

Article

# Consumer price inflation, updating weights: 2018

An overview of the latest annual update of CPIH weights, used in the inflation basket to calculate the UK consumer price inflation indices.

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## Table of contents

1. [Introduction](#)
2. [What is a weight?](#)
3. [How do we calculate weights in consumer price indices?](#)
4. [The aggregation process in consumer price indices](#)
5. [Weight changes between 2017 and 2018](#)

# 1 . Introduction

Consumer price inflation is an important indicator of how the UK economy is performing. The “shopping basket” of items and their economic importance (or weight) used in compiling the various measures of consumer price inflation<sup>1</sup> are reviewed and updated each year to ensure the indices remain representative of the latest consumer spending patterns.

This article focuses on updates to the weights applied within these baskets.

The second section explains what is meant by a weight and why weights are required.

The third section will explain how weights are calculated in consumer price inflation, defining the data sources and methodology used.

The fourth section will look at the aggregation structure, that is, what level are weights calculated at and where are they used to aggregate through price indices.

Finally, the fifth section will take a look at the latest (2018) set of consumer price inflation weights and explain any notable movements when comparing with weights used in 2017.

The [accompanying dataset](#) presents the latest (February 2018 updated) Consumer Prices Index including owner occupiers' housing costs (CPIH) weights (Table W3) and Consumer Prices Index (CPI) weights (Table W1) from 2005 onwards. The latest Retail Prices Index (RPI) weights (Table W2) are also included for reference.

For reference, [a similar article was published in 2017](#), which also included a section with a particular focus on the weight for owner occupier housing costs.

This article will focus primarily on the CPIH. Further detail on the methods and process discussed in this article can be found via the [CPIH compendium](#) and the [Consumer Price Indices technical manual \(PDF, 674KB\)](#).

## Notes for: Introduction

1. Namely CPIH, a measure of UK consumer price inflation that include owner occupiers' housing costs, the Consumer Prices Index (CPI) and the Retail Prices Index (RPI).

# 2 . What is a weight?

Consumer price inflation is the rate at which the prices of goods and services bought by households rise or fall and is estimated by using price indices. One way to understand a price index is to think of a very large shopping basket<sup>1</sup> containing goods and services typically bought by households. The price index estimates changes to the total cost of this basket by calculating the average of price changes of the items within the basket.

However, we know that households spend more on some goods and services than others, so we would expect, for example, a 10% increase in the price of petrol to have a much bigger impact on the basket than a similar rise in the price of tea. For this reason, the components of price indices are weighted; using the amount we spend on these items as consumers, to ensure that it reflects the relative importance of the various items in the average shopping basket.

The various weights used in the calculation of consumer price inflation, along with the items that form the “shopping basket” are reviewed and updated each year. This ensures weights remain representative of current household expenditure patterns and reflect the introduction of new items into the shopping basket and removal of old ones. A separate article is published that explains the [annual update to the content of the consumer price inflation basket of goods and services](#).

#### Notes for: What is a weight?

1. In reality there are three inflation baskets: for the CPIH, CPI and a basket used by RPI.

## 3 . How do we calculate weights in consumer price indices?

Within Consumer Prices Index including owner occupiers’ housing costs (CPIH) and Consumer Prices Index (CPI), there are four different types of weight:

- central or regional shop weights
- stratum weights
- CPIH and CPI item weights
- Classification Of Individual Consumption according to Purpose (COICOP) weights, for the CPIH and CPI higher-level indices

The list is the order in which the weights are used. The first two types of weights are used to produce the item indices (that is, combining the individual price quotes within the basket), the next is used to combine items into higher-level indices (that is, COICOP-level indices) and the last is used for all levels above this.

Aggregation is explained further in section 4 or via the [technical manual \(PDF, 674KB\)](#). This article will now focus on the COICOP-level weights.

In 2017, a new, additional level of the COICOP classification was introduced. This new level of detail, known as COICOP5 sits between the existing class- (or COICOP4) level indices and item-level indices. Further detail on the impact of introducing this new level of classification can be found in the October 2016 article explaining [methodological improvements on the consumer price indices](#).

### Data sources for CPIH and CPI weights

In consumer price inflation, expenditure weights are designed to reflect the expenditure patterns of the target population of households covered by the index. CPIH and CPI have a different target population to Retail Prices Index (RPI)<sup>1</sup> and therefore have different expenditure weights, and thus a different source of data underpinning the weight.

The CPIH and CPI cover all expenditure within the UK by:

- private households
- residents of institutions such as university halls of residence or nursing homes
- visitors to the UK from abroad

Information on spending patterns, which underpin the CPIH and CPI weights, come largely from the [household final consumption expenditure \(HHFCE\)](#) component of the UK National Accounts. These data are used because the expenditure information is comprehensive and balanced against data collected in other sectors of the economy to create the most accurate picture of consumer spending. However, there are a few exceptions where additional source data is used to supplement the HHFCE data and improve the coherence with the intended scope of the indices.

- the Living Costs and Food Survey (LCF) is used to supplement HHFCE data in the calculation of weights for air travel, package holidays and actual rentals
- the International Passenger Survey, which is also used in the calculation of a weight for air travel
- the public sector component of the national accounts, which is used in the calculation of the weight for passport fees

The HHFCE expenditure used in the annual update of CPIH and CPI weights is always the latest calendar year national accounts dataset that is available at the time of weights calculation, that are consistent in methodology with the latest published UK National Accounts: the Blue Book. The annual CPIH and CPI weights update commences in January each year, so the weights are sourced from the latest national accounts update in Quarter 3 (July to Sept) of the preceding year.

For the 2018 weights update, the latest set of HHFCE expenditure was taken from the Quarter 3 2017 national accounts dataset. This data is consistent with the most recent Blue Book release ([Blue Book 2017](#), published in October 2017). In all cases the current price measure (as opposed to the chained volume measure) is used. Effectively, the 2018 weights are calculated using a more up-to-date version of data in [Table 6.2.14](#) of Blue Book 2017: Individual consumption expenditure at current market prices by households, non-profit institutions serving households and general government: classified by function.

This approach to the use of the latest national accounts data is consistent over time, and will remain so going forward.

## Methodology behind the update of COICOP weights and above

Higher-level CPIH and CPI weights (that is, at the COICOP level and above) are updated annually with the January index (published in February), followed by a further update with the February index (published in March) due to the 2017 introduction of [improved methodology](#) for the production of consumer price inflation and to coincide with the introduction of new items to the basket of goods and services.

The underlying expenditure in each COICOP grouping is converted to an expenditure share relative to total household expenditure for the overall basket and given an integer weight in parts per thousand so that the sum of the weights equals 1,000.

The weights are based on the latest available calendar year's HHFCE data; however, this data is not timely enough for immediate use in consumer price indices due to the lag at which national accounts data are published. For example, in Blue Book 2017 the latest available calendar year is 2016. To make the expenditure data as up-to-date as possible, we can restate the expenditure in current prices using a process called price updating.

## Price updating process

For a given index year  $y$ , the weights are based on the latest available national accounts expenditure from  $y-2$ .

At the first annual update of weights (published with the January index), the expenditure needs to be price updated to December of year  $y-1$ . For the 2018 weights this would mean expenditure from the calendar year 2016 is updated to December 2017 by applying the respective change in price between 2016 and December 2017. This process is applied at the lowest level of COICOP within the weighting structure using the accompanying price movement for that COICOP level in CPIH and CPI (this process is presented in formula in [Annex E](#) of the CPIH compendium).

At the second update of weights, published with the February index, the same underlying 2016 expenditure is updated to January of year  $y$ . So, for the 2018 weights this would mean HHFCE expenditure from the calendar year 2016 is updated to January 2018 by applying the respective change in price between 2016 and January 2018. This approach ensures the latest available expenditure is adjusted so that it is suitable for use in the calculation of consumer price inflation weights. Effectively the same expenditure underpins both the January and February update of weights, with the main difference being the period covered in the price update.

Further details on this double update approach can be found in the October [2016 methodology article](#) and [Annex E of the CPIH compendium](#).

There are two further aspects of the annual weights update that warrant a mention.

Firstly, when calculating the CPIH and CPI weights for insurance (such as insurance connected with the dwelling, travel, health and transport) an average of the most recent three years' expenditure is used in line with international regulation. As insurance expenditure is recorded on a net basis (the difference between expenditure on insurance premiums and the amount paid out in claims) this approach safeguards against exceptional cases where the amount paid out in claims could exceed the amount paid in premiums.

Secondly, the [revisions policy \(PDF, 49KB\)](#) for consumer price statistics means that indices are not usually revised historically. Published weights for consumer price inflation reflect the best available understanding of what households spend their money on in the UK at the time they were produced. Whilst the source data are often revised at a later date, these revisions are not taken into the calculation of weights, that is, only the latest calendar year's data are used in each weights update. As such, the changes in weights between years may reflect changes in data sources, methods and definitions, as well as changes in spending patterns. For this reason, the weights should not be used to analyse trends in consumer spending over time.

### Notes for: How do we calculate weights in consumer price indices?

1. Further details on the RPI can be found in section 10 of the Consumer price indices technical manual.

## 4 . The aggregation process in consumer price indices

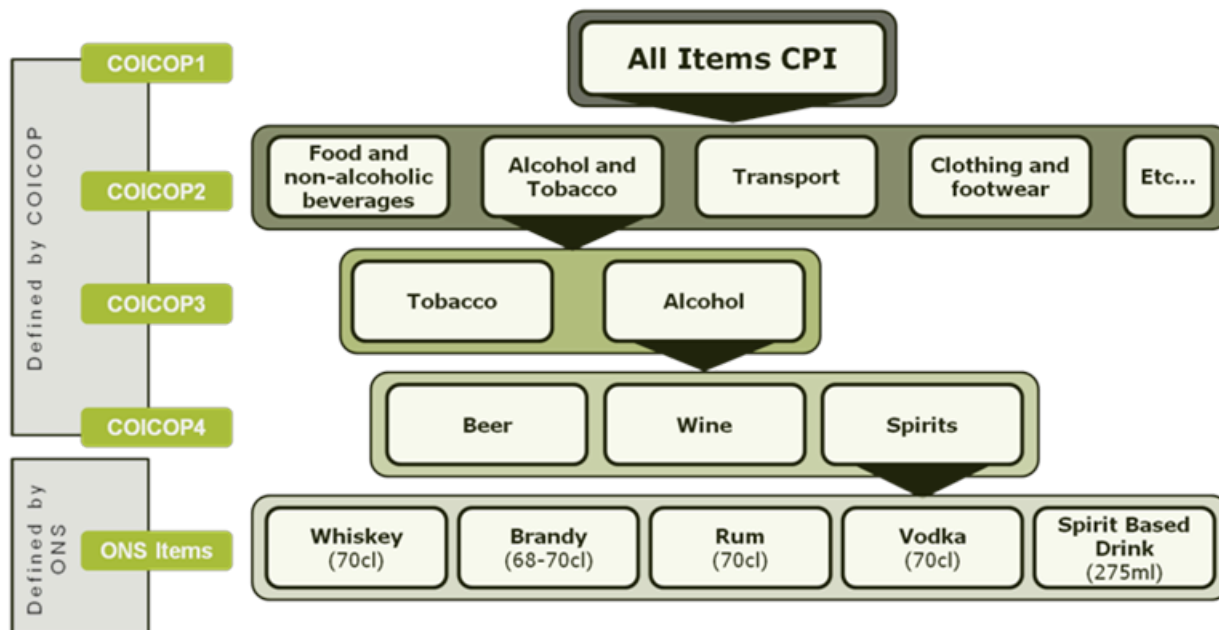
Having explained how and why weights are calculated in consumer price indices, it is worth defining the various levels of aggregation that weights are used in the production process.

The Consumer Prices Index including owner occupiers' housing costs (CPIH) and Consumer Prices Index (CPI) are classified according to the Classification Of Individual COnsumption by Purpose, commonly referred to as COICOP. This is the international classification of household expenditure and is used in the production of national accounts, the Living Costs and Food (LCF) survey and consumer price indices. COICOP enables the consistent classification of individual consumption expenditure incurred by households, according to their purpose.

In previous years (prior to 2017) there were four COICOP levels, with the fourth COICOP level being commonly referred to as “class level”. Items within these levels are aggregated together using expenditure weights up to the first COICOP level – the headline CPIH or CPI.

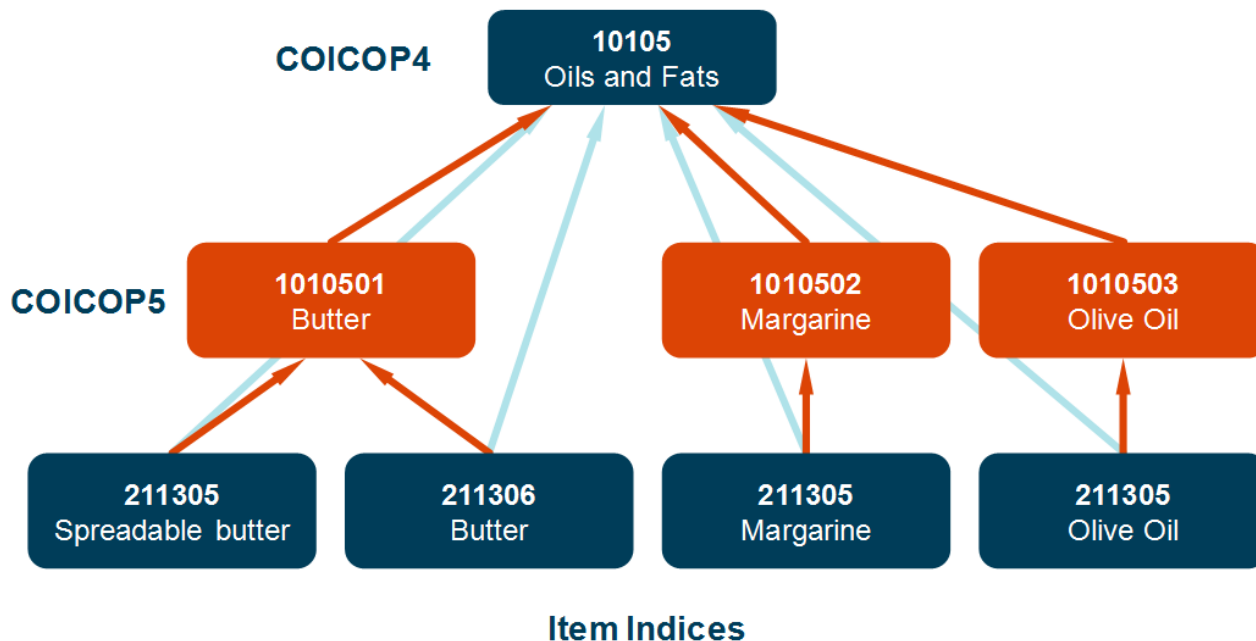
**Figure 1: Consumer price inflation aggregation structure**

Prior to the introduction of Classification of Individual Consumption by Purpose 5 (COICOP5)



Traditionally the class level was the first building block of aggregation, however, as of March 2017 a new, more detailed level was introduced into CPIH and CPI aggregation. This new level is referred to as COICOP5 and it sits between the existing COICOP4-level indices and item-level indices. Effectively the COICOP5 classification has replaced COICOP4 as the first building block of aggregation in consumer price indices and is the level at which HHFC expenditure is delivered and COICOP-based weights in consumer price indices are first calculated. Further details on the [introduction and impact of COICOP5 in 2017](#) can be found in the October 2016 article.

**Figure 2: The introduction of Classification of Individual Consumption by Purpose 5 (COICOP5)**



## 5 . Weight changes between 2017 and 2018

This section considers the largest weight changes between 2017 and 2018, focusing on the Consumer Prices Index including owner occupiers' housing costs (CPIH) weights and explains the reasons for these changes. These published weights reflect the best available understanding of what households spent their money on at the time the weights were produced. Differences in the weights between years can reflect changes in data sources, methods and definitions, as well as changes in consumer spending in the UK over time. Therefore, these weights should not be used to compare consumer spending over time.

This section will firstly take a look at the CPIH divisional-level weights (Classification Of Individual COntsumption by Purpose 2 (COICOP2) level) and drill down through the structure to explain any movements when compared with 2017. Additionally, any notable lower-level movements are also explained. The [accompanying dataset](#) presents the latest (February 2018 updated) CPIH weights (Table W3) and Consumer Prices Index (CPI) weights (Table W1) down to a class level from 2005 onwards. The latest Retail Prices Index (RPI) weights (Table W2) are also included for reference.

### Summary of weight changes

The update of 2018 weights has seen two separate updates, in line with the “double update” methodology introduced in 2017:

- the first update of weights for the January 2018 set of indices, where expenditure for 2016 is price updated to December 2017
- the second update of weights for the February to December 2018 indices, where the expenditure for 2016 is price updated to January 2018

Table 1 presents the CPIH divisional-level COICOP weights. The most notable movements will be explained further in this section, firstly focusing on the comparison of January 2018-updated weights with the latest available weights for 2017 (that is, those updated in February 2017 and used for the period February to December 2017) and then explaining any change between the January 2018 and February 2018-updated weights. Typically, changes in weight between years can be caused by two factors:

- a change in the underlying expenditure used to calculate the weight
- a change in the price factor applied to price update the expenditure

The change when comparing the February 2018 update against the January 2018 update will be driven by any notable movement in price update factor, which is used to price update the underlying expenditure. Any change when comparing the January 2018-updated weight with last year's weights will be due to a combination of changes in expenditure (comparing 2016 expenditure with the expenditure used in 2015) and any notable movement in the price update factor.

**Table 1: CPIH division level weights, 2017 to 2018<sup>1</sup>**

Parts per thousand

CPIH Division	2017 weight (ppt)	2018 Weight January update (ppt)	2018 Weight February update (ppt)
01 Food and non-alcoholic beverages	81	82	83
02 Alcoholic beverages and tobacco	34	33	34
03 Clothing and footwear	58	59	57
04 Housing, water, electricity, gas and other fuels	294	300	301
05 Furniture, household equipment and maintenance	49	50	48
06 Health	21	21	21
07 Transport	126	124	124
08 Communication	21	20	20
09 Recreation and culture	121	120	120
10 Education	17	18	18
11 Restaurants & hotels	101	97	97
12 Miscellaneous goods and services	77	76	77
<b>Total</b>	<b>1000</b>	<b>1000</b>	<b>1000</b>

Source: Office for National Statistics

Notes:

1. A double weights update was introduced in 2017. The first update of weights covers the January period only. The second update covers the period February to December.

There are three divisions with notable movements when comparing the 2018 January update with 2017 weights.

### **Division 04 Housing, water, electricity, gas and other fuels**

This division has shown an increase in weight of 6 parts per thousand (ppt) when comparing the January 2018 updated weight with 2017, followed by a further increase of 1ppt at the February 2018 update.

This increase, when compared with 2017, is driven by the class for actual rentals, which has seen an increase of 13ppt between 2017 and January 2018 weights (from 56ppt to 69ppt). The reason for this increase can be attributed to the expenditure being used to underpin the weight. A new methodology has been introduced for the measurement of actual rents in national accounts, which has led to an upward revision to the expenditure series. This change is exacerbated by the no revision policy in the production of consumer price indices. Further details on the [changes made in national accounts](#) can be found in the February 2017 article.

This increase in weight for actual rents has led to a fall in the weight for imputed rents, from 174ppt in 2017 to 168ppt in the January 2018 update. The fall is due to a relative reallocation of weight due to the large increase seen in actual rents.



Finally, this division has seen a 1ppt increase between the January 2018 update and the February 2018 update (from 300ppt to 301ppt). This increase is caused by a small increase in price for imputed rentals between January and February 2018, which in turn has just caused the weight to tick upwards from 168ppt at the January 2018 update to 169ppt at the February 2018 update.

## **Division 07 Transport**

This division has seen a fall in weight of 2ppt from 126ppt in 2017 to 124ppt in the January 2018 update. This fall is caused by the operation of personal transport group, which includes both petrol and Vehicle Excise Duty. Petrol has seen expenditure fall by approximately 7% between periods, whilst Vehicle Excise Duty expenditure has fallen by approximately 10% when comparing what was used in 2017 weights (2016 Blue Book-consistent) with the 2018 update (2017 Blue Book-consistent). These falls have contributed to the overall drop of 2ppt at the divisional level.

At the divisional level, the weight has remained the same between the January 2018 and February 2018 update.

## **Division 11 Restaurants and hotels**

This division has shown a fall of 4ppt from 101ppt in 2017 to 97ppt at the January 2018 update. This fall is driven by a fall of 2ppt in two of the groups that feed into the division:

- catering services: this group has seen a fall from 77ppt in 2017 to 75ppt in the January 2018 update; whilst the expenditure is relatively flat between periods, the fall in weight has been caused by the relative increase in weight for actual rents (described previously)
- accommodation: this group has fallen from 24ppt last year to 22ppt in the January 2018 update; again, as with catering services, whilst the expenditure is relatively flat between periods the latest weight has fallen due to the relative increase in weight elsewhere in the basket (actual rents)

At the divisional level, the weight has remained the same between the January 2018 and February 2018 update.

## **Other notable class movements**

This section draws out some notable COICOP lower-level movements in weight, which have not already been covered previously, again focusing on CPIH and the movement between 2017 and the January 2018 update.

### **Group 06.2, Outpatient services**

This group increased by 2ppt from 5ppt in 2017 to 7ppt in the January 2018 update. In general, this increase has been caused by an increase in expenditure used for medical services and paramedical services, and dental services between the weight periods, with each contributing a 1ppt increase in weight.

### **Group 09.4, Recreational and cultural services**

This group has seen a general, small fall in expenditure for each COICOP5 that feeds in between the 2017 and January 2018 weights update, coupled with a small fall in the price update ratio that was used in the January 2018 update compared with the 2017 exercise. These factors combine to bring the weight at the class level down 3ppt from 26ppt in 2017 to 23ppt at the January 2018 update.

## Group 09.6 Package holidays

As mentioned earlier, the weight for package holidays is derived from the Living Costs and Food survey, based on average spend per week. The spend per week has increased by approximately 13% between what was used in the 2017 weights and the January 2018 update of weights, along with an increase of approximately 5% in the price update factor used in these periods. These factors combine to see the weight for package holidays increase from 28ppt in 2017 to 31ppt in January 2018.

## Notable movements between the January 2018 and February 2018 update

This final section focuses on the notable movement in weight between the January 2018 and February 2018 weights update. There are two divisions that warrant a mention.

### Division 03 Clothing and footwear

This division has seen a decrease in weight of 2ppt from 59ppt in the January 2018 update to 57ppt at the February 2018 update. The decrease in weight is driven by a fall in the price ratio used to uprate expenditure (so effectively [a fall in price between](#) between December 2017 and January 2018) of approximately 4.0% in the garments class, subsequently lowering the expenditure used in the February update and driving the fall of 2ppt at the divisional level.

### Division 05 Furnishings, household equipment and maintenance

This division has seen a decrease in weight of 2ppt from 50ppt in the January 2018 update to 48ppt at the February 2018 update. The decrease is driven by a general fall in price between December and January for a number of the classes that make up this division, namely class 50200, household textiles and class 50100, furniture and furnishings. This is supported by the fact the division saw a [fall in price](#) of approximately 3% between updates. This fall in price has led to a fall of 1ppt in the weights of the aforementioned classes, aggregating to a 2ppt fall at the divisional level.

Further information about the construction of the weights can be obtained by contacting:

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