

Article

# CPIH-consistent inflation rates for income groups by category of spend, UK: 2005 to 2018

Consumer Prices Index including owner occupiers' housing costs (CPIH)-consistent inflation rates calculated for different income groups, by category of spend.

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# 1 . Main points

- Consumer Prices Index including owner occupiers' housing costs (CPIH)-consistent inflation rates have been calculated for different income groups, by category of spend.
- The 12-month inflation rate for food and non-alcoholic beverages has followed a similar trend over the period 2005 to 2018 for households at both ends of the income distribution.
- In comparison, price changes in tobacco have had a greater impact on the alcoholic beverages and tobacco inflation rate for households in income decile two compared with income decile nine.
- Gas and electricity are the main contributors to the difference between the housing costs 12-month growth rate for income deciles two and nine.

## 2 . Things you need to know about this release

### What are CPIH-consistent inflation rate estimates for UK household groups?

The Consumer Prices Index including owner occupiers' housing costs (CPIH) is our most comprehensive measure of consumer price inflation. It measures the change in the prices of the goods and services as consumed by households. However, because the consumption baskets of specific households differ, the price experience of different groups of households may also differ from the average figure for all households. Producing CPIH-consistent inflation rates for different household groups therefore provides an insight into how these price changes can vary between different groups, within an established framework based on economic principles.

We publish a regular quarterly series that contains [CPIH-consistent inflation rates for households](#) by retirement status, tenure type, if they have children, and equalised disposable income and expenditure deciles (see Glossary).

Users should note that the CPIH-consistent inflation rates for different household groups are experimental indices and therefore we would caution against any use other than for research purposes.

### What is included in this article?

Our regular quarterly bulletin presents data on the all-items CPIH for different household groups. In the first section of this release, we summarise our results for households in different income deciles. Due to the [unusual composition of households in the first and 10th income deciles](#), our analysis focuses on the difference between households in decile two and decile nine.

We can also construct inflation rates for different sub-categories of spend using similar methodology. In the second section, we present these indices for our income groups. For example, how have prices changed for food and non-alcoholic beverages for households in different income deciles.

While we have produced indices and 12-month growth rates for the 12 main categories of spend (available in the accompanying [dataset](#)), we have focused on the three most interesting categories in this release, notably:

- alcoholic beverages and tobacco
- housing, water, gas, electricity and other fuels
- food and non-alcoholic beverages

## Quality and methodology information

The methodology that we use to calculate these estimates means that differences in the expenditure shares of the various categories of household spending are the sole driver of any differences in the inflation rates between the household groups.

For more information on the methodology used to create these indices, please see the Methodology section at the end of this article.

To find further information on the quality and methodology used to calculate the all-items CPIH-consistent inflation rates, please see the [Quality and methodology section](#) in our regular quarterly release. Please send your feedback on these statistics to [cpi.ons@gov.uk](mailto:cpi.ons@gov.uk).

## 3 . Rate of inflation experienced by income deciles

This section presents inflation rates for income deciles: 10 equally-sized groups of households ranked by their equivalised disposable income.

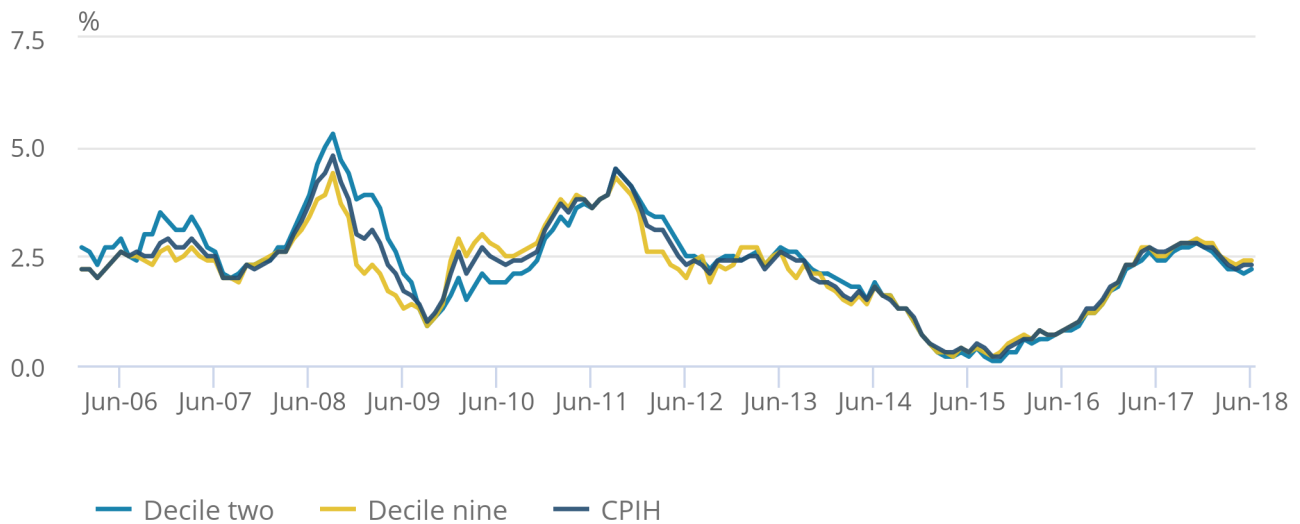
The 12-month inflation rates for the second and ninth income deciles are shown in Figure 1. The largest difference between the two groups occurred in January 2009 when the difference was 1.8 percentage points. However, the spread of the rates between the two income deciles has narrowed over the period and this trend has continued since the beginning of 2018.

**Figure 1: 12-month growth rates for equivalised disposable income deciles two and nine; CPIH**

UK, January 2006 to June 2018

Figure 1: 12-month growth rates for equivalised disposable income deciles two and nine; CPIH

UK, January 2006 to June 2018



Source: Office for National Statistics

Notes:

1. Equivalised income deciles (1 equals lowest-income households, 10 equals highest-income households).

The differences in inflation rate are caused by differences in expenditure share. Spending on “essentials” such as food, housing and utilities declines smoothly as a fraction of total spending between the lowest and highest income deciles. Conversely, the fraction of expenditure on restaurants, hotels and transport tends to gradually increase.

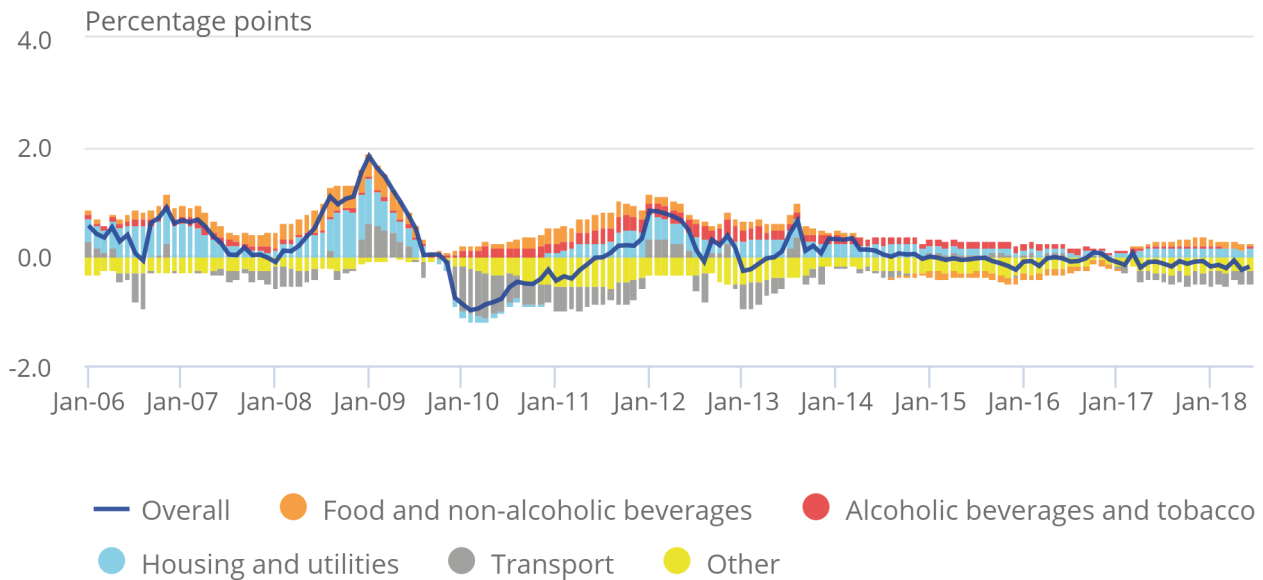
These differences can be shown more clearly if we look at the contributions to the 12-month growth rate. Figure 2 presents the difference in contributions for income decile two less income decile nine. It shows that the contribution from housing, food, drink and tobacco act to increase the inflation rate for the lower-income households compared with households in the ninth income decile. By comparison, transport and the “other” category act to increase the inflation rate for the ninth decile compared with the second decile. Over the period since 2016, the magnitudes of these contributions have cancelled out, however, leading to the convergence of these inflation rates.

**Figure 2: Contributions to the difference in annual inflation (income decile two less income decile nine)**

UK, January 2006 to June 2018

Figure 2: Contributions to the difference in annual inflation  
(income decile two less income decile nine)

UK, January 2006 to June 2018



Source: Office for National Statistics

Notes:

1. Contributions may not sum due to rounding.
2. This figure shows the difference in contributions for decile two less decile nine. If the bar is positive, it means that the contribution for that component is higher for decile two than decile nine (that is, the component is pushing the inflation rate of decile two higher compared with decile nine). If it is negative, the contribution is higher for decile nine than decile two. The line shows the overall difference in the 12-month growth rate between decile two and decile nine.
3. The “other” category consists of: clothing and footwear, furniture, household equipment and maintenance, health, communication, recreation and culture, education, restaurants and hotels, miscellaneous goods and services.

The following section presents inflation rates for the categories highlighted in Figure 2: food and non-alcoholic beverages, alcoholic beverages and tobacco, and housing and utilities. Due to the underlying data used to calculate the expenditure weights, the sample estimates are quite volatile for components in the transport category (for example, passenger transport by air). Therefore, we have not provided detailed analysis for this category although the index and 12-month growth rates for the aggregate transport category are available in the accompanying dataset.

For further information about the quality and methodology used to calculate the all-items CPIH-consistent inflation rates, please see the [Quality and methodology section](#) in our regular quarterly release.

## 4 . Inflation by category of spend, for income deciles

### Alcoholic beverages and tobacco

One of the categories that showed the most difference between the inflation rate for households in the second and ninth income decile is alcoholic beverages and tobacco. Over the period since January 2005, the index increased by 94% for the second income decile, compared with 65% for the ninth income decile.

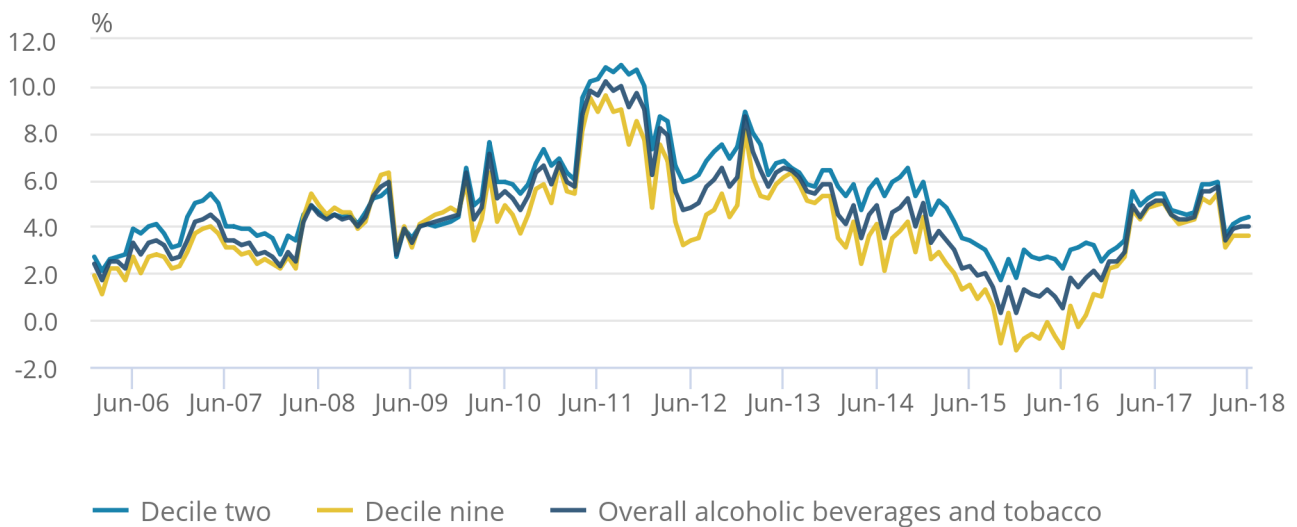
Figure 3 shows the 12-month growth rate for alcoholic beverages and tobacco for income decile two and income decile nine, compared with the aggregate Consumer Prices Index including owner occupiers' housing costs (CPIH) growth rate for that category. At the beginning of 2011, there was a notable shift upwards in the rate for both deciles, but it was larger for the second decile. This gap continued over much of the period to 2017, when the growth rates then stabilised.

**Figure 3: 12-month growth rate of alcoholic beverages and tobacco for income decile two, income decile nine and overall**

UK, January 2006 to June 2018

Figure 3: 12-month growth rate of alcoholic beverages and tobacco for income decile two, income decile nine and overall

UK, January 2006 to June 2018



Source: Office for National Statistics

Notes:

1. Equivalised income deciles (1 equals lowest-income households, 10 equals highest-income households).

The higher growth rate for income decile two since 2011 can be attributed to rapid price increases for tobacco. Spending on tobacco covers on average around 70% of the second decile's expenditure for the total alcoholic beverages and tobacco category compared with just 44% for decile nine. If the price of tobacco rises significantly, it will therefore impact more on decile two compared with decile nine.

For context, overall, income decile two spends on average 4.5% of their expenditure on alcoholic beverages and tobacco compared with 2.9% for income decile nine. Section 5 (Methodology) explains in more detail how the changes in expenditure weights at a lower level of spending can impact the inflation rate at a higher level.

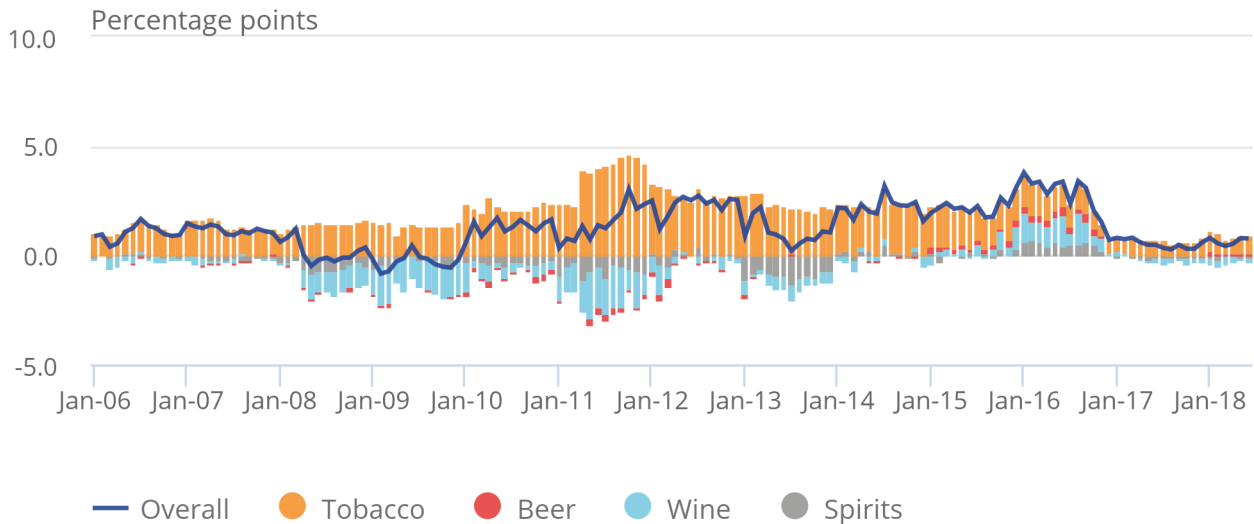
Figure 4 shows the difference in contributions for decile two less decile nine for alcoholic beverages and tobacco. In 2011, tobacco had a substantial positive impact on the inflation rate of decile two compared with decile nine. This aligns to an [increase in tax duty in the 2011 budget](#), which added 50 pence to the price of a packet of "economy" cigarettes and 33 pence to "premium" cigarettes. However, in recent years tobacco has contributed less to the difference between deciles two and nine. Combined with a reduction in contributions to the difference from alcohol since the end of 2016, this has meant that the gap between the 12-month growth rates has decreased notably in the latest period.

**Figure 4: Contributions to the difference in annual inflation of alcoholic beverages and tobacco (income decile two less income decile nine)**

UK, January 2006 to June 2018

Figure 4: Contributions to the difference in annual inflation of alcoholic beverages and tobacco (income decile two less income decile nine)

UK, January 2006 to June 2018



Source: Office for National Statistics

Notes:

- Contributions may not sum due to rounding.
- This figure shows the difference in contributions for decile two less decile nine. If the bar is positive, it means that the contribution for that component is higher for decile two than decile nine (that is, the component is pushing the inflation rate of decile two higher compared with decile nine). If it is negative, the contribution is higher for decile nine than decile two. The line shows the overall difference in the 12-month growth rate for alcoholic beverages and tobacco between decile two and decile nine.

## Housing, water, gas, electricity and other fuels

Housing and utilities is another category where the income deciles have experienced different growth rates over the period, showing a 3.7 percentage points difference in the cumulative growth rate since January 2005. Figure 5 shows the 12-month growth rate for income decile two and income decile nine for this category, with the largest gap appearing in 2006.

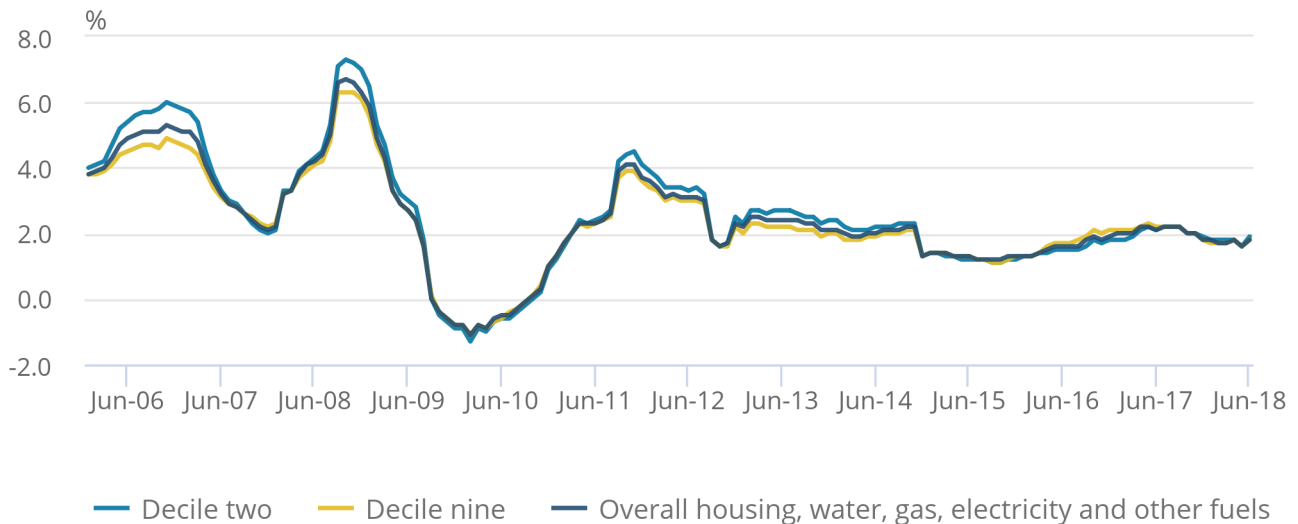


**Figure 5: 12-month growth rate of housing, water, electricity, gas and other fuels for income decile two, income decile nine and overall**

UK, January 2006 to June 2018

Figure 5: 12-month growth rate of housing, water, electricity, gas and other fuels for income decile two, income decile nine and overall

UK, January 2006 to June 2018



Source: Office for National Statistics

Notes:

1. Equivalised income deciles (1 equals lowest-income households, 10 equals highest-income households).

In comparison with alcoholic beverages and tobacco, differences in expenditure weights do not have as much of an impact in this category. For example, households in the second income decile spend a higher proportion of their expenditure on actual rentals, while households in income decile nine spend a larger portion of expenditure on owner occupiers' housing costs (OOH). However, for rents and OOH, the price changes are relatively consistent in comparison with other items in this category, particularly gas. This means actual rents and OOH have little effect on the difference in inflation experience for income decile two and income decile nine in this category.

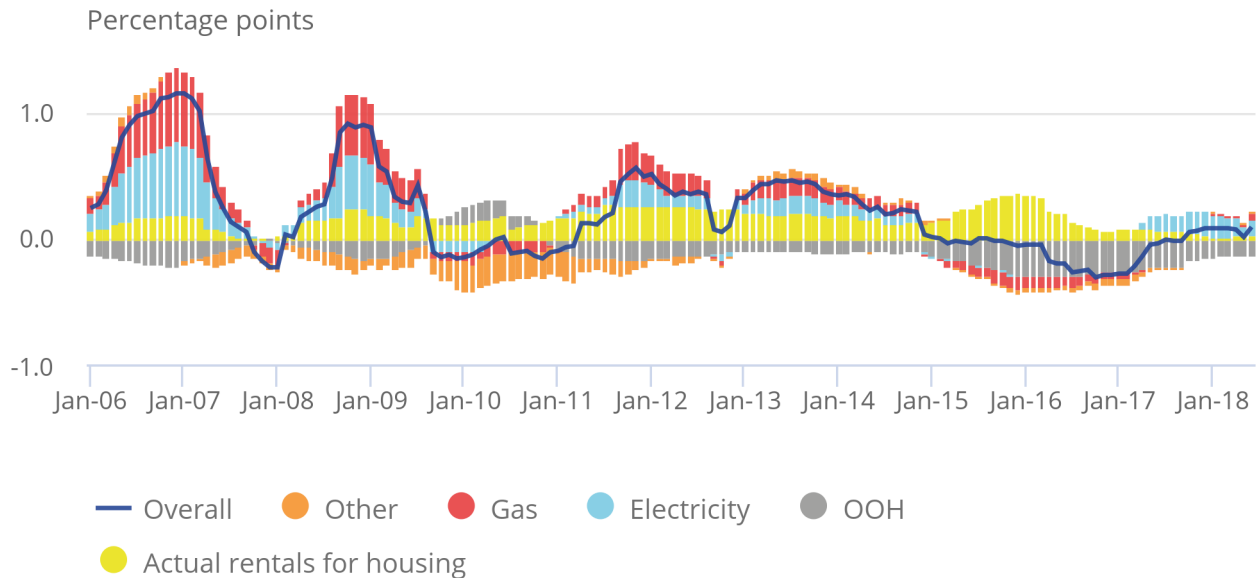
Figure 6 shows the difference in contributions for decile two less decile nine for housing and utilities. As discussed, the contributions from OOH and actual rents generally act to cancel each other out. The main drivers of the difference are instead gas and electricity. In particular, in times of volatile energy movements (for example, price increases in 2006 and 2008), the differences between income decile two and income decile nine are derived almost entirely from these categories.

**Figure 6: Contributions to the difference in annual inflation of housing, water, electricity, gas and other fuels (income decile two less income decile nine)**

UK, January 2006 to June 2018

Figure 6: Contributions to the difference in annual inflation of housing, water, electricity, gas and other fuels (income decile two less income decile nine)

UK, January 2006 to June 2018



Source: Office for National Statistics

Notes:

- Contributions may not sum due to rounding
- This figure shows the difference in contributions for decile two less decile nine. If the bar is positive, it means that the contribution for that component is higher for decile two than decile nine (that is, the component is pushing the inflation rate of decile two higher compared with decile nine). If it is negative, the contribution is higher for decile nine than decile two. The line shows the overall difference in the 12-month growth rate for housing and utilities between decile two and decile nine.
- The “other” category consists of: materials for maintenance and repair; services for maintenance and repair; water supply; sewerage collection; liquid fuels; solid fuels; and Council Tax and other rates.

## Food and non-alcoholic beverages

In contrast with the first two examples, the price inflation experienced by the second and ninth income deciles for food and non-alcoholic drinks is very similar (Figure 7), which is perhaps counter intuitive at first. However, the reason for this is that both deciles spend similar proportions of their expenditure on the items within this category (see Section 5 for a longer example).

For context, households in income decile two spend on average a larger proportion of their expenditure on food and non-alcoholic beverages (11.4%) compared with income decile nine (7.3%).

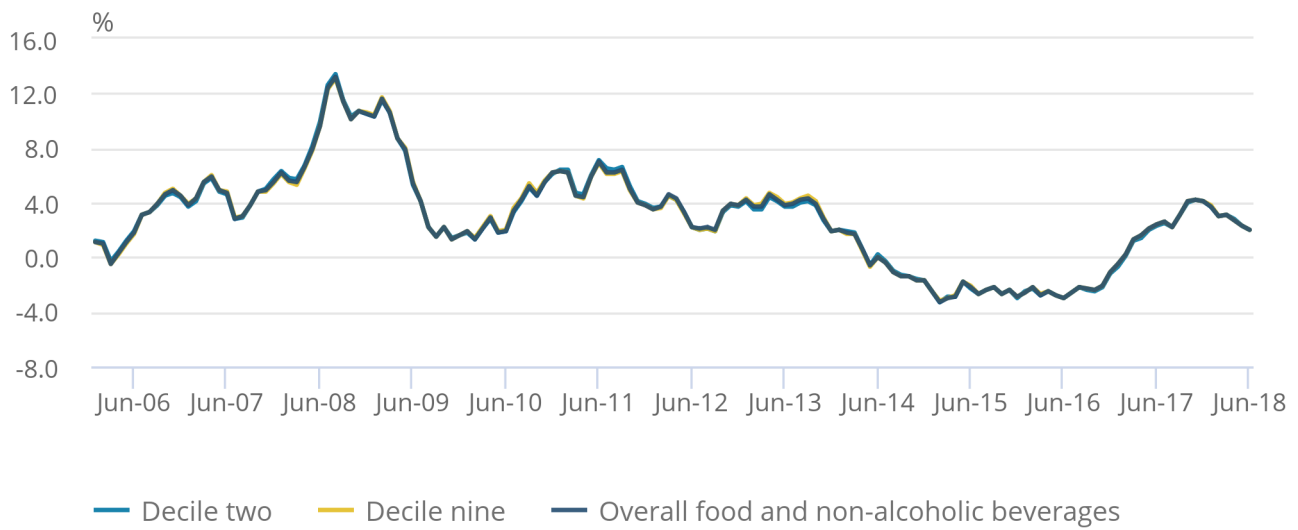
Over the period, the largest contributors to the relatively small difference between the two deciles is fruit, vegetables, bread and cereals, and milk, cheese and eggs (Figure 8).

**Figure 7: 12-month growth rate of food and non-alcoholic beverages for income decile two, income decile nine and overall**

UK, January 2006 to June 2018

Figure 7: 12-month growth rate of food and non-alcoholic beverages for income decile two, income decile nine and overall

UK, January 2006 to June 2018



Source: Office for National Statistics

Notes:

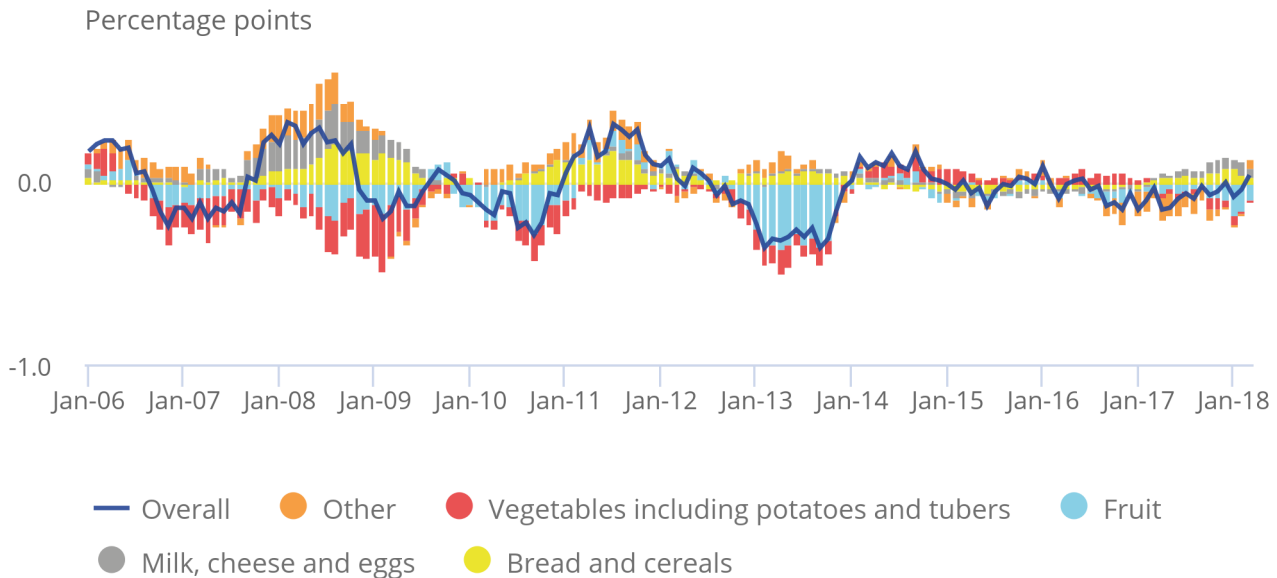
1. Equivalised income deciles (1 equals lowest-income households, 10 equals highest-income households).

**Figure 8: Contributions to the difference in annual inflation of food and non-alcoholic beverages (income decile two less income decile nine)**

UK, January 2006 to June 2018

Figure 8: Contributions to the difference in annual inflation of food and non-alcoholic beverages (income decile two less income decile nine)

UK, January 2006 to June 2018



Source: Office for National Statistics

Notes:

- Contributions may not sum due to rounding.
- This figure shows the difference in contributions for decile two less decile nine. If the bar is positive, it means that the contribution for that component is higher for decile two than decile nine (that is, the component is pushing the inflation rate of decile two higher compared with decile nine). If it is negative, the contribution is higher for decile nine than decile two. The line shows the overall difference in the 12-month growth rate for food and non-alcoholic beverages between decile two and decile nine.
- The “other” category consists of: meat; fish; oils and fats; sugar, jams, syrups, chocolate and confectionery; food products (not elsewhere classified); coffee, tea and cocoa; and mineral waters, soft drinks and juices.

## 5. Methodology

The methodology used is similar to how we produce the aggregate figures in the series of articles [CPIH-consistent inflation rate estimates for UK household groups](#). We use the same national price indices and then any differences are driven by using different expenditure weights for different categories of spending. For example, at the aggregate level, households in the second income decile have a high expenditure share on food and non-alcoholic beverages. Any price changes for these goods will therefore have a larger impact on these households compared with higher income deciles that spend more on categories such as recreation and culture.

The same principles can be applied to these results, just at a lower level. For example, any difference in price change for food and non-alcoholic beverages for different income deciles will be driven by differences in the expenditure share of lower-level categories within this division. That is, it will not be affected by how the total spend on food and non-alcoholic beverages compares with other divisions such as recreation and culture.

Each category of spending has been looked at separately. The differences in price indices for these divisions for income deciles two and nine are therefore driven by differences in weights at lower-level categories of spending. We can demonstrate the process on a simple hypothetical example for food and non-alcoholic beverages (which in this example is just comprised of bread and cereals, fruit and meat). Income decile two may spend £100 a week on this division, compared with £200 a week for income decile nine. However, if within this total spend the proportion of expenditure on different categories is the same for both deciles, these deciles would not experience any difference in prices for food and non-alcoholic beverages. This is because the expenditure shares on categories within this division are equal. This example is demonstrated in Table 1.

**Table 1: Example of equal expenditure shares with different total expenditure**

| <b>Income decile two - Food and Non-Alcoholic Beverages (£100)</b>  |            |
|---|------------|
| Bread and cereals   | £25 (25%)  |
| Fruit   | £25 (25%)  |
| Meat  | £50 (50%)  |
| <b>Income decile nine - Food and Non-Alcoholic Beverages (£200)</b> |            |
| Bread and cereals   | £50 (25%)  |
| Fruit   | £50 (25%)  |
| Meat  | £100 (50%) |

Source: Office for National Statistics

However, differences would show if the expenditure proportions of categories within the division changed for each decile (Table 2). In this example, if there is a price increase for bread and cereals this will cause higher inflation for income decile nine (all else constant) as households in this decile spend a higher proportion of their expenditure on this item (40% for income decile nine compared with 25% for income decile two). This will result in a different growth rate between the two deciles for food and non-alcoholic beverages.

**Table 2: Example of different expenditure shares with different total expenditure**

| <b>Income decile two - Food and Non-Alcoholic Beverages (£100)</b> |           |
|--|-----------|
| Bread and cereals  | £25 (25%) |
| Fruit  | £25 (25%) |
| Meat   | £50 (50%) |

| <b>Income decile nine - Food and Non-Alcoholic Beverages (£200)</b> |            |
|---|------------|
| Bread and cereals   | £80 (40%)  |
| Fruit   | £20 (10%)  |
| Meat  | £100 (50%) |

Source: Office for National Statistics

## 6 . Glossary

### Disposable income

Disposable income is that which is available for consumption and is equal to all income from wages and salaries, self-employment, private pensions and investments, plus cash benefits less direct taxes.

### Disposable income deciles

Households are grouped into deciles (or tenths) based on their equivalised disposable income. The richest decile (decile 10) is the 10% of households with the highest equivalised disposable income. Similarly, the poorest decile (decile one) is the 10% of households with the lowest equivalised disposable income. It should be noted that the second and ninth deciles are more stable so users may wish to consider these in their analysis.

### Equivalised

Income and expenditure groups are based on a ranking of households by equivalised income and expenditure. Equivalisation is the process of accounting for the fact that households with many members are likely to need a higher income to achieve the same standard of living as households with fewer members.

Equivalisation takes into account the number of people living in the household and their ages, acknowledging that while a household with two people in it will need more money to sustain the same standard of living as one with a single person, the two-person household is unlikely to need double the income. This analysis uses the [modified Organisation for Economic Co-operation and Development \(OECD\) equivalisation scale](#).

## 7 . Authors

Michael Zelenka, Jack Philips and Tanya Flower.