

## Article

# The feasibility of producing regional household final consumption expenditure, UK: 2016

Household final consumption expenditure (HFCE) generally covers traditional consumer spending on goods and services to meet their day to day needs. Being able to measure this type of expenditure regionally is becoming increasingly important due to devolution of power to regions and local areas. To meet the growing need for better regional statistics, ONS conducted this study to determine whether it is possible to produce regional HFCE at this point in time. This report summarises work carried out so far in order to produce regional HFCE at a NUTS1, 2 and 3 level. It considers how HFCE is compiled and published at a national level, and provides definitions of key concepts and terminology, such as final consumption expenditure, COICOP categories used to classify the aforementioned, and households. It discusses the national and domestic concept of HFCE. It also briefly discusses the potential regional availability of the main national level data sources.

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Release date:  
31 October 2016

Next release:  
To be announced

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# 1 . Executive summary

Household final consumption expenditure (HFCE) generally covers traditional consumer spending on goods and services to meet their day to day needs. The total HFCE for the UK for 2015 was £1,157,989 million <sup>1</sup>. Being able to measure this type of expenditure regionally is becoming increasingly important due to devolution of power to regions and local areas. To meet the growing need for better regional statistics, we conducted this study to determine whether it is possible to produce regional HFCE at this point in time.

This report summarises work carried out so far in order to produce regional HFCE at a Nomenclature of Territorial Units for Statistics (NUTS)1, 2 and 3 levels. It considers how HFCE is compiled and published at a national level, and provides definitions of key concepts and terminology, such as final consumption expenditure, classification of individual consumption by purpose (COICOP) categories used to classify the aforementioned, and households.

It also discusses the national and domestic concept of HFCE; the domestic concept measures all the expenditure in the UK by UK residents and non-residents. The national concept measures expenditure by UK households in the UK and abroad, and excludes any expenditure by non-residents. These two concepts will have a great bearing on what can be published as not all data sources collect their information according to the same set of principles, such as Living Costs and Food Survey (LCF) which collects expenditure data from the UK household's perspective, and thus their location; essentially national concept HFCE. Whereas the Retail Sales Inquiry (RSI) collects turnover data from the business perspective, and thus is domestic concept HFCE as it includes all spending by UK households and non-UK residents.

This takes us to another important aspect of national HFCE, many different sources of data feed into national HFCE such as our surveys (mainly LCF, RSI and the Annual Business Survey), administrative data from HMRC, data from other government departments, market research, sector regulators and businesses. These sources are adjusted, grossed, smoothed and have historic ratios or linked factors applied to them during compilation. Some data is also forecast. Further investigation is needed to understand these methods and the impact they could have on regional indicator datasets used to apportion national totals, and thus the quality of regional HFCE. LCF, a major data source, is likely to be available at NUTS3, however further research is needed into all other sources to confirm their regional availability. The biggest contributor to national HFCE is owner occupied imputed rental, and we are currently working on improving its compilation method so will have a good quality regional indicator for this.

The study has concluded that regional HFCE is theoretically possible. However further investigation into data sources is needed before concluding for certain that it can be compiled in practice, and that the outputs would be of acceptable quality. Below is a full list of recommendations as a result of this report:

## Recommendations:

1. Better understanding of the many adjustments and calculations used to compile UK HFCE is needed to determine which need to be carried out at a regional level.
2. As the LCF doesn't collect information on institutions such as prisons, residential care homes nor halls, further investigations are needed to discover exactly how HFCE gross up the LCF to account for this.
3. Further investigation into whether International Passenger Survey (IPS) data can be apportioned regionally, where used to supplement Labour Force Survey (LFS) data to produce domestic concept HFCE.
4. Ensure regional HFCE is considered as part of wider project to improve owner occupied imputed rental.
5. Obtain clarification on which Scottish islands are considered offshore for the purpose of the LCF, and map these to NUTS3 areas to determine which areas are affected by being excluded from the LCF sample.
6. Determine a suitable method for the Isles of Scilly where LCF data is used; the Isles are not sampled.
7. Gain better understanding of LCF Northern Ireland sample size and number of responding households. Also enquire about the probable date of the future sample boost for Northern Ireland.
8. Ensure open communication is maintained with Scottish government as to project progress.
9. Regional Accounts to be involved in renegotiation of any commercial contracts relating to access to data used in HFCE.
10. Detailed investigation of data available for regional imports and exports.
11. Investigation into the impact of cross border domestic tourism.
12. System used for compilation of regional HFCE is set up to process and output domestic concept, net tourism, and national concept HFCE as separate series for each region.

### **Notes on Executive summary:**

1. Based on the national concept, see the [United Kingdom National Accounts, The Blue Book: 2015 Edition](#) for further information.

## **2 . Introduction**

### **a) Background**

#### **Regional economic statistics**

Regional economic statistics have existed for many years, however their availability in terms of topic and regional coverage have varied over time. Ever since the [Allsopp Review](#) in 2004 concluded that there was a "pressing need for better regional data" we have been working on improving the range, detail and quality of regional economic data. The [Bean Review](#) in 2016 expanded on this, by stating that users need "timelier and more detailed statistics at a finer level of geographical disaggregation".

The increased pace of devolution of powers, not only to the nations, such as Scotland and Wales, but at a lower regional or local level with City Deals and Local Enterprise Partnerships (LEPs), is also driving the need for better regional data. In order to achieve their goals of improving economic growth these organisations will need to access data about their particular area, and as the Bean Review states “the lack of information [...] represents a handicap for policy and business decisions”.

## Household final consumption expenditure statistics

There are four main drivers for Household final consumption expenditure statistics (HFCE):

1. Decision making – at present we publish regional gross disposable household income (GDHI), which shows the amount households have left over for spending or saving after the effect of taxes and benefits on household labour and investment income have been accounted for. GDHI is thus a “valuable measure of relative wealth between regions”<sup>1</sup> but provides no information on how that leftover amount is actually spent or saved. HFCE is the next step in the household account and would provide users with information on the spending patterns of households, and hence a more complete picture of the demand for goods and services across different regions. This information would help inform policy decisions and investment decisions for areas with devolved powers. It could also guide private business investment decisions<sup>2</sup>.
2. Savings ratio – having calculated regional household final consumption expenditure (HFCE), we should be able to derive the savings ratio on a regional basis. The savings ratio is a valuable headline indicator as it is the percentage of disposable income leftover after spending.
3. Longer term goals – regional data on consumer spending could also help in the longer-term development of our regional Supply and Use Tables (SUT). The Northern Ireland Statistics and Research Agency (NISRA) has expressed a desire for these data to inform their own SUT and for wider policy use.
4. [European System of Accounts 2010 \(ESA\)](#) – Under ESA the transmission of regional HFCE is a voluntary requirement (see section below for further detail). The UK, as one of the larger EU economies, should aim to be fully compliant with the ESA requirements.

## b) Objectives of report

The objectives of this report are to assess the feasibility of producing regional HFCE; this will include investigating whether regional HFCE is possible at Nomenclature of Territorial Units for Statistics (NUTS)<sup>1</sup>, NUTS2 and NUTS3 level, and the product breakdown for each region. Implicit to this will be a high level investigation into the main sources of data that feed into HFCE data as published in Blue Book, as our intention is to be as inline as possible with the data that’s published in Blue Book in terms of numbers and product breakdown.

Our minimum aim is to produce regional HFCE that satisfies the requirements of Table 13 of the European System of Accounts 2010 Transmission Programme of Data (TPD,) that is at NUTS level 2, and is in line with the product breakdown in Blue Book. Further detail of product breakdown can be found in section d) Measuring HFCE, below.

Our ideal goal would be to produce the same breakdown as Blue Book at NUTS3. Therefore to avoid duplication of effort, a baseline of investigating source data at NUTS3 has been established. If it is found that data is available at NUTS3 and of sufficient quality, then a bottom-up approach would be utilised whereby NUTS3 data would be aggregated to NUTS2, and NUTS2 data to NUTS1.

In line with our policy and Bean Review guidance, we will investigate administrative data and big data sources as well as existing survey data. The characteristics of these sources will determine the quality of the regional HFCE output. Factors such as the following will all need to be considered:

- timeliness of the data
- time period covered
- sample size of survey data
- regional coverage
- level of detail available
- methods of collection of the data (web scraping, surveys, mandatory returns to industry regulators, administrative data)
- measurement method (that is, is the data collected from the household itself or from a business' perspective) along with definitions of variables
- missingness and quality of data (in terms of errors and data cleaning)

All investigations are based on producing the above breakdown in current prices.

If regional HFCE is deemed feasible, we aim to deliver our first output in the Spring of 2018 as experimental statistics.

Recommendations are noted throughout this report in relation to areas that require further investigation before a new system can be built to produce HFCE.

### **c) Defining HFCE – Concepts and terminology**

HFCE is recorded in the Use of Income Account in the national accounts. It is recorded as a use, with disposable household income recorded as a resource in the same account. The balancing item of the account is saving.

ESA2010 states that there are two concepts of final consumption:

1. Final consumption expenditure (P.3)
2. Actual final consumption (P.4)

It states that "Final consumption expenditure is expenditure on goods and services used by households, NPISHs [Non-Profit Institutions Serving Households] and government to satisfy individual and collective needs. In contrast, actual final consumption refers to its acquisition of consumption goods and services"<sup>3</sup>.

Individual consumption expenditure is classified according to the internationally agreed system of classification for reporting consumption expenditure in national accounts; classification of individual consumption by purpose (COICOP)<sup>4</sup>.

There are 14 categories in the classification:

- 01 - food and non-alcoholic beverages
- 02 - alcoholic beverages, tobacco and narcotics
- 03 - clothing and footwear
- 04 - housing, water, electricity, gas and other fuels
- 05 - furnishings, household equipment and routine household maintenance
- 06 - health
- 07 - transport
- 08 - communication
- 09 - recreation and culture
- 10 - education
- 11 - restaurants and hotels
- 12 - miscellaneous goods and services
- 13 - individual consumption expenditure of non-profit institutions serving households
- 14 - individual consumption expenditure of general government

The sum of the first 12 categories in this system give individual consumption expenditure of households, and the last two give individual consumption expenditure by the non-profit institutions serving households (NPISH) and general government sectors. Together all 14 categories represent actual final consumption by households<sup>5</sup>, that is, what the household sector actually consumes as opposed to what they purchase.

For regional HFCE we are therefore interested in the first 12 categories only. These are the normal, day to day expenditures of households on goods and services, such as food and drink, utilities, clothing and visits to the dentist. Owner-occupied imputed rental is also included for the purpose of national accounts and will be discussed later in this article.

Households, as a sector in the national accounts are individuals or groups of people sharing living accommodation and possibly other aspects of daily life such as meals. The household sector thus includes not only those living in traditional households, but also those people living in institutions, such as retirement homes, boarding houses or prisons<sup>6</sup>.

HFCE predominantly covers traditional consumer spending on goods and services, including housing services, to meet their requirements for day-to-day living<sup>7</sup>.

HFCE also includes the following:

- goods and services received as income in kind by employees, such as free or subsidised meals and accommodation
- goods or services produced as outputs of unincorporated enterprises owned by households that are retained for consumption by members of the household; examples are food and agricultural produce
- domestic service (for example, cleaners and gardeners)
- imputed rentals for owner-occupied dwellings

HFCE excludes the following:

- items treated as intermediate consumption , for example, expenditure that an owner occupier incurs on the decoration, maintenance and repair of the dwelling not typically carried out by tenants
- expenditure by households owning unincorporated enterprises when incurred for business purposes, for example, fuel for the business vehicle
- items treated as gross fixed capital formation, for example, purchase of dwellings or major improvements to existing dwellings, stamp duty in relation to transfer of land or property (but stamp duty in relation to transfer of bonds and shares is included under COICOP 12.6.2.)
- items treated as gross capital formation , that is valuables such as antiques, works of art or jewellery when purchased as stores of value
- subscriptions, contributions and dues paid by households to NPISH, such as trade unions and sports clubs
- voluntary transfers in cash or in kind by households to charities, relief and aid organisations
- any business expenditure where the household owns an unincorporated enterprise

Having defined what HFCE includes and excludes, it is also important to recognise that it can be measured by two different concepts; the domestic concept and national concept. The domestic concept measures all the expenditure in the UK by UK residents and non-residents. The national concept measures expenditure by UK households in the UK and abroad. The national concept does not include any expenditure by non-residents in the UK. To achieve the national concept, expenditure by UK residents abroad (imports) is added to the domestic concept, and expenditure by non-residents in the UK (exports) is subtracted; domestic concept HFCE plus net tourism equals national concept HFCE.

## Currently published data

We publish the [UK National Accounts known as the Blue Book](#). The data published in the Blue Book satisfy the requirements of Table 1 and Table 5 of the TPD in relation to HFCE. The relevant tables in the Blue Book for 2016 are 6.2 and 6.3. Table 6.2 provides current price data and 6.3 provides chain volume measures. The tables organize the data into durable goods, semi-durable goods, non-durable goods and services<sup>8</sup> and their respective COICOP categories<sup>9</sup>. These four sections are summed to produce final consumption expenditure in the UK by resident and non-resident households (domestic concept). The table also provides final consumption expenditure outside the UK by UK resident households, final consumption expenditure in the UK by households resident in rest of the world and final consumption expenditure by UK resident households in the UK and abroad (national concept).

The value of UK HFCE at current prices for 2015 is £1,147,262 million based on the domestic concept, and £1,157,989 million on the national concept (see below for further information on domestic and national).

No data is currently published which satisfies the requirements of Table 13.

## d) Measuring HFCE

Blue Book publishes UK data under the following headings:

- durable goods; COICOP categories 05, 06, 07, 08, 09, 12, total.
- semi-durable goods; COICOP categories 03, 05, 07, 09, 12, total.
- non-durable goods; COICOP categories 01, 02, 04, 05, 06, 07, 09, 12, total.
- services; COICOP categories 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, total.
- final consumption expenditure in the UK by resident and non-resident households (domestic concept) that is, the sum of the four above.
- final consumption expenditure outside the UK by UK resident households (imports).
- final consumption expenditure in the UK by households resident in rest of the world (exports).
- final consumption expenditure by UK resident households in the UK and abroad (national concept).

## How it's done at UK level

UK level data is processed at the 4-digit COICOP level. Sources of data include surveys, administrative and market research, other government departments, sector regulators and businesses. Various adjustments (coherence, data validation, multiplicative, balancing and explicit exhaustiveness adjustments to name a few) are made to the data, along with other calculations such as grossing, smoothing, applying historic ratios or link factors. For example, Annual Business survey (ABS) data is apportioned using a Living Costs and Food Survey (LCF) ratio, and then a multiplicative Retail Sales Inquiry (RSI) adjustment is applied (applies to COICOP 05.1.1 to 05.1.5 excluding 05.1.3). Some data are also forecast (using ARIMA, or Holt Winters) as data sources have dried up.

Link factors are used to address the step change in LCF data series. Prior to Quarter 2 (Apr to June) 2001 we conducted two household budget surveys; the Family Expenditure survey and the National Food Survey. In Quarter 2 2001 these were merged to form the Expenditure and Food Survey (EFS), the LCF's predecessor. Changes to methodology and sample size were made at the same time hence the need to link the old datasets to the EFS. The EFS underwent a name change to the LCF in 2008; no methodological changes were implemented thus no link factors are used during 2008.

The ABS collects financial data from businesses' end year accounts, such as total turnover. A breakdown of retail and non-retail turnover is requested, and in the retail section a further breakdown by product is requested. This breakdown is used for some of the COICOP categories as described in Table 1 below.

Where the LCF is used, some categories are supplemented by International Passenger Survey (IPS) data to ensure expenditure by UK non-residents is included as the LCF only covers UK resident households.

Deductions are made for some categories such as in COICOP 04.5.1 electricity, for the use of electricity in the production of cannabis, which is considered intermediate consumption. Deductions are also made to COICOPs 03 clothing and footwear, 04.1.1 actual rentals paid by tenants for housing and 06.1.1 private purchases of medication, in relation to intermediate consumption with regard to prostitution.

Four-digit data is fed to the supply use system and aggregated to classification of product activity (CPA) categories and balanced. The balancing adjustment is provided to HFCE who decide how to distribute the adjustment across the 4-digit COICOP categories within that CPA category, depending on the quality of data sources at the 4-digit level.

Data is then aggregated up to 2-digit COICOP categories for publication in Table 6.2 of the Blue Book.



Recommendation: Better understanding of the many adjustments and calculations used to compile UK HFCE is needed to determine which need to be carried out at a regional level. Adjustments are carried out to other data sources apart from the LCF, and conceptual differences may also apply to those, so all sources need to be reviewed as part of this recommendation.

Due to the varied and numerous sources of data used for HFCE, there is no single measurement of the accuracy of HFCE. Although standard errors are available for LCF, and similar measures for other survey data, no such measures are available for the administrative data or data from the industry regulator. Accuracy for such sources could be indicated by the size of revisions from year to year. Where sample survey data is used, sampling and non-sampling errors can affect the output. Non-sampling errors are likely to affect the non-survey sources.

## Sources

The main sources for measuring HFCE for the purpose of National Accounts are LCF, RSI and ABS. Where it is known that respondents to the LCF underestimate expenditure, such as alcohol and tobacco, alternative sources to the LCF are used, for example, administrative data from HMRC.

The table below illustrates the primary sources for each 2-digit COICOP category and the percentage value of each category in comparison to total HFCE.



## Table 1: Primary sources for UK HFCE

COICOP	Product group name	Percentage of total HFCE	Primary data sources	Data Provider
01	Food and non-alcoholic beverages	8	LCF	ONS
02	Alcoholic beverages, tobacco and narcotics	4	HMRC administrative data	HMRC
			External market research survey for alcohol	Commercial contract
03	Clothing and footwear	6	RSI	ONS
04	Housing, water, electricity gas and other fuels	25*	Local Authorities administrative data	UK Local Authorities via ONS
			Utility companies administrative data	OFWAT
05	Furnishings, equipment and routine maintenance of the house	5	ABS	ONS
			RSI	ONS
			LCF	ONS
06	Health	2	NHS payments	NHS
			LCF	ONS
07	Transport	14	Transport Regulator	ORR
			Department for Transport	DfT
			IPS	ONS
08	Communication	2	Sector regulator	OFCOM
			LCF	ONS
			ABS	ONS
			RSI	ONS
09	Recreation and culture	10	LCF	ONS
			ABS	ONS
			RSI	ONS
			Main service provider	Sky plc
			Sector regulator	Gambling Commission
10	Education	2	LCF	ONS
			Department for Education	DfE
11	Restaurants and hotels	10	LCF	ONS
			Armed Forces accommodation data	ONS
			HMRC data for alcohol	HMRC
			External market research survey for alcohol	Commercial contract
12	Miscellaneous goods and services	13	Bank of England	BoE
			Financial Inquiries Survey	ONS
			LCF	ONS

		Association of British Insurance	ABI
Total	100		

Source: Office for National Statistics

Notes:

1. \*Owner-occupied imputed rental (COICOP 04.2.1) contributes the greatest proportion to any 2-digit category at 17%.

A list of the secondary sources with a bit more detail can be found in the Annex, note this is taken directly from a Consumer Trends Publication<sup>10</sup>.

The total of the 12 COICOP categories provides an estimate of the domestic concept HFCE. Net tourism is added to this to estimate the national concept HFCE. Net trade is the expenditure by UK residents minus the expenditure of non-residents in the UK. Net trade is measured mostly by using the IPS.

Expenditure by UK residents abroad includes traditional holiday spending, as well as expenditure by UK forces and UK government employees stationed abroad, and outward imputed rental, that is the housing services the owner occupier consumes whilst living in their home abroad. Outward imputed rental is currently sourced from our Trade branch. This is added to domestic concept HFCE.

Expenditure in the UK by non-residents is also obtained from the IPS. It covers expenditure by foreign students, members of the USA forces stationed in the UK, non-UK government employees and inward imputed rental. USA forces data is sourced from the Defence Analytical Services Agency (DASA). It also includes inward imputed rental. This is subtracted from national concept HFCE.

Categories which use historic forecasts to estimate data have been prioritised for review by HFCE so that alternative data sources can be found.

## Living Costs and Food Survey

As is seen in the table above, the LCF is the main source for many COICOP categories. The LCF is a voluntary household expenditure survey<sup>11</sup>. It is a sample survey of private households and as such does not include people living in residential homes, hostels, hotels, boarding houses nor other institutions. It defines a household as comprising of one person living alone or a group of people (not necessarily related) living at the same address who share cooking facilities and share a living room or sitting room or dining area.

Recommendation: As the LCF doesn't collect information on institutions such as prisons, residential care homes nor halls, further investigations are needed to discover exactly how HFCE weight the LCF to account for this. Data for the survey is presented as estimates of the average weekly expenditure of a UK household for NUTS1 regions by the LCF four-digit product breakdown categories, in the Family Spending publication as a three-year moving average<sup>12</sup>.

LCF is used for 400 low-level directly compatible COICOP categories in HFCE so no adjustments for differences in classifications are needed for these categories. Not all LCF 4-digit categories are an exact match to the four digit COICOP categories breakdown used for HFCE due to the LCF using its own sequential numbering system. A mis-matched example is LCF 04.2 maintenance and repair of dwellings, whereas for HFCE COICOP 04.2 relates to Imputed rentals. At 2-digit breakdown there is an exact match for 01 to 12 between LCF and COICOP categories.

The main conceptual difference to note between the LCF and HFCE data is that the LCF collects data from UK resident households. Therefore in order to obtain domestic concept HFCE, 4-digit COICOP categories that are calculated using the LCF will need to have expenditure by non-UK residents added to them, where that spend is significant, for example, COICOP 11.1.1 restaurants and cafes, and 11.2 accommodation services. This supplementary data is sourced from IPS.

Recommendation: Further investigation into whether the IPS data can be apportioned regionally.

The LCF collects expenditure of the household whilst abroad, but as previously mentioned IPS data is mostly used for expenditure abroad by UK residents.

Another conceptual difference is that LCF includes mortgage payments, but takes no account of owner-occupied imputed rental. Whereas HFCE for the purpose of national accounts, doesn't include any mortgage payments but does include owner-occupied imputed rental.

Recommendation: We are currently investigating improvements to regional owner occupier imputed rental in relation to other regional outputs. The requirements of HFCE should be considered as part of that project.

## **Reliability**

Reliability of the LCF results is affected by three main issues:

1. Non-response bias
2. Sampling variability
3. Inaccurate reporting of certain items

LCF non-response bias is minimised by carrying out sample-based weighting using results from the 2001 Census linked study of non-responders (Further weighting is carried out to match the non-response weights to population totals in order to provide UK-level totals and means).

Sampling variability occurs due to a sample of the population being used, rather than the whole population. The difference between the sample results and the true population statistics is estimated by the standard error. A full list of estimated standard errors for LCF two to 5-digit categories of expenditure can be found in Table A1 <sup>13</sup>.

Inaccurate reporting of certain items on the LCF is reduced by having in-built checks in the computer assisted personal interviewing program used during the interview part of the survey. Validation checks are also carried out on unusual values or changes in spending year on year. Outliers are also detected and treated, so that if extreme values are confirmed as correct, they're still included, but only represent themselves rather than thousands of other households.

## **Notes for Introduction:**

1. [Supporting devolution: developments in regional and local statistics](#).
2. Ibid.
3. See 3.93 of the [European system of accounts - ESA 2010](#). Explanations of HFCE concepts are also available in the [System of National Accounts 2008 \(SNA\)](#).
4. See the [United Nations Statistics Division website](#) for a detailed product breakdown.
5. See 22.13, the [European system of accounts - ESA 2010](#).
6. More detail is available in "[Consumer Trends: Definitions and conventions](#)".
7. The System of National Accounts 2008 (SNA) defines HFCE in 9.56 as consisting of "expenditure incurred by resident households on consumption goods or services. As well as purchases of consumer goods and services, final consumption expenditure includes the estimated value of barter transactions, goods and services received in kind, and goods and services produced and consumed by the same household".
8. See the [Consumer Trends methodology](#) for detail on durable goods, semi-durable goods, non-durable goods and services.
9. See tables 6.2 and 6.3 in the [UK National Accounts. The Blue Book: 2016 edition](#).
10. The [following documentation](#) also discusses sources as used in the quarterly household final consumption expenditure publication.
11. See [Family spending: 2015](#) for further information on the Living Costs and Food Survey its methodology and data.
12. See Table A35 Detailed household expenditure by UK countries and regions, 2012 to 2014 in [Family spending: 2015](#).
13. See Table A1 Components of household expenditure, UK, 2014 in [Family spending: 2015](#).

## 3 . Regional HFCE

### a) Define regional HFCE

Regional household final consumption expenditure (HFCE) is the disbursement of national HFCE across areas of the UK. It would be measured according to NUTS areas.

The concept of HFCE would remain the same, that is the expenditure of a household, but adding in the regional dimension raises the question of what we wish to measure:

1. The amount spent by households in that region.
2. The amount spent by households of that region.

To answer this we must also consider what is published in the Blue Book. Regional HFCE will be constrained to Blue Book totals and would be consistent in terms of product breakdown. Table 6.2 of the Blue Book, as previously mentioned, presents HFCE as four main sections:

1. Final consumption expenditure in the UK by resident and non-resident households.
2. Final consumption expenditure outside the UK by UK resident households.
3. Final consumption expenditure in the UK by households resident in rest of the world.
4. Final consumption expenditure by UK resident households in the UK and abroad.

The first section of Table 6.2 covers domestic concept HFCE. If we apply this to regional HFCE it would cover the expenditure of resident and non-resident household in that region. If we take UKC22 Tyneside, a NUTS3 region as an example, it would be the expenditure of every household resident in Tyneside, plus any expenditure in Tyneside by households resident in all other UK regions and the expenditure of non-UK resident households.

The second section, final consumption expenditure outside the UK by UK resident households, when related to the regions would cover expenditure incurred by a household outside their home region. For example the Tyneside household may visit UKD33 Manchester to purchase new clothing, or may go on holiday abroad and purchase food. This would be an import into the region.

The third section is final consumption expenditure in the UK by households resident in rest of the world. Regionally this would be expenditure in that particular region by households not resident in that region and those not resident in the UK, such as a UKD42 Blackpool household visiting Tyneside, or a tourist from abroad visiting Tyneside. This would be an export out of the region.

The fourth and final section is final consumption expenditure by UK resident households in the UK and abroad. This is the national concept HFCE, so is equal to the domestic concept plus imports minus exports. On a regional basis it would therefore cover all the expenditure of a household resident in that region in the region, plus any expenditure they incur outside their home region (whether in other regions in the UK or abroad). It would exclude any expenditure by non-resident households, whether they were from other regions in the UK or from abroad.

## **b) Measuring HFCE regionally**

### **Regional availability of data**

As can be seen from Table 1, the main sources of data used in the compilation of national HFCE are Living Costs and Food Survey (LCF), Retail Sales Inquiry (RSI) and Annual Business Survey (ABS), which are collected and processed by us and the Northern Ireland Statistics and Research Agency (NISRA). LCF data is available at Local Authority level, RSI and ABS data should be available at NUTS3.

The table below presents the sample sizes for NUTS1 regions (to the nearest 10) for the LCF in 2014. This information is available in Table 2.5<sup>1</sup> of the Family Spending publication, based on the sample size for 2014 only.

Further sample sizes by single year are available in the Annex for NUTS1 regions based on current NUTS geography, and for NUTS3 based on 2008 NUTS geography.



**Table 2: NUTS1 sample sizes for LCF, 2014**

	North East	North West	Yorkshire and Humber	East Midlands	West Midlands	East	London	South East	South West
Weighted number of households (thousands)	1120	3010	2230	1940	2330	2510	3190	3670	2290
Total number of households in sample	260	590	460	440	470	500	410	740	470
	England	Wales	Scotland	Northern Ireland	UK				
Weighted number of households (thousands)	22290	1280	2290	730	26600				
Total number of households in sample	4330	220	430	150	5130				

Source: Office for National Statistics

The overall response rate for Great Britain in 2014 was 48%. For Northern Ireland the response rate was 60%.

Detailed breakdown of number of responding households for the UK broken down by 2 to 5 digit categories can be found in Table A1<sup>2</sup> of the Family Spending publication.

A simpler breakdown of total number of responding households for Local Authorities is also available in the Annex.

Here is the explanation of the LCF sample design as stated in the LCF Methodology<sup>3</sup>: “The LCF sample for Great Britain is a multi-stage stratified random sample with clustering. It is drawn from the small users file of the postcode address file (PAF) – the Post Office’s list of addresses. All Scottish offshore islands and the Isles of Scilly are excluded from the sample because of excessive interview travel costs. Postal sectors are the primary sample unit. 638 postal sectors are randomly selected after being arranged in strata defined by regions (sub-divided into metropolitan and non-metropolitan areas) and 2 variables from the 2001 Census: socio-economic group of the head of household and ownership of cars. These census variables were new stratifiers originally introduced for the survey year ending 1997, and updated following the results of the 2001 Census. The results of the 2011 Census will be used in due course. The Northern Ireland sample is drawn as a random sample of addresses from the Land and Property Services Agency list.”

No definition of Scottish offshore islands in terms of NUTS3 is currently available. Information suggests that UKM64 Eilean Siar, UKM65 Orkney and UKM66 Shetland would be considered offshore.

Recommendation: Further information needs to be obtained in order to clarify which Scottish islands are considered offshore for the purpose of the LCF. These then need to be mapped to NUTS3 areas to determine which areas are affected by being excluded from the LCF sample.

Isles of Scilly are included with Cornwall as the NUTS3 region UKK30 Cornwall and Isles of Scilly.

Recommendation: As the Isles of Scilly aren’t sampled, a method needs to be found as to how to treat it for the purpose of regional HFCE.

We conduct the survey fieldwork in Great Britain and NISRA conducts fieldwork in Northern Ireland. Northern Ireland data is then sent to us for compilation and publication.

Recommendation: Further information is needed regarding the Northern Ireland sample as data isn't available in the LCF sample and number of responding household files used above for NUTS1 and 3. When requesting this information, possibly from NISRA directly, need to also enquire about the sample boost for Northern Ireland and gain an exact date for when this will go ahead as will affect the quality of data available for Northern Ireland going forward.

Data provided by other government departments such as HMRC, Department for Transport, or Department for Education may be more likely to have NUTS3 data, and be more willing to share it. This is likely to be true of sector regulators such as OFCOM, Office for Rail Regulation and the Gambling Commission.

Other government data is used to compile regional owner-occupied imputed rental as already used in regional gross disposable household income (GDHI). We therefore already have data for a large proportion of regional HFCE.

Most of the data collected for HFCE is at current price, however some sources such as alcohol-related data from HMRC and fuel from Department for Energy and Climate Change (DECC) are supplied as volume. HFCE then multiply this by an individual price to obtain current price estimates.

Many of the other data suppliers are likely to collect regional information from households, such as the utilities companies, market research companies, service providers such as SKY plc, and the Association of British Insurers. However the data is unlikely to be readily available at NUTS3 as they have collected the data for the purpose of providing services to customers. They may collate regional data for their own internal use, as many businesses have their own office regions, but not for the purpose of sharing it with us. Businesses may have concerns over providing this data to us regarding confidentiality and competitors using this information to gain an advantage.

Recommendation: Commercial contracts are held with some data suppliers, Regional Accounts should be involved in renegotiation of these contracts to see if we can obtain regional data.

We should also consider the impact of the data access legislation currently being reviewed which will provide us with greater access to detailed administrative government data. This would certainly improve our ability to obtain data from other government departments. Whether this would give us better access to the data held by the utilities companies, market research companies, service providers such as SKY plc, and the Association of British Insurers is yet to be determined. The risks of administrative data should be balanced against its availability, and as with all regional indicator datasets any new sources should be thoroughly quality assured.

## **ESA statements on regional HFCE**

ESA states that a top-down method for regionalising HFCE is the norm due to a lack of suitable regional sources, and that it's practically impossible to apply A-methods (which represent the actual values or approximate to the ideal as possible)<sup>4</sup> for its compilation. This is because household budget surveys, such as Labour Force Survey (LFS) are of limited use due to their coverage that is only collect data for private households and not institutions. Adjustments then also have to be made to account for imports and exports in and out of regions when data such as the RSI is used.

Initial findings suggest that the majority of sources available to us would be B-method sources, that is they are acceptable alternatives to the actual values we're trying to regionalise.

I believe that we would have at least one A-method source of data; owner-occupied imputed rental as our regionalising method would use exactly the same data as is used to compile the national figure.

Other sources, such as those used for categories that are currently being forecast are likely to be C-methods due to lack of national data to begin with.

## Reliability

Due to the nature of the compilation process of regional HFCE it will not be possible to estimate the accuracy of the estimates in terms of detailed statistical properties, for example through their standard errors. Therefore, the reliability of the estimates would be estimated by the extent of revisions.

Headline UK estimates will be affected by revisions to the Blue Book control totals, while revisions to NUTS1 and lower level estimates will come from revisions to the data used to apportion the UK HFCE estimates and Blue Book revisions.

Comparisons could be made with market research and any other regional expenditure outputs to judge the quality of the regional data. Volatility of the timeseries could be analysed, in line with comparison to the regional GDHI data. Our economists could provide guidance as to whether they think there is a strong enough correlation between income and expenditure to use this as a guide for measuring quality.

## Scotland, Northern Ireland and EU countries

Scotland produces HFCE for Scotland using our published data in Table A35<sup>5</sup> of the Family Spending publication. Data is published as part of the Quarterly National Accounts Scotland (QNAS) at the 12 2-digit COICOP categories, which sums to domestic total. They also include net tourism and national total (HFCE)<sup>6</sup>.

Recommendation: Maintain open communication with Scottish government by regular updates on project progress.

Northern Ireland have published HFCE data as part of the development of their Supply and Use Tables (SUTs).

Other EU countries are varied in their approach to regional HFCE. Some do not produce regional HFCE at all, others produce it at NUTS1 only; but do not provide any COICOP breakdown, others do produce it at NUTS3 but use the same shares as disposable household income to apportion expenditure to the regions. The common theme between all countries is that regional data is lacking or not of high enough quality to provide a very low level of detail.

More information is available for compilation methods of Scotland, Northern Ireland and other EU countries in the Annex.

## c) Further points to explore before going ahead

### Users

Users will need to be consulted to see whether our proposed methods and outputs will meet their needs.

### Sources

Before proceeding any further we need to fully evaluate the sources being used to compile the HFCE data in Blue Book. This will involve further investigation into:

1. Which source(s) is being used for each COICOP 4-digit category.
2. Are these volume or price sources?
3. The regional availability for each source, that is, is the data received by HFCE at UK level from the supplier, or any other level and summed to UK by the HFCE team?
4. Where the source is not currently supplied at a regional level, can it be provided at a regional level?
5. If yes to the above, what is the lowest level available? NUTS3 is the preferred.
6. If current sources are not available regionally, alternative sources will need to be found for use as indicator datasets.
7. If no alternative sources can be found, we may need to model based on LCF.

Alternative sources will be found through:

1. At desk research.
2. Collaboration with internal Household Expenditure branch regarding existing data and potential sources discovered but not yet in use.
3. Collaboration with internal Admin Data Division to identify any potential sources on the Admin Sources and Information Asset Register (ASIAR), that is, sources we already use, and find new sources of administrative data we are not currently using.
4. Hack days – internal cross divisional sessions whereby interested parties collaborate to find new or alternative sources to data currently being used.
5. Collaboration with the devolved administrations.

The above will give us a better idea of the level of product breakdown we'll be able to publish. Once all sources have been identified they will need rigorous quality assurance to ensure they are fit for purpose.

## LCF

Sample sizes will affect the quality of data available for certain regional areas. This will need to be investigated further, including the number of responding households.

LCF doesn't have data readily available at a lower level than 2-digit. With advance notice, LCF can compile data at a 4-digit level which we can then match/map to 4-digit COICOP categories, once we've identified which categories in UK HFCE used LCF as the data source.

## Net Tourism and cross border tourism

As mentioned above, imports have to be added to the domestic concept HFCE and exports subtracted to produce national concept HFCE. At a UK level this isn't a problem as we have data for total imports and exports to and from the UK. At a regional level it may be more difficult to measure due to cross border domestic tourists. Expenditure incurred by UK-based residents abroad can be provided by the IPS as the survey asks where the respondent lives. The data is currently only available for England Scotland Wales and London. IPS are working on compiling this data at a NUTS1 level, but it may be a while before it's available. Once the NUTS1 data is available, we could use NUTS3 data, on holiday spending from the LFS to breakdown the NUTS1 IPS data to lower regions.

IPS data could also be used for non-UK residents visiting the UK, along with Visit England data.

Other sources to investigate include the HMRC quarterly Regional Trade Statistics publication, and a recently published article of ours on estimating the value of services exports abroad from the English regions, Scotland, Wales and Northern Ireland.

Recommendation: Detailed investigation of data available for regional imports and exports.

Domestic cross border tourism is broader than the general sense of someone going on holiday. It could cover a person travelling from one region to another to buy a car, visit a large shopping centre or visit a family attraction, and services such as buying insurance or lottery tickets online. So is only a concern for regional HFCE, at a national level it has no impact.

Clothing data in the HFCE comes from the RSI, which would be collected on a business location basis. Due to this it would be impossible to determine how much of that data relates to the expenditure of the residents of that area and to non-residents, so it would not be possible to subtract their expenditure determine the national concept of HHCFE. This could skew the data for certain areas upwards, such as UKL22 Cardiff and Vale of Glamorgan and allocate a large proportion to COICOP 3 Clothing and Footwear due to the large shopping centre in Cardiff, as people travel in to the city to buy clothing. Data for other regions could be pushed down due to lack of shopping centres and people travelling out of their region to purchase.

The LFS does not have a breakdown of region of spend to assist with this.

Recommendation: Investigate the impact of cross-border domestic tourism; may have greater impact at lower region levels, as people are more likely to travel within reasonable distances for regularly purchased goods and services. May have less impact at a higher level as people won't travel as far, will also have less impact on the larger good and/or services that are purchased infrequently.

## **Changes in the economy**

We are [currently investigating the sharing economy](#), that is, activities that are facilitated by digital platforms which enable people or businesses to share property, resources, time and skills, such as Uber and Airbnb. As many of these services are offered by households who own the particular good used to provide the service, (for example, a car for the provision of a "taxi service" via Uber) to another household, the information isn't collected through business surveys. Consequently if the data feeds into a COICOP category that isn't estimated by the LCF we may be under-representing a large part of this type of expenditure by households nationally and consequently regionally.

The increase in internet shopping may also affect data which is collected on business location.

## **National and domestic concept, and savings ratio**

Since regional GDHI is calculated for the resident population of a region, it is clear that we need to measure HFCE by the national concept in order to leave net savings and derive the savings ratio for a region. It is less clear whether there is a need for us to measure HFCE by the domestic concept, so we should consult with users to establish their needs, as described above.

My research indicates that UK HFCE is compiled on a domestic concept basis, and net tourism is then added to reach national concept UK HFCE due to conceptual differences in data sources. Different users may have different requirements, and these may change over time I therefore advocate that the new system for compiling regional HFCE is set up to produce and output regional data based on the domestic concept, net tourism, and national concept of HFCE, regardless of user needs, but that we publish data that will meet user needs.

Recommendation: System used for compilation of regional HFCE is set up to process and output domestic concept, net tourism, and national concept HFCE as separate series for each region.

## Notes for Regional HFCE

1. See 'Table 2.5: Housing expenditure by UK countries and regions, 2014' in [Family spending: 2015](#).
2. See 'Table A1 Components of household expenditure, UK, 2014' in [Family spending: 2015](#).
3. See section 1, Description of the survey in [Family spending: 2015](#).
4. See Section 3.9 in the [Manual on regional accounts methods](#).
5. See Table A35 Detailed household expenditure by UK countries and regions, 2012 to 2014 in [Family spending: 2015](#).
6. See Table H in the QNAS 2016 Q1 Tables in [Family spending: 2015](#).

## 4 . Conclusion

This report discussed preliminary work and findings of research into the feasibility of producing regional household final consumption expenditure. It discussed the drivers for the work, definitions and terminology at a national level and regionally, and data sources.

There are three methods in my opinion that could be used to measure regional household final consumption expenditure (HFCE).

1. Use Living Costs and Food Survey (LCF) data to apportion UK HFCE to NUTS3 regions and aggregate to NUTS2 and then NUTS1.
2. Obtain a regional breakdown of all the sources that feed into UK HFCE at NUTS3.
3. Obtain a regional breakdown of as many sources that feed into UK HFCE and alternative sources for those not available at NUTS3.

There are advantages and limitations to each. With the first method for example, it would be a very simple method where we'd obtain the proportion of expenditure for each 4-digit COICOP category for each NUTS3 region from raw LCF data, and apply this to the UK HFCE data. We'd have to first sum the 4-digit LCF categories to match the 4-digit classification of individual consumption by purpose (COICOP) categories in HFCE, and then map the remainder to the most appropriate categories. We'd then use this matched or mapped LCF data at NUTS3 to apportion UK HFCE. As this is similar to the method used by Scottish government to calculate Scottish HFCE, I'd expect them to have a document that matches or maps LCF categories to COICOPs readily available.

Provided there is good sample coverage, I believe this method could work to provide us with rough estimates of regional HFCE, which would be in line with what Scottish government produces for Scotland. However, for some of the LCF categories with a high standard error there may be concerns over the quality of data produced by this method. The method also doesn't account for any of the adjustments made by HFCE, neither will it include any data for apportioning owner-occupied imputed rental nor expenditure on prostitution to the regions.

The second method would be the ideal method as it involves procuring the regional data that underpins the national level data that feeds into UK HFCE. Much of this data, (Labour Force Survey, Retail Sales Inquiry, Annual Business Survey) is likely to be available regionally, see below for further discussions. Yet the main limitation for this method is that some of the national data is historical and forecast. It is therefore highly unlikely that there'll be a regional source for this data if the national data does not exist.

The third method is most likely to be used in practice. It is an approach similar to how regional gross value added (GVA) and gross disposable household income (GDHI) is measured, in that regional indicator datasets would be used to regionally apportion Blue Book data. Some of the GVA and GDHI indicator datasets are the regional breakdown of the data used in the National Accounts, and others are approximations to the national dataset.

In theory this is possible, again there are limitations to being able to do this in practice:

1. Regional data may not be available at all, not even a close approximation.
2. Regional data may not be available at the lowest level, NUTS3.
3. Regional data may be available at the lowest level, but may not be robust enough to be used as an indicator dataset.
4. As mentioned above, for method 2; where forecasts are used, there's low probability of finding regional data, or even approximate data sets, if the national data doesn't actually exist.
5. Conceptual measurements differences apply to sources; LCF for example will only cover UK resident private households. The RSI on the other hand collects data from retailers who will not be able to distinguish whether goods are sold to UK residents or non-residents, private households or institutions. Some sources thus supply data on the national concept and others on the domestic concept principle or don't provide full sector coverage.
6. Many adjustments are applied to national data, which may need to be applied to regional data sources.

In conclusion it should be possible to produce regional HFCE depending on the availability and quality of lower region data. The main sources (Living Costs and Food Survey, RSI and ABS) are all available regionally at NUTS3. I think there is a strong probability that the data provided by other government departments and sector regulators would be available now, but if not I believe the data access legislation would improve our chances of gaining access to the lowest level data. Privately supplied data may not be available at the lower level, but I think we would have enough data sources available to calculate a reasonable estimate at the NUTS1 or 2 level, and then possibly use the LCF to breakdown further. I think we'll be using a mix of bottom-up and top-down approach to calculate regional HFCE, for some COICOP categories we'd aggregate the lower regions to the higher, with others we'd use a direct match one indicator dataset to break the national data to NUTS1, then due to availability of data sources at the lower regional level, would need to use approximate indicator datasets at lower regional levels.

Our goal is to publish the same product breakdown as the Blue Book for all NUTS1, 2 and 3 regions. However, data sources will be the main driver behind the level of product breakdown we can produce. We may not be able to produce such a detailed breakdown, for example, we may only be able to produce durable goods, semi-durable goods, non-durable goods and services data, without the COICOP breakdown for each for NUTS1, 2 and 3. On the other hand we may be able to go down to the 2-digit COICOP level, but only at a NUTS1 geographical level as there isn't sufficient coverage by data sources at NUTS2 and 3.

While the report gave an overview of data currently used for the production of national level HFCE there is still a lot more work to be done in researching these sources so that they could be used at a regional level. The national Household Expenditure branch in ONS are constantly reviewing the sources they use so there needs to be a lot of collaboration between Household Expenditure branch and Regional Accounts to assist each other in finding alternative, improved sources that provide national and regional information in relation to HFCE.

Recommendations are also listed below that need to be completed before the project goes ahead.

## Recommendations:

1. Better understanding of the many adjustments and calculations used to compile UK HFCE is needed to determine which need to be carried out at a regional level.
2. As the LCF doesn't collect information on institutions such as prisons, residential care homes nor halls, further investigations are needed to discover exactly how HFCE gross up the LCF to account for this.
3. Further investigation into whether IPS data can be apportioned regionally, where used to supplement LFS data to produce domestic concept HFCE.
4. Ensure regional HFCE is considered as part of wider project to improve owner-occupied imputed rental.
5. Obtain clarification on which Scottish islands are considered offshore for the purpose of the LCF, and map these to NUTS3 areas to determine which areas are affected by being excluded from the LCF sample.
6. Determine a suitable method for the Isles of Scilly where LCF data is used; the Isles are not sampled.
7. Gain better understanding of LCF Northern Ireland sample size and number of responding households. Also enquire about the probable date of the future sample boost for Northern Ireland.
8. Ensure open communication is maintained with Scottish government as to project progress.
9. Regional Accounts to be involved in renegotiation of any commercial contracts relating to access to data used in HFCE.
10. Detailed investigation of data available for regional imports and exports.
11. Investigation into the impact of cross-border domestic tourism.
12. System used for compilation of regional HFCE is set up to process and output domestic concept, net tourism, and national concept HFCE as separate series for each region.

## 5 . Annex

### Methods of compilation used by Scotland, Northern Ireland and EU countries

#### Scotland

As mentioned above, Scotland publishes domestic total household final consumption expenditure (HFCE) by 12 2-digit classification of individual consumption by purpose (COICOP) categories, net tourism and national total HFCE. They define their domestic concept of HFCE as "final consumption in Scotland by Scottish and non-resident (including RUK) households" (RUK equates to the rest of the UK). They define their national concept as "final consumption by Scottish households in Scotland and abroad (including RUK)". Their net tourism is "final consumption by Scottish households abroad (holiday spending) less final consumption in Scotland by non-resident households (tourist expenditure)".

Data is processed at a low level using the Scottish proportions from the Living Costs and Food Survey (LCF) for the relevant category and summed to produce COICOP 2-digit level data for all data bar narcotics (COICOP 02.3), prostitution (COICOP 12.2) and owner-occupied imputed rentals (COICOP 04.2.1). For narcotics, they use the same method as we use for the national accounts. For owner-occupied imputed rentals they produce their own imputed rental data.



## Northern Ireland

As stated above Northern Ireland is in the process of developing their SUTs and as part of this have published HFCE data for Northern Ireland at Nomenclature of Territorial Units for Statistics (NUTS)1 and 2 <sup>1</sup>. (Northern Ireland is the same size and name region at NUTS1 and 2.) The data is split by classification of product activity (CPA), that is the classification of products; goods and services, at the level of the EU, as data in Supply and Use Tables (SUTs) are classified by CPA.

Northern Ireland is also working on producing a HFCE matrix which will mirror the HFCE table in our SUTs <sup>2</sup>. The data are still experimental so have not yet been published. To produce their data on a COICOP 2-digit basis they map Living Costs and Food survey data to COICOP categories and then use the UK HFCE table to disaggregate the totals across the CPA codes.

As the LCF does not include communal household establishments such as care homes or university halls of residence, adjustments are made to the data by using Census and Consumer Price Index (CPI) data.

The LCF data used is a 3-year average due to the small sample size; fewer than 200 households for Northern Ireland. To improve the robustness of their data, Northern Ireland have received funding to boost their sample size this year.

They produce data on a domestic and national concept basis. Tourist expenditure data required to produce the national concept data is based on data from our International Passenger Survey (IPS), and data published by Visit England and Northern Ireland Statistics and Research Agency (NISRA).

## European Union

A very limited number of EU countries produce regional HFCE. If they do, it's at NUTS1 with very limited product breakdown, for example, Germany produces regional HFCE at NUTS1 using the total expenditure of households data from their survey of income and expenditure, which isn't based on COICOP 2-digit categories. Hungary for example only produces regional HFCE at NUTS1 by 2-digit COICOP.

Norway is the odd one out in that it does produce HFCE at current prices at NUTS3, but it only produces it as a total HFCE figure (that is, no category breakdown). As Norway has regional data for disposable household income but lack regional data for household expenditure, it uses the same regional shares as disposable household income to apportion household expenditure to the regions.

Spain produces HFCE at NUTS2 at a 2-digit breakdown, and has done so since 2000. They, similar to the UK, use a household budget survey as the main source, which is supplemented by administrative data and prices information.

## Secondary sources used for the compilation of UK household final consumption expenditure

Information in this table is taken directly from the [Consumer Trends: Sources document](#).

COICOP	Product group name	Secondary data sources
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1	Food and non-alcoholic beverages	Food and non-alcoholic beverages	LCF provides a detailed record of expenditure on food brought into the home. Expenditure on food outside the home (for example in restaurants), with the exception of casual purchases of confectionery, soft drinks and ice cream, is included under catering services. Relevant components of the CPI are used to deflate expenditure at current prices to derive chained volume measures.
2	Alcoholic beverages, tobacco and narcotics	Alcoholic beverages, tobacco and narcotics	<p>Estimates for alcoholic beverages are based on volume of sales and average prices of individual types of alcoholic beverages for off-licence trades. This information is obtained from a continuous survey of retail outlets.</p> <p>The volume data extracted from this survey are grossed up to align with monthly figures obtained from HMRC relating to the quantities of alcoholic drink released for sale within the UK. The price data obtained from the survey are used to derive both current expenditure and estimates at previous year prices in order to derive chained volume measures.</p> <p>Separate data are provided for outlets licensed to sell for consumption off the premises (off-licence trade retail shops and so on) from those licensed for consumption of alcohol on the premises (licensed trade restaurants, public houses and so on). This information has been used to derive separate estimates of household expenditure for the two appropriate COICOP categories: 2.1 alcoholic beverages off-licence trade; and 11.1.1 restaurants, cafés, pubs and the like licensed trade.</p> <p>Estimates for tobacco are based on data obtained from HM Revenue and Customs (HMRC) relating to the quantities of tobacco released for sale within the UK. Relevant components of the CPI are used to convert this volume data into current and chained volume measure estimates.</p> <p>Estimates of household expenditure on alcoholic drink and tobacco smuggled into the UK are made from 1994. These are based on HMRC intelligence on the level of smuggling, including freight smuggling and diversion fraud, taking place together with assumptions on the prices at which the goods are sold to final consumers through different types of outlet. For alcohol, retail shops and restaurants are assumed to sell the goods at the same prices as the rest of</p>

			<p>their stock. For street sales (that is not through off-licences or restaurants), 70 per cent of the average legal UK price is used for beer and 115 per cent of the French prices (published by the French Statistical Institute, INSEE) for wines and spirits. For tobacco, the prices at which smuggled goods are bought by UK households are assumed to be slightly above Belgian market prices, although the goods are not necessarily regarded as having been sourced from Belgium.</p> <p>Estimates of illegal narcotics are derived from Home Office "Drugs Misuse Declared" statistics derived from the Crime Survey from England and Wales and purity data derived from police seizures, and from United Nations price data.</p>
3	Clothing and footwear	a. Clothing materials (03.1.1)	a. ABS and RSI
		b. Garments (03.1.2)	b. ABS and RSI
		c. Other articles of clothing and clothing accessories (03.1.3)	c. ABS and RSI
		d. Cleaning and hire of clothing (03.1.4)	d. LCF
		e. Shoes and other footwear (03.2.1)	e. ABS and RSI
		f. Repair and hire of footwear (03.2.2)	f. LCF

4	Housing, water, electricity gas and other fuels	a. Actual and imputed housing rentals (04.1, 04.2)	<p>a. Estimates for housing rentals make use of private sector data from the LCF and public sector rented dwellings data supplied by local authorities to the (DCLG) and to the Scottish government and the Wales and Northern Ireland Offices. Estimates of rent receipts by Housing Associations and public corporations are also included. In order to construct chained volume measures, the number of occupied dwellings is used as a volume indicator. This indicator is based on total housing stock data, less estimates of unoccupied dwellings, supplied by DCLG and adjusted by a quality factor to take account of overall improvements in the housing stock over time. Changes have been made to the method for calculating nominal (current price) rentals data in Household Final Consumption Expenditure (HFCE). This is in order to more closely align the annual growth (quarter on corresponding quarter of the previous year) of household expenditure on actual and imputed rentals with the annual growth of comparable CPIH data series CPIH is a measure of consumer price inflation that includes owner occupiers housing costs (OOH).</p> <p>The average value for rented accommodation is revised from 2010 onwards the impact has caused revisions to the HFCE implied deflator. From 2011, the quarter on quarter of previous year growths of the relevant rental implied deflators, track the relevant CPIH (OOH) growths. This change does not mean that the implied deflator for HFCE on actual and imputed rental will fully match the equivalent measure from CPIH as differences in the method and source data for stocks of housing will continue. With publication of Blue Book 2014, this method is now implemented for growth into Quarter 1 (Jan to Mar) 2011. To achieve this, 2010 data has been adjusted and is used to link the old basis data using the Living Costs and Food Survey (LCF), with the data based on relevant CPIH data (including OOH). Estimates of real HFCE and real GDP (chained volume measures) are unaffected by this change. Current price estimates prior to 2010 are also unaffected. For a detailed explanation of this change see the article published on 3 September 2014.</p>
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		b. Materials for the maintenance and repair of the dwelling (04.3.1)	b. ABS and RSI
		c. Services for maintenance and repair of the dwelling (04.3.2)	c. Based on the LCF. They include expenditure by householders and, under insurance policies, by insurers.
		d. Water supply (04.4.1)	d. Estimates for water supply are based on data supplied by OFWAT and the Scottish Government. The chained volume estimates are based on movements in domestic rateable values up to 1995. Thereafter, the appropriate component of the CPI is used to deflate the current price series.
		e. Refuse collection (04.4.2)	e. LCF
		f. Sewerage collection (04.4.3)	f. Based on the data supplied by OFWAT and the Scottish Government. The methodology for deriving the chained volume measure is as described for water supply (NDG COICOP 04), above.
		g. Electricity, gas and other fuels (04.5)	g. Estimates for electricity, gas and other fuels are based on data obtained by the Department for Energy and Climate Change (DECC) from various energy suppliers. Relevant components of the CPI are used to deflate current expenditure and derive chained volume measures.
5	Furnishings, equipment and routine maintenance of the house	a. 05.1.1 Furniture and furnishings	a. ABS and RSI
		b. Carpets and other floor coverings (05.1.2)	b. ABS and RSI
		c. Repair of furniture, furnishings and floor coverings (05.1.3)	c. LCF

		d. Household textiles (05.2)	d. ABS and RSI
		e. Major household appliances (05.3.1)	e. ABS, RSI and LCF
		f. Small electric household appliances (05.3.2)	f. ABS, RSI and LCF
		g. Repair of household appliances (05.3.3)	g. LCF
		h. Glassware, tableware, household utensils (05.4)	h. ABS and RSI
		i. Major tools and equipment (05.5.1)	i. ABS, RSI and LCF
		j. Small tools and miscellaneous accessories (05.5.2)	j. ABS and RSI
		k. Non-durable household goods (incl cleaning products)(05.6.1)	k. LCF
		l. Domestic and household services (05.6.2)	l. LCF

6	Health	a. Outpatient and hospital services (06)	a. Estimates for NHS payments and private medicine are based on Department of Health (DH) data and the LCF respectively. Estimates for medical insurance are based on a survey of companies conducted by the DH and information on premiums is provided by the Association of British Insurers. For NHS payments and medical insurance, average prices of the previous years are applied to volume data in order to obtain chained volume measures. For private medicine, relevant components of the CPI are used to deflate to chained volume measure. Estimates for dental services are based on the LCF and DH data. Paramedical services are based on the LCF and hospital services are based on the LCF and DH data.
		b. Pharmaceutical and other medical products (06.1.1)	b. ABS, RSI and LCF
		c. Therapeutic appliances and equipment (06.1.3)	c. LCF
7	Transport	a. Purchase of vehicles (07.1.1)	a. Information on the V55 Registration Document is used to measure the number of motor cars and motor cycles sold to private individuals. These are valued using trade information and include on-the-road costs other than vehicle excise duty. The method has been applied back to 1993. Prior to that, for motor cars, expenditure on new cars was taken as the residual after subtracting capital formation from the value of total new car registrations. Used vehicles are estimated from motor traders data from the ABS. This heading also includes estimates for cars-in-kind (the imputed value of the use of company cars for private purposes), based on the taxable value of company cars as required by HMRC. [Different methods of calculating growth for new and used cars.]



		b. Vehicle fuels and lubricants (07.2.2)	b. Estimates for vehicle fuels are based on data obtained by the DECC from various energy suppliers together with LCF data on household expenditure. Estimates for lubricants are based on the LCF. For vehicle fuels, average prices of the previous year are applied to volume data in order to obtain chained volume measures.
		c. Vehicle maintenance and repair and other vehicle services (07.2.3 and 07.2.4)	c. Vehicle maintenance and repair also includes motoring organisation subscriptions. Data are obtained from the LCF. Other vehicle services include cherished number plates, which are based upon data collected by the DVLA. Driving licences are based on administrative records; they are deflated by an appropriate price index. Estimates for other components are largely based on the LCF. These include driving lessons and tests and self-drive car hire.
		d. Transport services (07.3)	d. Derived from the Office of Rail Regulation. Light rail, road and other transport services are largely based on data collected by the DfT. Estimates for air and sea travel are based on the IPS. The IPS is a continuous sample survey of passengers (both UK residents and non-residents) travelling between the UK and foreign countries. In order to construct chained volume measure estimates, the number of journeys, based on information collected
8	Communication	a. Postal services (08.1)	a. LCF
		b. Telephone and telefax equipment (08.2)	b. ABS and RSI
		c. Telephone and telefax services (08.3)	c. Estimates for telephone and telefax services are based on trade and OFCOM (the industry regulator) data for fixed lines, including cable, and the LCF for mobile phones.
9	Recreation and culture	a. Recording media (09.1.4)	a. ABS and RSI

b. Repair of audio visual, photographic and information processing equipment (09.1.5)	b. LCF
c. Major durables for outdoor recreation (09.2.1)	c. ABS and other sources as available
d. Musical instruments and major durables for indoor recreation (09.2.2)	d. Derived from the ABS
e. Maintenance and repair of other major durables for recreation and culture (09.2.3)	e. LCF
f. Games, toys and hobbies (09.3.1)	f. ABS and RSI
g. Equipment for sport, camping and open-air recreation (09.3.2)	g. ABS and RSI
h. Garden plants and flowers, pets and newspapers (09.3.3)	h. LCF
i. Veterinary and other services for pets (09.3.5)	i. LCF
j. Recreational and sporting services (09.4.1)	j. LCF
k. Cultural services (09.4.2)	k. Estimates for most are derived from LCF

		l. Games of chance (09.4.3)	l. Data for games of chance other than the National Lottery are based on duty receipts provided by HMRC. Estimates for the National Lottery are based on data obtained from the National Lottery Commission.
		m. Books (09.5.1)	m. LCF
		n. Stationery and drawing materials (09.5.4)	n. ABS and RSI
		Everything else is estimated using ABS and RSI	
10	Education	Education	Based on the LCF, BIS and DfE data and, in the past, data received from the Higher Education Funding Council, the Independent Schools Information Service and fees charged by local authorities (derived from local government accounts).
11	Restaurants and hotels	Catering and accommodation services	Household expenditure on catering services is based on the LCF. Information provided from commercial data on alcohol sales has been used to derive household expenditure class 11.1.1 restaurants, cafes and so on, licensed trade (see notes under NDG COICOP 02 Alcoholic beverages). Similar expenditure by students living in university or college accommodation is derived from surveys sponsored by the BIS. Ministry of Defence (MoD) survey data is used to construct estimates of expenditure by military personnel residing in barracks. A number of different deflators, including relevant components of the CPI, are used to obtain chained volume measure estimates for catering.
12	Miscellaneous goods and services	a. Hairdressing salons and personal grooming establishments (12.1.1)	a. LCF
		b. Electric appliances for personal care (12.1.2)	b. ABS and RSI

	c. Prostitution	c. Derived from a study by Eaves in 2004 and from prices and population data.
	d. Jewellery, clocks and watches (12.3.1)	d. ABS and RSI and exclude antiques.
	e. Other personal effects (12.3.2)	e. ABS and RSI
	f. Social protection (12.4)	f. Estimates for social protection, including childcare, are based are on various sources, including the LCF. Estimates of expenditure by persons living in private residential and nursing homes are benchmarked on a 1993 survey of such establishments. Estimates for fees and charges paid by similar persons residing in Local Authority administered homes are based upon data obtained from the DCLG, the Scottish government and the Wales Office.
	g. Insurance and other financial services (12.5 and 12.6)	g. Estimates for the administrative costs of life insurance and pension funds are largely based on inquiries conducted by ONS and data published by the Association of British Insurers. An appropriate component of the Average Earnings Index is used to deflate current expenditure and derive a chained volume measure. The supply of Financial Intermediation Services Indirectly Measured (FISIM) - excluding imports - is based on a total of interest receipts and payments, estimated from detailed data on stocks of loans and deposits and associated interest rates. Estimates for stamp duties on securities make use of HMRCs data while estimates for securities dealers' commission are based on stock exchange information. For both stamp duties and securities dealers' commission, an index of share prices is used to deflate current expenditure to derive chained volume measures. Estimates for other financial services use data provided by the Bank of England and several other sources. A number of different deflators are used to obtain chained volume measure estimates for financial services. Estimates for most components of non-life insurance are based on the LCF.

		h. Other services (12.7)	h. This includes estimates for undertaking, which makes use of the number of deaths data collected by ONS. A price deflator obtained from survey data is used to convert this volume data into both current and expenditure estimates. Also included is expenditure on legal services and on photocopying services.
TOUT table in CT publication	UK and foreign tourist expenditure		Estimates for foreign tourist expenditure and UK tourist expenditure abroad are based on the International Passenger Survey (IPS). Special price deflators are constructed by Office for National Statistics (ONS) for the purposes of revaluing foreign tourists expenditure to volume terms. For UK tourist expenditure abroad, retail price indices are available for most of the countries visited and special indices are constructed by ONS to represent the kind of goods and services likely to be bought by UK travellers overseas.

#### Notes for Annex:

1. See [Multipliers derived from Input-Output tables](#). Click on the link in the text body 'NI Supply Use Tables Multipliers 2012' and navigate to column AJ in the tab named NI use.
2. ONS SUTs can be found in [Input-output supply and use tables](#).