

Article

Impact analysis on transformation of UK consumer price statistics: private rents and second-hand cars, December 2023

Indicative impacts of the planned improvements to private rental and second-hand car measurement in consumer price statistics from January 2018 to October 2023.

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1 . Main points

- Alternative data sources and new methods were first introduced into our consumer prices statistics in 2023 with the transformation of rail fares; we now plan to introduce improved private rents and second-hand cars price statistics as part of our ongoing programme of improvements.
- These statistics will be introduced into our headline measures: the Consumer Prices Index including owner occupiers' housing costs (CPIH) and the Consumer Prices Index (CPI), as well as into the Retail Prices Index (RPI) from February 2024 (published in March 2024).
- The average indicative impact to the CPIH annual rate from transformation of these categories, between January 2018 and October 2023, was positive 0.2 percentage points, where the impact was more concentrated in more recent years, influenced by transformed private rents.
- The average indicative impact to the CPI annual rate from transformation of these categories, between January 2018 and October 2023, was less than positive 0.1 percentage points.
- These planned changes will be introduced from March 2024 onwards only and there will be no revisions to any historical data.

2 . Overview of proposed transformation

To safeguard the production and publication of official statistics that serve the public good, as stated in the [Code of Practice for Statistics](#), we are currently undertaking an ambitious programme of transformation across our consumer price statistics, as explained in our [Transformation of consumer price statistics: April 2022 article](#). This includes identifying new data sources, improving methods, developing systems, and establishing new processes. The work has been in progress for several years, reflecting the complexity and intricacy of what we are aiming to achieve.

We aim to make improvements annually as part of a continuous improvement cycle. Our first introduction, in 2023, prioritised the inclusion of new data for rail fares, whereas the second introduction in 2024 will prioritise private rents and second-hand cars. These new data will offer a substantial improvement in the coverage and level of detail of our published indices for these categories with greater rental prices detail published within the new [Price Index of Private Rents \(PIPR\) publications](#).

Rental price data are provided by the Valuation Office Agency (England), Welsh Government and Scottish Government. Approximately 500,000 data points per year are collected by Rent Officers across the three nations. The data they collect are representative of the full range of local market rents in each Broad Rental Market Area (BRMA) and include information on the property address, rental price, and property characteristics. For private rents, we made the decision to delay the implementation of the new methodology for Northern Ireland and will continue to use the current methodology for Northern Ireland. For further information on this, please see [Section 7: Future developments](#).

The second-hand cars data are provided by [Auto Trader](#), currently the largest and most visited vehicle advertising website in the UK providing approximately 300,000 data points per month, after data cleaning procedures. As well as the advertised price, they include extensive metadata on each listed car, and date back to January 2018. As these data are for advertised listings, they do not contain explicit sales revenue information.

The size, information, and dynamic nature of this more detailed data means that new methods, systems, and processes are required to enable quality and robust calculation of price indices. More details on these data and our proposed methods for measuring inflation from them can be found in our [Research and developments in the transformation of UK consumer price statistics: July 2023 article](#). The estimates in the present analysis are indicative.

Our priorities are improving the quality and upholding the integrity of our statistics. While we intend to introduce these changes from February 2024 (published in March 2024), we are also currently completing final quality assurance and testing of our systems and processes.

3 . Indicative impact of transformation on annual consumer price inflation rates

We plan to introduce private rents and second-hand cars transformations simultaneously from 2024. To show the indicative impact of using these data simultaneously, as second-hand cars data are only available from 2018, we have chosen to include the private rents data from 2018 despite having these data from 2015. Indicative impacts using the new private rents data from 2015 are available in our [accompanying dataset](#).

This revised series from 2018 is chain-linked to the published series pre-2018 to show the indicative impact on the growth rates in the year of introduction. For more information on chain-linking and existing practices for calculation of consumer price indices, please refer to our [Consumer Prices Indices Technical Manual, 2019](#).

The existing, published weights for private rents and second-hand cars, as shown in our [Consumer price inflation, updating weights: 2023 article](#), are used to aggregate the new data and methods into our published consumer price statistics.

For each of our consumer price statistics – Consumer Prices Index including owner occupiers' housing costs (CPIH), Consumer Prices Index (CPI) and Retail Prices Index (RPI) – we have assessed the impact of transforming private rental prices and second-hand cars between January 2018 and October 2023, had the changes been introduced from February 2018. These are covered separately throughout this section.

Indicative impact on Consumer Prices Index including owner occupiers' housing costs (CPIH)

The new private rents price statistics are used to measure both actual rentals for housing, and owner occupiers' housing costs. The weight for owner occupiers' housing costs ranged between 16.0% and 18.5% of CPIH (Table 1) while for actual rentals for housing, the weights ranged from 6.4% to 7.4% of CPIH, note that private rents only feed into a part of actual rentals for housing (for 2023 this was 63%, previous years are between 58% and 67%).

For second-hand cars, the weights range between 1.2% and 2.1% of CPIH.

Table 1: Weights for Consumer Prices Index including owner occupiers' housing costs (CPIH)

Period (Feb-Dec)	Owner-occupiers' housing costs	Actual rentals for housing	Second-hand cars
2018	16.9%	6.9%	1.4%
2019	16.5%	6.9%	1.4%
2020	16.3%	6.8%	1.4%
2021	18.5%	7.4%	1.2%
2022	17.3%	6.9%	2.0%
2023	16.0%	6.4%	2.1%

Source: Consumer price inflation, updating weights, from the Office for National Statistics

Notes

1. January weights have not been included for presentational purposes.

Figure 1 shows the indicative impact of transforming private rents and second-hand cars indices on headline CPIH between January 2018 and October 2023, had they been introduced in February 2018.

The average indicative impact to the CPIH annual rate of change was 0.2 percentage points, this was mostly influenced by private rental prices. The impact to the CPIH annual rate of change was larger in more recent years because of the sharp increase in private rental prices (used to measure both owner occupiers' housing costs (OOH) and private rents within CPIH) where prices are rising at near record rates (Figure 2).

The differences between the old rental prices estimates and the new are influenced by two important methodological differences. This includes the new measure using all available data collected in the latest month, and stratifying at a lower geographical level, which is more representative of the UK rental market than the current methods. More detail on these can be found within our [Redevelopment of private rental prices statistics, impact analysis, UK: December 2023 article](#).

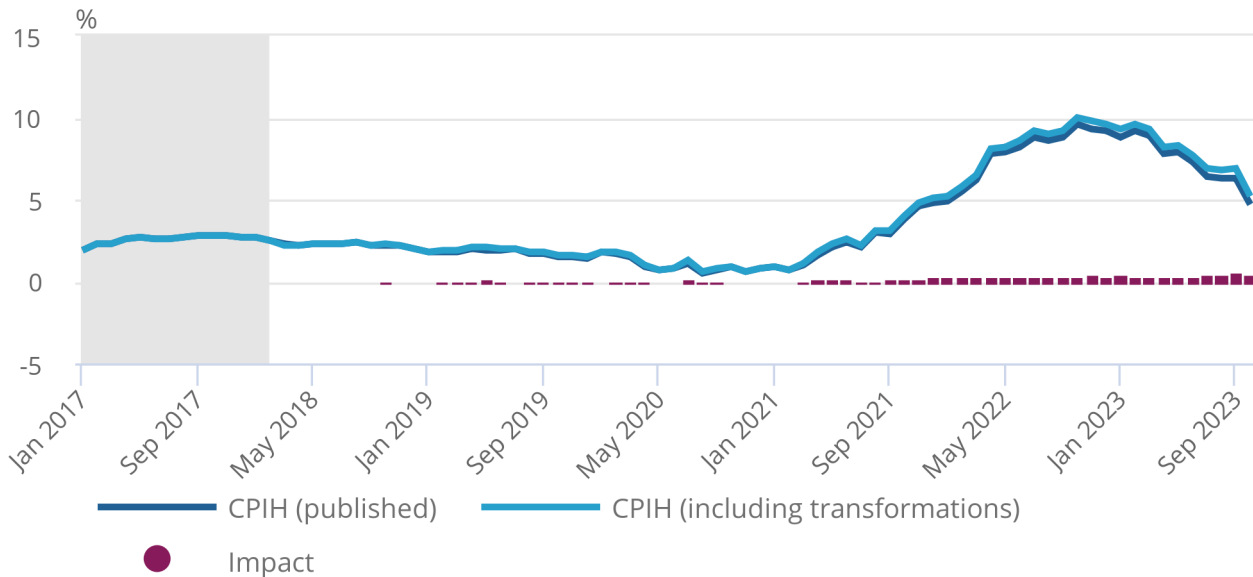
The impact to CPIH was larger than the impacts to CPI and RPI because of the use of private rents data to also calculate owner occupiers' housing costs, which forms a large weight of the CPIH (Table 1).

Figure 1: The average impact to the annual rate of change of CPIH was 0.2 percentage points

Indicative impact of transformed private rents and second-hand cars indices on CPIH 12-month rate, UK, January 2017 to October 2023

Figure 1: The average impact to the annual rate of change of CPIH was 0.2 percentage points

Indicative impact of transformed private rents and second-hand cars indices on CPIH 12-month rate, UK, January 2017 to October 2023



Source: Impact analysis of transforming statistics for second-hand cars and private rents on UK consumer price statistics from the Office for National Statistics

Notes:

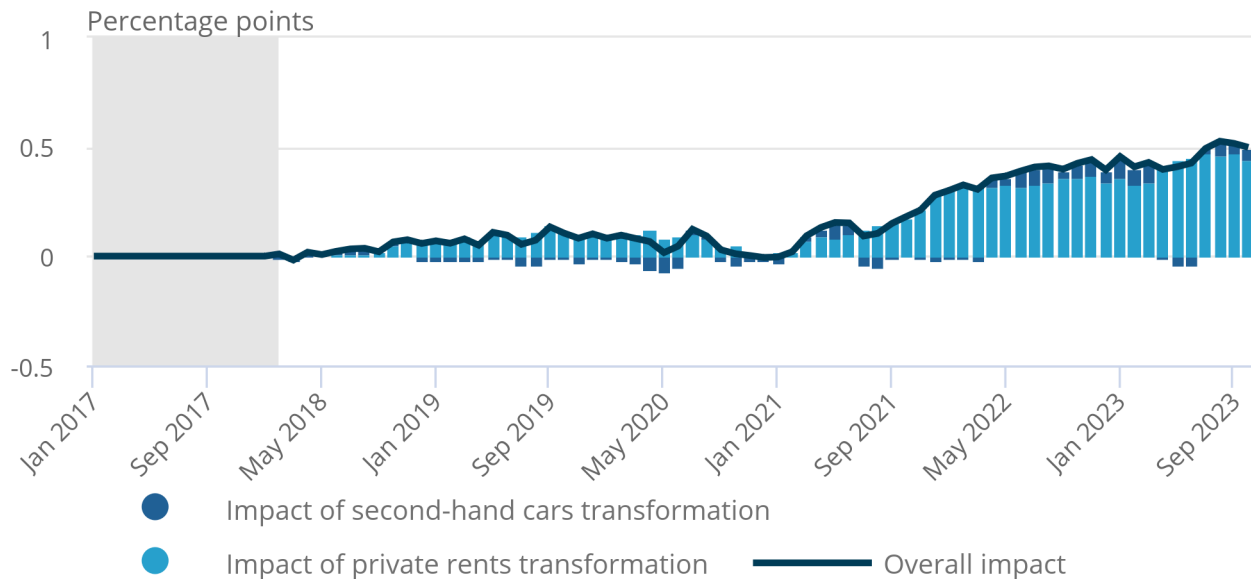
1. Impact changes are based on 12-month growth rates rounded to one decimal place.

Figure 2: Private rents improvements had a larger impact on CPIH than second-hand cars

Contributions from transformed private rents and second-hand cars to the indicative impact in the CPIH 12-month rate, UK, January 2017 to October 2023

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Contributions from transformed private rents and second-hand cars to the indicative impact in the CPIH 12-month rate, UK, January 2017 to October 2023



Source: Impact analysis of transforming statistics for second-hand cars and private rents on UK consumer price statistics from the Office for National Statistics

Notes:

1. Impact changes are based on contributions rounded to three decimal places so may differ from estimates based on 12-month growth rates rounded to one decimal place.

Further information on the lower-level breakdowns can be found in our [accompanying dataset](#).

Indicative impact on Consumer Prices Index (CPI)

The new private rents are used to measure part of actual rentals for housing in the Consumer Prices Index (CPI). CPI does not include owner occupier housing costs and so the weight of rents will be less than in CPIH. The weight for actual rentals for housing ranges between 7.9% and 9.4% for CPI (Table 2); note that private rents only feed into a part of actual rentals for housing (for 2023 this was 63%, previous years are between 58% and 67%).

For second-hand cars, the weights range between 1.6% and 2.5% of CPI.

Table 2: Weights for Consumer Prices Index (CPI)

Period (Feb-Dec)	Actual rentals for housing	Second-hand cars
2018	8.6%	1.8%
2019	8.5%	1.7%
2020	8.4%	1.7%
2021	9.4%	1.6%
2022	8.7%	2.5%
2023	7.9%	2.5%

Source: Consumer price inflation, updating weights, from the Office for National Statistics

Notes

1. January weights have not been included for presentational purposes.

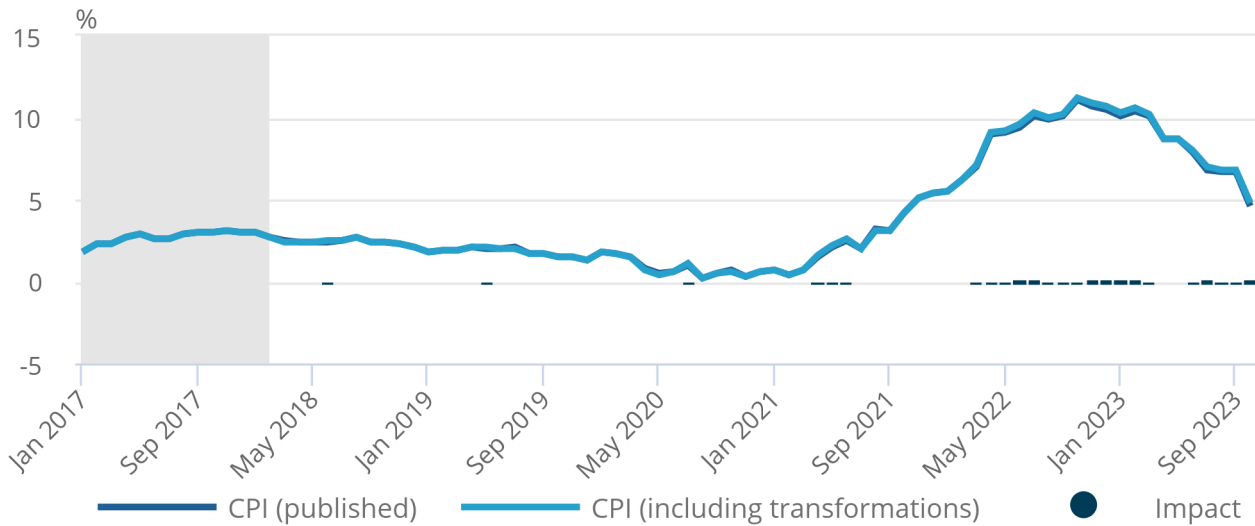
Figure 3 shows the indicative annual growth rates for the CPI series had we used the new methods and data sources for both private rents and second-hand cars compared with the published CPI. The average impact to the annual rate of change was less than 0.1 percentage points, with those largest differences being in more recent years because of the sharp increase in private rental prices (used to measure both OOH and private rents within CPIH) where prices are rising at near record rates.

Figure 3: The average impact to the CPI annual rate of change was less than 0.1 percentage points

Indicative impact of transformed private rents and second-hand cars indices on CPI 12-month rate, UK, January 2017 to October 2023

Figure 3: The average impact to the CPI annual rate of change was less than 0.1 percentage points

Indicative impact of transformed private rents and second-hand cars indices on CPI 12-month rate, UK, January 2017 to October 2023



Source: Impact analysis of transforming statistics for second-hand cars and private rents on UK consumer price statistics from the Office for National Statistics

Notes:

1. Impact changes are based on 12-month growth rates rounded to one decimal place.

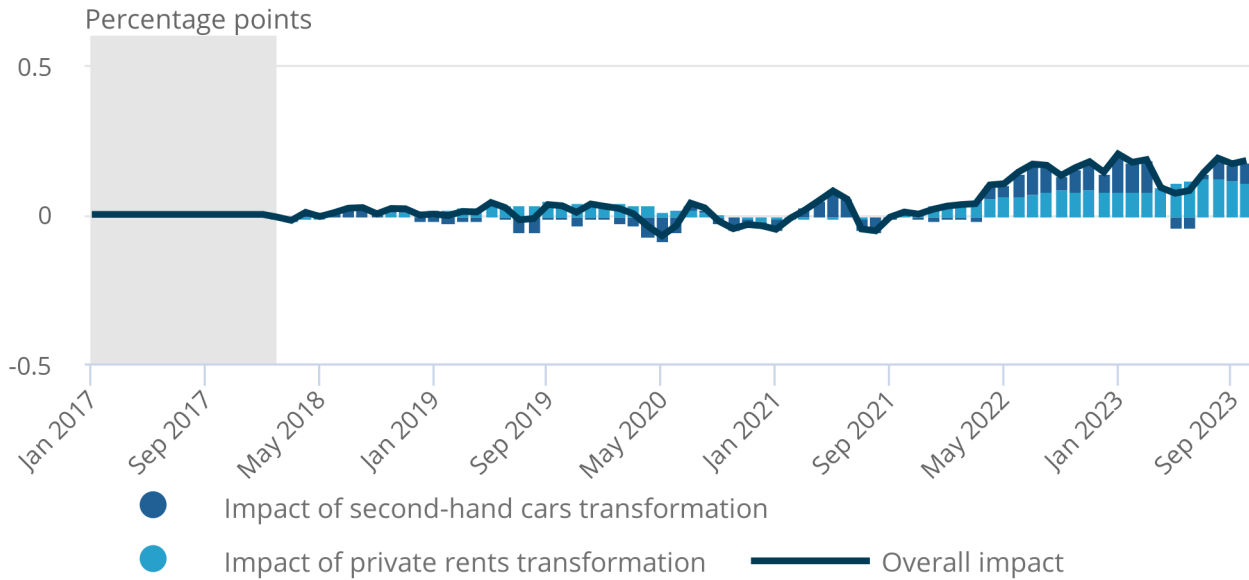
The indicative impact on CPI was influenced more evenly by second-hand cars and private rents than CPIH because of the exclusion of owner occupiers' housing costs in CPI (Figure 4). Private rents had contributed to more of the impact in recent years because of the sharp increase in private rental prices (used to measure both OOH and private rents within CPIH) where prices are rising at near record rates.

Figure 4: Private rents improvements had a larger impact on CPI than second-hand cars

Contributions from transformed private rents and second-hand cars to the indicative impact in the CPI 12-month rate, UK, January 2017 to October 2023

Figure 4: Private rents improvements had a larger impact on CPI than second-hand cars

Contributions from transformed private rents and second-hand cars to the indicative impact in the CPI 12-month rate, UK, January 2017 to October 2023



Source: Impact analysis of transforming statistics for second-hand cars and private rents on UK consumer price statistics from the Office for National Statistics

Notes:

1. Impact changes are based on contributions rounded to three decimal places so may differ from estimates based on 12-month growth rates rounded to one decimal place.

Indicative impact on Retail Prices Index (RPI)

The new private rents are used to measure actual rentals for housing in the Retail Prices Index (RPI). Rather than using rental equivalence (used in the CPIH) to measure owner-occupiers' housing costs, the RPI is measured using the payments approach, which includes mortgage interest payments and other house purchasing costs, and does not use rental prices. This means the impact on RPI will be smaller than on CPIH because of a lower weight. The weight for rent ranges between 7.5% and 8.4% for RPI (Table 3).

For second-hand cars, the weights range between 2% and 3.4% of RPI.

Table 3: Weights for Retail Prices Index (RPI)

Period	Actual rentals for housing	Second-hand cars
2018	7.6%	2.8%
2019	7.7% (pre July 2019) 7.5% (July 2019 onwards)	2.7% (pre- and post- July 2019)
2020	8.2%	2.0%
2021	7.9%	3.0%
2022	8.4%	3.4%
2023	8.0%	3.2%

Source: Consumer price inflation, updating weights, from the Office for National Statistics

Notes

1. An error was identified in the dataset underpinning the 2019 weights covering the period February to June 2019. In line with the consumer price inflation statistics revisions policy, RPI has not been revised. The corrected weights have been used in July 2019 RPI onwards.

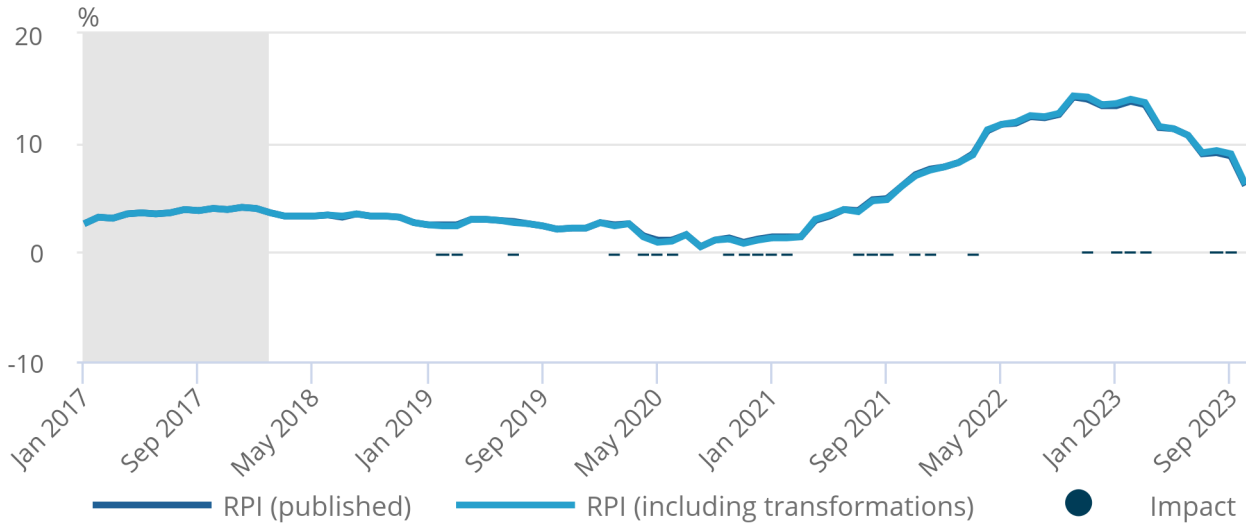
Figure 5 shows the indicative annual growth rates for the RPI series had we used the new methods and data sources for both private rents and second-hand cars compared with the published RPI. On average, the impact to the RPI annual change was neutral (0.01 percentage points from unrounded calculations). The maximum impact to the annual rate of change was 0.2 percentage points, as seen in six individual months between November 2022 and September 2023. Second-hand cars contribute more to the indicative impact on RPI, with their average contribution being 0.008 percentage points (Figure 6).

Figure 5: The average impact to the annual rate of change for RPI was neutral

Indicative impact of transformed private rents and second-hand cars indices on RPI 12-month rate, UK, January 2017 to October 2023

Figure 5: The average impact to the annual rate of change for RPI was neutral

Indicative impact of transformed private rents and second-hand cars indices on RPI 12-month rate, UK, January 2017 to October 2023



Source: Impact analysis of transforming statistics for second-hand cars and private rents on UK consumer price statistics from the Office for National Statistics

Notes:

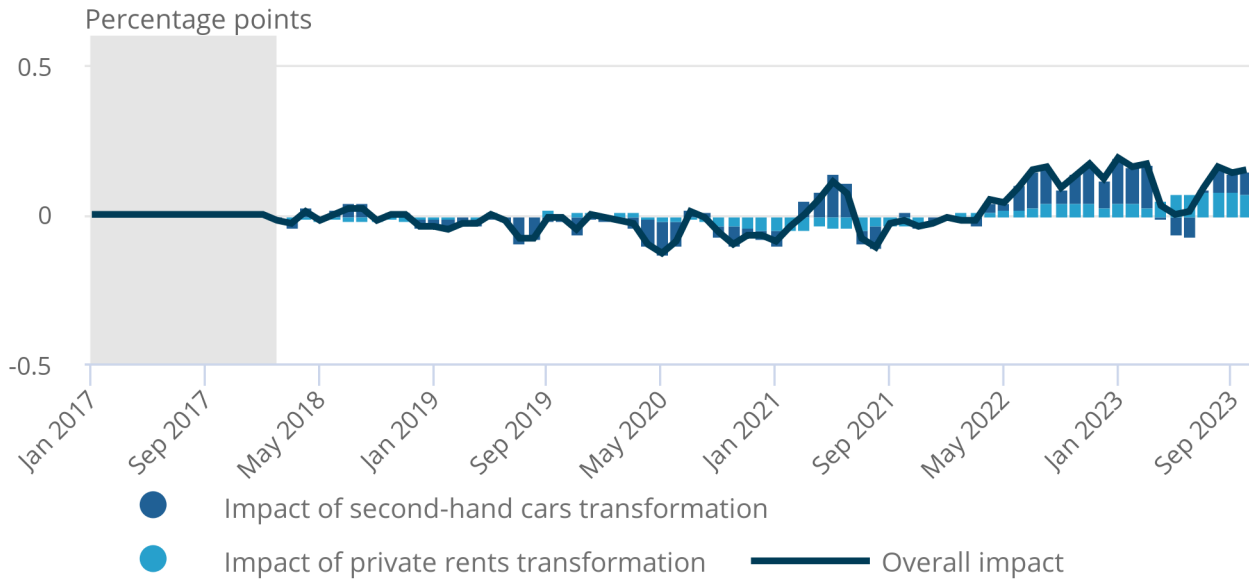
1. Impact changes are based on 12-month growth rates rounded to one decimal place.

Figure 6: Second-hand cars improvements had a larger impact on RPI than private rents

Contributions from transformed private rents and second-hand cars to the indicative impact in the RPI 12-month rate, UK, January 2017 to October 2023

Figure 6: Second-hand cars improvements had a larger impact on RPI than private rents

Contributions from transformed private rents and second-hand cars to the indicative impact in the RPI 12-month rate, UK, January 2017 to October 2023



Source: Impact analysis of transforming statistics for second-hand cars and private rents on UK consumer price statistics from the Office for National Statistics

Notes:

1. Impact changes are based on contributions rounded to two decimal places so may differ from estimates based on 12-month growth rates rounded to one decimal place.

Indicative impacts to the comparison of CPIH and RPI

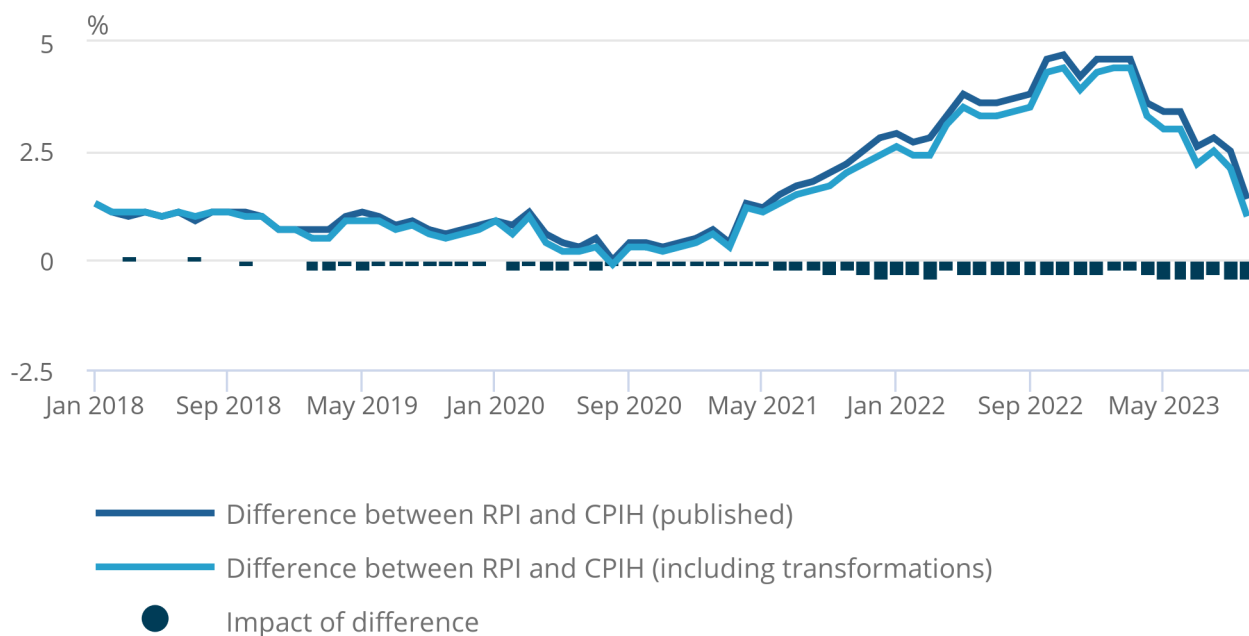
The difference between the CPIH and RPI inflation rates over the past five years would have been smaller had we used the transformed private rents and second-hand cars. The reduction in the difference is mainly influenced by private rents, which increased the annual rate of change in CPIH in all months, while it had a minimal impact on RPI. This is because the rental price statistics contribute to a higher amount of the weight in CPIH than in RPI. The indicative impact on the difference between CPIH and RPI is more prominent in recent years because of the sharp increase in private rental prices (used to measure both OOH and private rents within CPIH) where prices are rising at near record rates.

Figure 7: The difference between CPIH and RPI annual rate of change was smaller using the newly transformed statistics

Contributions from transformed private rents and second-hand cars to the comparison between CPIH and RPI 12-month rate, UK, January 2018 to October 2023

Figure 7: The difference between CPIH and RPI annual rate of change was smaller using the newly transformed statistics

Contributions from transformed private rents and second-hand cars to the comparison between CPIH and RPI 12-month rate, UK, January 2018 to October 2023



Source: Impact analysis of transforming statistics for second-hand cars and private rents on UK consumer price statistics from the Office for National Statistics

Notes:

1. Impact changes are based on 12-month growth rates rounded to one decimal place.

Indicative impacts for CPIH, CPI and RPI can be found in our [accompanying dataset](#).

4 . Increased level of detail in published indices

There are many improvements arising from use of the new data sources. A notable improvement is that users will have access to a greater level of detail in the published indices once these transformations are incorporated.

Private rents

We currently produce the Index of Private Housing Rental Prices (IPHRP) and the Private rental market statistics (PRMS); however, from March 2024, our rental price statistics will be presented in a new, single, monthly publication that provides a more detailed insight into the rental market.

This new publication will publish private rental prices statistics comparable over time and down to lower geographic levels than currently available in the IPHRP. We aim for these measures to be available for the UK, its countries, English regions and local authorities or broad local rental market areas.

The new publication will contain:

- an index of private rental prices
- annual rate of change
- average private rental prices
- a breakdown of private rental prices by geography, property type and bedroom category (one bedroom, two bedrooms, three bedrooms and four or more bedrooms)

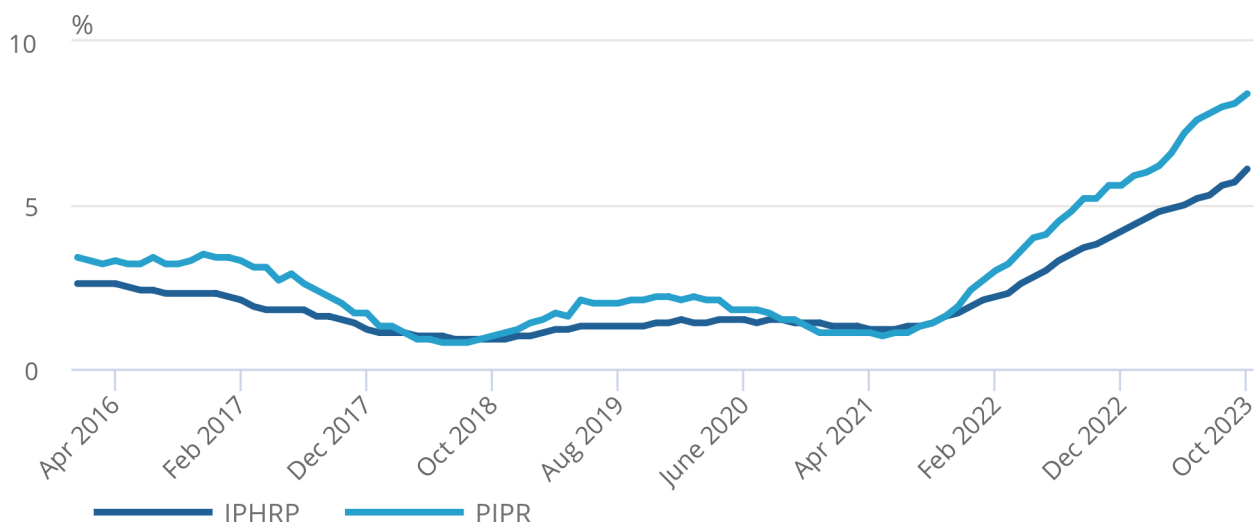
The new Price Index of Private Rents (PIPR) is more responsive to market changes than the current Index of Private Housing Rental Prices (IPHRP) (Figure 8). We have published a more detailed [impact analysis of the new private rental prices data](#) alongside this article.

Figure 8: Private rental price annual change using the new methodology was generally higher between January 2016 and October 2023

Private rental price annual change for the UK, January 2016 to October 2023

Figure 8: Private rental price annual change using the new methodology was generally higher between January 2016 and October 2023

Private rental price annual change for the UK, January 2016 to October 2023



Source: Index of Private Housing Rental Prices and Price Index of Private Rents from the Office for National Statistics

Second-hand cars

We will begin to publish the inflation rate of second-hand cars with different fuel types, replacing the existing item indices for: two-year-old and three-year-old second-hand cars.

These two new published indices will be for petrol second-hand cars, and diesel second-hand cars, as subsidiaries of the second-hand cars subclass within the Classification of Individual Consumption by Purpose (COICOP) hierarchy.

These indices are further stratified into the ages of the cars, ranging from one to two years, to ten years, but the data are not published.

The indices for different ages of second-hand cars are further stratified into the makes of the cars, such as Vauxhall, Ford, and others, but the data are not published.

While we have data for second-hand hybrid and electric cars, the number of cars in the sample is still small. Those two consumption segments will be added as part of the annual basket update once they gain a substantial proportion of the second-hand car market.

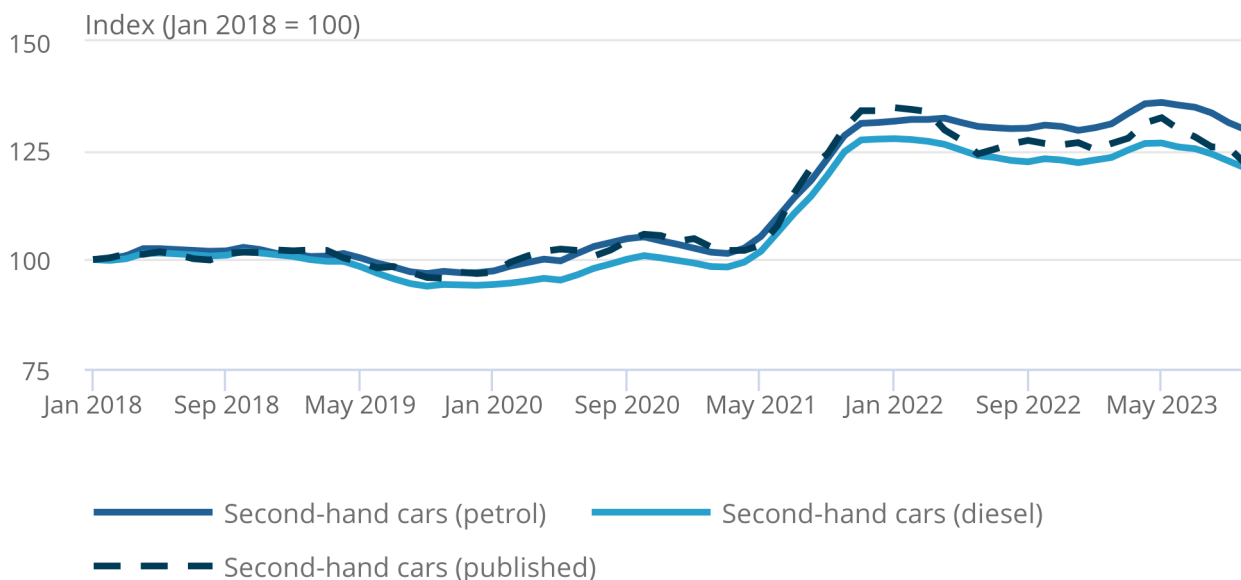
Indices for petrol and diesel second-hand cars using new data and methods are shown in comparison to the currently published COICOP5 index for second-hand cars in Figure 9, with the annual growth rate for these indices shown in Figure 10.

Figure 9: Second-hand cars indices by fuel type experienced similar trends in price change to the currently published index

New second-hand cars indices by fuel type compared with currently published second-hand cars index, UK, January 2018 to October 2023

Figure 9: Second-hand cars indices by fuel type experienced similar trends in price change to the currently published index

New second-hand cars indices by fuel type compared with currently published second-hand cars index, UK, January 2018 to October 2023



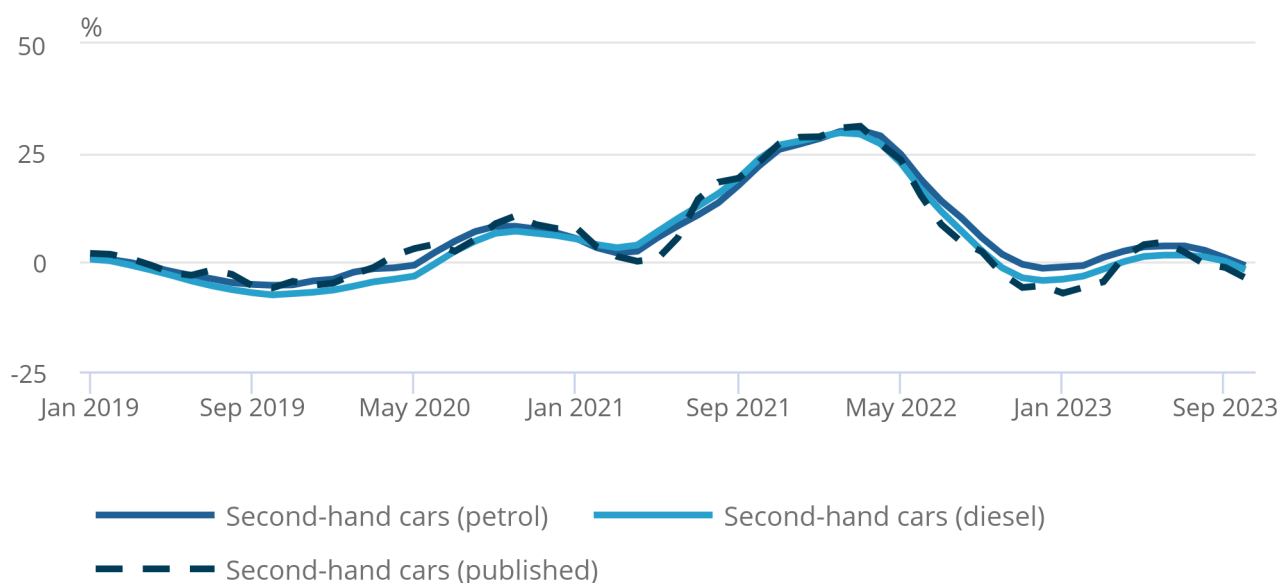
Source: Impact analysis of transforming statistics for second-hand cars and private rents on UK consumer price statistics from the Office for National Statistics

Figure 10: Second-hand cars 12-month growth rates by fuel type experienced similar trends compared with the currently published series

Second-hand cars indices by fuel type compared with currently published second-hand cars index, UK, January 2019 to October 2023

Figure 10: Second-hand cars 12-month growth rates by fuel type experienced similar trends compared with the currently published series

Second-hand cars indices by fuel type compared with currently published second-hand cars index, UK, January 2019 to October 2023



Source: Impact analysis of transforming statistics for second-hand cars and private rents on UK consumer price statistics from the Office for National Statistics

The indices show that diesel cars have experienced slower growth over this period than petrol cars. While broadly similar trends to the published series are observed, the published series has been more in line with the inflation rate of petrol cars since January 2019. This has not been the case since March 2022, when there was a sharp downward trend in the published series. While the annual growth rate for the revised series also slowed from March 2022, the decline was not as sharp. Since July 2022, the published series has remained between the inflation rates of petrol and diesel second-hand cars until it became more in line with the inflation rate of diesel cars in October 2023.

There are many potential reasons for differences between the published and revised series. In particular, the revised series have substantially increased coverage (both temporal and market coverage), meaning that the price indices are less sensitive to sudden price movements of individual makes or models of car.

The new petrol and diesel second-hand car indices are stratified by age (between 1 and 10 years) and make (approximately 25 makes per fuel type). We will therefore be able to provide users with more detailed information (through our [monthly CPI detailed briefing note dataset](#)) as to, for example, the age of second-hand cars that are contributing to the change in inflation, although these stratum-level indices will not be published as part of the regular inflation tables.

5 . Impact analysis of transforming statistics for second-hand cars and private rents on UK consumer price statistics data

[Impact analysis on transformation of UK consumer price statistics: private rents and second-hand cars, UK Dataset](#) | Released 1 December 2023
Data tables containing impact analysis on transformation of UK consumer price statistics: private rents and second-hand cars, including indices, 12-month and 1-month growth rates.

6 . Data sources and quality

Private rents

Further information on the data sources and quality for private rents can be found in our [accompanying methodological article](#).

Second-hand cars

Further information on the data sources and quality for second-hand cars can be found in our [Using Auto Trader car listings data to transform consumer price statistics, UK: July 2023 article](#).

Pandemic impact

Please note, through 2020 and 2021 there were several unavailable items because of the coronavirus (COVID-19) pandemic that had to be imputed in some periods. For this impact analysis, we have not recalculated these imputations for the revised series.

7 . Future developments

For private rents, we made the decision to delay the implementation of the new methodology for Northern Ireland. We aim now to implement Northern Ireland changes by March 2025 and will continue to use the current methodology for Northern Ireland until then, including the continued use of Kantar data for consumer prices statistics. This decision has been made because the differences in the Northern Ireland data result in additional complexity when developing the new system and it is no longer possible to incorporate by March 2024.

In our future work, ahead of entering production with the new second-hand cars data, we are in the process of:

- acquiring a new variable from Auto Trader, to improve standardisation in a vehicle's mark, reducing unnecessary product churn
- finalising and testing our systems development to allow sustainable index calculations within a production environment

8 . Related links

[Research and developments in the transformation of UK consumer price statistics: December 2023](#)

Article | Released 1 December 2023

Our plans to transform UK consumer price statistics by including new improved data sources and developing our methods and systems for production from 2023.

[Redevelopment of private rental prices statistics, impact analysis, GB: December 2023](#)

Article | Released 1 December 2023

We are redeveloping our private rental price statistics. We expect these to be used in our measurement of consumer prices from 2024. This article provides research indices using these data.

[The redevelopment of private rental prices statistics, intended methodology: December 2023](#)

Article | Released 1 December 2023

Overview of the methodology that we intend to be used for our redeveloped private rental prices statistics.

[Using Auto Trader car listings data to transform consumer price statistics, UK: July 2023](#)

Article | Released 26 July 2023

Car listings data will improve measurement of consumer prices from 2024. This article updates our methods and research indices using these data.

[Transformation of consumer price statistics: July 2023](#)

Article | Released 6 July 2023

We are undertaking a programme of transformation across our consumer price statistics, including identifying new data sources, improving methods, and developing systems to improve both the Consumer Prices Index including owner occupiers' housing costs (CPIH) and the Consumer Prices Index (CPI).

[Consumer price inflation, UK: October 2023](#)

Bulletin | Released 15 November 2023

Price indices, percentage changes, and weights for the different measures of consumer price inflation.

[Consumer Prices Indices Technical Manual, 2019](#)

Methodology | Last revised 22 March 2023

This technical manual is a reference tool for anyone wanting to understand how measures of consumer price inflation and associated indices are compiled.

[Correspondence on proposed changes to the Retail Prices Index \(RPI\)](#)

Webpage | 7 February 2023

Annual letters and responses between Office for National Statistics and the Bank of England outlining proposed changes to consumer price inflation statistics.

9 . Cite this article

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