

Article

# Impact analysis on transformation of UK consumer price statistics: rail fares, February 2023

Final impacts of the planned improvements to rail fare measurement in consumer price statistics between January 2019 and June 2022.

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# 1 . Main changes

- Rail fare transaction data for Great Britain will be used in the measurement of the Consumer Prices Index including owner occupiers' housing costs (CPIH), the Consumer Prices Index (CPI) and the Retail Prices Index (RPI) from February 2023 (to be published on 22 March 2023).
- Historical impact analysis shows that the transformation of rail fares indices would not have affected headline CPIH, CPI or RPI if changes had been introduced between January 2019 and June 2022; there are small impacts (up to 0.1 percentage points) at the transport division level of CPIH and CPI.
- Though the historical impact would have been small, following their introduction, the new indices will offer a quality improvement in measurement, from increased coverage of prices to a higher level of granularity (measure of the level of detail), available in our published data.
- New data and methods for second-hand car indices will not be incorporated at this time, while we make further necessary improvements to our methods and systems to ensure their reliability; we will publish an update to our timelines for transformation of second-hand car indices in spring 2023.

## 2 . Outcomes of quality assurance and testing

We are currently undertaking an ambitious [programme of transformation](#) across our consumer price statistics. 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. This programme will build over subsequent years as we acquire data and develop the skills and systems required to apply new data and methods in our production process. This evolution will enable us to continuously improve the quality and integrity of our outputs, while making incremental steps towards our long-term transformation goals.

Our recent work has prioritised new data and methods for rail fares and second-hand cars. The rail fares data for Great Britain are provided to us by the Rail Delivery Group and are sourced from the rail industry's Latest Earnings Networked Nationally Overnight (LENNON) ticket revenue system (this system does not retail, meaning it does not act as a ticket selling platform). The second-hand cars data are provided by [Auto Trader](#), currently the largest and most visited vehicle advertising website in the UK. 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: June 2022](#) article.

In our previous release, [Impact analysis on transformation of UK consumer price statistics: rail fares and second-hand cars, November 2022](#) we explained that our highest priorities are improving the quality and upholding the integrity of our statistics. We outlined that we were completing the final quality assurance checks of our systems and processes, before making the final decision on the incorporation of second-hand cars and rail fares data. Our quality assurance has involved a readiness assessment covering five areas: the quality of our data, methods, systems, business processes, and user readiness.

For rail fares, the quality assurance we have done has resulted in high confidence in the data, systems behaviour and reliability. The indices have been successfully produced on the new systems using three years of real data. We have also reviewed our contingency plans and have in place mitigating actions should any problems emerge during the monthly consumer price statistics publication round. The project decision was to proceed with incorporating the rail fares data into headline consumer price statistics from February 2023, to be first published on 22 March 2023.

For second-hand cars, the data and methods are more complex (including the improvements required to filtering and imputation procedures). The quality assurance has highlighted challenges that may affect the reliability of the statistical production process, which have not yet been fully resolved and we will aim to address throughout 2023. We will therefore not incorporate the new second-hand cars data into headline consumer price statistics at this time. Our plans and timelines for the transformation of second-hand car consumer price indices will be updated as part of a wider update to our [Transformation of UK consumer price statistics](#) article series in spring 2023.

Therefore, transaction-level rail fares data will be incorporated in the Consumer Prices Index including owner occupiers' housing costs (CPIH), the Consumer Prices Index (CPI) and also the Retail Prices Index (RPI), following the annual governance process in line with the Statistics and Registration Service Act, from February 2023 (to be published on 22 March 2023). The impact analysis in the remainder of this article does not include second-hand cars data while further improvements are being made.

### 3 . Final impact of transformation on annual consumer price inflation rates

In our [previous impact analysis](#), we presented the combined impact on our consumer price statistics of transforming rail fares and second-hand cars indices. Since we are now only presenting the impact of transforming rail fares, which have a smaller weight than second-hand cars (less than 1% weight in the Consumer Prices Index including owner occupiers' housing costs (CPIH), the Consumer Prices Index (CPI) and the Retail Prices Index (RPI)), the impact on our headline consumer price statistics is negligible.

Since our last impact analysis we have implemented improved outlier detection and removal methods, and changed our production method to mimic the monthly and annual production processes that will be used in live production, running each month sequentially; these changes have had a negligible impact on our indices.

For each of our consumer price statistics, CPIH, CPI and RPI, we have assessed the impact of transforming rail fares indices between January 2019 and June 2022, had the changes been introduced from February 2019. For CPIH, CPI and RPI, the transformation would have had no impact on the headline 12-month rates, rounded to one decimal place (consistent with published data). Our analysis showed an impact in some months to three decimal places for CPI and CPIH; the maximum impacts for each inflation measure are shown in Table 1.

Table 1: The impacts of the transformation on CPIH, CPI and RPI are negligible  
Maximum impact of rail fares transformation on 12-month rate for CPIH, CPI and RPI, UK, January 2019 to June 2022

<b>Statistic</b>	<b>Maximum impact (percentage points)</b>	<b>Month</b>
<b>CPIH</b>	0.004	Nov 2020, Dec 2020, Mar 2021 and Apr 2021
<b>CPI</b>	0.005	Dec 2020, Mar 2021 and Apr 2021
<b>RPI</b>	0	All months

Source: Office for National Statistics - Impact analysis on transformation of UK consumer price statistics: rail fares

#### Notes

1. Growth rates for RPI are only produced and published to one decimal place.

## Impact on the transport division of Consumer Prices Index including owner occupiers' housing costs (CPIH)

While there were negligible impacts on our headline consumer price statistics, we can see some small impacts at more detailed levels of the hierarchy. We show this using the transport division level index in CPIH. The transport division of CPIH (and CPI) contains consumption categories including the purchase of vehicles, both new and second-hand cars, operation of personal transport equipment including motor fuels, and transport services including air fares. This means that the transport division often provides a notable contribution to the change in the 12-month inflation rate.

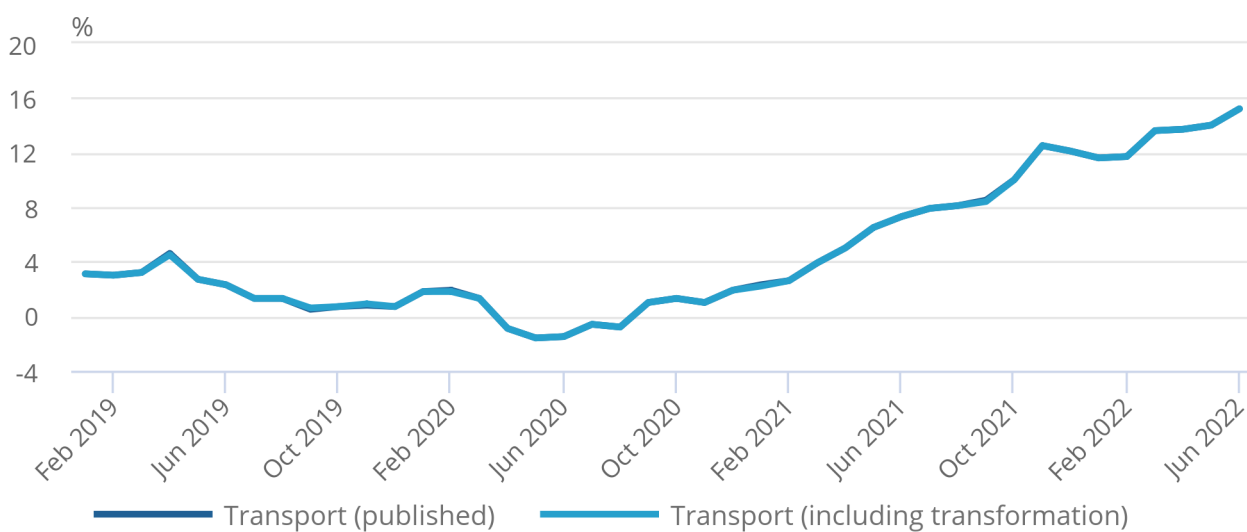
Rail fares has accounted for less than 7% of the transport division of the CPIH since 2019. The transformation has a minimal impact on the transport division index, with a difference in 12-month rates ranging from negative 0.1 to positive 0.1 percentage points across the period. The impact of the latest transformations to the transport division index are shown in Figure 1.

**Figure 1: The transformation has a minimal impact on the 12-month rate of the transport division of the Consumer Prices Index including owner occupiers' housing costs (CPIH)**

Final impact of transformed rail fares indices on 12-month rate for CPIH transport division, UK, January 2019 to June 2022

### Figure 1: The transformation has a minimal impact on the 12-month rate of the transport division of the Consumer Prices Index including owner occupiers' housing costs (CPIH)

Final impact of transformed rail fares indices on 12-month rate for CPIH transport division, UK, January 2019 to June 2022



Source: Office for National Statistics - Impact analysis on transformation of UK consumer price statistics: rail fares

## 4 . Updated lower-level indices for rail fares

While the final impact of the transformation of rail fares indices on our consumer price statistics is small, there are many improvements arising from use of the new data source.

A notable improvement is that users will have access to a greater level of detail in the published indices once these transformations are incorporated. We will begin to publish six new indices based primarily on ticket type, as detailed in the [previous release in this series](#). Note that the newly published index for Northern Ireland will continue to be produced using data from our current provider and existing methods.

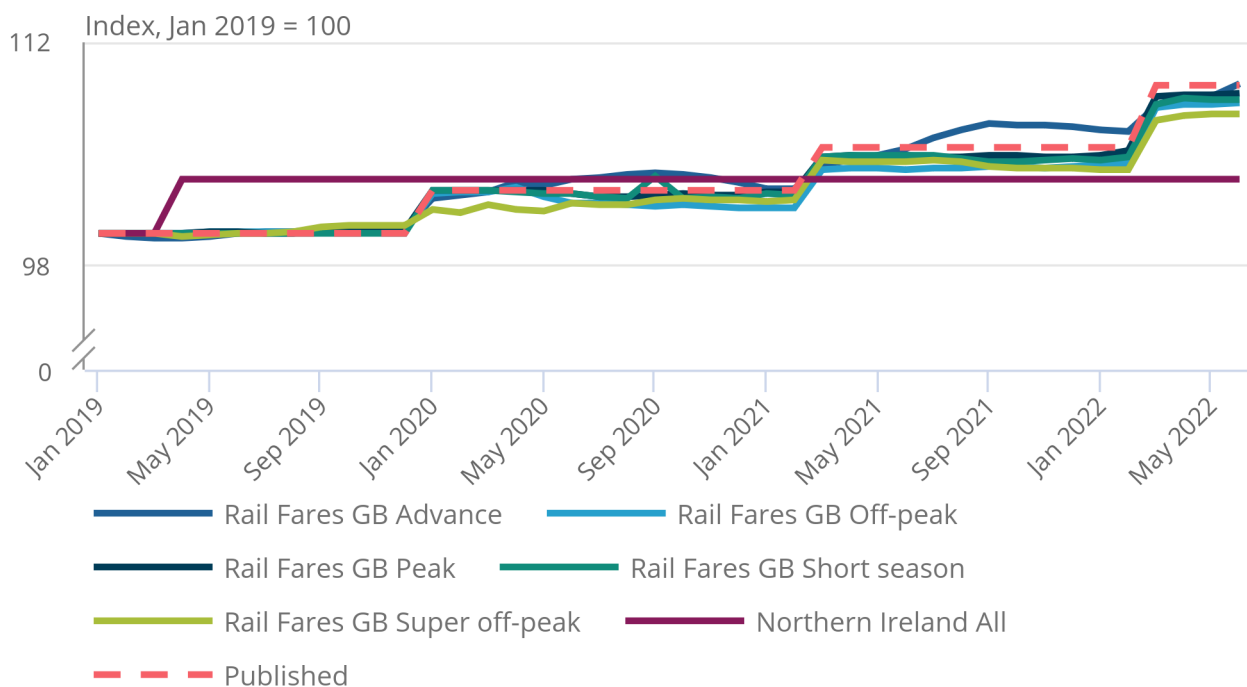
The final consumption segment indices for rail fares are shown in comparison with the published index in Figure 2, with annual growth rates for these indices shown in Figure 3.

**Figure 2: The different ticket type indices compared with the currently published rail fares index all experience a similar price change**

Rail fare indices by ticket type compared with the currently published index, UK, January 2019 to June 2022

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Rail fare indices by ticket type compared with the currently published index, UK, January 2019 to June 2022



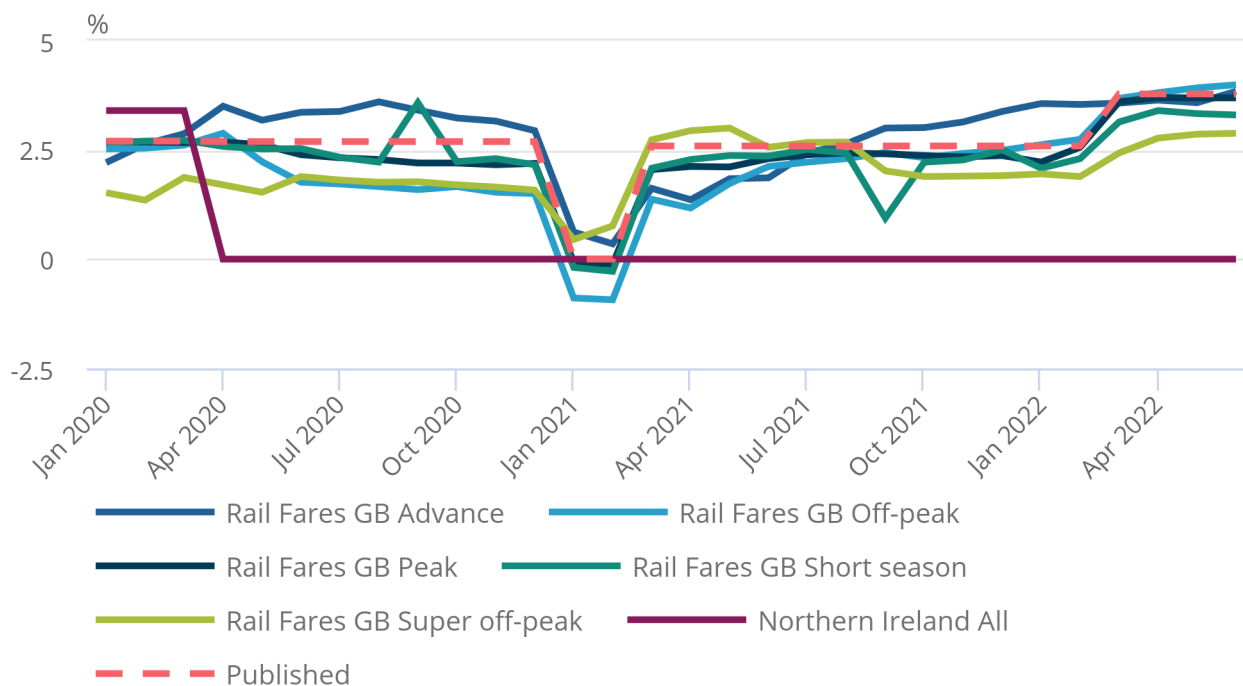
Source: Office for National Statistics - Impact analysis on transformation of UK consumer price statistics: rail fares

**Figure 3: The rail fare 12-month growth rates by ticket type, are more dynamic than the currently published 12-month growth rate for rail fares**

The rail fare 12-month growth rates by ticket type compared with the currently published 12-month growth rate for rail fares, UK, January 2020 to June 2022

Figure 3: The rail fare 12-month growth rates by ticket type, are more dynamic than the currently published 12-month growth rate for rail fares

The rail fare 12-month growth rates by ticket type compared with the currently published 12-month growth rate for rail fares, UK, January 2020 to June 2022



Source: Office for National Statistics - Impact analysis on transformation of UK consumer price statistics: rail fares

The indices and growth rates broadly follow the same trends as when they were presented in our [previous impact analysis](#).

Great Britain Advance tickets show the biggest change, with higher growth centred in March to June 2020 (up to 0.9 percentage points higher) and December 2021 to May 2022, and lower growth centred in December 2020 to June 2021 (up to 1.5 percentage points lower). These minor differences primarily result from an improvement made to the handling of negative prices and quantities (typically caused by ticketing errors and refunds). There are also small differences observed from an improvement made to include more child tickets, following discussion with the [Advisory Panel for Consumer Prices – Technical in January 2022](#).

## 5 . Future developments

This latest development is part of a continuous [programme of transformation](#) across our consumer price statistics. We will update the timelines for the programme in spring 2023.

## 6 . Related links

[Impact analysis on transformation of UK consumer price statistics: rail fares and second-hand cars, November 2022](#)

Article | Released 28 November 2022

Indicative impacts of the planned improvements to rail fare and second-hand car measurement in consumer price statistics between January 2018 and June 2022.

[Transformation of consumer price statistics: April 2022](#)

Article | Released 27 April 2022

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

[Outlier detection for dynamic price data: rail fares and second-hand cars](#)

Methodology | Released 28 November 2022

We are applying data cleaning techniques to web-provided and transaction data to remove out-of-scope observations and errors when calculating our consumer price indices.

[Introducing multilateral index methods into consumer price statistics](#)

Methodology | Released 28 November 2022

How we will use the GEKS-Törnqvist to introduce alternative data into our consumer price statistics, including how the method works and its advantages.

[Research and developments in the transformation of UK consumer price statistics: June 2022](#)

Article | Released 28 June 2022

Research to modernise the measurement of consumer price inflation in the UK: fourth in a series of biannual articles to update users.

[Consumer price inflation, UK: December 2022](#)

Bulletin | Released 18 January 2023

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

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

Methodology | Released 18 September 2019

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

## 7 . Cite this methodology

Office for National Statistics (ONS), released 7 February 2023, ONS website, methodology, [Impact analysis on transformation of UK consumer price statistics: rail fares, February 2023](#)