     5.84   0.000     218.1573    438.3771
[7 adult household]
     nagepen |    23.4775   4.073883     5.76   0.000     15.49228    31.46272
[number of adults over pension age in hh]
 _Itenure2_1 |   reference category       ---     ---           ---         ---
[own outright]
 _Itenure2_2 |  -33.85195   1.828833   -18.51   0.000    -37.43664   -30.26725
[own with mortgage]
 _Itenure2_3 |   -4.79627   2.109451    -2.27   0.023    -8.931007   -.6615338
[social or private rent]
       _cons |    19.9426   2.330886     8.56   0.000     15.37383    24.51137
[constant]
------------------------------------------------------------------------------
```

Appendix 3: Comparison of TUS and HBAI net household income distribution

See also Figure 2.

Income range £ per week	TUS %	HBAI %
up to 0	0.5	1.3
0-99	6.7	4.2
100-199	18.8	15.9
200-299	19.2	19.8
300-399	15.6	17.8
400-499	13.1	13.3
500-599	9.5	9.6
600-699	5.5	6.1
700-799	3.1	3.9
800-899	2.1	2.4
900 plus	5.9	5.7
All	100.0	100.0

Notes:
Sample selection: households containing at least one member of working age.
Table shows distribution of households.
TUS column shows figures for net household income using net earnings plus imputed non-labour market income, and excludes households with (potentially) missing earnings.
HBAI column shows figures for net household income (variable entinchh) adjusted to allow negative incomes.

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ONS [Office for National Statistics] (2003a) *United Kingdom Time Use Survey 2000 Technical Report,* London: ONS.

Figure 1

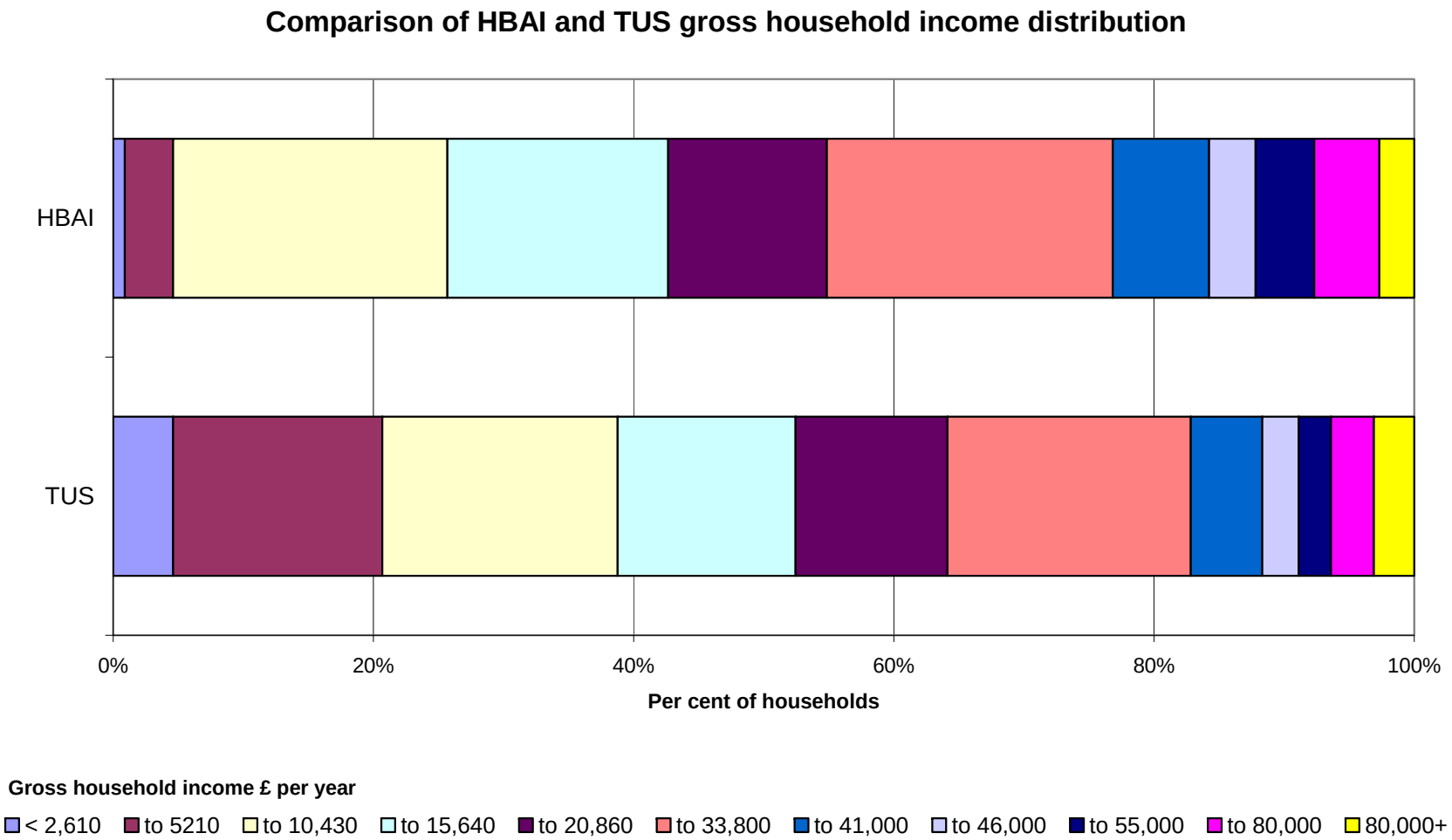
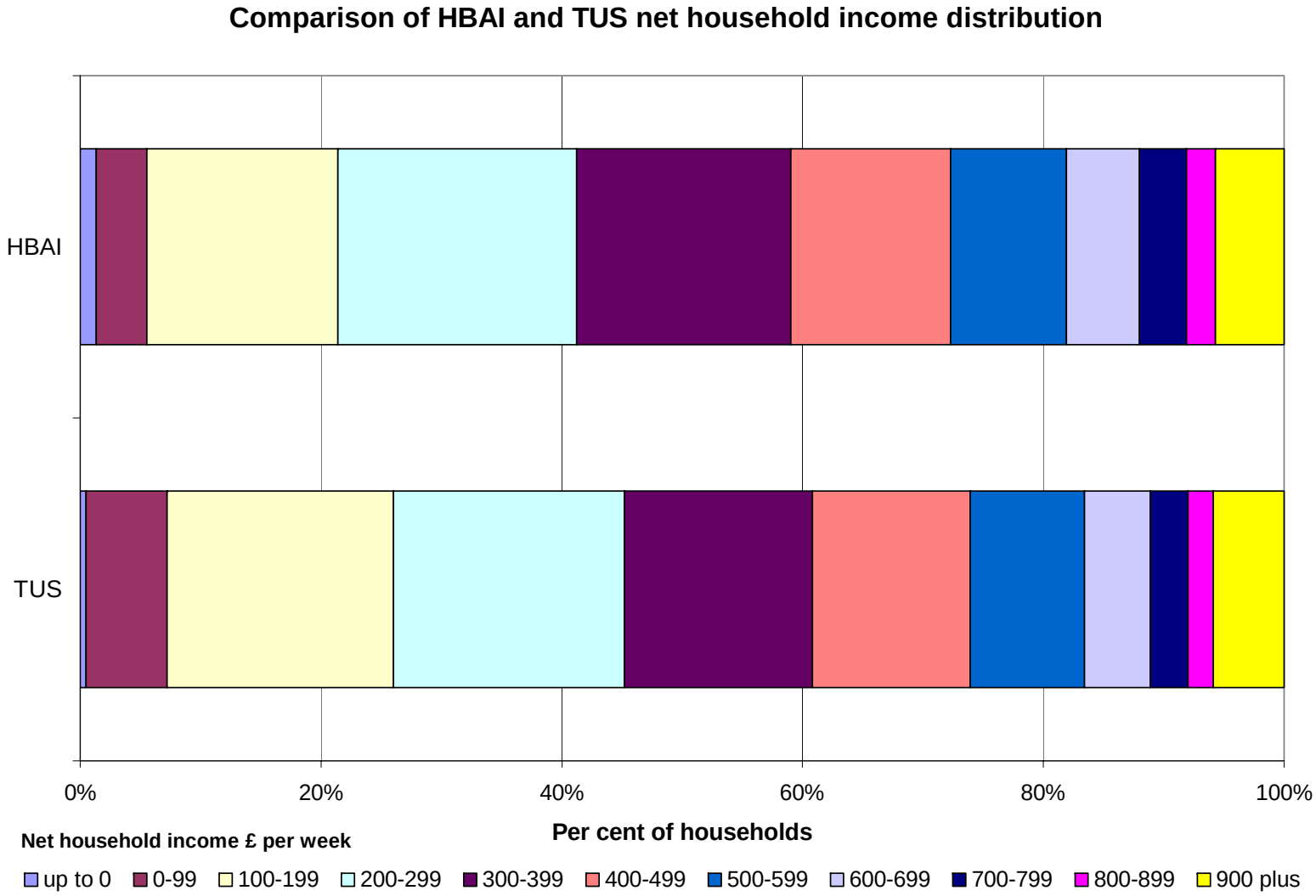

Comparison of HBAI and TUS gross household income distribution
HBAI
TUS
0%
20%
40%
60%
80%
100%
Per cent of households
Gross household income £ per year
< 2,610
to 5210
to 10,430
to 15,640
to 20,860
to 33,800
to 41,000
to 46,000
to 55,000
to 80,000
80,000+

Figure 2


Comparison of HBAI and TUS net household income distribution
HBAI
TUS
0%
20%
40%
60%
80%
100%
Per cent of households
Net household income £ per week
up to 0
0-99
100-199
200-299
300-399
400-499
500-599
600-699
700-799
800-899
900 plus

4. Research note on estimating childcare expenditure in the UK Time Use Survey 2000

1. TUS questions

The UK TUS 2000 identified the main adult responsible for each child in the household aged 0-14. This adult was then asked detailed questions about use of childcare for each child for which they were responsible. The questions refer to all types of childcare, formal and informal, in the full week (Monday to Sunday) before interview.[2] The information collected includes:

- types of childcare used
- number of days on which each type was used
- number of hours per day on the days on which each type was used (if the number of hours per day varied, interviewers were instructed to request the most frequent number of hours)
- whether any payment was made by the household for each type of childcare
- whether the week in question was in the school holidays (for children at school or aged 5+)

This provides very rich data on patterns and extent of usage of different forms of childcare. In order to be able to estimate *expenditure* on childcare however, supplementary data must be drawn from another source.

2. Hourly cost of childcare

The Department for Education and Skills has for several years carried out nationally representative surveys of parents' use of childcare for children aged 0-14. The survey carried out in 2000/1 is closest in time to the fieldwork for the TUS, but the published results from that survey do not contain estimates of hourly cost by type of childcare provider (Woodland et al, 2002). The report on the most recent DfES childcare survey, carried out in 2004/5, does contain such estimates (Bryson et al, 2006) and for that reason the later survey is used here. As described in more detail below, the costs are deflated to take account of the difference in time periods when the data were collected.

The categories used by TUS and the DfES survey are similar but not identical in all cases. Table 1 lists the TUS categories and shows the closest match available to the hourly cost figures reported in Bryson et al (2006). For nurseries and playgroups, the TUS distinguishes by type of provider while the DfES results do not. The DfES distinction between a "nursery school" and a "day nursery" is taken to correspond roughly to the distinction in TUS between a "local authority creche or nursery school" and all other types of creche or nursery. The term "family centre" is not used in the DfES results; the hourly cost of a playgroup or preschool is used as the closest approximation. The DfES survey asked about childcare in non-holiday periods and consequently did not collect information on the costs of holiday schemes or

[2] Excluding time in school during school hours of children aged 6 or over or in school year 1 or above.

playschemes. In terms of informal care, DfES figures on payments made to grandparents are assumed to hold for other relatives except older brothers and sisters and ex-partners (who are not remunerated at all in a large majority of cases).

Table 1: TUS and DfES categories of childcare provider

TUS code	TUS description	DfES categories for hourly cost	£ per hour, 2004 prices
1	childminder	childminder	3.13
2	daily nanny at child's home	nanny or au pair	5.51
3	live-in nanny or au pair	nanny or au pair	5.51
4	baby-sitter at child's home	babysitter at child's home	2.43
5	LA creche or nursery school	nursery school	2.43
6	private creche or nursery school	day nursery	3.39
7	workplace creche or nursery	day nursery	3.39
8	LA playgroup or preschool	playgroup or pre-school	1.67
9	private playgroup or preschool	playgroup or pre-school	1.67
10	community or vol playgroup or preschool	playgroup or pre-school	1.67
11	nursery class attached to primary school	nursery class attached to primary or infants' school	0.30
12	reception class attached to primary school	nursery class attached to primary or infants' school	0.30
13	family centre	playgroup or pre-school	1.67
14	term-time 'out of school' club (eg before/after school, breakfast club)	breakfast club or after school club on-site or not on-site	2.76
15	holiday scheme or play scheme	-	
16	ex-spouse or ex-partner	-	
17	child's grandparent(s)	child's grandparent	1.11
18	child's older brother or sister	-	
19	another relative	child's grandparent	1.11
20	friends or neighbours	a friend or neighbour	2.48
21	other	-	

The final column in Table 1 shows the cost per hour, per child, given in Table 5.20 of Bryson et al (2006). These costs are gross costs, that is, before any assistance with childcare costs the parent may receive has been taken into account. Two adjustments are made to these figures before they are used to estimate costs in TUS. Firstly, a deflator based on the National Average Earnings (NAE) index was applied to take account of increase in prices between 2000 and 2004. The NAE was used rather than the Retail Prices Index on the grounds that labour costs are by far the biggest component of childcare costs.

Secondly, Bryson et al (2006) found considerable variation in the hourly cost of childcare by region. An index of relative regional prices was derived from the average costs given by Bryson et al (2006) in Table 5.21 and applied to the hourly cost, depending on the region of residence of the TUS respondents.[3] This method reflects

[3] The DfES survey covers England only. For Wales, Scotland and Northern Ireland, the relative regional consumer prices produced by ONS for 2003 – the earliest year available – was applied. See Wingfield et al, 2005, Table 3.

the average variation in childcare costs between regions but does not take account of any variation in the mix of childcare providers used by parents in different regions.

3. Estimating weekly childcare expenditure in TUS

The estimates of household weekly childcare expenditure were derived in the following stages:

(i) sum number of hours of each type of childcare used by each child, multiplying number of days used in week (q41) by number of hours per day on days used (q42).
(ii) identify whether any payment was made for each type of childcare for each child (q43). If don't know or no response given, assume some payment made for all formal types of childcare except those attached to primary schools, and assume no payment made for the remainder.[4]
(iii) if any payment was made, multiply number of hours of that type used by estimated hourly cost (see section 2 above).
(iv) sum across childcare types for each child.
(v) sum across children within the household.

Since TUS was carried out throughout the year, any seasonal variation in childcare expenditure (including due to school holidays, for example) should be reflected in due proportion in the results. Two caveats are necessary, however. Firstly, the DfES survey did not provide an hourly cost for holiday schemes or play schemes, so the cost of these is missing from the TUS estimates, which will therefore tend to underestimate childcare expenditure during holidays. Secondly, although the averages for the TUS sample as a whole should be robust, expenditure by particular families is collected for either a holiday week or a non-holiday week, not both. Results based on small cell sizes should therefore be treated with caution.

4. Summary results

There are 1953 respondent households in TUS with at least one child aged 0-14. Of these, 188 do not complete any individual questionnaires so no detailed information on childcare is available. In a further 60 households, an individual questionnaire is completed, but not by the person identified as responsible for childcare, so information is also missing. This leaves an effective sample of 1705 households in which the relevant individual completed an questionnaire.[5] The results presented here are unweighted.

[4] This assumption was based on Table 5.1 in Bryson et al (2006), which shows that 65 per cent or more of parents who used each type of formal care, except those attached to primary schools, made some payment, while less than 15 per cent made any payment for informal care. For nursery classes attached to primary schools, the figure was 51 per cent.
[5] In addition, in 1 household, the childcare questions were completed despite there not being any child aged 0-14 in the household. This household is excluded from the results presented here.

Among these households, just under half used some kind of childcare (i.e. provided by someone other than themselves or their co-resident partner), as shown in Table 2. Around 1 in 7 made some payment for childcare.

Table 2: Use of paid and unpaid childcare, by number of children in household

Percent of households with any child aged 0-14

Number of children in household	Any paid care	Any unpaid care	Any childcare	*Number of households = 100%*
1	12	34	41	*780*
2	17	38	49	*638*
3 or more	11	41	46	*287*
All	14	37	45	*1705*

Of those using any paid or unpaid childcare, the mean number of hours per week they used for all children is shown in Table 3. For example, for households with one child aged 0-14 who used some paid care, the average weekly hours of paid childcare for that child was 21.7. For households with one child who used any unpaid care, the average weekly hours were similar. But these are generally different households, so that the overall average childcare hours for households with one child using either paid or unpaid childcare is only slightly higher, at 24.8 hours per week.

Not surprisingly, the total number of hours of childcare used rises with the number of children in the household.

Table 3: Total hours of childcare used in the week, by number of children in household

Households with any child aged 0-14 who used the type of childcare in question

Number of children in household	Mean paid care hours	Mean unpaid care hours	Mean childcare hours
1	21.7	21.8	24.8
2	22.8	28.2	30.0
3 or more	40.5	41.6	47.7
All	24.9	28.0	30.9
Number of households	*237*	*626*	*759*

Finally, table 4 reports the estimated weekly gross expenditure by households on childcare. The results depend on which group of households one averages over – households using any paid care, households using any childcare, or all households with a child aged 0-14.

Table 3: Estimated weekly gross expenditure on childcare, by number of children in household

Households with any child aged 0-14

Number of children in household	Households using any paid care £ pw	Households using any childcare £ pw	All households £ pw
1	45.82	12.28	4.99
2	57.72	18.99	9.23
3 or more	97.57	22.91	10.54
All	58.74	16.87	7.51
Number of households	*218*	*759*	*1705*

These tables have been produced with households as the unit of analysis. Results can also be produced with children as the unit of analysis if preferred, and/or by childcare type. Further breakdowns, for example by the ages of children and the employment status of parents are also possible.

5. Comparison with DfES childcare survey

To check their accuracy, some of the summary statistics derived from the Time Use Survey 2000 estimates can be compared with those derived from the 2000/1 DfES childcare survey (as reported in Woodland et al, 2002).

The population sub-group for both surveys is households with at least one child aged 14 or under. To enhance comparability, the results for TUS shown below are restricted to households in which the reference week was not a school holiday for any of the children.

Table 5: Comparison of selected results from TUS and DfES childcare survey

Time Use Survey		**DfES childcare survey**	
Used any childcare	44%	Used any childcare	48%
Hours of childcare per week (households using any childcare)	27.6	Hours of childcare per week (households using any childcare)	21.4
Paid for any childcare (households using any childcare)	32%	Paid fees or wages for childcare (households using any childare)	40%
Mean weekly childcare cost (households using any paid care, with 1 or 2 children)	£51	Mean weekly childcare cost (households using any paid care, with 1 or 2 children)	£40

The comparison suggests that the two surveys found very similar proportions of households using any childcare in the reference week. The higher number of hours reported in the TUS may reflect the fact that the TUS included all children in the age

group while the DfES survey estimated hours for third and subsequent children within a household.

The DfES survey detected a higher proportion of parents who were making payments for childcare than the TUS, but the payments made by these 'additional' parents were relatively small. Hence the average cost of payments for childcare among those who paid was lower in the DfES survey than in TUS. The higher detection of small payments for childcare in the DfES survey is consistent with the fact that it was a specialist survey and hence respondents' were asked in more detail about payments, for example including specific questions about charges for meals, outings, and use of equipment.

The comparison implies that TUS should not be used for making population-level generalisations about childcare expenditure. However the similarity between the results is broadly-speaking reassuring and there is no reason to doubt the accuracy of the information derived from TUS for those households which do report childcare spending.

References

Bryson, C., Kazimirski, A. and Southwood, H. (2006) *Childcare and Early Years Provision: a study of parents' use, views and experiences.* Department for Education and Skills Research Report 723. London: DfES.

Wingfield, D., Fenwick, D. and Smith, K. (2005) "Relative regional consumer price levels in 2004", *Economic Trends*, 615 (February): 36-45.

Woodland, S., Miller, M., and Tipping, S. (2002) *Repeat Study of Parents' Demand for Childcare.* Department for Education and Skills Research Report 348. London: DfES.