HOUSEHOLD SATELLITE ACCOUNT (EXPERIMENTAL) METHODOLOGY

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Dedication and acknowledgements

This paper is dedicated to the memory of Henry Neuburger, who began the work on the Household Satellite Account in 1997[1].

The authors wish to acknowledge the helpful comments received from the members of the Household Satellite Account Programme Board and project boards**,** colleagues in ONS and other government departments, and members of the Eurostat Task Force on Household Satellite Account Methodology.

[1] Murgatroyd, L & Neuburger, H (1997) *A Household satellite account for the UK* Economic Trends No. 527 October 1997

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INTRODUCTION

This paper describes in detail the methodology used to produce the first experimental estimates of the value of unpaid work in the United Kingdom, based on an output approach. The estimates are published as the Household Satellite Account, which means that they are linked to the main National Accounts and use the same concepts wherever possible. However, they can also draw on different sources and incorporate different metrics, as well as providing a monetary valuation.

Household production has been divided into six principal functions. Five of these are as defined in a Eurostat working paper[2] - providing housing, nutrition, clothing, care and education, and voluntary activity. We have also included transport as a principal function, as explained later. The paper begins by looking at some of the general issues relating to measuring and valuing unpaid work. It goes on to devote a chapter to each of the principal functions in turn, starting in each with a discussion of the concepts. Brief mention is made of the inputs into each function, which are dealt with in more detail in later chapters. A full description of the data sources, assumptions and methodology follows, plus a summary of the sensitivity analyses which have been undertaken.

The Household Satellite Account is part of the ONS' set of experimental statistics. The aims of the publication of experimental statistics include:

- *Consultation:* ONS would like to get informed feedback from potential users.
- *Acclimatisation:* Where the experimental series are alternative versions of the format of existing series, ONS may wish to help users become accustomed to new presentations.
- *Use:* Experimental series can provide very useful information for users as long as their nature is well explained and understood.

The Household Satellite Account is being published in order to gain informed feedback and the authors therefore welcome any comments on the methodology described here, which can be sent to hhsa@ons.gov.uk.

[2] Varjonen, J. et al *Proposal for a Satellite Account of Household Production* Eurostat Working paper 9/1999/A4/11

1. THE HOUSEHOLD SATELLITE ACCOUNT

The 1993 System of National Accounts takes the view that the inclusion of all activity which is productive in the economic sense but which does not have a monetary value, would swamp the monetary flows, obscure what is happening in the markets, and reduce the usefulness of National Accounts data for analysis. It includes within the production boundary all production of goods for own use, although in practice adjustments are made for only part of this category – principally self-build dwellings. There is at present no data on, for example, vegetables grown and consumed within the household in the UK. The SNA excludes all production of services for own final consumption within households (except for the services produced by employing paid domestic staff, the own-account production of housing services by owner-occupiers and the collection of firewood and water (*SNA 1993 Ch. I*)). However, it does recognise the limitations of this approach and suggests the use of satellite accounts to expand the analytical capacity of national accounting for selected areas of social concern. They are linked to the central framework of National Accounts but are also linked to the information system relevant to the field or topic to be analysed. They are the place where additional monetary and physical data can be integrated in the accounts (*SNA 1993, Ch. XXI*).

A household satellite account looks at non-market production by households using the 'third party' criterion first developed by Margaret Reid in the 1930s – if someone else could be paid to provide this service for you, then it should be measured. Luisella Goldschmidt-Clermont defines productive activity more widely as any activity that might be delegated to someone other than the person benefiting from it (*Goldschmidt-Clermont, 1994*) and Ann Chadeau points out that borderline cases must be resolved by reference to 'normal social practice and standards' (*Chadeau, 1992*). So for instance childcare, meal preparation and cleaning would be included in production, but personal care, studying and sleeping would be considered human capital activities and leisure would be a separate category. National Accounts data can be tracked because it is recorded somewhere as a monetary transaction. Household production has to be measured in other ways. The two possibilities are to measure inputs or outputs.

Measuring inputs relies principally on time use data. This usually takes the form of a diary, which the survey respondent is asked to complete, giving information about their principal activities throughout a 24-hour period. The length of the time slot may vary – 10 to 15 minutes is usual - and some diaries will record additional information about secondary activities. Some surveys may ask the respondent to remember what they did on one or two days in the previous week, while others may leave a diary to be completed over one or two days or a whole week.

The Output Approach

The alternative is to attempt to measure outputs, for example the number of children cared for or the number of meals prepared. This is important because it is often easier to value outputs than inputs, particularly when there is a market equivalent to the service being produced. Measurement of the outputs is also more consistent with the way the rest of the National Accounts are constructed and reflects household productivity situations. It may be possible to construct a historical series using this approach, even in the absence of time use data. Outputs can be estimated through surveys which specifically request this type of information. A pilot study in Switzerland to test the methodology suggested that households have no difficulty in identifying how often they use the washing machine, the number and type of meals prepared

and number of servings etc. (*Goldschmidt-Clermont et al. 1998*). ONS has constructed a set of initial, experimental estimates using a combination of pre-existing administrative and survey data.

Valuation

The valuation of household production allows comparison of different types of outputs, as well as comparison with traditional National Accounts measures, such as gross domestic product. Some argue against any sort of valuation of household because of the difficulties in applying a market price or wage rate to outputs without any information on the variation in quality between households. Others argue that it is impossible to value this activity because it is impossible to separate the productive and leisure elements of household work and to quantify the process benefits. Simultaneous activities are difficult to value if an input-approach is used, so for example, the Eurostat working paper recommends that they are not included in the account, but in this way a large proportion of the care activities will not be accounted for. However, valuing outputs rather than inputs can help with some of these difficulties, and none of them are insuperable.

Quality adjustment can be tricky in a National Accounts context, when estimating the non-market output of the public sector, but it is attempted nonetheless. It would be wrong to assume that the output of a particular unpaid productive activity is homogeneous, but assumptions about variations in quality, as long as they are clearly explained, can be challenged and tested. Nonetheless, it should be recognised that, to some extent, these assumptions will always be subjective, as there may be many different reasons for choosing between market and household production.

The enjoyment that has gone into the production of marketed outputs does not generally affect their value, and similarly the satisfaction obtained from household production does not affect the value of the output. It may, however, affect the length of time spent on the activity and therefore the hourly effective return to labour when calculated by residual (see below). Similarly, joint production is a feature of market as well as non-market production, and ways are found to price the output and cost the inputs. In the household satellite account, it is more easily dealt with using an output approach, because, where there are two outputs, both are valued and the inputs are apportioned accordingly.

Outputs

So how should we go about finding an appropriate market price for the outputs of household production? One possibility is to follow the National Accounts procedure in pricing public sector output, which also does not have a market price, and calculate the cost of the inputs. The difficulty with this in the household accounts context is that, unlike the public sector, we do not have a market wage for the labour input either. Goldschmidt-Clermont[3] suggests that 'in order to ensure compatibility with National Accounts procedures, non-SNA output (her term for household production) should be valued at the market price of equivalent market products'[4]. The problem then becomes to identify the nearest market equivalent. This

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3 Goldschmidt-Clermont, L., & Pagnossin-Aligisakis, E., (1995) *Measure of Unrecorded Economic Activities in Fourteen Countries* UNDP Human Development Report Office, Occasional Paper No. 20

4 See also *'Monetary Valuation of Non-Market Productive Time – Methodological Considerations'* by Luisella Goldschmidt-Clermont in Review of Income & Wealth, December 1993 for a fuller discussion of wage-based and output-based valuations.

implies that the output data must be sufficiently disaggregated to make sensible comparisons. For example, meals are not a homogeneous category. The cost of a breakfast in a transport café will be very different from the cost of a five-course meal in a five-star hotel. And the cost of a breakfast will also vary depending on whether one is buying tea and toast or a full English cooked breakfast. Likewise, it does not seem sensible to value all childcare at the cost of paying a babysitter. Neither would it be prudent to value it all at the £125 per night charged by the Hopes and Dreams children's hotel in Islington.

In most cases, the key must be to differentiate sufficiently between the various types of output, in order to facilitate a meaningful comparison between market and household provision. By applying a distribution of prices for bought meals to a similar category of home-cooked meals, we could make some implicit adjustments for differences in quality. In many circumstances, we will have to make the assumption that the distribution of different quality outputs in the market sector (differentiated by price) is the same as the distribution of different quality outputs in household production.

Inputs

The inputs into household production consist of intermediate consumption – goods and services used up or transformed in the production process, including things such as raw materials and rented accommodation; household capital – durable goods such as washing machines and dishwashers, as well as owner- occupied housing; and labour – measured by the time input[5]. Valuation of intermediate consumption is the most straightforward, once the relevant components of final consumption in the National Accounts have been identified, and simply requires an adjustment to the National Accounts estimate of final consumption expenditure of households, in order to avoid double counting.

Capital

Household capital can be valued in a number of ways. Aslaksen[6] assumes that all household capital goods are consumed when purchased, so that depreciation and income from capital can be disregarded. Ironmonger[7] takes account of capital inputs by using input-output tables to allocate all unpaid labour, capital and purchased intermediate inputs to all household activities. The capital components are represented by estimates of housing costs plus purchases of vehicles and other household durables, as recorded in the Household Expenditure Survey. The Eurostat working paper's recommendation is to follow the current treatment of capital in the National Accounts, which uses a perpetual inventory model to calculate depreciation based on an assumed distribution of each asset's service life.

Ironmonger[8] points out that it would be more appropriate to use an estimated rental value of the service flows from the stock of housing and durables/semi-durables owned by households, and that this approach has been used by the Canadians (although not for housing) in their household input-output tables. The principal difference between this and a perpetual

5 Human capital can also be seen as an input, but at this stage we do not propose to try to capture this in our estimates.

6 Alaksen, Iulie & Koren, Charlotte (1996) *Unpaid Household Work and the Distribution of Extended Income: The Norwegian Experience* Feminist Economics 2(3)

7 Ironmonger, Duncan (1989) in *Households Work: Productive Activities, Women and Income in the Household Economy* Sydney: Allen and Unwin

8 Ironmonger, Duncan *Time Use and Satellite Accounts for Modelling the Household Economy* paper prepared for the IARIW 24th General Conference Session, Lillehammer, Norway

inventory model is that the former uses asset price, depreciation and rental price/user cost. We have followed the National Accounts method, but have also produced capital services estimates for comparison.

Labour

The valuation of labour in the input gives rise to the most controversy, with a variety of methods to choose from, all of which have advantages and limitations. These include the opportunity cost method, and replacement cost with at least three possible variations. Previous illustrative estimates of the value of household production in the UK are based on a simple application of the opportunity cost method. The Eurostat working paper recommends replacement cost based on the wages of a generalist worker or housekeeper, while recognising that not all household production activities would be undertaken by a housekeeper, for example voluntary work or some aspects of household management and general maintenance.

When using an output-based approach, the return to labour can be calculated by deducting the value of the other inputs from the value of the output. This residual is the equivalent of 'mixed income' in the National Accounts: "'Mixed income' is the term used for the income of unincorporated enterprises owned by households in which household members may work without receiving a wage or salary. … It is 'mixed' because the total implicitly includes an element of remuneration for work done, alongside the surplus accruing from production"[9].

This return to labour could, in theory, be positive or negative, because it does not take any account of individual preferences which may not equate 'efficiency' with 'welfare'. The hours invested in an activity may be longer than in market production because if the leisure element is greater, or shorter if there is greater scope to do more than one thing at once in a household production setting.

Dividing the effective return to labour by hours reported in time use surveys is also useful as a cross-check for the wage-based methods of valuing labour, and may help to highlight areas where the measurement of the labour input may be deficient. For example, we know that caring activities are usually under-recorded in time use diaries, because they often take place at the same time as other activities. These activities involve relatively little in the way of intermediate and capital consumption, so labour will be the major component. Comparison of the value of labour arrived at by the different methods may give an indication of the order of magnitude of any under-recording in the time-use survey data, but, in some circumstances, differences may be due to valuation by inappropriate wage rates.

9 UK National Accounts Sources and Methods, 1998

2. PROVIDING HOUSING

Output

Concepts

The output of housing is accommodation for members of the household – that is, services produced by owner-occupied dwellings. This accommodation is required by households for shelter, and also as the location for productive activities and non-productive activities. This function is defined as: 'buying or renting a house or flat, getting it furnished and equipped, cleaning it, maintaining it, repairing it etc.' (Eurostat proposal). Because goods and services related to the dwelling (e.g. water, electricity, furniture etc.) can be used in productive and non-productive activities, some have suggested that these intermediate inputs should be allocated to production and leisure respectively according to the relative proportions of time spent in the two activities. We disagree.

If households do not provide accommodation for themselves, e.g. by buying their own house, they must purchase it from someone else – by renting property, or paying for lodgings, bed and breakfast or a hotel room. Whether they are productive or at leisure while they are using these purchased accommodation services is immaterial. Thus the whole of the cost of providing owner-occupied accommodation services (i.e. clean, warm, lit, maintained, furnished, insured accommodation, including gardens) should be included in the household account. The market price used to value this output should therefore be the cost of renting furnished accommodation and the value of the output should also include costs of maintenance, cleaning and provision of utilities and insurance.

House construction using unpaid household labour is a separate output. An estimate for the value of this is already included in the National Accounts, but needs to be moved to the Household Satellite Account, in order for the time spent on this activity to be accounted for correctly. However, the output is not part of household final consumption, but rather is part of capital formation.

An additional output in this function is the maintenance and furnishing of rented accommodation. The output of these tenant services will be a variable proportion of the services provided by owner occupiers, depending on the nature of the tenancy – whether the rented accommodation is furnished or unfurnished, who has responsibility for maintenance of the accommodation during the tenancy and upkeep of communal areas etc. This will range from a 'service flat', where all the cleaning and maintenance is provided by the landlord, to unfurnished accommodation where the tenant provides their own furniture, and is expected to clean and possibly maintain the property itself. Because these 'tenant services' cannot be purchased as a package, there is no readily available market price. However, a valuation, which is consistent with the one for owner-occupied accommodation services, can be obtained by adding together the value of the inputs (labour, intermediate consumption and capital consumption), using the effective return to labour for the owner-occupied services, expressed as an hourly rate, to value the time spent on these activities by tenants.

When valuing other outputs (meals, care etc.) using comparable market prices, the cost of the premises etc. where the market activity takes place may be included in the price. In such cases, a proportion of the output of housing should appear as intermediate consumption in the three principal functions which take place in the home – providing care, providing nutrition and providing clothing, as this has already been implicitly included in the value of the output

of these functions. This is best dealt with in a supply and use table, where 'output' can appear more than once, but double counting is avoided by aggregating value-added.

Inputs

Intermediate consumption
This includes all the consumables used to provide the accommodation services – utilities, insurance, cleaning and DIY materials etc., as well as inputs for self-build housing.

Household capital consumption
The major item under this heading is the housing stock itself, but it also includes all goods which meet the National Accounts definition of capital i.e. goods which are not entirely used up during the accounting period. Thus furniture and soft furnishings, linen etc. will also be included, whenever they are owned by the household rather than a landlord - those owned by landlords will, in theory, already be included in the existing National Account. If computers are used in household management tasks, then a proportion of their value should also be included. However, as computer use grows in importance, it may in future be preferable to estimate computer services separately and allocate them as intermediate inputs to the appropriate functions of household production.

Related services
This includes all the maintenance, cleaning, gardening, shopping and management undertaken by the household, which relate to the provision of accommodation, either owner-occupied or rented. Maintenance etc. by a landlord would not be included, since they are already included in market services. The input is the time spent on these activities.

Labour
In the UK the amount of time spent on house construction will be relatively small compared with the amount of time spent on the related services associated with providing accommodation services.

Methodology

Data sources
The National Accounts already include an estimate for the imputed rent of owner-occupied dwellings. This is based on an estimate of the number of owner-occupied rooms multiplied by an average rent for unfurnished accommodation. The number of dwellings is supplied by DTLR, and then averaged and smoothed by ONS to provide unpublished quarterly estimates. We have used the same data and taken the average of the four quarters to provide an annual estimate. Because access to a kitchen is included in the rent we have used in our valuation, and the estimate of the number of rooms in owner-occupied dwellings includes the kitchens, we have assumed one kitchen per dwelling and removed kitchens from the total number of rooms. Owner-occupied housing will often include more than one communal living room, but this is counterbalanced by the fact that bedrooms are often shared, so we have made no further adjustment to the number of rooms. Neither have we tried to make any adjustment for the different quality of accommodation belonging to owner-occupiers and offered by communal establishments.

Value

In order to value the output of accommodation, we have used the average rent for a self-catering university room. This was obtained from the National Union of Students Accommodation Costs Survey, which collected information from 129 universities. This applies to blocks of accommodation containing eight or more students, who each occupy a furnished bedroom/study with access to shared bathroom and kitchen facilities. Heating and lighting etc. and maintenance services – cleaning, repairs and upkeep of the grounds – are included in the rent. Insurance of the contents of the accommodation is not included, so the actual cost of this is added to the output.

Tenant services

Tenant services are provided both by those in furnished accommodation, who provide the only maintenance, and those in unfurnished accommodation, who also provide and maintain furniture. They are calculated by adding together the hours spent by tenants in cleaning, gardening and DIY (valued using the owner-occupier hourly effective return to labour – see above), the intermediate consumption of tenants of maintenance related items, and their capital consumption – furniture, tools etc. The former relates only to tenants in unfurnished accommodation. The intermediate consumption is allocated to tenants on the basis of the proportion of total time spent in maintenance activities. This is because intermediate consumption is thought to relate more directly to this than to the proportion of total rooms. The capital consumption of furniture is allocated on the basis of the proportion of total rooms (owner-occupied plus unfurnished rooms). This is because, generally, the more rooms you have, the more furniture you require.

3. PROVIDING TRANSPORT

Output

Concepts
The household transport account includes all transport provided by the household, using the third party criterion – if the activity can be delegated to a third party, it is productive. For example, if you choose to travel from your house to a friend's house by bus, you pay for that journey and this is picked up in the National Accounts in the output of the bus industry. If you choose to make the same journey on foot instead of by bus, the same output has been achieved, but rather than being an output of the bus industry, it is an output of the household. The same would be true if you used your car or bicycle. Because you have provided the mode of transport and not paid for the journey, it is household production of transport. However, when the travel is an end in itself, e.g. walking for exercise or pleasure, it cannot be delegated and is therefore not included.

The cost of 'business travel' is usually claimed back from employers, and is therefore included in the National Accounts, and should be excluded from the HHSA. Business travel, as recorded in our data source, may include some commuting where a respondent does not have a permanent place of work, such as builders who work on different sites. As it is not possible to split this code at present, all business travel has been excluded from our estimates. Those modes of transport which people pay to use, such as bus, coach, train and taxi, are also not included, because they are measured in the National Accounts.

Just as a proportion of the output of housing is an input to some productive activities, so a proportion of the output of transport services will be an input to other principal functions. This will occur when the market prices used to value other outputs in the Household Satellite Account include transport costs.

Inputs

Intermediate consumption
This includes all domestic consumption of car fuel, as well as other consumables related to domestic transport.

Household capital consumption
Cars, vans, motorbikes, bicycles and other private vehicles should all be included.

Related services
This includes shopping for transport-related items, where it can be identified, and maintenance of vehicles.

Labour
This includes time spent on all journeys which have a purpose i.e. where the travel is not for its own sake, but excluding business travel.

Methodology

Data sources

The National Travel Survey (NTS) is carried out by the Social Survey Division of the ONS, on behalf of the Department of Transport, Local Government and the Regions (DTLR). The NTS has been a continuous survey on personal travel in Great Britain since 1988. During the period January 1998 to December 2000, individuals in 9,390 households completed a seven-day travel diary, covering all travel over 50 yards in distance. Details collected include purpose and method of travel, time of day and length of trip, numbers in parties and the cost of travel. Only travel within Great Britain is included. Journeys to other places are included only up to the ticket control point at which the boat, plane, or the train using the Channel Tunnel is boarded. More details on the survey can be found at www.transtat.dtlr.gov.uk/personal.

It should be noted at this point that as the NTS is a sample survey the results are subject to sampling variability, which can be quite large particularly when looking at travel data broken down by purpose and mode. The effect of this has been examined in our sensitivity analysis.

Personal travel data is not available in the same form for Northern Ireland. Our results therefore assume that Northern Ireland has the same travel patterns as the rest of the UK. A survey was started in Northern Ireland this year, so data will be available in the future – details of Northern Ireland transport data can be found at www.doeni.gov.uk/statistics/transport.

Mode

The modes of travel included in this project are *walk*, *bicycle*, *car or van*, *motorcycle* and *other private.* However, *just walk*, which is walking as a leisure activity, has been excluded as explained above. Private hire buses have been excluded from the NTS category *other private*, as these are paid for and are therefore included in the National Accounts.

Purpose

The NTS data is broken down by purpose of travel. In the HHSA, transport is an input to other projects, the main areas being education and shopping. For this reason, the results in this article, have been aggregated into four purpose categories, with the escort trips classified to those purposes to which they most closely relate:

Education	Leisure & other (incl.voluntary & care escort)
Education work	Day trip
Escort Education	Eat/drink with friends
	Entertainment/ public activity
Shopping	Holiday: base
Shopping	Other social
Escort shopping / personal business	Sport: participation
	Visit friends at private home
Work	Other non-escort
Commuting	Escort home (not own) and other escort
Escort Commuting	Personal business medical
Other work	Personal business other

The survey estimates have been grossed to the UK population, using data derived from the Labour Force Survey, which exclude people living in institutions.

Price

In order to value the output of transport provided by the household, the nearest market equivalent has to be identified. As the objective is to value a trip from one particular point to another, i.e. 'door to door', a private hire vehicle (PHV) is the closest equivalent. (This is a taxi which is booked in advance and collects you from wherever you specify.) If a train or bus were used, for example, a trip to the station or the bus stop would still be required.

The NTS collects information on the cost of PHV trips. Respondents report the length and cost of each journey, so an average cost per trip and an average cost per mile can be calculated. This data is available separately for London and the rest of Great Britain (RoGB). The cost of PHVs may be a flat rate or may be metered irrespective of the number in party, luggage etc. When people share a PHV, the cost reported in the NTS should be the total, split between the number in the party. However, this does not appear to have been calculated correctly by all respondents. To ensure the estimates are as accurate as possible, only single occupancy trips have been included in the PHV costs used in these calculations.

The NTS also collects data for taxi travel. Both the PHV and taxi rates are wholly dependent on the survey respondent to record this information correctly. There may be some doubt among respondents as to whether they are travelling in a PHV or a taxi. If the vehicle has been booked in advance the respondent will usually know (most likely a PHV) or if it has been hailed in the street and has therefore been plying for trade it will be a taxi. However, if for example you walk out of a station and get in a vehicle at the taxi rank it could be either a taxi or a PHV. This is because the taxi rank is normally on private property and the PHV is able to operate here, as it is not plying for trade on a public road. Respondents are more likely to misclassify PHVs as taxis, rather than taxis as PHVs. The NTS 5-year average cost for a PHV centred on 1997 is £1.39 per mile in London and 87p per mile in the rest of Great Britain. The corresponding taxi costs are £1.63 and £1.17 respectively.

School buses were investigated as a possible market equivalent for education trips. The DTLR 'Surveys of concessionary fares schemes for children and students in 1999'[10] showed that, of the 101 education authorities who responded, 60 had no scheme for children and 53 had no scheme for students. Those authorities with schemes had wide variations in terms of flat rates, photo passes, permits, different age ranges and time of day limitations. As a guide, from those authorities who responded, the average term travel fee per child was £19 and for students £58. Given that the availability and types of scheme vary so widely, it would be inappropriate to use an 'average' approach for the whole of the UK. Also there would still be the problem that children or students have to get to the bus stop. As education (including escort trips) was the reason for 4 per cent of total travel in 1999, using a different pricing system for education trips, if an option were available, would have a fairly small effect on the total.

Provision of transport for the ill and disabled also varies widely, as do subsidies for the elderly. The 'Mayor's Draft Transport Strategy'[11] indicates that in London, Dial a Ride, funded by Transport for London (TfL), provides 1.2 million trips per year. In 1999/2000 the

10 Transport Statistics Bulletin: *Concessionary Fares Schemes* SB(99)19 Department of Transport, Local Government and the Regions

11 Chapter 4N: *Improving London's Transport System: Taxis and Minicabs, Community Transport and Door-to-Door Transport*

service cost £12.5m, which implies a cost of £10.42 per trip. However this will also cover the overheads of running the service. TfL also provides subsidised taxi travel - approximately 700,000 trips per year at a cost of £7m in 1999/2000, giving an average of £10 per trip.

The report on concessionary fares also covers schemes for the elderly, disabled, registered blind and those with impaired mobility. In London, all travel on public transport for elderly residents is free after the morning peak. Outside London, there is often some form of reduced fare, sometimes tiered, with different rates for the over 75s, and take up rates vary. As with school travel, these subsidies have wide variations throughout the country and usually apply to bus and train travel, so are not 'door to door'.

Volume

Due to the level of detail by mode and purpose required from the NTS for this analysis, it is not sensible to look at individual year data, because of the large sampling errors around the estimates. The estimates are based on 3-year centred averages, so 1997 is the average of 1996 to 1998.

All of the NTS data used is for the average distance travelled per person per year. Distance has been used rather than the number of trip stages, as this is more appropriate, given the price information available for valuing the results. The distance of all trip stages provided by the household has been included. For example, if, on a trip to work, an individual got a lift to the station, caught the train and then walked to the office, the lift to the station is commuting as a car passenger, the train trip is excluded and the walk to the office is commuting by walking. The car driver would also record an 'escort commuting' trip as a car driver.

The distance per person per year data has been calculated separately for 0-16 year olds (children) and 17+ (adults) and also for London and the rest of Great Britain (RoGB). In order to get the total distance travelled by everyone in the UK, the average distance per person has been grossed to the appropriate population totals. As we are assuming that travel patterns in the rest of the UK (RoUK) are the same as those in RoGB, the average distance per adult in RoGB has been grossed by the adult population of RoUK. This has been done separately for motorised and non-motorised modes of transport. Motorised modes include *car*, *van*, *motorcycle* and *other private* vehicles and non-motorised modes are *walk* and *bicycle*.

As a PHV trip is the 'unit' of travel, we assume that if people travel together they would also share a PHV. The total distance travelled by all people in the UK therefore needs to be adjusted by the average number of people travelling together. The numbers in party for motorised and non-motorised modes by purpose have been averaged over eight years (1992 to 1999) from the NTS data. Each year's data has then been divided by this average number in party. As adults and children travel together, it is not possible to keep child and adult trips separate when looking at the party data. Between 1992 and 1999 approximately 7 per cent of all child trips and 49 per cent of all adult trips were undertaken alone. The average number in party for motorised modes ranges from 1.4 people per party for 'other work' travel to 3.0 people for holidays. The average for non-motorised parties ranges from 1.1 for commuting to 2.7 for holidays.

As the HHSA account is for the year 2000 and the transport results are based on a three year rolling average, data is not yet available for a three year period centred on 2000. Data for 2000 therefore had to be forecast from rolling averages available for 1993 to 1999. The series forecast were the number of mile travelled per person per year by purpose, broken down into

motorised and non-motorised and then further subdivided by under 17 years, 17 and over, and by London and the rest of Great Britain. A total of 144 series were forecast. 138 series were forecast using the Holt exponential smoothing method. For 5 series the Holt method gave negative results, which was interpreted as evidence of a lack of trend and a simple exponential method was therefore used. The remaining series had been zero since 1994 and this was therefore repeated in 2000. It should be noted that six years of data is a very limited series on which to base a forecast, and this should be borne in mind when looking at the results.

Value

The NTS PHV cost per mile data is available for 1995 onwards, separately for London and the rest of Great Britain (RoGB). We have again had to assume that Great Britain is representative of the UK. Due to the relatively small number of respondents, this data has been averaged for 1995 to 1999, giving a value centred on 1997. As noted earlier the centred average cost of a PHV in London in 1997 was £1.39 per mile, and in the rest of Great Britain 87p per mile. The year on year changes in the retail price index for taxis in London and outside London have then been applied to the 1997 values, to create a price series from 1993 to 1999. The separate London and RoUK prices are then applied to the appropriate totals by purpose, still split between motorised and non-motorised modes. This assumes that the trips made by Londoners outside of London are balanced by the trips made by RoUK respondents in London.

The cost of hiring a PHV includes a charge to cover the time that the PHV (and driver) are not in use or 'dead time' during the working day. In the absence of information on what proportion of the charge covers this dead time, we have assumed it to be 5 per cent in our results.

Sensitivity analysis

We have tested the sensitivity of our estimates to potential range of volume estimates due to sampling variability, the use of a five-year rather than a three-year rolling average. We looked at the effect of changing the assumption about 'dead time', by assuming that PHV drivers spend no time waiting for fares, or that 10 per cent of their charge covers dead time. We also started to look at the effect of travel patterns changing if there were a switch from household to market production of transport, by removing 50 per cent of single person escort trips.

4. PROVIDING NUTRITION

Output

Concepts
The output of this function is "meals, snacks, drinks for the members of households", and the principal activity is food preparation. In order to value these meals appropriately, we must distinguish between the different types and the likely content. A breakfast should not be valued at the same price as a dinner. Tea and toast should not be valued at the same price as a full English breakfast. An adult meal should not be valued at the same price as a child's meal.

The cost of a meal bought in a restaurant or café and used in the valuation also includes the cost of the premises and the furniture, as well as the cost of the ingredients, equipment and labour. Double counting must be avoided - see above.

Inputs

Intermediate consumption
This includes the bought ingredients which are transformed in the process of preparing a meal. When estimating the value of the ingredients, we need to be very careful to distinguish between these items and food which is eaten without preparation –fruit, snacks etc. – the latter remains in the National Accounts as final consumption.

The cost of any inputs to homegrown food (seeds, fertiliser etc.) are also part of intermediate consumption. The value of the fruit and vegetables etc. which are produced should <u>not</u> be deducted from the value of the meal. In this way, the return to labour will include the value of the home grown food. To take an example, if a vegetable hotpot is valued at £3.00 and the cost of the vegetables, household capital etc. etc. comes to £1.50, the return to labour is £1.50 – this may represent 30 minutes preparing the dish i.e. an hourly rate of £3.00. If the vegetables are all home grown, and the cost of the other inputs is only £0.50, then the return to labour is £2.50. This may represent 30 minutes preparing the dish and a total of 30 minutes in the allotment – an hourly rate of £2.50. The return to labour is higher in the second case because the ingredients are also produced by the household. The hourly rate is lower because it represents more time relative to value added spent in producing the meal.

The market prices used to value meals will include the cost of the premises and related transport costs. Intermediate consumption in this account should therefore also include a proportion of the goods and services relating to the accommodation (owner-occupied and rented) where the activity takes place. Transport costs should also be included, both relating to market-provided transport (if this can be identified as relating to providing nutrition) and to household-provided transport (e.g. a proportion of the consumables identified in the transport account).

Household capital consumption
This includes ovens, dishwashers and refrigerators, as well as smaller items such as mixers and food processors. If computers are used to purchase food, a proportion of their value should also be included.

Related services
As above, the shopping, gardening etc. which relate to providing nutrition must be separately identified and allocated.

Labour
This is time spent in food preparation and related activities e.g. washing up.

Methodology

Data sources
We purchased market research data from Taylor Nelson Sofres for the year 2000. The Family Food Panel (FFP) samples 11,000 individuals within 4,200 households. The panel reports on all food and drink consumed at home, with each household reporting for a two-week period every six months via self-completion diaries. The sample is staggered so that every day of the year is covered. The sample is designed to be representative of the GB household population. Initially the sample design was based on a random route quota sample controlled by district. Since the initial recruitment the sample has been maintained to ensure that panel attrition is replaced to the appropriate demographics, poor responders are replaced and targets are revised to take account of changes in the GB household population.

The diary keeper is asked to allocate all the ingredients used during the period according to when they were eaten i.e. at breakfast, morning snack, lunch, tea, evening meal or evening snack. They also note who in the household consumed the meal and whether it was eaten in the home or outside (e.g. a lunchbox). This results in approximately 2 million records relating to one calendar year, which need to be condensed into a more manageable dataset.

Information on prices comes from the Eating Out section of the National Food Survey (NFS). This estimates eating out consumption from occurrences and estimated portion sizes, to supplement the information on household food and drink collected in the main survey. The NFS is a continuous sampling enquiry into the food consumption and expenditure of private households in the United Kingdom. Information is obtained continuously throughout the year, apart from a short break over the Christmas period. For 2000, the sample size for home foods was 5,974 households with a response rate of 64 per cent.

2,549 households responded to the Eating Out section, with a response rate of 57 per cent in 2000. Each member of the household over the age of 11, including visitors staying with the household, is given a diary to record all personal consumption of, and expenditure on snacks, meals, confectionery and drinks eaten outside the home (not from household supplies). The following details are recorded in the eating out diary for each food item: the description, the number and size of certain items (where possible), the cost (where the respondent paid), the type of outlet where it was bought, and whether it was consumed on or off the premises. The expenditure is attributed to a complete dish (course) or to a whole meal.

The prices in the Eating Out section are therefore an average from a range of eating out establishments, from a small, basic café to a large expensive restaurant. We have assumed that the range of quality of meals that this represents is similar to the range of quality which is found in home produced meals.

Volume

By looking at the ingredients in each meal and who ate it, as recorded in the FFP survey, we were able to classify meals by portion size and by NFS meal classification, taking a 'common sense' approach to the likely ingredients of NFS meals. So, for example, if the FFP ingredients include beef, vegetables, rice or pasta, we have used the NFS price of a beef meal. If the ingredients include beef, bread and salad vegetables this is a meat sandwich, and if the ingredients include only beef and salad vegetables, this is a meat salad. Of course, the former could also be a beef salad eaten with a bread roll, but this would be more expensive when eaten out, and, as we do not have more precise information, we have used the classification which gives us the most conservative estimate. The classification, detailed in Annex 4.1 at the end of the chapter, includes 29 different types of meal, 5 types of salad, 9 types of sandwich, and 41 other ingredients consumed on their own. These meals can be eaten at any time of the day.

We identified one, two and three course meals by looking at starters and desserts. The only starter we were able to identify easily was when soup was eaten with the meal. This means that we have underestimated the number of three course meals. We have made a distinction between packet soup and other soup, and valued these differently. Breakfast cereal is eaten with a wide variety of other ingredients, so we have also classified this as a starter, where the additional items do not include potatoes, rice, pasta or other vegetables. We identified 8 types of dessert, including fresh fruit. Because the respondents report who is eating each individual ingredient, we can account for adult and child portions, and different individuals eating different meals at the same time. We have also identified those occasions where only snacks were eaten – these include biscuits, crisps etc. – as well as the total number of hot drinks (tea, coffee, hot chocolate etc.) made.

In order to arrive at volume estimates for the UK population, we used grossing factors using data derived from the Labour Force Survey, which exclude people living in institutions, stratified by gender, eight age groups and three regions, as show in table 4.1 below.

Table 4.1 Categories used for grossing factors

Age Groups	Gender	Regions
1: 0-9 years	Male	**North:** Rest of Scotland, Strathclyde, Tyne & Wear,
2: 10-19 years	Female	South & West Yorkshire, Rest of Yorkshire & Humberside
3: 20-29 years		**Middle:** East Anglia, East Midlands, Greater Manchester &
4: 30-39 years		Merseyside, Rest of North, Rest of North West, Rest of
5: 40-49 years		West Midlands, West Midland Metropolitan County
6: 50-59 years		**South:** Inner London, Outer London, Rest of South East,
7: 60-69 years		South West, Wales
8: 69+ years		

Source: HHSA/LFS

We were not able to subdivide the age groups further, due to sample sizes in the individual cells, so we used a definition of child portions that corresponded to the first age group 0-10 years old. The diaries are kept for two weeks, and we assumed that these two weeks are representative of the whole quarter, and multiplied the results by 6.5 for the quarterly estimate. The four quarters are then added together to produce the annual estimate.

Value

The NFS gives prices for meals and for individual ingredients, and is the average of prices collected in Great Britain. The prices cover items purchased from the following types of outlets: major chain fast food outlets, other fast food/takeaway outlets, Chinese, Indian and other ethnic restaurants, other restaurants and cafes (including railway and bus terminals, airports, hotels and guest houses), public houses and wine bars. The GB prices are not thought to be significantly different from prices collected at the UK level.

We have used these prices in the following way. Any item which we have classified as a dessert or a starter is always priced, whether or not it is eaten as part of a meal. Individual ingredients, when we have not classified them as snacks, are also priced even when they are the only item that is eaten at a 'meal'. Ingredients which we have classified as snacks and which are eaten on their own have not been valued. So for example, a beef salad meal may include crisps among the ingredients. We have assumed that these could be included in the price of a beef salad. Crisps eaten on their own are not valued.

Children's portions are all those meals consumed by children under the age of 10. This is definition of a child is dictated by the level of aggregation required for the grossing factors. Children's portions have been valued at half the price of an adult meal.

Only hot drinks have been valued - tea, coffee and hot chocolate. Individual instant soups have also been classified as hot drinks, when they are the only item consumed at a meal.

Sensitivity analysis

We have looked at the sensitivity of our estimates to the assumption about children's portions, and to average prices including subsidised outlets.

Annex 4.1 Classification of meals

Meal	**Salad**	**Other**	**Starter**
Beef	Cheese	Bacon	Packet Soup
Burger	Chicken	Baked Beans	Soup
Casserole	Egg	Beans on Toast	Breakfast Cereal
Chicken	Fish	Beef	
Chinese	Meat	Bread	**Dessert**
ChineseB		Bread & Spread	Cake
Duck		Casserole	Dessert
Egg	**Sandwich**	Cheese	Fruit
Fish	Cheese	Chicken	Fruit Salad
Fry Up & Chips	Egg	Chips	Ice Cream
Ham	Fish	Chop Suey	Milk Pudding
Kebab	Fish in Bun	Cooking Sauce	Yoghurt
Lamb	Hamburger	Duck	
Liver	Meat	Egg products	
Meat Curry	Poultry	Eggs	
Meat CurryB	Steak	Fish	
Meat Pie	Vegetarian	Fishfingers	
Mixed Grill		Ham	
Other		Jacket Potato	
Pasta		Kebab	
Pizza		Lamb	
Pork		Liver	
Quiche		Meat	
Sausage		Meat Dish	
Steak		Meat Pie	
Turkey		Other Meat	
Veal		Pasta/NoodleDish	
Veg Curry		Pastry	
Vegetarian		Pie Filling	
		Pizza	
		Pork	
		Prepared Dish	
		Rice	
		Sardines	
		Sausages	
		Soya	
		Spread	
		Steak	
		Turkey	
		Vegetables	
		White fish	

Notes: A meal includes the main ingredient plus potatoes and/or vegetables and/or rice and/or pasta. A salad includes the main ingredient plus salad vegetables. A sandwich includes the main ingredient plus bread. Other refers to ingredients eaten on their own:

"Chop suey" is any type of Chinese sauce without another main ingredient
"Egg products" are quiches without any other ingredients
"Meat" includes beef, lamb and pork
"Meat Dish" is a bought prepared savoury dish eaten on its own
"Other meat" is burgers eaten on their own
"Pasta/Noodle Dish" covers pasta eaten alone, hot instant snacks and canned pasta meals
"Sardines" covers all tinned fish.

5. PROVIDING CLOTHING & LAUNDRY SERVICES

Output

Concepts
The output of this function is garments produced by households. It should also include, separately identified, the maintenance of all clothing – this output is the provision of maintenance & laundry services.

Inputs

Intermediate consumption
This includes fabric, knitting wool and other haberdashery items plus soap powder, fabric conditioners etc.

Household capital consumption
This includes sewing and knitting machines, washing machines and tumble driers etc. plus a proportion of the housing cost – rented and owned-occupied.

Related services
The maintenance (washing, ironing and repair) of all clothing is an output, but related services should include any clothing-related shopping which can be identified.

Labour
This is the time spent on production and maintenance – it should not include time spent on sewing home furnishings, which belongs in the housing account.

Methodology

Data sources
Garments: As most of the work relating to clothing in the 1990s involves maintaining clothes produced by the market, there is very little information on home production of sewn and knitted clothes. We used the intermediate consumption figures for the purchase of fabric and knitting wools, and haberdashery items, and doubled this to obtain the value of the output of homemade garments.

Laundry: Information on the average number of washing loads per week came from the Lever Faberge UK Laundry Market report. This was multiplied by the number of households in the UK (from the Family Expenditure Survey) to obtain the volume of washing. We obtained the weight of an average load of washing from the National Association of the Laundry Industry, and assumed that 10 per cent of each wash load is ironed. This is roughly equivalent to 5 garments per person per week.

Value
We used a launderette service wash price per load to value the output of washing, and an ironing price per kilo to value the output of ironing. A service wash includes drying and folding the clothes. Prices were collected by phone from a random selection of launderettes.

Sensitivity analysis
We tested the sensitivity of our estimates to our assumption about the amount of ironing.

6. PROVIDING CHILDCARE

This is part of the principal function, providing care and education, where the output is "care services to children, the sick and the elderly". We have divided it into two main categories – childcare and adult care. Providing education is conceptually different from providing care, but is not currently separately identified in this account.

Output

Concepts
We have information on the numbers of children in each age group in the population. We know that the requirement for childcare varies with age, the cost and availability varies throughout the day and that different levels of provision are required in term-time and school holidays. We are able to calculate the number of population (child) hours in a year and to allocate them to four different types of day – weekday (term-time), weekday (school holiday but working week), weekday (holiday), weekend day. These are multiplied by the appropriate number of days in the year, to give the total child hours which need to be accounted for in each year.

We can allocate all the information we have on formal care (childminders, nurseries, school places, hospital beds, foster care, out of school clubs etc.) to the different types of day and different times of the day. By subtracting this from our child hours, we can estimate informal care by time of day and type of day, including assumptions about time spent alone as children grow older.

The definitions of formal and informal childcare vary between different surveys and projects. Formal childcare can be defined as provision that is registered and paid for, e.g. registered childminder places for the under 8s. Information on registered and paid childcare provision is collected by national surveys such as the DfEE (now DfES) Children's Day Care Facilities. Another definition of formal childcare is care which is formalised by payment but unregistered, e.g. unregistered childminders (childminders who work for less than 2 hours a day, as defined by the Care Standard Bill 99/00) and nannies.

Informal childcare is often defined as unpaid care. This usually refers to care given by family members such as grandparents and siblings, as well as friends. Babysitting is probably the most significant example of this type of care, although carers could be "paid" in favours or by small gifts. (Babysitters are defined in the Care Standard Bill as looking after a child between the hours of 6.00 p.m. and midnight on day one and 12.01 to 2.00 a.m. on day two, and at no other time on these days acting as a childminder.) This definition of informal care does not usually include care given by parents. Alternatively, informal childcare can be defined as care which is unregistered even if paid for, so paid babysitters could fall into this category. This is still referred to as informal care because the arrangements are not formalised with contracts or employment rights.

As most of the childcare carried out by the household members or their networks (family members or neighbours) could be delegated to another person, it is deemed to be part of the productive role of households. We have not tried to distinguish between physical acts of supervision or help and the building of parent-child relationships, which obviously cannot be delegated. Therefore the HHSA definition of informal childcare is all care which does not involve a monetary transaction. It is the total amount of childcare required (total number of

children in the population multiplied by twenty four hours a day) less any formal childcare, defined as all paid childcare, whether it is registered or unregistered. However, we have not been able to include in our estimates some paid care, which we know takes place, but for which we have been unable to find any data. This includes care by babysitters and au-pairs, as well as out-of-school clubs and holiday play schemes for children over 8 years old. If and when such data becomes available, it will be included in the estimates.

As children get older, some of them are left unsupervised for varying amounts of time. An allowance has been made for this, so that the amount of informal care is reduced for older children. There is limited hard data on the actual amount of unsupervised time. If, in fact, the assumptions we have made lead to informal childcare being underestimated (i.e. we have included too much unsupervised time), this will be offset to some extent by the unmeasured formal care which has not been included.

By using a residual approach to estimate informal childcare we are accounting for all the time a child needs supervision. This supervision can be 'active' or 'passive'. Passive care includes the time when an adult may not be directly interacting with the child, but is still responsible for them. The important point is that if no unpaid carer were available, a third person would have to be paid to take their place. Therefore passive care is part of the productive role of households and is included in our estimates.

One simple way of distinguishing between passive and active childcare is to look at waking and sleeping time. If we assume a child under 5 sleeps for twelve hours, we can say that 50 per cent of their childcare is passive, and so on. Using a set of assumptions about the relative proportions of waking and sleeping time for children of different ages as proxies, we can value separately active and passive informal childcare.

Inputs

Intermediate consumption
This includes toys and books etc., as well as any relevant housing and transport costs.

Household capital consumption
This includes specialist equipment – cots, pushchairs etc.

Related services
This includes any shopping related to childcare.

Labour
Typically time spent caring for children is underestimated in Time Use diaries because it is an activity which often takes place at the same time as other activities. Allowing respondents to list main and secondary activities will hopefully improve the estimates.

Methodology

Data sources
Administrative data on formal childcare places, including schools, is available from the Department for Education and Skills for England and the constituent countries for the rest of the UK. Data on hospital, children's homes and foster places comes from the Department of Health for England and the constituent countries for the rest of the UK. Much of this

information is available for the last 10 years or more. Other information – on out-of-school clubs etc. – is collected by surveys. It is available only on a UK basis and is collected only sporadically. We have pro-rated this data to give a more complete pattern of childcare in the constituent countries and over time.

Formal Hours

Information on different types of formal care has been collected for each UK country. This mainly takes the form of the numbers of childcare places available, and in all cases we have assumed 100 per cent take-up of places. The requirement for and use of formal childcare varies for children of different ages, so the places have been allocated to the following categories:

Age Group 1	under 5 years old
Age Group 2	5-10 years old
Age Group 3	11-15 years old

As formal childcare availability varies by the time of the year, the year has been split into four types of day:

Weekend	= 104 days
Week Day - School Day	= 180 days (36 weeks x 5 days)
Week Day - Working Holiday	= 28 days (4 weeks x 5 days plus 8 bank holidays)
Week Day - School Holiday	= 53 days (12 weeks holiday minus working holiday and bank holidays)

The estimates for each age group by time and type of day have been aggregated to obtain a figure for the total number of hours spent by all children in the UK in formal care in any one year.

Assumptions

For each separate type of day and age group, assumptions have been made about the length of time the various types of childcare provision are available. For example, an average school day is assumed to be 6.5 hours long, and includes lunchtime supervision at school. Assumptions about the average length of day spent with a childminder are based on the childcare module from the DSS (now DWP) Family Resources Survey, which asks for average weekly hours used in term-time and during school holidays. This suggests that, in those households using childminders, on average under 5s spend 25 hours per week with them, while 5-10s and 11-15s spend 10 hours per week with them. Information from the DfES on Children's Day Care Facilities suggest that, on average, playgroups offer 5 sessions per week, so we have assumed one 3-hour session per day per playgroup place. We have assumed that day nursery places are filled for 5 hours each day, that out-of-school clubs run for two hours on each weekday in term-time, and that holiday clubs are open for 6 hours each weekday during the school holidays.

We have assumed those children in foster places and children's homes are cared for 24 hours a day all year round, with the exception of attending school for 6.5 hours a day. Similarly, full time boarders are assumed to be in formal care 24 hours a day on school days and at weekends. Weekly boarders are assumed to be in formal care 24 hours a day on weekdays in term time. This means that for some individual children we may be double counting the total number of hours spent in formal care. For example, a foster child, a child living in a children's home or a boarder may attend other formal care activities. They may attend a

holiday play scheme, or out of school club. Due to this double counting, the total number of formal hours may be slightly over estimated, which will result in an underestimate of informal hours.

Assumptions have also been made in order to divide the data on places between the three different age groups. If the data is already broken down into different age groups from the ones outlined above, then the data is prorated using the UK country and year specific population age structure. If only the total number of children in a care category is available, then the proportion in each age group from the England data has been applied to the total numbers. Finally, if data is split down into the age groups for only some years, then the average split between the age groups has been applied to the years when only the total is available. Missing data points have been estimated by predicting the trend between existing data points.

The total number of children in the population in Great Britain (as estimated by the Population Estimates Unit, ONS) is higher than the total number of pupils on the school rolls (aggregating estimates from DfES, the Scottish Executive and the Welsh Assembly). We have assumed that the number of children who are not accounted for in the school rolls are those children who are taught at home, children who are under special arrangements for the education of travellers' children, or refugees and asylum seekers. As the population figures are estimates only and the school rolls and population figures are often taken at different times of the year, this will also account for some of the differences. For Northern Ireland, however, there is the additional problem that the number of pupils attending school from across the land-border cannot be separated from those resident in Northern Ireland. The number of school places in Northern Ireland is much higher than the relevant population figures. Therefore we have assumed that all 5-15 year olds resident in Northern Ireland attend school there, and the population figures have been used in place of the number of school places.

Full details of the data sources and assumptions made about each type of formal provision can be found in Annex 6.1, at the end of the chapter.

Informal Hours

We estimate the volume of informal care by subtracting the hours spent in formal care plus an allowance for the hours a child aged 12-15 may be left unsupervised, from the child population multiplied by the total number of hours in a year. As with formal care, the total hours of informal care can be broken down by age group and time and type of day.

Assumptions

The assumption about the time children aged between 11 and 15 spend unsupervised is critical in calculating informal hours, and is perhaps the hardest to support with hard evidence. To estimate the number of hours spent in informal care, the number of hours a child is left unsupervised needs to be subtracted from the total population hours in addition to the hours spent in formal childcare activities. This time unsupervised by adults could be when a child is spending time with their friends, being looked after by an older sibling or on their own.

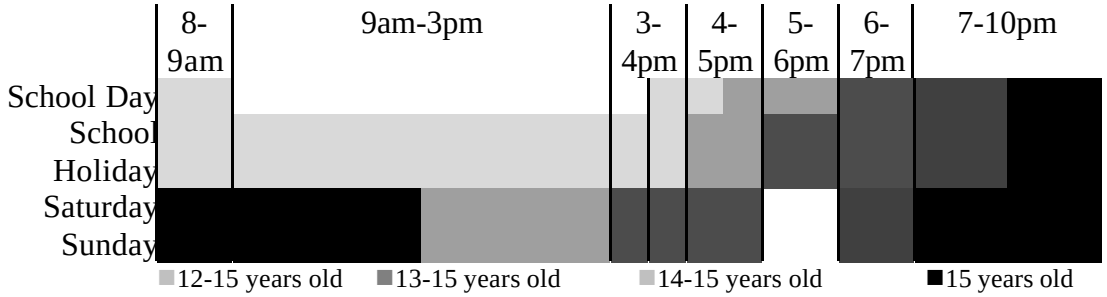
The data available on when children are left unsupervised by their parents is very sensitive to reporting errors, due to social norms and beliefs about the amount of time children should spend alone. A survey carried out by Kids. Club Network in 1997, sponsored by Nestlé, estimated that 6 per cent of children return home to an empty house. The sensitivity of the

issues suggests that there is under-reporting by parents, which leads Kids. Club Network to estimate that the true figure would be closer to 9 per cent. The Family Working Lives Survey carried out by DfES in 1996 found that 5 per cent of respondent households reported that their school age children look after themselves in term-time and school holidays, and 2 per cent reported that they were looked after by an older sibling. Because of the lack of data about the length of time left unsupervised, we have started from the working assumption outlined below.

In the HHSA we have assumed that no child aged 11 or under is left unsupervised and that 10 per cent of 12 year olds, 20 per cent of 13 year olds, 30 per cent of 14 year olds and 50 per cent of 15 year olds spend time without adult supervision. In every case, we have not included any allowance for time spent unsupervised during four weeks holiday plus Bank Holidays. These assumptions can be interpreted as a mix of two extremes. We could say that 10 per cent of children aged 12 are left unsupervised all the time. We could also say that out of 337 days (365 days minus 4 weeks paid holiday of carer minus 8 days bank holiday) an individual 12-year-old would spend a total of 10 per cent of their time unsupervised.

As Chart 6.1 (below) shows, for a 12 year old, this unsupervised time could typically include an hour in the morning before school, plus an hour and a half after school (e.g. walking themselves to and from school), plus being left unsupervised by an adult between 8.00 a.m. and 4.00 p.m. in the school holidays, while a parent is at work. This scenario assumes no time unsupervised in the evenings or at the weekends. For a 15-year-old, the assumption includes the same times of day as a 12-year-old, plus additional hours after school on school days, in the evenings in the school holidays and at the weekend.

Chart 6.1 Unsupervised time



Source: HHSA assumptions

Informal care in the HHSA is therefore care of children by adults, as care of children by other children is included in the assumption of time unsupervised.

Value

As mentioned earlier the requirement for and use of informal childcare varies for children of different ages, as well as by different times of the day and different days of the year. It is possible to value al informal hours at a single market price or to take into consideration the time of the year, time of the day and the age of the child. Because we are valuing the output of childcare, i.e. the number of children cared for multiplied by the total time in a year when they receive this care, the market price must also be a rate per child.

The services provided by an employed live-in nanny are deemed to be the nearest market equivalent to the services provided by parents and other informal carers, so their rate per child hour has been used to value informal care. The wages of live-in nannies have been taken from the Professional Nanny/Nannytax Annual Survey, which gives average wages by geographical area and for the UK. The average weekly net wages are given in Table 6.2.

Table 6. 2
Average Weekly Net and Gross Wages - Live-in Nanny 1995 – 1999

Year	Net	Gross wage and National insurance contributions
1995	£113	£119
1996	£131	£171
1997	£136	£177
1998	£139	£180
1999	£169	£223

Source: PN/Nannytax Annual Survey of Nannies' Wages 1999, Nanny Tax Payroll Services

As the table shows, there have been sharp increases in average wages between 1995 and 1996, and between 1998 and 1999. While there are likely to be many factors which have caused this growth, one of the key influences in the latest increase is the introduction of the National Minimum Wage in April 1999. A shortage of nannies may also have led to an increase in their average wage.

The averages in Table 6.2 conceal considerable variation. Daycare Trust found that, in 2000, the average monthly cost of a nanny ranged from £540 to £1340 per month, an estimated £135-£335 per week. The PN/Nannytax Annual Survey also found considerable regional variation, with the net mean hourly wage for the East Midlands at £3.90 but £4.30 in the South East. We have used the average wage for other cities, i.e. excluding London.

Payment in kind
A live-in nanny is paid not just in wages but also in accommodation and food, with some nannies receiving additional perks such as the use of a car. Because of this, the live-in nanny wage rate is lower than the daily nanny rate. The PN/Nannytax Annual Survey of nannies' wages found that the net weekly wage rate for 1999 for a live-in nanny was £169. For a daily nanny this was £196 per week. We have made an adjustment for payment in kind using data from the Agency Nannies Training Survey 1999, comparing the live-in and daily rate for nannies working the same number of hours per week. This results in an upward adjustment to the net wage rate of 8.5 per cent and the gross wage rate of 10 per cent.

Rate per child hour
Nannies do not charge for their services by the hour or per child. Based on the findings of the Annual Nannies Survey 1999, we have assumed that the average live-in nanny works 48 hours a week looking after an average of 2 children. This information is used to adjust the gross and net weekly wages and the rate per child hour is shown in Table 6.3 below. In order to be consistent with the other output measures, which are at purchasers' prices, the gross wage is used to value informal childcare.

Table 6.3 Estimated rate per child hour (net and gross) 1995 - 1999

Year	Net	Gross wage and National insurance contributions
1995	£1.28	£1.38
1996	£1.48	£1.97
1997	£1.54	£2.03
1998	£1.57	£2.07
1999	£1.91	£2.56

Source: HHSA estimates

Sensitivity Analysis

We tested for the sensitivity of our results to the time 11-15 spend alone, by altering our assumptions about the numbers of children who are left unsupervised. Firstly, we increased the proportions of each age group by 10 percentage points, so that 10 per cent of 11 year olds, 20 per cent of 12 year olds, 30 per cent of 13 year olds, 40 per cent of 14 year olds and 50 per cent of 15 year olds spend their non-school time unsupervised. Secondly, we assumed that no child under 16 is ever left unsupervised.

We tested our assumption, that the difference between the number of school places and the child population is accounted for by informal childcare, by assuming that no informal care of school age children occurs during the school day, i.e. between the hours of 9.00 a.m. and 3.30 p.m.

Our assumption that all children in foster homes and children's homes are not receiving any additional formal care is likely to have a negligible impact on the estimates, as less than 0.5 per cent of the UK under 16 population are in care.

We tested our assumption about 100 per cent take-up of formal places, by assuming that only three-quarters of formal childcare places are taken up.

Annex 6.1 Childcare Assumptions

CARERS	Coding Issues	Assumptions	Other Data Issues
Childminders	England • Raw Data - DfEE: 1988-1991 under 5s. 1991-1999 under 8s. • HHSA age split - Percentage split for 1991 and 1992 for the two age groups applied to all years (90% under 5s, 10% 5-7). Northern Ireland • Raw Data – DHSSPSNI[1]: 1988-1997 under 8. 1997-1999 under 5 and "other" category. 1997 -1999 data on sponsored childminders and registered childminders. No data on sponsored childminders prior 1997. • Calculations - Estimate 1998 childminder figures. To be consistent with other country data assume all childminder places are for under 5s or 5-7s: childminders for under 8s are recorded in 5-7 age group. 1997-1999 assumes "other category" is 5-7's. • HHSA age split - Percentage split 1997-1999 for the two age groups applied to all years.(51% under 5s, 49% 5-7) Scotland • Raw Data - Scottish Abstract of Statistics: 1988-1998 under 8s. 1997 age split for under 5s and under 8s. • Calculations - Estimate 1998. To be consistent with other country data assume that all childminder places for under 5s or 5-7s: childminders for under 8s are recorded in 5-7 age group. • HHSA age split - Applied 1997 age split to all years(58% under 5s, 42%5-7) Wales • Raw data -Welsh Office:1988-1998 total places. • HHSA age split - no data points to estimate an age breakdown so assume 50/50 split base on the evidence that Northern Ireland and Scotland is approximately 50/50 %.	**Under 5's** 9 hours per day (0800-1700): school day & school holiday **5-7s** 3 hours per day (0800-0900 & 1500-1700): school day 9 hours per day: school holiday. **7-11s** assume no childminder places (data on places for under 8s only) **All** Assume 100% take up of places. This may be an over estimate in the number of childminders but could offset unregistered paid childminders.	• Using an estimate to calculate the split between under 5's and 5-7 from the total childminders figure affects the total number of informal hours spent in childcare. • If the valuation of childcare for under 5s is at a higher rate than the 5-7s, then the total hours spent in care with a childminder is more crucial.
Nannies	UK • Raw Data - Labour Force Survey:1988-1999 number of nannies. • Calculations - applied average number of dependent children (1.8) to approximate number of children looked after.	8 hours per day: school day, school holiday and weekend Assume under 8 only.	• Estimate may include other jobs such as Dinner supervisor

UNDER 5s	Coding Issues	Assumptions	Other Data Issues
Day Nursery	England • Raw Data - DfEE:1988-1999 total places. • HHSA age split - all day nursery for under5's. Scotland • Raw Data - Scottish Abstract of Statistics:1994-1997 total places. • HHSA age split - all day nursery for under5's Wales • Raw Data - Health Statistics and Analysis Welsh Office:1988-1998 total places. • HHSA age split - all day nursery for under5's Northern Ireland • Raw Data - DHSSPSNI: 1998-1999 total places. • HHSA age split - all day nursery for under5's	8 hours per day (0900-1700): school day and school holiday Assume 100% take up of places.	
Nursery School	England • Raw Data - DFEE:1988-1998 total places given. • HHSA age split - assume under 5. Northern Ireland • Raw Data - NI Education Department:1988-1999 total places given. • HHSA age split - assume under 5 Scotland • Raw Data - Scottish Education Board:1988-1999 total places given. • HHSA age split - assume under 5. Wales • Raw Data - Welsh Education Board:1988-1999 total places given. • HHSA age split - assume under 5.	**Full-time** 6 hours a day; school day **Part-time** 3 hours a day; school day Assume under 5s only.	
Play Groups	England • Raw Data - DFEE:1988-1999 total places. • HHSA age split - Assume under 5s. Northern Ireland • Raw Data - Department of Education:1989-1999 total places. • HHSA age split - Assume under 5s. Scotland • Raw Data - Department of Scottish Education:1988-1999 total places • HHSA age split - Assume under 5 year olds. Wales • Raw Data -Welsh Office: 1988-1999.Registered and L.A. figures given. • HHSA age split - assume under 5 year olds.	6 hours per day; school day Assume under 5s only. Assume 100% take up.	

SCHOOLS	Coding Issues	Assumptions	Other Data Issues
Nursery Classes	England • Raw Data - DFEE. 1988-1998 totals given. • HHSA age split - assume under 5. Northern Ireland • Raw Data- no data Scotland • Raw Data - no data Wales • Raw Data - no data	**Full-time** 6 hours per day: school day **Part-time** 3 hours per day: school day Assume under 5s only.	
Maintained Schools	England • Raw Data - DFEE:1988-1998 number of pupils by age. • HHSA age split - aggregate ages. Northern Ireland • Raw Data - NI Education Department:1988-1999 number of pupils split down by HHSA age groups. • HHSA age split - given in age splits Scotland • Raw Data - Scottish Education Board:1988-1999 number of pupils by education level. • HHSA age split - Aggregate education level data. Wales • Raw Data - Welsh Education Board:1988-1999 primary places for 5-10s and 11-15s. • HHSA age split - split using population proportions.	**Full-time** 6 hours per day: school day **Part-time** 3 hours per day: school day	Assumption the children not included in the school education rolls but are counted in the population estimates are being cared for informally. The population is estimated and takes place mid April whilst the school statistics count children at the start of September.
Special Needs	England • Raw Data - DFEE:1988-1998 total places for individual ages. • HHSA age split - aggregate ages. Northern Ireland • Raw Data - NI Education Department:1988-1999 • HHSA age split - given in age splits Scotland • Raw Data - Scottish Education Board:1988-1999 numbers of pupils by education level. • HHSA age split - Aggregate education level data. Wales • Raw Data - Welsh Education Board:1988-1999 number of pupils by primary places, 5-10 and 11-15s.	**Full-time** 6 hours per day: school day **Part-time** 3 hours per day: school day	

	• HHSA age split - split using population proportions		
SCHOOLS	Coding Issues	Assumptions	Other Data Issues
Boarding School	England • Raw data - DfEE: 1988-1999 total boarders (weekly and full) • Calculations - Applied ISIS[2] weekly/full time places split to raw data. • HHSA age split - ISIS age breakdown Northern Ireland • Raw Data - ISIS Data: 1988-1999 full boarders. • Calculations - Applied ISIS weekly/full time places split to raw data. • HHSA age split - ISIS age breakdown Scotland • Raw Data - ISIS Data: 1988-1999 full Boarders • Calculations - Applied ISIS weekly/full time places split to raw data. • HHSA age split - ISIS age breakdown Wales • Raw data -Welsh Office: 1988-1999 total boarders (weekly and full) • Calculations - Applied ISIS weekly/full time places to raw data. • HHSA age split - ISIS age breakdown	**Full-time** 24 hours per day : weekend and school day **Weekly** 24 hours per day: school day	• Data sensitive to the reliability of the ISIS split between weekly and full time boarders. • Northern Ireland and Scotland: the number of total boarders is underestimated as the ISIS census covers only 80% of all independent schools. This means that the number of day pupils (see independent schools) is over estimated, which results in an underestimation of total hours spent in formal care. This is partly offset by day pupils attending other formal care categories such as out of school clubs.
Independent Schools	England • Raw data - DfEE:1988 -1999 no. of pupils split down by individual age. • HHSA age split - aggregate ages. Wales • Raw Data - Welsh Education Department:1988-1999 number of pupils split down by individual age including borders. • Calculations - Subtract boarders from Independent schools (ISIS data) • HHSA age split - aggregate ages. Northern Ireland • Raw Data - Northern Ireland Education Department:1996-1999 number of pupils split down by individual ages including boarders. • Calculations - Subtract boarders from Independent schools (ISIS data). • HHSA age split - aggregate individual ages. Scotland • Raw Data - Scottish Education Department: 1994-1999 number of pupils by education level. • Calculations - Subtract boarders from Independent schools (ISIS data). • HHSA age split - aggregate individual ages.	**Full-time** 7 hours per day: school day **Part-time** 3 hours per day: school day	• The number of independent day pupils for Wales, Northern Ireland and Scotland has been calculated as the residual of all pupils in independent schools minus the boarders. As the number of boarders is calculated on only 80% of all independent schools, then the total hours spent in boarding schools and therefore formal care is underestimated. This is partly offset by the fact that day pupils may attend other care categories, and so still are formally cared for. • This assumption will have a marginal affect on the valuation of childcare, as the number of children under 5 who are boarders is small.

24 HOUR	Coding Issues	Assumptions	Other Data Issues
Children's Homes	England • Raw data - DOH: 1988-1991 places for age groups under 5's, 5-9 and 11-15. • HHSA age split - Applied the age split of the population in 5-7, 8-10 and 10-15, to raw data. Northern Ireland • Raw Data – DHSSPSNI: 1997-1999 places for age groups under 5's, 5-11 and 12-15 age group. • HHSA age split - Applied the proportion of the population in 5-7, 8-10 and 11 to raw data. Scotland • Raw Data - Education Statistics Directorate: 1988-1998 places for 0-4, 5-10, 11-15, age groups. • HHSA age split - Applied age split from the population in 5-7, 8-10 to raw data. Wales • Raw Data - Health Stats. and Analysis Unit: 1998-1999 total places only. • HHSA age split - applied the proportion in each age group from England's Children's home data.	**All** 24 hours per day: school holiday, working holiday and weekend. Assume no other formal care. **Under 5s** 24 hours per day: school day **5-15s** 18 hours per day: school day	• Assumption that no other care category is used if a child is resident in a children's home, means that the total hours spent in formal care is overestimated. • This results in an under estimation of the total number of informal hours resulting in a lower valuation of informal childcare across all age groups.
Foster Places	England • Raw Data - DOH:1988-1991 age group under 5s, 5-9 and 11-15. 1991-1999 data given in HHSA age split • HHSA age Split - 1988-1991 applied the proportion of the population in 5-7, 8-10 and 10-15 age group to raw data. Northern Ireland • Raw Data – DHSSPSNI:1997-1999 age group under 5s, 5-9 and 11-15. • HHSA age Split - applied the proportion of the population in 5-7, 8-10 and 11 to raw data. Scotland • Raw Data - Scottish Board:1988-1998 under 5s, 5-10 and 11-15. • HHSA age Split -applied population proportion in 5-7, 8-10 to raw data. Wales • Raw Data - Health Statistics and Analysis:1988-1999 total foster places. HHSA age Split - applied the proportion in each age group from England's Foster Places data.	**All** 24 hours per day: school holiday, working holiday and weekend Assume no other formal care. **Under 5s** 24 hours per day: school day **5-15s** 18 hours per day: school day	• Assumption that no other care category is used if a child is fostered, means that the total hours spent in formal care is overestimated. • This results in an under estimation of the total number of informal hours and results in a lower valuation of informal childcare across all age groups

24 HOUR	Coding Issues	Assumptions	Other Data Issues
Long Stay Hospitals	England • Raw Data - DOH:1988-98 number of places. • HHSA age split - prorated using population data for 5-7, 8-10 and 11-15 age split. Northern Ireland • Raw Data - DHSSPSNI: 1994 -1998 • HHSA age split - data provided in HHSA age groups. Scotland • Raw Data - Scottish NHS:1988-1998 • HHSA age split - aggregate ages. Wales • Raw Data -1995-1998 National Assembly for Wales. • HHSA age split	24 hours per day: all year	
Short stay Hospitals	England • Number of bed-day given so divide by 365 to give average for one day. Northern Ireland, Wales and Scotland • Grossed up England data to UK totals	24 hours per day: all year	
CLUBS			
Holiday Clubs	England • Raw Data – DfEE: 1988-1999 total 5-7s. • HHSA age split – assume for 5-7s only. Scotland • Raw Data – Scottish Abstract of Information: 1994 and 1996 total 5-7. • HHSA age split – assume for 5-7s only. Northern Ireland • Raw Data – no data available Wales • Raw Data – Welsh Office: 1997 and 1998 • HHSA age split – assume for 5-7s only.	6 hours per day (0900-1500): school holiday Assume 100% take up of places.	
Out of School Clubs	England • Raw Data - DFEE:1993-1998 places for 5-7s. • Calculations - Estimate 1988-1993 and 1993 figure. • HHSA age split - assume 5-7s. Northern Ireland, Scotland and Wales • Grossed up England data to UK totals	2 hours per day: school day Assume 5-7s only due to data availability.	• Assume 5-7s only due to data availability. Kids Club Network suggests that the 40% of all clubs have a max. age limit of 11 years, implying an underestimation in the number of children in formal care

OTHER	Coding Issues	Assumptions	Other Data Issues
Time Alone	• UK- assume all children under 11 require 24-hour care throughout school day, weekend and school holiday and working holiday. • Children 11-15 applied estimate of time spent alone: 10% of children age 12(or 20% of an individual child's time) 20% of children age 13(or 40% of an individual chills time) 30% of children aged 14(or 60% of an individual child's time) 40% of children aged 15(or 80% of an individual child's time)		• The evidence on time children spend alone is sparse and the sensitivity of the question will mean that this is under reported, as social norms may suggest that a child should not be left unattended • 24% of children (1.5 million) are not accompanied home from school (1996 Latchkey Survey) • 350,000 5-12 year olds go home to an empty house i.e. 6-9 % children left alone after school • 5% of all school age children are left alone in term time(Family and Working Life Survey)

[1] DHSSPSNI: Department of Health, Social Security and Personal Services in Northern Ireland
[2] ISIS: Independent Schools Information Service – Annual Census

7. PROVIDING ADULT CARE

Output

Concepts
Informal adult care is defined in the HHSA as any help received either from members of one's own household, or from members of other households in the UK. We shall refer to this group as informal carers. It does not aim to measure the help provided by members of voluntary organisations. This will be recorded separately in our voluntary activity project, where voluntary activity is defined as unpaid work undertaken for or on behalf of an organisation or group, which benefits other people or the environment.

The output of adult care is the number of adults receiving care. There must be some adjustment for the amount/quality/regularity of care given. It is important that we disaggregate this output sufficiently to be able to value it at the market rate of an equivalent service. The type of care varies from specialised care, such as lifting or changing dressings, to "keeping an eye" on someone or doing their shopping. The amount of care received also varies from a visit once a week to continuous care. The cost of providing 24 hour nursing care for an elderly person is very different from the cost of providing a meal once a day or doing the shopping for an elderly neighbour once a week. If the valuation method uses residential rates as the equivalent market price, then the related housing provided by the household should be included in the inputs and the output of housing should be adjusted accordingly. If a domiciliary care rate is used, then no housing costs should be included in the inputs. Care which involves providing transportation needs to be linked to the transportation account, so that double counting is avoided.

The output of informal care is therefore the number of adults looked after, differentiated by the type and frequency of care they receive

Inputs

Intermediate consumption
Theoretically this includes any consumables relating to caring for the elderly. In practice, it is unlikely that we will be able to identify them separately. It should also include the relevant housing and transport costs if appropriate.

Household capital consumption and related services
As for childcare.

Labour
As well as Time Use Data, other household surveys collects information on time spent caring for adults, which may provide a useful comparison.

Methodology

Data source
The Family Resource Survey (commissioned by the Department for Work and Pensions – DWP) collects information on the number of adults receiving care and whether this care is on a weekly, daily or continuous basis. The FRS is currently the best data source, but is known to underestimate the numbers of adults receiving care.

In the FRS, the definition of adults is the population over 16 years of age, and care includes all help or assistance given to others because of physical or mental need. It ranges from odd jobs e.g. helping an elderly neighbour/relative with shopping or gardening, to full-time nursing care of the sick, disabled or elderly.

The FRS is a continuous survey that samples households in Great Britain using a stratified multi-stage probability sample. The questions and answers that we are interested appear in the care module and are listed below:

1. In some households, there are people who receive help or being looked after, for example because they are sick, disabled or elderly. Is there anyone in this household who receives any of these kinds of help or looking after? This could be from outside or anyone who lives here.
   Yes / No

2. How frequently does (X) receive such help?
   1 - Continuously
   2 - Several times a day
   3 - Once or twice a day
   4 - Several times a week
   5 - Once a week
   6 - Less frequently

3. Who looks after, or provides help for (X)? Anyone else?
   1 - 14 - Named person
   15 - Relative
   16 - Friend
   17 - Helpers

4. About how many hours a week, on average does (name of helper) spend actually providing help for or looking after (X)?
   Number of hours given.

5. What kind of things does (X) usually receive help with?
   1 - Personal care (dressing, bathing, washing, shaving, feeding, using the toilet)
   2 - Physical care (walking, getting into and out of bed, and getting up and down stairs)
   3 - Other sorts of personal care (preparing meals, giving medicines, changing dressings)
   4 - Help with paper works or financial matters (writing letters, dealing with bills, handling money, and banking)
   5 - Other practical help (shopping, laundry, housework, gardening, doing odd jobs, taking out for walks, visiting, talking to, keeping an eye on)

Question 1 provides information on the number of adults receiving help, and question 2 gives the respondent's perception of the help received. This perception may include active care (direct interaction or supervision) or passive care (i.e. available on call if needed).

The total number of adults receiving help includes those who are helped by people working for organisations, e.g. visiting social workers, nurses, specialist teachers and volunteers. For simplicity, we will refer to this group as formal carers. For HHSA purposes, we need to exclude any episodes of care, which they provide. For this reason, our estimates will differ from those published in the Family Resources Survey Reports 1995/6 - 1999/0 (published by Corporate Document Services).

Adults who are helped by only formal carers
We have excluded the cases where an adult is helped only by a formal carer.
Adults who are helped by informal carers only
Using question 3 we can identify the number of cases where an adult is helped by informal carers only. These cases include adults who are helped by spouses, their children, neighbours, friends and other relatives.

Adults who are helped by both a household member and a formal helper or volunteer
There are cases where an adult is receiving both formal and informal care. In some cases, an adult is being cared for by an outside helper and the informal carer is supplementing this help e.g. an adult may be attending a day care home for the majority of the day, with a neighbour popping in for an hour or so when they get home. In other cases, an adult is being cared for by a household member and the outside helper is called in to give specialised help such as changing a dressing etc. For the HHSA it is important that we include all adults who are helped by an informal carer, even if they are also receive help from a formal care provider. In order to include these cases, we need to adjust the type and length of the help received, to estimate the help from informal carers only.

Frequency of help received
For valuation purposes we need to differentiate between continuous and less frequent episodes of care, as these are associated with different market rates. Using question 2, we have some information on how often the adult receives help. The frequencies are broken down into the following categories:

1. Continuously
2. Several times a day
3. Once or twice a week
4. Several times a week
5. Once a week

However, this is dependent on the respondent's perception of what constitutes each frequency type. Equivalent market prices of informal care are based on an hourly rate rather than on an episode of care or an independent measure of the output e.g. bathing an elderly person. Therefore we have had to make an assumption about the approximate the number of hours in each episode of care.

Estimating the number of hours in each frequency type
To estimate the number of hours that correspond to each frequency, we examined the cases where an adult is helped by informal carers only. When we examined the hours of help given (question 4) and the frequency of help received (question 2); there was a considerable range in the total number of hours helped and the frequency type. This suggests a difference in respondents' perception of frequency. This can be accounted for by the fact that frequencies are undefined, and that no distinction is made in the question between active and passive care. The modal number of hours was used to approximate the number of hours, which correspond to each frequency, and these are summarised in Table 7.1 below.

Table 7.1 Assumption about number of hours per week corresponding to reported frequency

Frequency	Average (mode) number of hours reported	Number of hours: HHSA assumption
Continuous	Not applicable	112 hours (household members) 168 hours (neighbours and friends)
Several times a day	16	14 - 111
Once or twice a day	12	11 - 13
Several times a week	7	4 -10
Once a week	2	1 -3

Source: HHSA

A number of sensitivity tests have been calculated to see the effect of using the median and mean hours in each frequency and the mid-point of the band.

Measuring passive care

In the HHSA we define productive activity as anything that could be delegated to another person - the "third party criterion" developed by Margaret Reid (1934). The important point is that if no unpaid carer were available, a third person would have to be paid to take his or her place. We should therefore measure passive as well as active care wherever possible. In the FRS, an adult has the option of reporting that they receive continuous care. We assume this is 168 hours per week: 24 hours a day times 7 days. There are cases where an adult reports that they need continuous help (active plus passive care), but the total number of hours of help given by informal carers is only a few hours a week (active care only). Similarly, there are cases where a helper reports giving care 168 hours a week (active and passive care), yet the frequency of help received is reported as several times a week (active care only).

In order to include passive care, whether it is reported or not, we have re-coded the frequency of help received to include not only those cases where the recipient records a need for continuous care, but also those cases where at least one household member gives more than 112 hours a week. Our underlying assumption is that, if a household member is caring for an adult 16 hours a day (the average waking day), 7 days a week (112 hours) then they are also likely to be caring for the adult at night - even if this is passive care. This is not the case when the informal carer is not a member of the same household as the adult receiving care, in which case they must be giving 168 hours of care for it to be considered continuous.

Although we have made this adjustment, we may be underestimating continuous care, because we have no information on overlapping versus sequential hours of household members. That is, the total number of hours given by several household members may sum to more than 168 hours per week, but this may not represent continuous care, because household members may work together e.g. to help an elderly person out of bed may require two people.

Reclassifying the frequency of help received by those adults who are helped by both formal and informal carers

As mentioned before, we need to exclude all formal care, whether provided by paid providers or by volunteers working on behalf of an organisation. From question 4, we have information on the total number of hours of help given by informal carers only and can exclude the number of hours given by formal carers. We can use this estimate of hours of help *given* as a proxy for the frequency of help received. By using our earlier assumption about the number

of hours which correspond to each frequency, we can then reclassify the frequency of help received.

There are limitations in this approach, as the number of hours of help *given* will not always correspond to the frequency of help received. This could be due to different perceptions of what constitutes care (passive or active), different perceptions of what constitutes each frequency type, two or more carers helping simultaneously, and reporting errors in the survey itself. However, to reclassify this help some assumption has to be made about the relationship of the frequency of help received to the hours of help given.

In order to inform this assumption, we examined the cases where adults receive help only from informal carers, and compared the total number of hours given by those carers with the reported frequency of help received. We calculated an average of the modal values of hours given corresponding to each frequency category reported in 4 survey years. We used this in order to re-categorise the frequency of help received once formal care hours were excluded. As before, an adult is considered to be receiving continuous help only if 112 hours or more are given by *one* household member.

Examples of this reclassification follow. An adult may report they receive continuous help and a total of 168 hours of help are given. This could be provided equally by a volunteer and a relative. By removing the hours of help given by the volunteer, the total number of hours given by the relative is reduced to 84. This corresponds with the several times a day category, and so the frequency of help received is re-categorised. Similarly an adult could report they receive continuous help and a total of 132 hours are given. This could be provided by a spouse who gives 112 hours and a relative who gives 20 hours a week. Because one household member is giving 112 hours we assume that this person is receiving continuous care.

Other cases also need to be re-categorised. For example, an adult could receive 10 hours of help and report that the frequency of help is several times a week. If 8 of these 10 hours of help are provided by (a district nurse, then we would re-categorise the frequency to once a week, as only 2 hours of help are being provided by an informal carer.

There are many cases where the number of hours given do not correspond to the frequency of help the person reports they receive. Only in the cases of re-categorising help received from both formal and informal carers do we use the number of hours giving help, rather than the reported frequency of help received.

To make these adjustments for 1999/00, there is an additional complication, because the hours of care given are recorded in bands. In order to reclassify the frequency of help for adults receiving informal and formal care (see above), we examined the 4 survey years where we have actual hours data. For these survey years we grouped the data into the 1999/00 banded hours (see below) and calculated the average mean number of hours in each banded hour category. We used the 4 year mean average and applied this to 1999/00.

Banded hours	**Mean of 4 survey years**
0-4 hours	3 hours
5-9 hours	6 hours
10-19 hours	12 hours
20-34 hours	23 hours
35-49 hours	39 hours
50-99 hours	67 hours

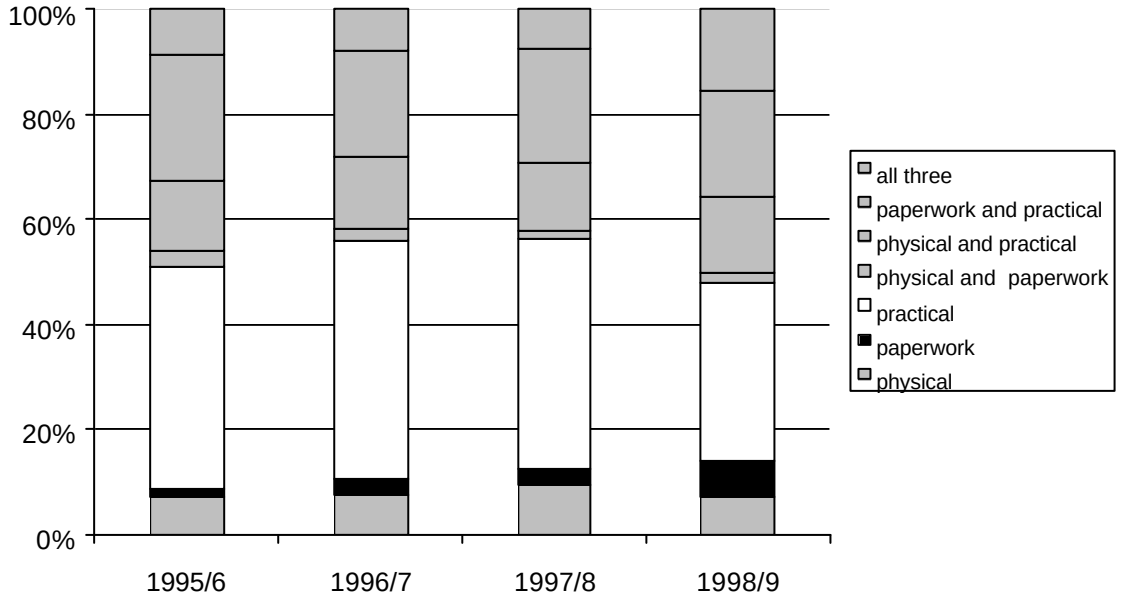
Type of help received

For non-continuous care (several times a day, once or twice a day, several times a week, and once a week), it is important to distinguish between the types of help received, so we can value the care at different appropriate market prices. Respondents are asked *"what kind of things does [X] usually receive help with*?". The type of help received includes "getting into and out of bed" (physical help), "keeping an eye on them" (other physical help), and "giving medicines" (other personal help). Respondents are given a show card to help prompt their answers, and can respond with one or more of the following:

Help with personal care	e.g. dressing, bathing, washing, shaving, feeding, using the toilet
Physical help	e.g. walking, getting up and down the stairs getting into and out of bed
Other sorts of personal help	e.g. preparing meals, giving medicines change dressings
Help with paperwork or financial matters	e.g. writing letters dealing with bills handling money, banking filling in forms
Other practical help	e.g. shopping laundry housework gardening doing odd-jobs, taking out for a walk, keeping an eye on him/her

Due to small sample sizes in each category, we have reclassified this help into three categories: personal help (help with personal care, other sorts of personal help), practical help (physical help, help with paper work or financial matters and other practical help) and both personal and practical help. As the graph below shows, the category "practical help" covers a wide range of activities from helping with paperwork to helping with housework. However as the number of adults who are helped with only their paperwork is small, ranging from 1-6%, compared with 34-46% of adults who are helped with practical tasks, we feel it is sufficient to group these tasks together as " practical help". We can then value all of the practical help received at a care attendant's wages. This does mean that the value of informal care may be underestimated, as help with paper work, may require additional skills which may be valued at a higher rate.

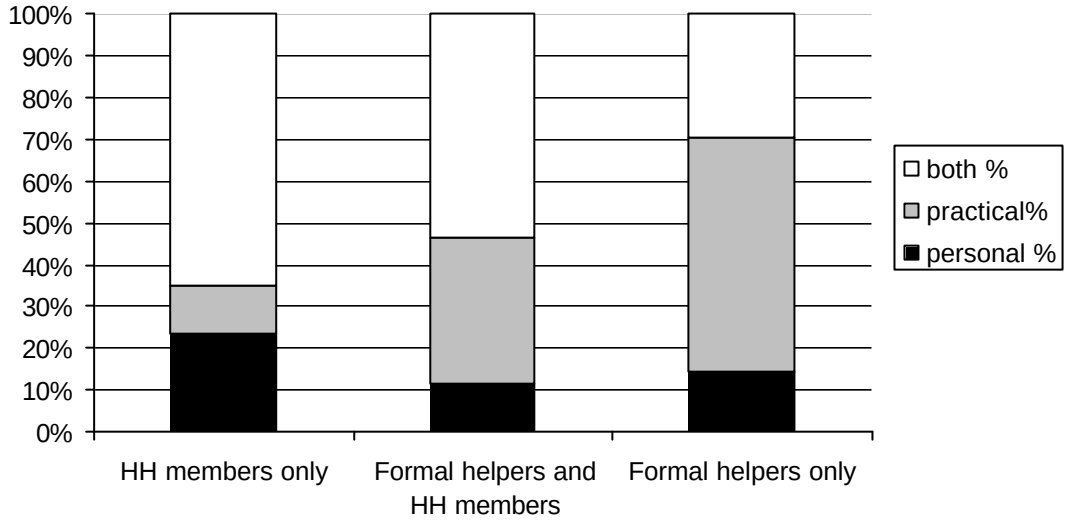
Chart 7.1 Proportion of type of help received



Reclassifying the type of help received by those adults who are helped by both formal and informal carers

Analysis shows formal and informal carers give different types of help. When adults are helped by informal carers only, approximately 60 per cent receive both personal and practical help. In contrast, in cases where adults are helped by formal carers only (help which is not included in the HHSA adult care project), approximately 60 per cent receive help with personal tasks only, and only 30 per cent with both personal and practical tasks. The proportion receiving help with practical tasks is similar in both cases. This seems to suggest that formal carers help more often with only one specific type of task, while informal carers provide are more likely to help with a range of activities.

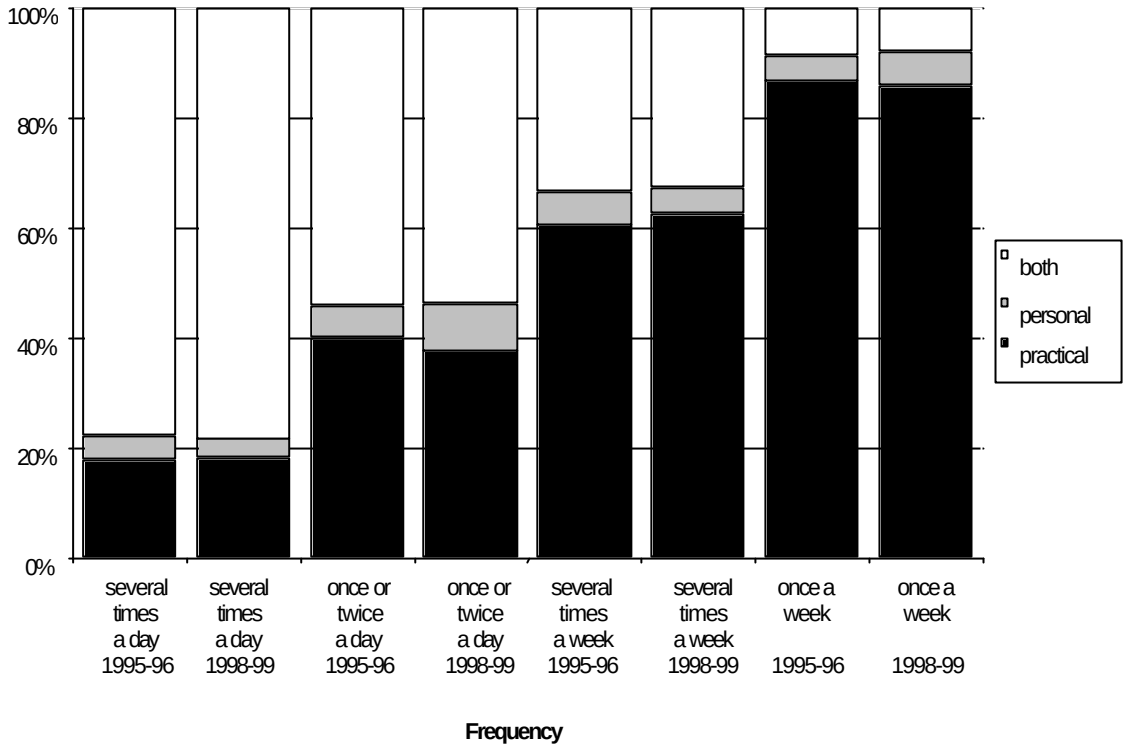
Chart 7.2 Type of help given to people receiving help from formal carers only, formal carers and household members, and household members only



The majority of adults who receive help from both formal and informal carers also are helped with both practical and personal tasks. However, it is hard to come to any conclusion about whether these adults use formal carers to support the help given by household members (e.g. an extra pair of hands to lift, bath etc.) or to provide additional, more specialised help.

The graph below shows that the proportion of adults receiving different types of help has not changed significantly over time. Therefore, in cases where help by formal carers has been excluded, we have adjusted the type of help received, by using the 4 year average distribution of the type of help given by informal carers only, by gender and frequency, and applied this to the adjusted hours of help received. Breaking down the distribution of the help received by age resulted in sample sizes which are too small.

Chart 7.3 Proportion of adults receiving different types of care



Estimating the type of help received by adults in 1999/2000
In 1999/00 the FRS did not ask about the type of help received. As Graph 2 shows, the distribution of personal help, practical help and help with both personal and practical tasks stays constant between the survey years. Therefore we have applied the four-year average of this distribution to all help received in 1999/2000.

Grossing to the UK population
The FRS coverage is currently Great Britain, although this is being extended to cover Northern Ireland as of April 2002. Data will therefore not be available on a UK basis before the end of 2003. In the meantime, we need to gross the data to a UK total to be consistent with the rest of the HHSA. There is not an equivalent Northern Ireland survey which could be used, so we have taken the FRS GB estimates and grossed them to the UK population using grossing factors using data derived from the Labour Force Survey, which exclude people living in institutions, and stratified by age and gender. We are aware of the limitations of this approach, knowing that Northern Ireland has different care structures, and we will revisit our estimates in the light of information from Northern Ireland, when it becomes available.

Value
In order to value informal care, we need to use the cost of the nearest equivalent service provided by the market. As already noted, it is important to try and encapsulate the different types of help received, taking into account how often the care is received and the type of care given.

We have valued continuous care using the residential care weekly fee, from the Care of Elderly People Market Survey 2001 conducted by Laing and Buisson. This is a postal survey

of all for-profit homes with 4 or more places in the UK. The homes were asked to give their minimum and maximum single and sharing fees for nursing and residential care. The average was calculated as the mean of the minimum and maximum fees, weighted by bed numbers. The response rate for 2000 was 24 per cent of all for-profit homes.

The residential rate was chosen because the services provided by a residential home involves daily help with personal and practical care, as well as being on call. We have used this rather than a nursing home fee, as more specialised help is available in a nursing home. Sensitivity tests have been run using the nursing home fee. This residential home fee include meals and accommodation costs and will often include an " on call" charge. When we calculate the value added by informal carers, an adjustment has been made to take into consideration the housing services and meals provided.

Non-continuous personal care includes help with dressing, bathing, changing dressings and feeding. We have chosen the average wage of an assistant nurse or nursing auxiliary as the most appropriate market rate for valuing this care. This is because a nurse/nursing auxiliary will usually provide this type of specialised care outside the home. For non-continuous practical care we have used the hourly rate of care assistants and attendants in health and related occupations.

The wage rates used are median hourly wages from the New Earnings Survey. This survey samples 1 per cent of UK employees (1998 onwards) who are members of the Pay As You Earn (PAYE) Income Tax Scheme. Prior to 1998 only employees in Great Britain were sampled. The wages are simply aggregated, and no grossing or weighting is attempted. No imputations for non-response or sample frame deficiencies are made. The average hourly earnings calculated take into account only those earnings not affected by sick absence and are basic wages excluding overtime.

Sensitivity analysis
We have tested the sensitivity of our results to our estimate of the number of hours in each frequency type. Instead of using the modal value, we can use the mean and median. We have also tested our sensitivity to the wage rate used and have valued continuous care used the nursing home fee, and the mean wage rate.

8. VOLUNTARY ACTIVITY

Output

The output of this function is goods and services for other institutions – the activities which relate to this function are undertaken by household members in the main outside the home.

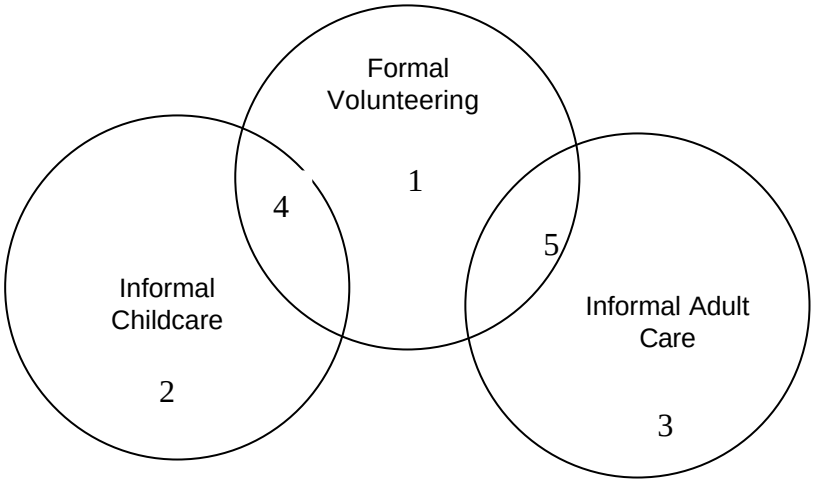
Concepts
The other elements of household production – providing accommodation, nutrition, clothing and care – have identifiable market equivalents, and the complementary valuation of both the outputs and the inputs is possible. As with all Household Satellite Account projects, the original goal of the voluntary activity project was to measure output independently of inputs; e.g. the number of children in uniformed organisations rather than the time spent supervising those children. The outputs could then be valued at the market equivalent prices; i.e. running a brownie pack (which is voluntary work) could be equated with running an after-schools club (paid employment). However, although there may be market equivalents for some activities, for many the paid service is often also offered on the basis of time spent. For example, the value of fundraising is the cost of the time of the fundraiser – you cannot buy some 'fundraising' on any other basis. It may, in future, be possible to measure the output of voluntary organisations independently of the input but, at this stage, quantifying the physical output of volunteers' efforts has not been possible. Therefore we have valued the time spent in voluntary activity (the input method). This is a departure in methodology from the rest of the account.

The measurement of voluntary activity is notoriously difficult, as there is no consensus on a definition. The very word 'voluntary' has different connotations for different people and different cultures. 'Voluntary work' is thought to conjure up images of formal employment, but this may not always be appropriate. The term 'volunteering' may also mean little to somebody from a minority ethnic group or different culture. Despite this difficulty, a number of attempts have been made to measure voluntary activity. The Institute for Volunteering Research has tried to avoid directly using the term and attempts to measure:

> "Any activity that involves spending time, unpaid, doing something that aims to benefit someone (individuals or groups) other than or in addition to close relatives, or to benefit the environment."
> (National Survey of Volunteering 1997)

For this project, we have refined the above definition to measure only 'formal' voluntary activity, which is undertaken through a group or organisation. We did not seek to create a new definition, since it is dependent on existing sources. In the HHSA, any 'informal volunteering', such as helping friends or family members, is included either in the childcare or adult care projects. The Venn diagram below helps to illustrate how these three projects are linked.

The voluntary activity project (1) records all the time spent formally volunteering. This can include time spent assisting adults through a voluntary organisation (5), e.g. a hospital visitor, and time spent supervising children (4), e.g. helping in an after-school club.



Informal care of children (2) is defined as 'care from household members or their networks i.e. help from family members or neighbours'. In the childcare project we have been able to identify informal care by household members. We have avoided double counting area (4) by measuring volunteer time spent supervising children *only* in the voluntary activity project. The same applies to adult care.

We recognise that informal care in its entirety includes all caring, whether by a voluntary organisation or household member, i.e. childcare (2) and (4), and adult care (3) and 5). In the same way voluntary work could include all caring tasks carried out by households and their members as well as formal voluntary activity, i.e. a proportion of (2) and (3), as well as formal volunteering (1). Although we are aware that public and policy interest often lies in being able to measure each activity as a "whole", because of data availability, it is not possible to identify and measure these areas separately. What is important for the HHSA is that informal care is not double counted.

The missing volunteers

Whilst using this definition of voluntary activity, we recognise that some types of volunteering may be under recorded in the surveys used. It is commonly acknowledged that present survey techniques fail to measure adequately some new types of voluntary activity. For instance, employer-supported activity (e.g. employees undertaking a community project out of work hours) meets all the characteristics of voluntary activity - it is unpaid, has benefit and is organised. The National Survey of Volunteering (NSV) does attempt to measure employer-supported volunteering. However, no data are collected on the type of employer-supported activity undertaken. Voluntary work undertaken via the Internet (known as 'virtual volunteering'), such as on-line counselling or training, is another area we are unsure about. Much of this may be picked up unknowingly. Since the medium in which the voluntary activity takes place is rarely recorded, we cannot be certain. Therefore the HHSA estimates give an "at least value" of voluntary activity.

Inputs

Intermediate consumption

As this is most likely to be provided by the organisation for which the voluntary activity is being undertaken, the intermediate consumption we wish to include in this account is only transport related, if households use their own transport in order to undertake the voluntary activity. This should only be included where volunteers do not receive a mileage allowance.

However, as the data source for transport does not separately identify travel for voluntary activity, we have not been able to make any adjustment for intermediate consumption.

Household capital consumption
Even if the voluntary work is done outside the home, it may well involve planning and organisation at home, often these days by using a home computer. In this case the appropriate proportion of the cost of the computer should be included. However, as we have no data on the use of computers by volunteers, we have not included any capital consumption in this project.

Related services
This should include shopping etc. related to voluntary work, if it can be identified. The Time Use Survey does not separately identify shopping related to voluntary work, and data on volunteering from the Omnibus Survey does not separately identify this task. Therefore we have no related services for this project.

Labour
Information on time spent in voluntary work from Time Use Diaries is likely to lead to a different valuation if the hours are multiplied by average wages, than if the hours spent in specific activities can be identified and valued using the wage of the appropriate market activity.

Methodology

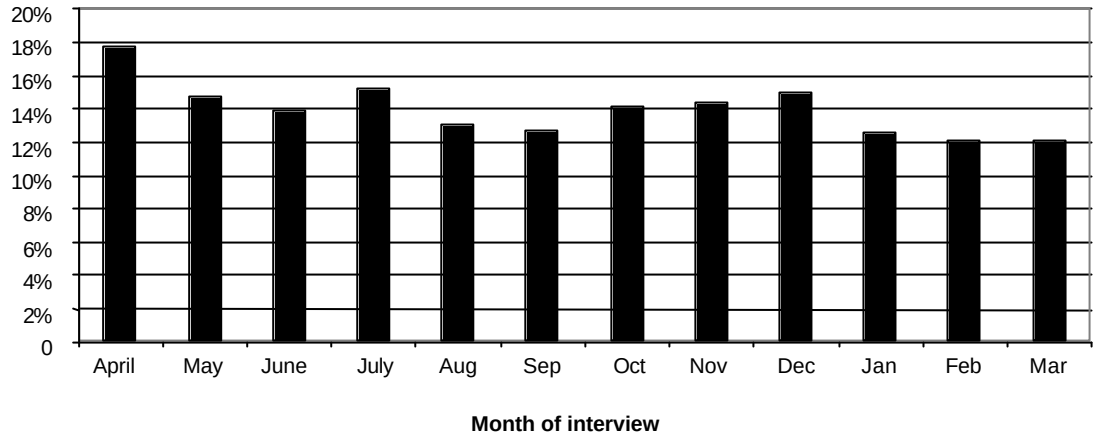
Data sources
The estimated number of volunteers varies considerably, depending on the survey used, with different surveys asking different questions at different times of the year. The primary source of information for the estimates in the HHSA is a module which was placed on the National Statistics Omnibus Survey**.** Other sources of information were examined and the National Survey of Volunteers (NSV) and the General Household Survey (GHS) and Continuous Household Survey (CHS) are used in our sensitivity analysis.

Both the National Statistics Omnibus Survey (2001) and the National Survey of Volunteering (1997) are ad hoc surveys. The 1992 General Household Survey (GHS) is the only year long, continuous survey of voluntary activity in Great Britain. The voluntary work module relates to individuals in all surveyed households. The month of each household interview is contained in another part of the dataset. We used the GHS to test the hypothesis that the proportion of people volunteering does not alter significantly throughout the year. Since all individuals in a household were interviewed at the same point in time, it is possible to match all individual cases with the relevant month of interview of the household. There was a maximum of 4 interviews per household. The responses to the question *'did you participate in voluntary work in the last 4 weeks?'* were compared with the month of interview. The results are presented below.

From these results, summarised in Chart 8.1 below, we concluded that overall rates of participation do not differ significantly during the course of a year. By examining the confidence intervals around each estimate we see that the difference between the proportion of volunteers recorded per interview month and the average annual proportion of volunteers is not statistically different for the majority of months, with the exception of three months. Results for February and March are marginally significantly different. The April result is the

most clearly significantly higher result. This may be because certain voluntary activities tend to occur more often in school holiday periods and the GHS survey year overlapped to cover both April 1991 and April 1992, thereby including two sets of Easter school holidays in the sample. Overall, therefore, it is reasonable to use the NS Omnibus result (where the questions were asked only in two months) as an estimate of overall levels of participation for the year.

Chart 8.1 Population volunteering in past 4 weeks, by month of interview



Source: General Household Survey (1992-93) unpublished data

How many volunteers in the United Kingdom (UK)?
The Household Satellite Account is attempting to measure and value unpaid productive work in the United Kingdom (UK). The NS Omnibus survey estimates were grossed to the GB population using data derived from the Labour Force Survey, which exclude people living in institutions. A further adjustment has to be made to obtain UK estimates. The hypothesis, that it is reasonable to assume that the percentage of the total population volunteering in Great Britain is the same as in Northern Ireland, was tested by merging the GHS (1992-93 Great Britain) and the Continuous Household Survey (1991-92 Northern Ireland).

The two survey estimates were combined, taking the respective population estimates into account. The results are presented in Table 8.1 below. The new proportion of formal volunteers is 24.1 per cent (in the 4 weeks prior to interview). This gives a total of 11.1 million volunteers in the United Kingdom in 1991-92. The overall effect of combining the CHS and GHS is negligible, because the Northern Ireland population is relatively small, when compared with the Great Britain population.

Results from the CHS indicate that 22 per cent of Northern Ireland respondents volunteered in the previous year. This result is significantly different (at the 95 per cent confidence level) from the 24 per cent reported in the GHS, and shows that it is not reasonable to assume the same distribution of volunteering in Northern Ireland as Great Britain.

Because of these results, we decided that it is important for the NS Omnibus figures to be grossed up from the Great Britain (GB) level to the United Kingdom level. The difference between the General Household Survey estimate (GB) and merged estimate (UK) were used as a ratio to multiply the NS Omnibus estimate. Unrounded proportions were used for this

procedure. It is not possible to gross the average number of hours obtained from the NS Omnibus, because we have no comparable mean values from the GHS and CHS.

Table 8.1 Estimated number of volunteers in Great Britain, Northern Ireland and UK

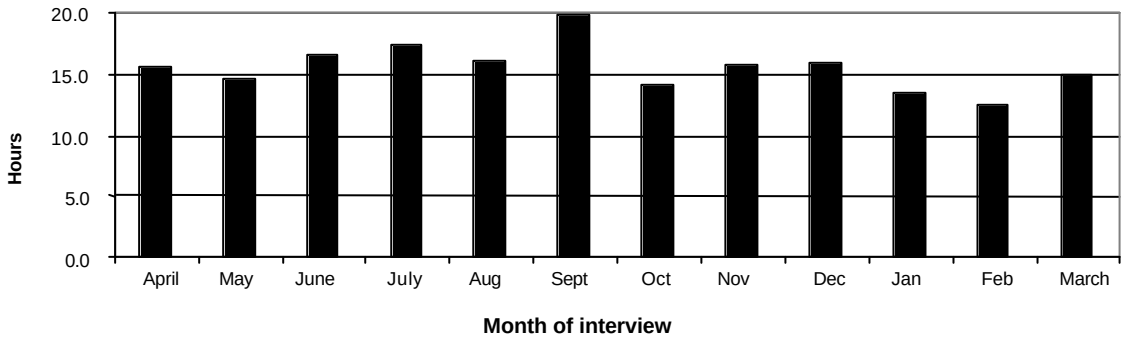
Survey	Population	Volunteered in past year	Volunteered in past 4 weeks	Mean (1)	Median	Base
GHS	Great Britain	24.2%	13.8%	15.6	8	2,504
CHS	Northern Ireland	22.4%	14.6%	13.5	8	849
GHS and CHS combined	United Kingdom	24.1%	14.0%	14.6	8	3,353

(1) The Continuous Household Survey revised all responses of 100 hours and above down to 99. This affected 13 cases.
Source: General Household Survey (1992-93) & Continuous Household Survey (1991-92)

How many hours do people volunteer?
People are asked how many hours they volunteered during a defined reference period. For the National Survey of Volunteering, this was one week, and for the General Household Survey, Continuous Household Survey and National Statistics Omnibus, the reporting period was four weeks. To estimate the annual number of hours volunteered, we assumed that the reference period is typical of the whole year and grossed up the hours to an annual total. There are some difficulties with this assumption.

Using the GHS, the question *'how much work did you undertake in the last 4 weeks?'* was compared to the month of interview. The estimate for each month will, therefore, contain voluntary work undertaken in the previous calendar month. Chart 8.2 below shows how much voluntary activity was undertake in the last 4 weeks compared with the month of interview. Firstly, the amount of time that 'active volunteers' volunteer does fluctuate during the course of the year. Analysis of the GHS shows that the mean number of hours spent volunteering each month was higher in the summer months and lower in the winter months. Therefore the NS Omnibus survey, conducted in January and March, may be an underestimation of hours volunteered.

Chart 8.2 Average time spent volunteering by month of interview



Source: General Household Survey (1992-93) - unpublished data

Secondly, analysis of the number of hours volunteered shows that the reference period of the survey affects the number of hours recorded. The GHS and the NS Omnibus modules asked

for information about the 'amount of time spent volunteering over the past 4 weeks'. The distribution of these values has some evidence of bunching around values divisible by 4. This is particularly the case for larger numbers of hours, for example 20, 40, 60 and 80. This affects the value of the mean more than the median. The problem of clustering around values divisible by 4 is not uncommon in surveys that ask questions along the lines of 'over the past 4 weeks'.

The average number of hours reported by volunteers in each survey varies, depending on the type of average used: the mean, median (the value in the middle) or mode (occurs most often). We believe that the mean is the most appropriate measure to use, with the median hours used for comparisons. Revised means were calculated by adjusting the particularly high number of hours that were reported by a minority of volunteers. Revision of outlying numbers is necessary only if we assume that the respondents gave inaccurate information. We have no way of testing this assumption. What we can investigate, however, is the extent to which these people said that their time was typical/untypical. As the table below shows, 67 per cent of people reported that the time spent volunteering was the same as usual, with approximately the same proportion volunteering "more than usual" as "less than usual".

Table 8.2 Typicality of number of hours volunteered

	More than usual	Less than usual	Same as usual	Total
Number of volunteers	92	98	396	587

Source: National Statistics Omnibus Survey (2001)

In order to calculate revised means, we reclassified an outlier as a respondent who had reported undertaking more than 100 hours of voluntary work in the past 4 weeks. Since the NSV asked people how much time they had volunteered in the past week, outliers were classed as those completing a total of 25 hours or more. This analysis is not possible on the GHS because a typicality question was not asked.

The results are inconclusive. We may have expected more respondents with 'outlying' hours, proportionally, to report that their time was *more than usual.* Only 1 person on the Omnibus and 5 people on the NSV reported this. The majority of the outlying cases said that the time undertaken on voluntary work was *about the same amount of time as usual*. Since we have no reason to doubt the plausibility of people reporting long hours volunteering, the use of revised means was rejected.

What type of voluntary activity takes place?

The range of voluntary activities includes fund-raising, organising groups, clerical work and professional help or coaching. These activities are undertaken at different rates and levels of intensity. For the purposes of valuation, it seems reasonable to allocate appropriate wage rates to different activities, which reflect this intensity and/or difficulty and/or skills used. Previous research on the nature of volunteering, broken down by activity, has been conducted by Katharine Gaskin[12], on a case study basis. We would have liked to replicate this work for the whole of the UK. This approach requires the average number of hours spent on formal voluntary activity, broken down by the type of activity that is being undertaken.

12 Katharine Gaskin and Barbara Dobson(1996) *The Economic Equation of Volunteering - A Pilot Study* Centre for Research in Social Policy, Loughborough University

Due to the structure of the GHS questionnaire, it was not possible to obtain information by type of activity from this source. The number of eligible cases on the NSV (n=134) is very small. A larger sample is obtainable from the NS Omnibus Survey. The original data set has eight categories:

1. Personally raising or collecting money
For example, selling flags on flag day; helping out at jumble sales or collecting jumble; sponsored activities; selling raffle tickets; making things to sell at fetes; carol singing.

2. Serving on committees or attending committee meetings
Such as local councillors; magistrates; school governors, charity trustees, those who attend committee meetings at PTA or Tenants Associations.

3. Organising or helping a club or group
For example girl guides; scouts; playgroup; youth club; local social club; canvassing; leafleting; performing/organising entertainment e.g. children's concert.

4. Giving professional advice, talks, coaching or training
For example local advice associations i.e. legal advice, financial advice; counselling; teaching; a qualified referee.

5. Giving non-professional advice, talks, coaching or training
For example unqualified coaching or training at sports club; classroom assistant; self-help groups; groups of enthusiasts.

6. Providing administrative, clerical or secretarial help
For example word processing; book-keeping; filling envelopes.

7. Giving other kinds of practical help not already mentioned
For example Meals on Wheels, Hospital Visitor, Prison Visitor, Hospital Patient Transport Scheme, first aider, special constable, healing, making costumes for play/pantomime.

8. Any other type of voluntary activity

Due to the small samples at this level of detail, these have been collapsed into three categories: professional occupations, personal & protective occupations, and clerical & secretarial occupations. This is based on categories used in the Standard Occupational Classification.

Volunteers who said they had given 'professional advice' or served on committees' were recoded as *professional occupations.* The justification for this is self-explanatory. Respondents who said that they had spent time 'giving non-professional advice' or 'other practical help' were regarded as being in *personal & protective service occupations.* This major category includes care assistants, caretakers, childcare and travel attendants. This is considered to be similar to the kind of voluntary work we expected to be conducted under 'non-professional advice' and 'other practical help'. Finally, 'personally raising money', 'organising or helping a group/club' and 'administration/clerical' voluntary activities were recoded into *clerical and secretarial occupations*. This major category includes numerical clerks and cashiers, secretaries, receptionists, personal assistants and telephonists. It was felt that the tasks of money handling, organisation skills and clerical tasks would be adequately covered under *clerical and secretarial occupations*. It is recognised that by recoding 'organising a group/club' into *clerical and secretarial occupations* we may be undervaluing the responsible nature of club/group organisation. However, there is no way of separating this work from the helping, leafleting, and canvassing that were also in this Omnibus category and

clearly are more akin to clerical and secretarial occupations. The recoding is summarised in Table 8.4 below.

Table 8.4 Re-categorising the Omnibus activities

NS Omnibus category	Standard Occupational Classification
Personally raising or collecting money	Clerical and secretarial occupations
Serving on committees	Professional occupations
Organising / helping a group or club	Clerical and secretarial occupations
Giving professional advice/training	Professional occupations
Giving non-professional advice/ training	Personal and protective service occupations
Administration/clerical	Clerical and secretarial occupations
Other practical help	Personal and protective service occupations

Source: HHSA

When voluntary activity is split into the professional, personal and protective, and clerical and secretarial occupations categories, a volunteer may do just one of the activities, three combinations of two activities or all three activities. The annual total number of hours volunteered was estimated as before. The annual number of hours volunteered in *only* professional activities, *only* personal and protective activities, and *only* clerical and secretarial activities can be calculated from the dataset. Total annual hours volunteered minus the annual hours volunteered in only *one* activity, gives the volume of hours given by respondents who participate in more than one voluntary activity ("multi-tasking volunteers"). The proportion of hours volunteered by "multi-tasking" respondents relating to each activity type (professional, personal and protective, and clerical and secretarial) is known. These proportions were applied to the total hours given by this group of volunteers, to complete the estimated annual number of hours volunteered by activity.

Value

The wage rates used are taken from the New Earnings Survey and relate to the occupations described above. This survey samples 1 per cent of UK employees (1998 onwards) who are members of the Pay As You Earn (PAYE) Income Tax Scheme. Prior to 1998, only employees in Great Britain were sampled. The wages are simply aggregated, and no grossing or weighting is attempted. No imputations for non-response or sample frame deficiencies are made. The average hourly earnings calculated take into account only those earnings not affected by sick absence and are basic wages excluding overtime. We used median wages, to avoid the effect of very high and very low levels of income in the distribution.

Sensitivity analysis

We tested the sensitivity if our estimates to the wage rate, looking at mean wages and the national minimum wage as alternatives. We looked at the impact of using median rather than mean hours of volunteering, and of assuming a 48-week rather than a 52-week year. We also re-ran the estimates holding the number of volunteers constant at the 1992 (GHS) level.

9. INTERMEDIATE CONSUMPTION

Concepts
In order to arrive at the value added by households in the household production process, we need to subtract goods and services which are purchased from market producers and used up in the production process. These need to be assigned to the relevant principal function

Methodology

Data sources
Our data source is the four-digit Classification of Individual Consumption by Purpose (COICOP) of Household Final Consumption Expenditure in the National Accounts. The first step is to reclassify each code to final consumption, intermediate consumption and household capital. Most codes can be classified in their entirety at the four-digit level, as shown in Annex 9.1 at the end of the chapter. Some, however, require a further breakdown, based on alternative data sources.

01 Food and non-alcoholic beverages
Snack food, which requires no preparation and which has not been included in our estimate of home produced meals, remains in final consumption. This includes biscuits, crisps and confectionery. The proportions used to obtain the splits are from the National Food Survey and the Family Expenditure Survey. Cold drinks also remain in final consumption.

03 Clothing and footwear
A proportion of 'Other articles of clothing and clothing accessories' relates to haberdashery, which is an input to the production and repair of clothing. This proportion comes from the Family Expenditure Survey.

04 Housing, water, electricity, gas and other fuels
Part of the rent paid by tenants is an input to some of the principal functions, so this is treated separately from the rest of household final consumption expenditure. The same is true for utilities and insurance paid by tenants (see below).

05 Furnishings, household equipment and routine maintenance of the house
The durable goods in this category are reclassified as household capital, while the semi-durable goods, which are generally of lower value, and with hard to quantify service life lengths, are reclassified as intermediate consumption.

12 Miscellaneous goods and services
Articles for babies, toiletries and equipment, are included in two categories in this section, and a proportion of each category is reclassified into intermediate consumption based on FES data.

The second step is to allocate the intermediate consumption to the respective HHSA project. As before, in most cases, a four-digit category can be allocated in its entirety to one or other project – Annex 9.2 at the end of the chapter. The exceptions are as follows:

04 Housing, water, electricity, gas and other fuels
In order to calculate not only owner-occupied accommodation services, but also the services provided by tenants, we need a breakdown of intermediate consumption by owner-occupiers

and renters. This will also be used later, in the UK Account calculation, to estimate the input of housing to projects where the market price used for valuation includes the cost of premises. The number of owner occupied and rented rooms respectively, as a proportion of total rooms, is used to distribute expenditure on utilities between owner-occupiers and renters.

A different split is used for goods and services relating to the maintenance and repair of dwellings. We have assumed that tenants rely on landlords to organise services related to maintaining dwellings and pay for them directly. Therefore we have allocated all of this category to owner-occupiers. Tenants do undertake some repairs themselves, and we have therefore looked at the relative amounts of time spent on construction and repairs by tenants and owner-occupiers, and used these proportions to allocate the purchases of maintenance related materials to owner-occupiers and tenants. But we have assumed that tenants then recover the cost of these materials from their landlords, so their share of this expenditure is considered to be final consumption.

05 Furnishings, household equipment and routine maintenance of the house
Non-durable household goods include cleaning and maintenance products, kitchen disposables (napkins, filters, kitchen roll etc.) and small items of hardware (matches, candles, string etc.). The cleaning and maintenance products need to be divided between the detergents used for washing up etc. (which belong in the nutrition project), the detergents used for doing the laundry (which belong in the clothing & laundry project), and the cleaning materials which are part of providing clean accommodation (and belong in the housing project). The latter also need to be split between owner-occupiers and renters. Although the FES distinguishes between detergents and cleaning materials and hardware, it does not help with the nutrition/laundry split, as washing powder is not separately identified. We have therefore used firstly the FES proportions, and then based Product sales and trade data using the Standard Industrial Classification to separate out the nutrition, laundry and housing elements of this category. The housing elements also need to be further subdivided between owner-occupiers and renters. As with utilities above, this is done based on the proportion of rooms in each of the two categories.

Repairs to household appliances are split between projects using the same proportions as the household appliances themselves in the Household Capital project.

Small tools and miscellaneous accessories are divided between owner-occupiers and tenants on the basis of the time spent in maintenance activities, i.e. in the same way that materials have been allocated to these two groups.

09 Recreation and culture
Expenditure on gardens, plants and flowers is divided between tenants and owner-occupiers on the basis of the relative proportions of the total time spent gardening.

Sensitivity analysis
We looked at how our results might differ using the proportions of expenditure on housing relating items by tenure in the FES, rather than the proportions of rooms.

Annex 9.1 Household Final Consumption Expenditure in the HHSA

COICOP Classification	Commodity	Intermediate consumption	Final consumption	Household Capital
01.1.1	Bread and cereals (ND)	X	X	
01.1.2	Meat (ND)	X		
01.1.3	Fish (ND)	X		
01.1.4	Milk, cheese and eggs (ND)	X		
01.1.5	Oils and fats (ND)	X		
01.1.6	Fruit (ND)	X		
01.1.7	Vegetables (ND)	X	X	
01.1.8	Sugar, jam, honey, chocolate and confectionery (ND)	X	X	
01.1.9	Food products n.e.c. (ND)	X		
01.2.1	Coffee, tea and cocoa (ND)	X		
01.2.2	Mineral waters, soft drinks, fruit and vegetable juices (ND)		X	
02.1.1	Spirits (ND)		X	
02.1.2	Wine (ND)		X	
02.1.3	Beer (ND)		X	
02.2.0	Tobacco (ND)		X	
02.3.0	Narcotics (ND)		X	
03.1.1	Clothing materials (SD)	X		
03.1.2	Garments (SD)		X	
03.1.3	Other articles of clothing and clothing accessories (SD)	X	X	
03.1.4	Cleaning, repair and hire of clothing (S)		X	
03.2.1	Shoes and other footwear (SD)		X	
03.2.2	Repair and hire of footwear (S)		X	
04.1.1	Actual rentals paid by tenants (S)	X		
04.1.2	Other actual rentals (S)		X	
04.2.1	Imputed rentals of owner-occupiers (S)			
04.2.2	Other imputed rentals (S)			
04.3.1	Materials for the maintenance and repair of the dwelling (ND)	X		
04.3.2	Services for the maintenance and repair of the dwelling (S)	X		
04.4.1	Water supply (ND)	X		
04.4.2	Refuse collection (S)	X		
04.4.3	Sewerage collection (S)	X		
04.4.4	Other services relating to the dwelling n.e.c. (S)	X		
04.5.1	Electricity (ND)	X		
04.5.2	Gas (ND)	X		
04.5.3	Liquid fuels (ND)	X		
04.5.4	Solid fuels (ND)	X		
04.5.5	Heat energy (ND)	X		
05.1.1	Furniture and furnishings (D)			X
05.1.2	Carpets and other floor coverings (D)			X
05.1.3	Repair of furniture, furnishings and floor coverings (S)	X		
05.2.0	Household textiles (SD)	X		
05.3.1	Major household appliances whether electric or not (D)			X
05.3.2	Small electric household appliances (SD)	X		
05.3.3	Repair of household appliances	X		

COICOP Classification	Commodity	Intermediate consumption	Final consumption	Household Capital
05.4.0	Glassware, tableware and household utensils (SD)	X		
05.5.1	Major tools and equipment (D)			X
05.5.2	Small tools and miscellaneous accessories (SD)	X		
05.6.1	Non-durable household goods (ND)	X		
05.6.2	Domestic services and household services (S)	X		
06.1.1	Pharmaceutical products (ND)		X	
06.1.2	Other medical products (ND)		X	
06.1.3	Therapeutic appliances and equipment (D)		X	
06.2.1	Medical Services (S)		X	
06.2.2	Dental services (S)		X	
06.2.3	Paramedical services (S)		X	
06.3.0	Hospital services (S)		X	
07.1.1	Motor cars (D)			X
07.1.2	Motor cycles (D)			X
07.1.3	Bicycles (D)			X
07.1.4	Animal drawn vehicles (D)			X
07.2.1	Spare parts and accessories for personal transport equipment (SD)	X		
07.2.2	Fuels and lubricants for personal transport equipment (ND)	X		
07.2.3	Maintenance and repair of personal transport equipment (S)	X		
07.2.4	Other services in respect of personal transport equipment (S)	X		
07.3.1	Passenger transport by railway (S)		X	
07.3.2	Passenger transport by road (S)		X	
07.3.3	Passenger transport by air (S)		X	
07.3.4	Passenger transport by sea and inland waterway (S)		X	
07.3.5	Combined passenger transport (S)		X	
07.3.6	Other purchased transport services (S)		X	
08.1.0	Postal services (S)		X	
08.2.0	Telephone and telefax equipment (D)		X	
08.3.0	Telephone and telefax services (S)		X	
09.1.1	Equipment for the reception, recording and reproduction of sound and		X	
09.1.2	Photographic and cinematographic equipment and optical instruments (D)		X	
09.1.3	Information processing equipment (D)		X	
09.1.4	Recording media (SD)		X	
09.1.5	Repair of audio-visual, photographic and information processing		X	
09.2.1	Major durables for outdoor recreation (D)		X	
09.2.2	Musical instruments and major durables for indoor recreation (D)		X	
09.2.3	Maintenance and repair of other major durables for recreation and culture		X	
09.3.1	Games, toys and hobbies (SD)		X	
09.3.2	Equipment for sport, camping and open-air recreation (SD)		X	
09.3.3	Gardens, plants and flowers (ND)	X		
09.3.4	Pets and related products (ND)		X	
09.3.5	Veterinary and other services for pets (S)		X	
09.4.1	Recreational and sporting services (S)		X	
09.4.2	Cultural services (S)		X	
09.4.3	Games of chance (S)		X	
09.5.1	Books (SD)		X	

COICOP Classification	Commodity	Intermediate consumption	Final consumption	Household Capital
09.5.2	Newspapers and periodicals (ND)		X	
09.5.3	Miscellaneous printed matter (ND)		X	
09.5.4	Stationery and drawing materials (ND)		X	
09.6.0	Package holidays (S)		X	
10.0	Education		X	
10.1.0	Pre-primary and primary education (S)		X	
10.2.0	Secondary education (S)		X	
10.3.0	Post-secondary non-tertiary education (S)		X	
10.4.0	Tertiary education (S)		X	
10.5.0	Education not definable by level (S)		X	
11.1.1	Restaurants, cafés and the like (S)		X	
11.1.2	Canteens (S)		X	
11.2.0	Accommodation services (S)		X	
12.1.1	Hairdressing salons and personal grooming establishments (S)		X	
12.1.2	Electric appliances for personal care (SD)		X	
12.1.3	Other appliances, articles and products for personal care (ND)	X	X	
12.2.0	Prostitution (S)		X	
12.3.1	Jewellery, clocks and watches (D)		X	
12.3.2	Other personal effects (SD)	X	X	
12.4.0	Social protection (S)		X	
12.5.1	Life insurance (S)		X	
12.5.2	Insurance connected with the dwelling (S)	X		
12.5.3	Insurance connected with health (S)		X	
12.5.4	Insurance connected with transport (S)	X	X	
12.5.5	Other insurance (S)		X	
12.6.1	FISIM (S)		X	
12.6.2	Other financial services n.e.c. (S)		X	
12.7.0	Other services n.e.c. (S)		X	

Annex 9.2 Allocation of intermediate consumption to HHSA projects

COICOP Classification	Commodity	Childcare	Nutrition	Clothing	Laundry	Transport	Owner occupiers	Tenants
01.1.1	Bread and cereals (ND)		X					
01.1.2	Meat (ND)		X					
01.1.3	Fish (ND)		X					
01.1.4	Milk, cheese and eggs (ND)		X					
01.1.5	Oils and fats (ND)		X					
01.1.6	Fruit (ND)		X					
01.1.7	Vegetables (ND)		X					
01.1.8	Sugar, jam, honey, chocolate and confectionery		X					
01.1.9	Food products n.e.c. (ND)		X					
01.2.1	Coffee, tea and cocoa (ND)		X					
03.1.1	Clothing materials (SD)			X				
03.1.3	Other articles of clothing and clothing access			X				
04.1.1	Actual rentals paid by tenants (S)							X
04.3.1	Materials for the maintenance and repair						X	X
04.3.2	Services for the maintenance and repair						X	
04.4.1	Water supply (ND)						X	X
04.4.2	Refuse collection (S)						X	X
04.4.3	Sewerage collection (S)						X	X
04.4.4	Other services relating to the dwelling n.e.c.							
04.5.1	Electricity (ND)						X	X
04.5.2	Gas (ND)						X	X
04.5.3	Liquid fuels (ND)						X	X
04.5.4	Solid fuels (ND)						X	X
04.5.5	Heat energy (ND)							
05.1.3	Repair of furniture, furnishings and floor cov.						X	X
05.2.0	Household textiles (SD)						X	X
05.3.2	Small electric household appliances (SD)		X					
05.3.3	Repair of household appliances (S)		X		X		X	X
05.4.0	Glassware, tableware and household utensils (S		X					
05.5.2	Small tools and miscellaneous accessories (SD)						X	X
05.6.1	Non-durable household goods (ND)		X		X		X	X
05.6.2	Domestic services and household services (S)						X	X
07.2.1	Spare parts and accessories for personal transport					X		
07.2.2	Fuels and lubricants for personal transport equipment					X		
07.2.3	Maintenance and repair of personal transport equipment					X		
07.2.4	Other services in respect of personal transport					X		
09.3.3	Gardens, plants and flowers (ND)						X	X
12.1.3	Other appliances, articles and products for personal care	X						
12.3.2	Other personal effects (SD)	X						
12.5.2	Insurance connected with the dwelling (S)						X	X
12.5.4	Insurance connected with transport (S)					X		

10. HOUSEHOLD CAPITAL

Concepts
In order to measure the contribution of household capital to the output of household production, we need an estimate of the value of the services they provide. In the absence of information on rental prices and stocks, we can use National Accounts data on expenditure and a perpetual inventory model (PIM) to estimate the value of capital consumption, as a proxy for the value of capital services. Consumption of fixed capital is the decline, during an accounting period, in the current replacement value of the assets used by producers, as a result of deterioration, obsolescence and accidental damage.

In order to identify household capital, we have used the COICOP classification of household final consumption expenditure, and taken only those items which are classed as durables. Semi-durables (household textiles, glass and crystal-ware, cutlery, kitchen utensils, small tools etc.) while they may last for as many years as durables, are generally items of less value. Estimates of their life lengths are almost impossible to come by, as they are more likely to be replaced for reasons of changing fashion and taste. They are therefore included in the HHSA as intermediate consumption.

Methodology

Data sources
The National Accounts estimates of consumption of household durables, at the four-digit COICOP classification level, do not, on their own, provide sufficient detail to develop a perpetual inventory model for HHSA purposes. This is because asset life lengths vary within a category such as major household appliances, and this category has to be split between several principal functions.

Market research information on the value of purchases of specific white goods is available from Mintel, and this has been compared with detailed data from the Family Expenditure Survey, in order to disaggregate the National Accounts data.

Volume data
The data required for the PIM are constant price expenditure at the appropriate level of detail, average asset life lengths, a mortality function which describes how assets are retired around the average, a depreciation formula and deflators to allow the capital consumption to be reflated to current prices.

The expenditure series are available from 1963 onwards and most can be allocated in their entirety to a principal function. These are assumed to relate to groups of assets with the same average asset life. As mentioned above, a combination of Mintel and FES data has been used to divide major household appliances between the various types of asset. The COICOP series for motor cars includes dealers' margins on second hand car sales and estimates of cars in kind, both of which, for the purposes of estimating the capital stock and consumption, must be excluded. Data on private registrations (new cars), dealers' margins and second hand cars is currently available only from 1986. This has been used to estimate a constant proportion of expenditure on new and second hand cars for years prior to 1986.

Information on asset service life lengths of white goods has been collected by the E-SCOPE study (Electronics industry – Social Considerations Of Product End-of-Life), investigating the

purchase, use and disposal of household appliances in the UK. Estimates of average life lengths for furnishings, carpets and bicycles have been taken from the Eurostat working paper. Average life lengths for new and second hand cars and for motorcycles were obtained from the DVLA – these are different from the life length of business vehicles used in the National Accounts, because we are assuming different patterns of usage by households and businesses. Table 10.1 below shows the percentages of the National Accounts series and the asset life lengths which have been used.

Table 10.1 Household capital volume series

COICOP classification	Description	Divided into:	% split	Principal function	Asset life length
05.1.1	Furniture & furnishings		100	Housing	*15
05.1.2	Carpets etc.		100	Housing	*10
05.3.1	Major HH appliances	Cookers	20	Nutrition	12
		Microwaves	5	Nutrition	7
		Fridges & freezers	20	Nutrition	11
		Dishwashers	5	Nutrition	9
		Washing machines & driers	23	Clothing	9
		Fires, showers, vacuum cleaners etc.	27	Housing	8
05.5.1	Major tools & equipment		100	Housing	7
07.1.1	Motor cars	New	52	Transport	†13
		Second hand	27	Transport	†11
07.1.2	Motor cycles		100	Transport	†10
07.1.3	Bicycles		100	Transport	*9

Source: Percentage split: HHSA estimates based on FES, Mintel and National Accounts data
Note: Cars do not add up to 100 per cent of the series because cars in kind, and dealers' margins on second hand cars have been excluded
Asset life lengths: * Eurostat working paper
† DVLA
all others – E-Scope Study

The PIM model

The Perpetual Inventory Method (PIM) used by the UK National Accounts conforms to international standards, with small variations. The procedure is to estimate the gross capital stock, to apply a depreciation function to calculate consumption of fixed capital and obtain net capital stock by subtracting accumulated capital consumption from the gross capital stock. To do this, the PIM uses data on purchases and sales of fixed assets and assumptions about their life lengths, retirement distribution and depreciation.

A retirement function is used to model the distribution of life-lengths modelling retirement as a process over time, rather than a discontinuous termination. The present UK methodology uses the normal distribution, that is, assets are assumed to retire according to this distribution either side of the average length of life for the group. The PIM also makes assumptions on spread of life lengths. For HHSA purposes we have used the shorter of the two spreads used in the National Accounts calculation – retirements are spread over 10 years either side of the average asset life. The National Accounts model uses three default coefficients of variation (CV: standard deviation/mean) in the retirement function. We have used the CV for vehicles (0.06) for cars, motor cycles and bikes, and the CV for plant (0.209) for all other household capital. Because we are applying the model to households and using data series from 1963 onwards, we have removed the adjustments for bankruptcy and war scrappage.

The model requires an assumption about how assets should depreciated. In part reflecting simplicity and part wider convention, the straight-line method is used throughout the calculation in the UK National Accounts, and we have also used this in the HHSA.

Sensitivity analysis

Calculations using a PIM are very sensitive to assumptions about asset life lengths, and we tested the impact on our estimates of varying the life lengths. We also looked at the impact of using a geometric function for depreciation. Using a model developed by Rormose & Mollgaard, we also calculated capital services. This involved calculating the consumption of fixed capital indirectly, using an age-price function to estimate the net capital stock at constant prices, based on a one-hoss shay age-efficiency profile. This assumes that items of capital equipment yield the same volume of services every year until they retire. The value of capital services is equal to capital consumption plus foregone income, and is therefore particularly sensitive to the discount rate used.

11. LABOUR

Concepts
Labour is an input to each of the outputs measured in the Household Satellite Account. Labour is measured by the amount of time people spend in producing the output and this can be measured by time use surveys.

Methodology

Data source
The data source for the Household Satellite Account is the UK 2000 Time Use Survey (TUS). Full details of this survey can be found at www.statisics.gov.uk/themes/social_finances/TimeUseSurvey, including descriptions of the sampling design, questionnaires, data processing and coding, weighting, grossing and standard errors.

The UK 2000 Time Use Survey collected information from all persons in a selected household who are aged 8 and over. This information was collected in the form of a household questionnaire, individual questionnaires and individual time use diaries. The time use diaries ask respondents to complete in their own words what they were doing in 10-minute time slots throughout two 24-hour periods. Each respondent was asked to complete a diary for a weekday and a weekend day. When recording their use of time, respondent said what their main activity was, anything else they were doing at the same time (not 8-13 year olds), where they were and who else they were with. Respondents' written descriptions of activities were allocated to one of approximately 260 pre-defined codes.

The TUS collected 20,981 diaries. For the HHSA results, we have not used 146 diaries where adults have completed child diaries and therefore have not recorded secondary activities. We have also excluded those diaries where more than 30 minutes of time is missing. In total 3,314 diaries have been excluded - we are therefore using 84.2 per cent of the available diaries.

Weighting and grossing
For the HHSA we require the number of hours the whole UK population spends in a particular activity. In order to obtain this, the results from the individual respondents in the time use survey have been weighted and then grossed to the UK population.

The various weights applied are:

1. a seasonality weight - to ensure seasons are equally represented
2. an average day of the week weight - to ensure days of the week are equally respresented
3. non-response weights
4. population calibration

The grossing factors applied are based on the relationship of the number of respondents to the UK population aged 8 and over (approximately 53 million people). An adjustment has been made to account for the fact that all the respondents should have completed two diaries – on average, each respondent completed 1.9858 diaries. Also, as we did not include all of the

diaries, the results were adjusted upwards to the full population, to allow for those diaries not selected due to missing time or where adults had completed child diaries. We grossed and weighted the data separately for males and females, and summed the figures to gain our estimated totals. We chose to use this weighted average method, in order to estimate the relative contributions of men and women to value added in household production. The survey estimates were grossed to the UK population using data derived from the Labour Force Survey, which exclude people living in institutions.

HHSA Results

The weighted and grossed results gave the amount of minutes in an average day spent by the UK population aged over 8 in each coded activity. The final adjustment was to multiply this by 365 days to obtain the results for a whole year, and to divide by 60 to convert the minutes into hours. As we were interested in the gender breakdown of the HHSA results, the results were produced separately for men and women.

In order for the total time spent in each principal function to be consistent with the output, each function was looked at separately, and the total of all time associated with it was estimated. This included both time recorded as a primary activity, and time recorded as a secondary activity. Additionally, in the childcare and adult care projects, an imputation was made for unrecorded passive care. Because of this, the total of all of the time across the projects, together with leisure, work and personal time not included in the HHSA, sums to more than 24 hours in a day for the population.

The activity codes allocated to each project are listed in Annex 11.1 at the end of the chapter, and a description of any additional adjustments made can be found below. The full coding frame is on the time use web site. The coding frame is at 4 levels: 1, 2 and 3 digit codes, which match the Eurostat time use coding frame, and 4-digit codes in areas of particular interest in the UK. For the HHSA, we have used the data at the lowest possible level (i.e. 3 or 4-digit). Within each 2-digit heading of the coding frame there is a code for 'unspecified' time. This is where the time could be allocated to the 2-digit level but not to a more detailed 3-digit heading. Similarly, each 2-digit heading also has an 'other specified' code, where the respondent has described an activity not listed in the detailed coding frame. Where the more detailed codes in a category have been allocated to different functions, any time recorded as 'unspecified' or 'other specified' has, where possible, been split between the functions in proportion to the time recorded at the 3 or 4-digit level.

Housing

Results were calculated separately for those respondents living in owner-occupied accommodation and those living in rented accommodation. By merging the details from the household questionnaire and the time use diaries, we could identify the respondent's tenure. We classified owner-occupiers as those who reported of their accommodation that they "own it outright", are "buying it with the help of mortgage or loan", or are "paying part rent and part ownership". Tenants were identified as living in rented accommodation. People who were living rent-free in relatives'/ friends' property, those who were squatting and those who refused or did not know the terms on which they occupied the accommodation were not selected.

Transport

As we are only interested in the transport provided by the household, results were produced based on the mode of transport being used. The mode was recorded in the 'where' part of the

diary. The transport mode codes are:

12 Travelling on foot
13 Travelling by bicycle
14 Travelling by moped, motorcycle or motorboat
15 Travelling by passenger car as the driver
16 Travelling by passenger car as a passenger
17 Travelling by passenger car – driver status unspecified
18 Travelling by lorry, or tractor
19 Travelling by van

The modes were split into motorised and non-motorised modes and time recorded in unspecified modes. Where a mode was not recorded, the time was allocated in proportion to the time in the recorded modes. Time recorded as walking in the code 982 Travel for day trip/just walk has been excluded.

The output of transport is based on the value of journeys by parties rather than individuals. The total time travelled by individuals was divided by the average numbers in parties in the NTS data, which was used to estimate the output. However, before this adjustment could be made, because the average number in party data includes 0-7 year olds, an estimate of time for the 0-7 year olds had to be added. As no other information was available, it was assumed that 0-7 year olds travel in the same way as 8-13 year olds. While this is a reasonable assumption for school age children, it is unlikely to be correct for the under 5s, but at this stage there is no alternative.

Once the results for travel were calculated, the time for the related service of vehicle maintenance was added.

Childcare
As we know that childcare is often under recorded in time use diaries, estimates for time when a child is being 'cared' for passively were imputed and added. Results were calculated for unrecorded passive care in two ways:

1. In households with children, all the sleep time of parents, guardians, step-parents and foster parents was included as passive care. This makes it possible to look at the gender breakdown of passive care, without making assumptions about who is on call.
2. Where any adult (over 16 years of age) recorded being with a child living in the same household while the adult was awake, this time was included as passive care when childcare was not recorded as either a main or secondary activity.

Adult care
In the same way that childcare is often under recorded, so where adult care is continuous, passive care may also be under recorded. We recoded the sleeping time of those adults, who reported spending more than 100 hours per week caring for an adult in their household in the TUS individual questionnaire, as passive adult care.

Voluntary activity
The Time Use code for voluntary activity is:

412 Volunteer work through an organisation

Sensitivity analysis
As the time use results come from a survey, they are subject to sampling errors. The standard errors around the grossed results for each 3-digit activity heading are shown in the sensitivity analysis results.

In the methodology described above we have looked at each principal function separately and produced estimates of the total time spent by the UK population in producing each output. In this way, the time use is consistent with the output. As people frequently do two or more activities at the same time, the time spent in both the primary and the secondary activity has been counted, where the two are both household production activities. Respondents have reported their time use in ten-minute slots. Frequently the primary and secondary activities are taking place at the same time. However, activities may also take place sequentially. If the activities are sequential, we will have overestimated the total time spent on any principal function, as we have allocated a full 10 minutes to both the primary and secondary activities.

If you were to add all of the time across all of the output projects it would sum to more than 24 hours per person per day. In order to see how the time estimates, and therefore the effective return to labour, is affected by allocating only 24 hours per day per person, we have produced two other sets of data for comparison. These are:

- the total of primary activities only for each project;
- Where any two activities take place at the same time (i.e. a primary and a secondary activity), 50 per cent of the reported time is allocated to the primary activity code and 50 per cent to the secondary code. The codes are then allocated to the individual projects.

RELATED SERVICES

Concepts
Related services are activities which are associated with other productive functions, rather than being activities in their own right. They include shopping, maintenance and household management. They are similar to ancillary activities in the National Accounts, in that they produce services rather than goods and they are not undertaken for their own sake. In the National Accounts enterprises are classified by their principal productive activity, and ancillary services typically produce outputs that are commonly found as inputs into almost any kind of productive activity. In the Household Satellite Account, household production is divided into principal functions, undertaken by all households, rather than classifying the households themselves by a principal activity. These related services are not common to all principal functions, and their inputs are separately identified, in order to allocate them to the appropriate function, so in this respect they are not like ancillary services.

If we wished to value related services separately in an output approach, the volume of maintenance, shopping and management would have to be calculated. There is not sufficient data to allow us to do this. However, the market prices used to value the output of the principal functions will usually include the provision of these related services. So, for example, the driver of a private hire vehicle makes a charge for the journey, which includes any overheads (s)he has for maintaining the vehicle. The cost of a meal in a restaurant also covers the time an employee spends shopping for food etc. The time spent on maintenance, shopping and household management should be recorded as an input into the appropriate principal function. This will account for all time spent doing maintenance, and most of the time spend shopping and managing the household. Some shopping and management time

will not be related to productive functions, e.g. shopping for gifts and planning leisure activities. In theory, this residual should be valued because it is also productive. However, this demands a great deal of detail from respondents to a self-completion time use diary, and a proliferation of codes in a pre-coded exercise. We therefore have to make some assumptions about the split of shopping and management between the various principal functions and non-productive activity.

Methodology

Data source
We used the UK 2000 Time Use Survey to identify the time spent on shopping and household management activities. This was then allocated to the relevant principal functions:

Housing:	shopping mainly related to accommodation, and shopping for and ordering goods and services related to accommodation via the internet
	part of household management
	banking and bill paying via the internet
Nutrition:	shopping for food and shopping and ordering food via the internet
	part of household management
Childcare:	part of household management

A full list of the time use codes used can be found in Annex 11.2 at the end of the chapter.

Volume
We adjusted the amounts of time spent in specified tasks by adding a proportion of the time spent in "unspecified" or "other specified" tasks. To do this, any time recorded as "unspecified" or "other specified" has been split between the functions in proportion to the time spent recorded at the 3 or 4 digit level. This means we allocated the time in "unspecified shopping and services" and "other specified shopping and services" to shopping, commercial and administrative services, and personal services, according the proportion of specified time spent in those activities. Similarly, we allocated the time spent in "unspecified shopping" and "other specified shopping" by the proportion of time spent in shopping mainly for food, mainly for clothing, mainly for accommodation, shopping or browsing and window-shopping.

For household management, because we have no details about the specific tasks involved, we applied a general split to the time spent in household management, based on the proportions of primary time spent in housing, nutrition, childcare and leisure activities. This assumes that the time spent planning and organising the outputs is proportional to the time spent actually producing them.

To allocate the time for related services by owner occupiers and tenants separately, we applied the proportion of primary time spent by each in shopping for accommodation, shopping for and ordering goods and services related to accommodation via the internet, household management, and banking and bill paying via the internet, to our adjusted figures.

Annex 11.1 Allocation of Time Use codes to HHSA projects

Housing

320 Unspecified household upkeep
321 Cleaning dwelling
322 Cleaning yard
323 Heating and Water
324 Various arrangements
324 Disposal of waste
329 Other specified household upkeep
341 Gardening
351 House construction and renovation
352 Repairs of dwelling
353 Making, repairing and maintaining equipment
3613 Shopping mainly related to accommodation
3724 Shopping for and ordering goods and services related to accommodation via the internet

Transport

901 Travel related to personal business
913 Travel to work from home and back only
914 Travel to work from a place other than home
921 Travel related to education
923 Travel escorting to/ from education
931 Travel related to household care
936 Travel related to shopping
937 Travel related to services
938 Travel escorting a child (other than education)
939 Travel escorting an adult (other than education)
941 Travel related to organisational work
942 Travel related to informal help to other households
943 Travel related to religious activities
944 Travel related to participatory activities other than religious activities
950 Travel to visit friends/ relatives in their homes (not respondent's household)
951 Travel related to other social activities
952 Travel related to entertainment and culture
961 Travel related to physical exercise
962 Travel related to hunting & fishing
963 Travel related to productive exercise other than hunting & fishing
971 Travel related to gambling
972 Travel related to hobbies other than gambling
981 Travel to holiday base
982 Travel for day trip/ just walk
989 Other specified travel

354 Vehicle maintenance

Nutrition

310 Unspecified food management
311 Food preparation
312 Baking
313 Dish washing
314 Preserving
319 Other specified food management
3611 Shopping mainly for food
3722 Shopping for and ordering food via the internet

Clothing & Laundry Services

333 Handicraft and producing textiles
331 Laundry
332 Ironing

Childcare

380 Unspecified childcare
381 Physical care and supervision
382 Teaching the child
383 Reading, playing and talking with child
384 Accompanying child
389 Other specified childcare
427 Childcare as help

Adult care

3910 Unspecified help to an adult household member
3911 Physical care & supervision of an adult household member
3914 Accompanying an adult household member
3919 Other specified help to an adult household member
420 Unspecified informal help
421 Food management as help
422 Household upkeep as help
423 Gardening and pet care as help
424 Construction and repairs as help
428 Help to an adult of another household

Voluntary activity

412 Volunteer work through an organisation

Annex 11.2 Time Use codes used for Related Services

Shopping and services

360 Unspecified shopping and services
361 Shopping
3611 Shopping mainly for food
3612 Shopping mainly for clothing
3613 Shopping mainly related to accommodation
3614 Shopping or browsing at car boot sales or antique fairs
3615 Window shopping or other shopping at leisure
3619 Other specified shopping
362 Commercial and administrative services
363 Personal services
369 Other specified shopping and services

Household management

371 Household management not using the internet
372 Household management using the internet
3720 Unspecified household management using the internet
3721 Shopping for and ordering unspecified goods and services via the internet
3722 Shopping for and ordering food via the internet
3723 Shopping for and ordering clothing via the internet
3724 Shopping for and ordering goods and services related to accommodation via the internet
3725 Shopping for and ordering mass media via the internet
3726 Shopping for and ordering entertainment via the internet
3727 Banking and bill paying via the internet
3729 Other specified household management using the internet

12. UK ACCOUNT

Concepts
In order to bring the estimates for all the principal functions together in one account, we need to be sure that we have avoided double counting any of the output in more than one project, and that all our output estimates are on the same price basis.

The areas of potential overlap occur particularly in relation to adult care, childcare and voluntary activity. The output measure of childcare includes all care given as help to other households, but excludes care provided formally by organisations (which is counted in voluntary activity).

All informal help to adults is included in the output of adult care, but this includes meal preparation and DIY for relatives, friends and neighbours. In theory, these should be included in nutrition and housing respectively. The detail in the adult care data source is not sufficient for us to identify separately these activities. The output estimates of housing and nutrition do not include the provision of services for other households, so we know they have not been double counted. Because we have used a residential rate for continuous adult care, an adjustment does need to be made for accommodation and meals (see below).

To be comparable with each other and with adjusted GDP at market prices, we need to ensure that the outputs are all valued at purchasers' prices, i.e. inclusive of taxes on products, e.g. VAT. Where we have used an hourly rate to value care, this implies using gross rather than net wages. Because VAT is charged at a standard rate, and we have net wages for all the estimates where gross wages have been used, we can also calculate output at basic prices.

Having calculated the value of the output in each principal function, the various inputs need to be subtracted, in order to arrive at a figure for value added. Intermediate and capital consumption are apportioned to each project as described in the relevant chapters. Additionally, household production of housing, transport and nutrition must also be subtracted from the output of some of the projects. This can be done in a supply and use table, as shown in Annex 13.1 at the end of the chapter.

In order to compare the results with GDP in the National Accounts, we need to subtract from GDP the amounts which are implicitly or explicitly included in the HHSA – imputed rent of owner occupiers, tenant rents which are inputs to household production, and any other Household Final Consumption Expenditure which we have reclassified as intermediate consumption or final consumption. This adjusted GDP becomes Gross Market Product, and can be added to Gross Household Product – the value added by households as calculated in the HHSA – to give Gross Economic Product[13].

Methodology

Housing
The prices used to value nutrition, laundry services and continuous adult care all include the cost of premises, and so the contribution of housing must be deducted in order to arrive at the value added by households. This includes both a proportion of the output of owner-occupied

13 As described by Duncan Ironmonger in Ironmonger, D. (1993*) "Why Measure and Valu e Unpaid Work?" in International Conference on the Measurement and Valuation of Unpaid Work, Proceedings* Ottawa: Statistics Canada

housing, and of the rents and other housing costs (utilities and insurance) paid by tenants.

The preparation of food generally takes place in the kitchen, and it seems sensible to assume that it is the cost of providing this room, where many meals will also be eaten, which should be taken into account. Because our housing estimate is based on the number of owner occupied and rented rooms, including the kitchen, and we assume that every dwelling has one kitchen, we can estimate the proportions of owner occupied and rented rooms which are accounted for by kitchens. However, meal preparation is not the only activity which takes place in a kitchen, and, particularly in smaller dwellings, it will be used for leisure as well as, in many cases, for another productive activity – providing laundry services. In order to calculate how much accommodation should be allocated to each, we made a broad assumption that 20 per cent of the kitchen is used for non-productive activities. We plan to examine this assumption in more detail at a later stage. We then took the average number of washing loads per household per week (5) over the average number of meals per household per week (21), and allocated 20 percent of the remaining kitchen accommodation to laundry services and 80 per cent to nutrition.

From the adult care estimates, we know the number of adults receiving continuous care in UK households. We know whether these adults are in owner-occupier or tenant households, and this proportion (number of rooms required for adult care over the total number of rooms in each category) gives the accommodation which needs to be allocated to the adult care project.

Transport

The prices used to value nutrition include the costs of transporting the meal ingredients from the outlet where they are purchased to the restaurant where they are prepared and served. Our estimate of the output of transport includes shopping journeys broken down into food-related shopping and all other shopping. The cost of the food-related shopping journeys is allocated to the nutrition project. The other shopping journeys remain in the transport project, because we have no way of allocating them to other principal functions.

Nutrition

The residential rate for continuous adult care includes the provision of meals, so an adjustment needs to be made to the output estimate. We have taken an average price for one breakfast plus two other meals per day per adult receiving continuous care, to make this adjustment.

Sensitivity analysis

The figures in the UK are sensitive to the assumptions described in each of the individual projects, and should be interpreted with caution, bearing this in mind.

Annex 12.1 Household Satellite Account Supply and Use table

Industries® **Products¯**	National Accounts *	Housing: Accomm services**	Transport	Nutrition	Clothing: Garments	Clothing: Laundry services	Childcare	Adult Care	Voluntary Activity	Total int. demand	Final cons. exp.	Gross capital formation	Total demand
National Accounts		Utilities, insurance, Cleaning materials, DIY goods & services, Other domestic services inc. employees	Petrol, insurance, car spares	Food, detergent,	Fabric, haberdashery	Washing powder	Equipment			Sub-total			ID+FCE +GFC
Accomm. services*				% rooms		% rooms		% rooms		Sub-total	X		Ditto
Transport services				Food shopping journeys			Escort journeys			Sub-total	X		Ditto
Meals								3 per adult per day			X		Ditto
Garments											X		Ditto
Laundry services											X		Ditto
Care services											X		Ditto
Voluntary Activity											X		Ditto
Total int cons	Zero	Sub-total	Sub-total	Sub-total	Sub-total	Sub-total	Sub-total		Sub-total	Total	Total	Total	**TOTAL**
Taxes - subs		Council tax	Car tax				Child Benefit			Sub-total			
GVA	NA output	*Output – int cons*	*Output – int cons*	*Output – int cons*	*Output – int cons*	*Output – int cons*	*Output – int cons*		*Output – int cons*	HHSA + adj to NA			
Total supply at market prices	*total value of output*	*total value of output*	*total value of output*	*total value of output*	*total value of output*	*total value of output*	*total value of output*		*total value of output?*	**TOTAL**			
Capital consumption		House, furniture, carpets, tools	Cars, motorcycles, bikes	Cookers, mircowaves, fridges, freezers dishwashers		Washing machines, tumble driers			?% computers	Sub-total HHSA			
Nett value added HHSA		*GVA – cap cons*	*GVA – cap cons*	*GVA – cap cons*	*GVA – cap cons*	*GVA – cap cons*	*GVA – cap cons*		*GVA – cap cons*	Total HHSA			

* these are already included in the National Accounts – adjustments will be shown elsewhere
** owner occupied
X denotes an expected entry