

Article

Impact of correction to chain-linking methodology used in Producer Price Indices and Services Producer Price Indices: October 2025

Description of the methodology error we identified in our Producer Price Indices (PPI) and Services Producer Price Indices (SPPI) in February 2025 and the corrections that we have applied, including how these corrections have affected previously published data and the narrative expressed in the PPI and SPPI data since 2014.

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Release date:
22 October 2025

Next release:
To be announced

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1 . Main points

- We suspended publication of our Producer Price Index (PPI) and Service Producer Price Index (SPPI) in March 2025, following the identification of an error in the chain-linking methodology.
- The error was a failure to introduce new base prices to align with the annual update of weights as part of chain-linking, meaning that a 2010 equals 100 base period continued to be used for all periods, despite weight changes being implemented.
- We have applied a correction to the annual chain-linking methodology used in PPI and SPPI which affects data from December 2013; we have made additional minor revisions to the data between December 2008 and December 2013 because of improvements in processing historic data.
- We have also applied a corresponding correction to the historic weights for PPI.
- The average annual inflation rate for Output PPI between January 2015 and June 2025 has increased from 2.9% to 3.2% because of the methodology corrections; Input PPI has increased from 3.4% to 4.0%.
- The average annual inflation rate for the headline Export Price Index (EPI) and Import Price Index (IPI) have increased from 3.0% to 3.3% and 2.6% to 3.0%, respectively; the average annual inflation rate for SPPI has reduced slightly from 2.5% to 2.4%.
- The peak annual inflation rate for the headline Output PPI in July 2022 has been corrected down from 19.6% to 18.0%.
- We have also published a [development plan](#), which details our commitment to ongoing improvements in the data.

2 . Methodological changes

Background

We calculated Producer Price Index (PPI) and Service Producer Price Index (SPPI) on a quintennial re-based index method before November 2020. This means that every five years, the base period was updated to more accurately reflect the structure of the manufacturing and services sectors. All index weights were then reflective of this base period, and product price relatives were referenced so that the annual average in the base period equalled 100.

PPI and SPPI were last re-based to 2010 equals 100 in 2013. In 2017, we announced an intention to introduce annual chain-linking as a methodology improvement, rather than continuing to re-base the PPI and SPPI indices.

We first published data using this update to the index methods in November 2020, along with several additional updates detailed in our [PPI methods changes article](#).

Annual chain-linking is the process of updating the base period every year and producing a linked series of indices with new weights and base prices every year. The original intention was to develop a new end-to-end data processing system using this new methodology. However, the scope of this project had to be reduced so that price data collection and validation could remain on the existing database, which continued to use the methodology associated with quintennial re-basing.

The documentation of downstream build requirements failed to adequately reflect this change. Therefore, index values reflected annual weights changes, but using product price relatives that continued to be referenced to 2010, rather than each new base period.

Index number methods

The index number methodology previously used to publish annually chain-linked producer price inflation statistics was incorrect. There was a failure to introduce new base prices along with each annual weights update.

Within any chain-linked Laspeyres-type price index, each chain of data represents an aggregation of price relatives that all share a common reference period.

Within PPI and SPPI, the base period is defined as the current year minus one. This means that in 2025, the base period is 2024. This is reflected in the index weights, which are based on sales data in the previous year.

The product-level price relatives need to use the same base period as the common reference period for each annual chain for it to be compliant with the Laspeyres index methodology.

In the previously published data, there was a failure to update the base period, so the price relatives in all periods were relative to the 2010 base period.

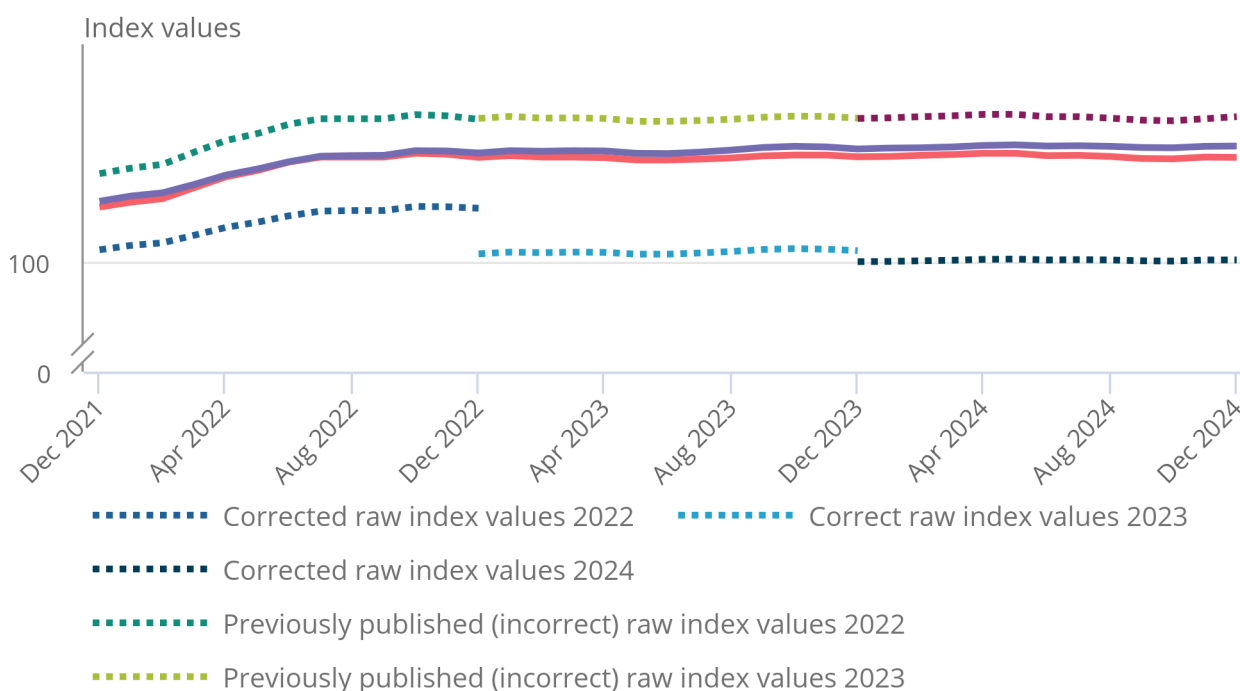
This does not constitute a Laspeyres price index, and this error causes a deviation within the methods as price relatives are aggregated into price indices.

Figure 1: Effects of incorrect and corrected chain-linking methodologies on index values

Output Producer Price Indices (PPI) raw and chain-linked index values, UK, December 2021 to December 2024

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Output Producer Price Indices (PPI) raw and chain-linked index values, UK, December 2021 to December 2024



Source: Producer Price Index (PPI) from the Office for National Statistics

Figure 1 shows the impact of the incorrect and correct methodologies on the raw and chain-linked index values within the Output PPI headline series between December 2021 and December 2024.

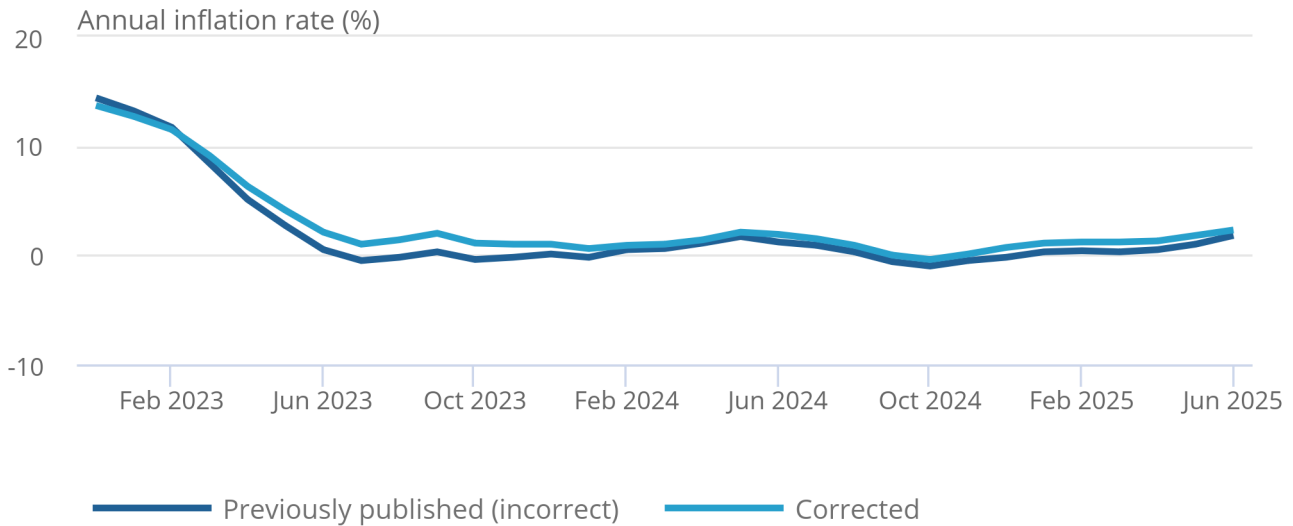
The previously published data showed an annual inflation rate close to 0% from June 2023 to January 2024 (Figure 2). The application of the correct chain-linking methodology now means that the annual inflation rate over this period is now closer to 1%.

Figure 2: Example of how the incorrect and corrected chain-linking methodology affect the annual inflation rate

Output PPI annual inflation rates, UK, December 2022 to June 2025

Figure 2: Example of how the incorrect and corrected chain-linking methodology affect the annual inflation rate

Output PPI annual inflation rates, UK, December 2022 to June 2025



Source: Producer Price Index (PPI) from the Office for National Statistics

The size of the error in a single period is dependent on both the previous price movement of a component and its parent index, and its current price movement. Therefore, there isn't a single expectation for the size and direction of corrections applicable to every index.

The corrected chain-linking methodology that is now being applied to PPI and SPPI is described in the Methods used to produce the data sections of our [Producer Price Indices quality and methodology information \(QMI\)](#) and our [Services Producer Price Indices QMI](#).

Weights

PPI and SPPI index weights are calculated from sales data in the base period and are mapped to Eurostat's [Classification of Products by Activity \(CPA\) 2.1 framework](#). This means they accurately reflect the relative economic importance of each product grouping within the manufacturing and service sectors.

When updating weights on an annual basis, limitations with the timeliness of the sales source data means that the sales for the base year are not available. Therefore, we use sales data relating to the year before the base period and apply the price uprating method to estimate the base year sales.

The methodology for price uprating introduced in 2020 also includes an error. The price-uprating factors were being calculated from the percentage change between the annual average of the index values in the year of the source data and the December of the base year, which corresponded with the link period for chain-linking. The correct methodology calculates the price uprating factors from the growth rate between the annual average of index values in the source year and the base year.

The price uprating methodology is only required when the sales data for the base period is unavailable. Since the actual base year sales are available for PPI, these have been used to calculate index weights, avoiding the need to price uprate. This correction has been applied to all periods from 2014 to 2024, except for 2021. The base year sales used for 2021 weights have been price uprated to avoid any distortion resulting from the coronavirus (COVID-19) pandemic.

Along with the updating of sales data for weights, we also implemented minor improvements to the mapping process applied to index sales. We did this so that all historic periods reflect the current best practice and to ensure consistency within the index weights for PPI.

The effect on the index values calculated because of the weights changes is mostly minimal. One exception to this is the downwards correction of the highest annual inflation rate for the headline Output PPI in July 2022. This is described in more detail in [Section 3: Impact of changes](#).

SPPI index weights have not been updated as PPI were because the correction to the price uprating process has substantially less effect.

The processing of historic sales data for SPPI was far more complex than it is currently. Before 2016, SPPI index weights were based on estimated sales data from a range of sources. The SPPI series, prior to 2019, was reflective of "business-to-business" activity, as opposed to "business-to-all" activity, which is the current basis of the survey. The current data processing systems were not designed to re-estimate these values. However, our analysis has indicated that any correction to price uprating did not sufficiently affect the weights to additionally impact index values beyond the application of the corrected chain-linking methodology.

Since any correction to price uprating had a negligible impact on weights across all periods, we decided not to take these on as additional corrections to the SPPI series.

The correct price uprating methodology will be applied to SPPI index weights from December 2025 onwards.

3 . Impact of Changes

This section highlights the impact of the methodology correction in the headline indices for Output and Input Producer Price Index (PPI), Export Price Index (EPI), Import Price Index (IPI), and the Services Producer Price Index (SPPI).

All charts for PPI, EPI and IPI reference data from December 2008 to June 2025. All charts for SPPI reference data from Quarter 4 (Oct to Dec) 2008 to Quarter 1 (Jan to Mar) 2025. The latest provisional data have not been included in this analysis, but are included in our latest PPI and SPPI releases.

Data from December 2008 to December 2013 are reflective of the 2010 equals 100 re-based series. Therefore, during this period there is an alignment between the methodology used previously and the corrected methodology. Minor deviations in index movements during this period are a result of data corrections and processing improvements. Larger differences begin in January 2014, where annual chain-linking begins.

The index values from before 2008 are based on previously published data, which has not been affected by this methods correction. However, the values now published have been corrected because they have been re-referenced to link to the corrected data.

Headline Output Producer Price Index

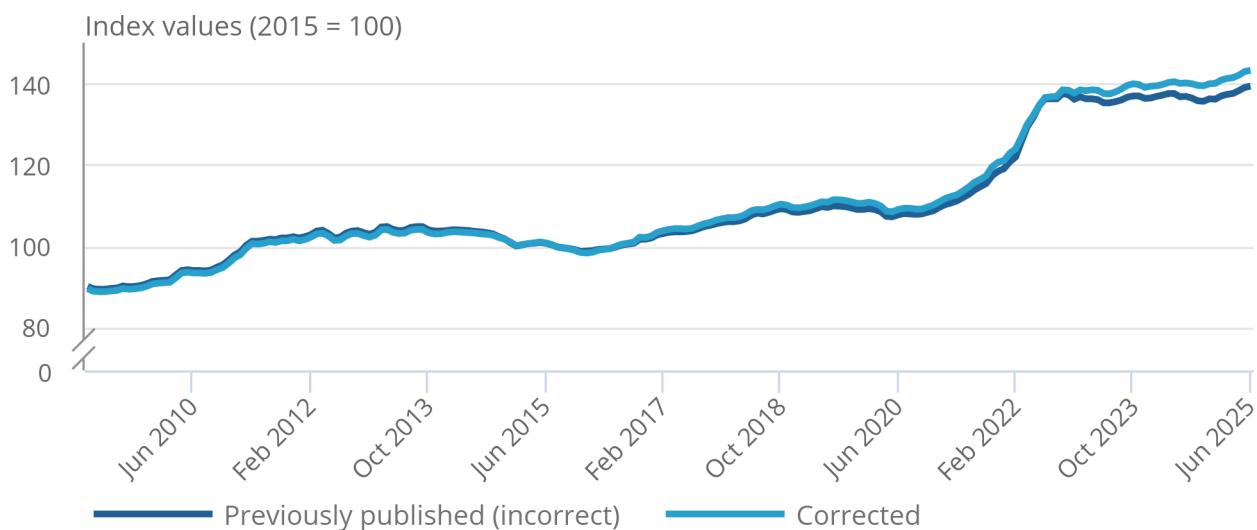
- The percentage change in headline Output PPI from June 2020 to June 2025 has been corrected up from 29.3% to 31.5% because of the change in methodology.
- The corrected annual inflation rate is higher than previously published from March 2023 to present.
- The peak in the annual inflation rate in July 2022 is lower than previously stated because of correction in the weights being applied.

Figure 3: Previously published (incorrect) Output PPI index values and the corrected index values

Output PPI index values, UK, December 2008 to June 2025

Figure 3: Previously published (incorrect) Output PPI index values and the corrected index values

Output PPI index values, UK, December 2008 to June 2025



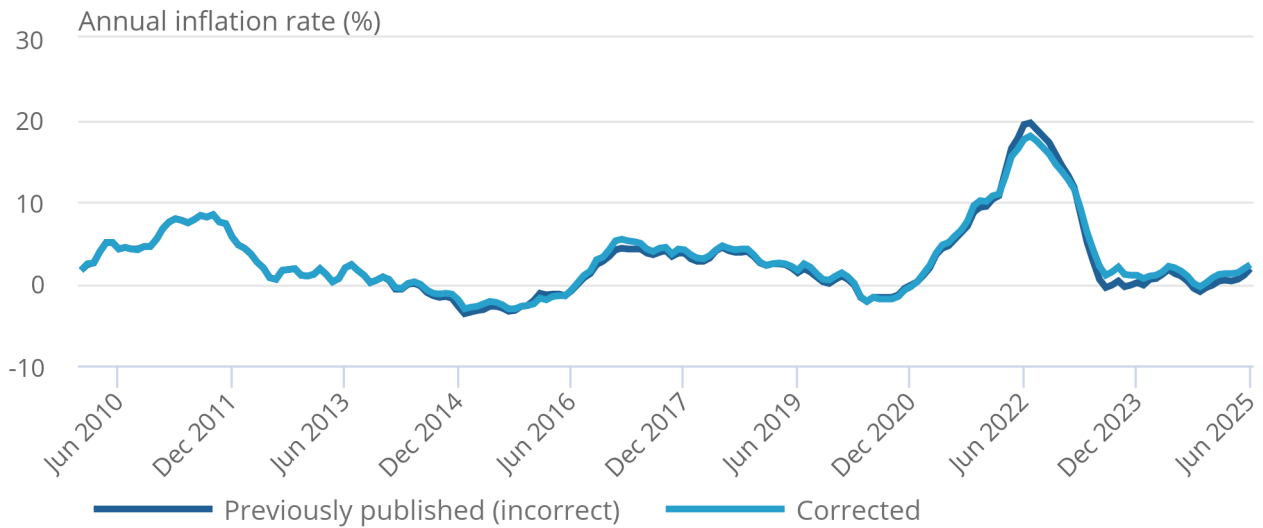
Source: Producer Price Index (PPI) from the Office for National Statistics

Figure 4: Previously published (incorrect) Output PPI annual inflation rate and the corrected inflation rate

Output PPI annual inflation rates, UK, December 2009 to June 2025

Figure 4: Previously published (incorrect) Output PPI annual inflation rate and the corrected inflation rate

Output PPI annual inflation rates, UK, December 2009 to June 2025



Source: Producer Price Index (PPI) from the Office for National Statistics

Impact on annual inflation rate

There was high price inflation between 2021 and 2023. These extreme conditions mean that this is where the deviations between the previously published and corrected indices are largest, though the overall macroeconomic developments implied by these data remain very similar. The failure to update the base period of price relatives means that the price movement of each product since 2010 has an impact on the aggregation of index values.

We focus on Output PPI in July 2022 in this subsection (since this was a recent peak point in the annual inflation rate) to illustrate the impact of both correcting the chain-linking methodology and then correcting the weights.

Products with large price increases followed by periods of flat or decreasing prices had the contribution of these flat or negative periods overinflated because of the index methodology error. We demonstrate this effect in [Section 4: Process and impact of index methods correction](#)

The annual inflation rate for Output PPI in July 2022 was previously published as 19.6%. The correction to the index methods caused this rate to increase to 20.1%. This has been included in our indicative PPI data published on 24 September 2025. However, including the updates to the index weights has caused the annual inflation rate for July 2022 to be corrected down to 18.0%.

This downward correction was caused by the reduced weight of petroleum products (C19) into the headline and the reduction of the weight of basic iron and steel (C241) into the Metals and machinery product group.

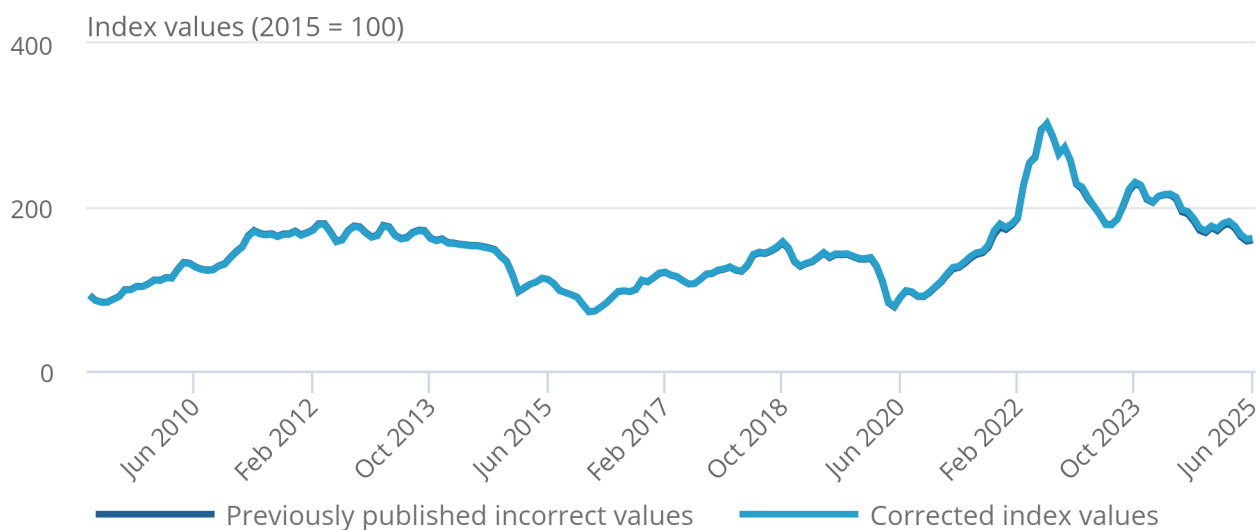
The Petroleum products index (C19) shows minimal corrections across the period because of the methodology correction (see chart in Figure 5). As it is showing very high inflation, it is the highest contributing component into the headline annual inflation rate (Figure 7) despite its reduction in weight (Figure 6), down from 6.57 to 5.07 (parts per 100). This reduction in weight has resulted in a 0.63 percentage point decrease in the headline inflation rate.

Figure 5: Previously published (incorrect) and corrected index values for Petroleum products (C19)

PPI C19 index values, UK, December 2008 to June 2025

Figure 5: Previously published (incorrect) and corrected index values for Petroleum products (C19)

PPI C19 index values, UK, December 2008 to June 2025



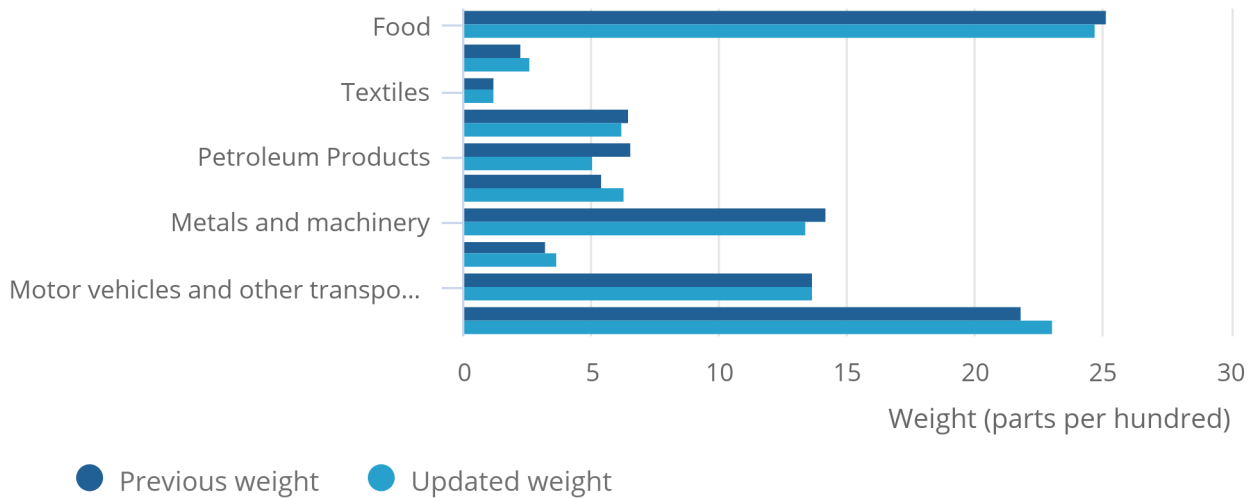
Source: Producer Price Index (PPI) from the Office for National Statistics

Figure 6: Weight of product groups into Output PPI

Output PPI component weights, UK, 2022

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Output PPI component weights, UK, 2022



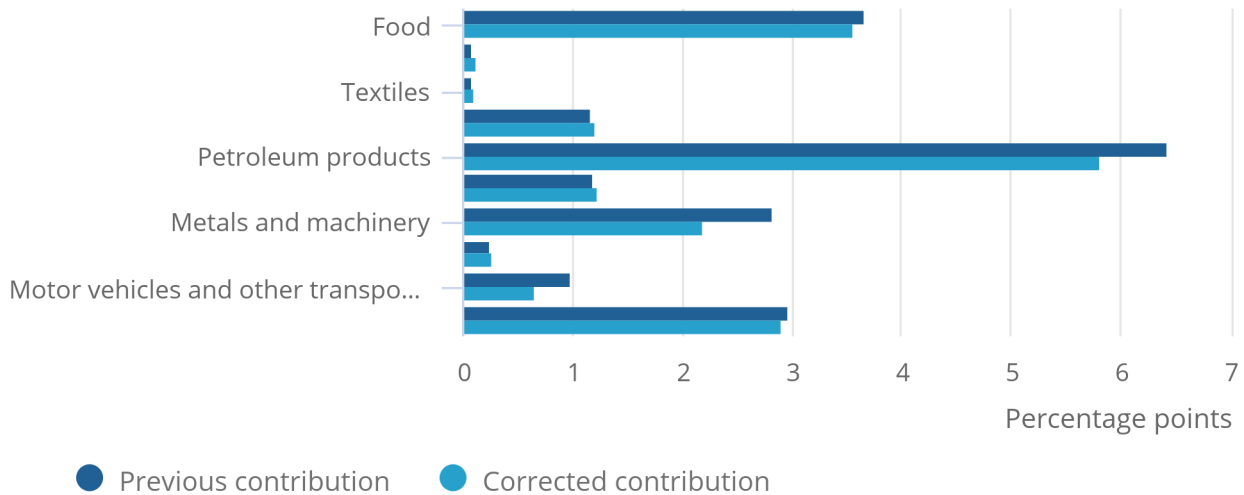
Source: Producer Price Index (PPI) from the Office for National Statistics

Figure 7: Contributions into annual inflation rate for Output PPI

Output PPI contributions, UK, July 2022

Figure 7: Contributions into annual inflation rate for Output PPI

Output PPI contributions, UK, July 2022



Source: Producer Price Index (PPI) from the Office for National Statistics

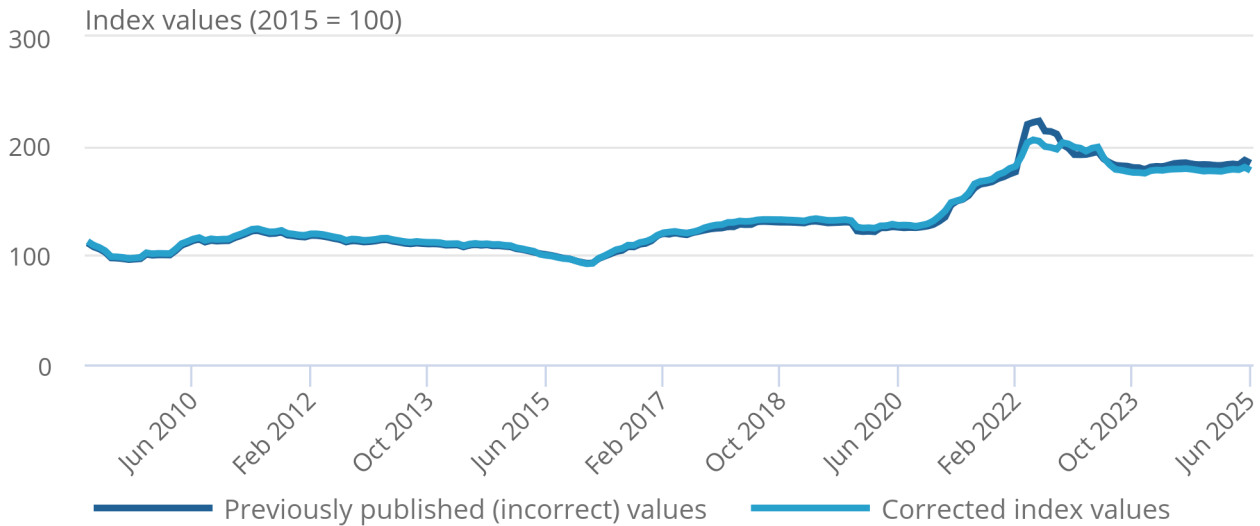
The Metals and machinery product grouping contributes 0.63 percentage points less to the corrected headline annual rate. This product group did show a small weight decrease in 2022. However, the change in contribution was prompted by the reduced weight of iron and steel (C241) into the basic metals (C24) index.

Figure 8: Previously published (incorrect) index values and the corrected index values for Basic metals (C24)

PPI index values for Basic Metals, UK, December 2008 to June 2025

Figure 8: Previously published (incorrect) index values and the corrected index values for Basic metals (C24)

PPI index values for Basic Metals, UK, December 2008 to June 2025



Source: Producer Price Index (PPI) from the Office for National Statistics

The reduced index movement in C24 carries through to the Metals and machinery grouping, and has caused its contribution into the Output PPI headline rate to decrease.

Headline Input Producer Price Index

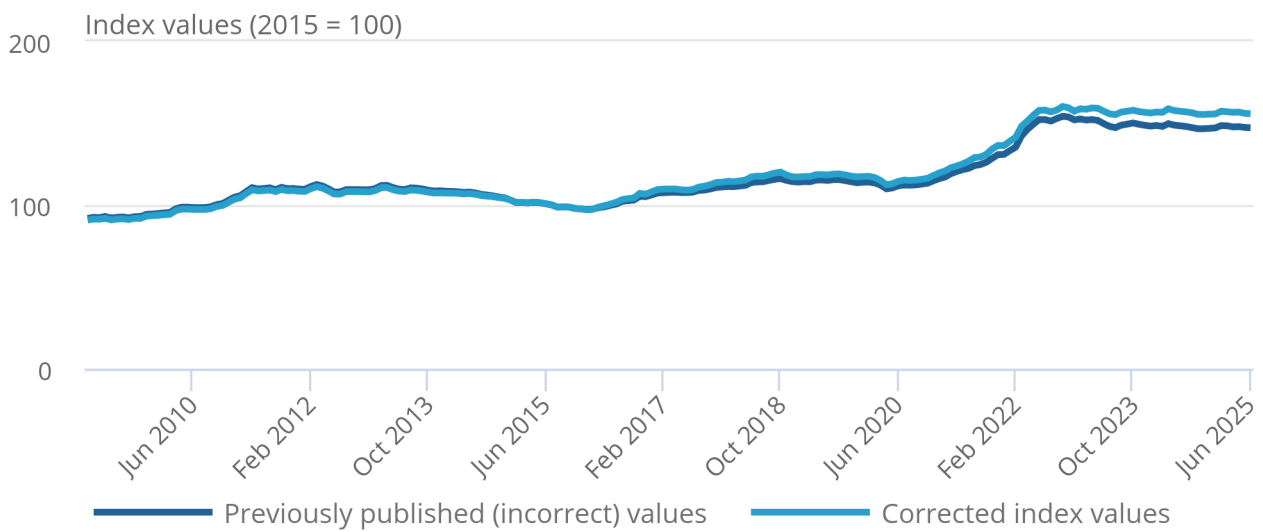
- The percentage change in headline Input PPI from June 2020 to June 2025 has been corrected up from 31.8% to 36.1% because of the change in methodology.
- The Input PPI weights were not affected by the error in price uprating and have not changed, so all corrections are the result of the correction made to the chain-linking methodology.

Figure 9: Previously published (incorrect) Input PPI index values and the corrected index values

Input PPI index values, UK, December 2008 to June 2025

Figure 9: Previously published (incorrect) Input PPI index values and the corrected index values

Input PPI index values, UK, December 2008 to June 2025



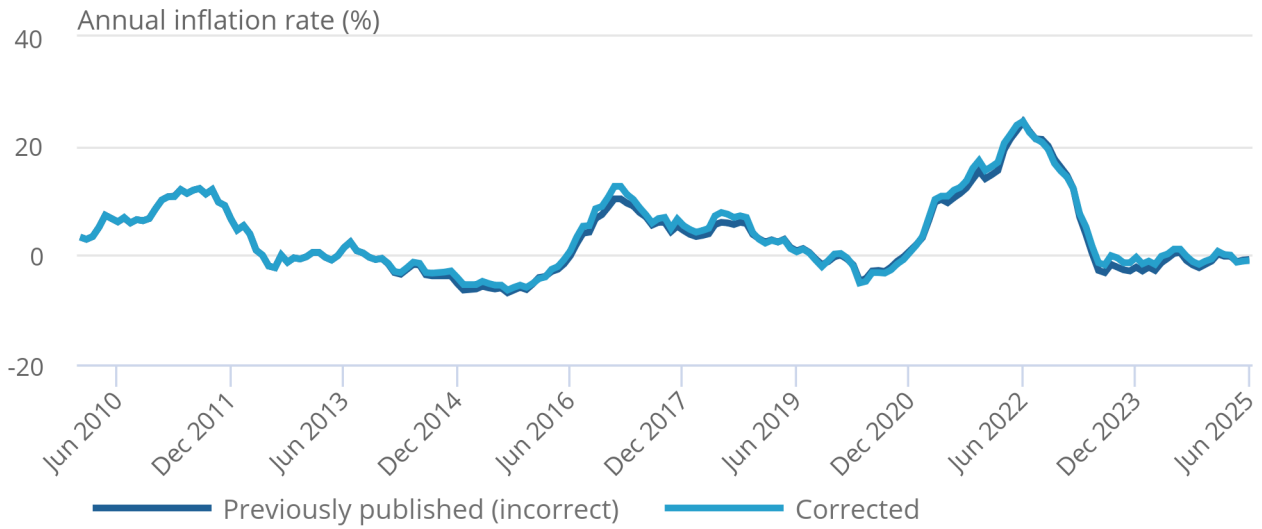
Source: Producer Price Index (PPI) from the Office for National Statistics

Figure 10: Previously published incorrect Input Producer Price Indices annual inflation rate and the corrected inflation rate

Input Producer Price Indices (PPI) annual inflation rates, UK, December 2009 to June 2025

Figure 10: Previously published incorrect Input Producer Price Indices annual inflation rate and the corrected inflation rate

Input Producer Price Indices (PPI) annual inflation rates, UK, December 2009 to June 2025



Source: Producer Price Index (PPI) from the Office for National Statistics

Headline Export Price Index

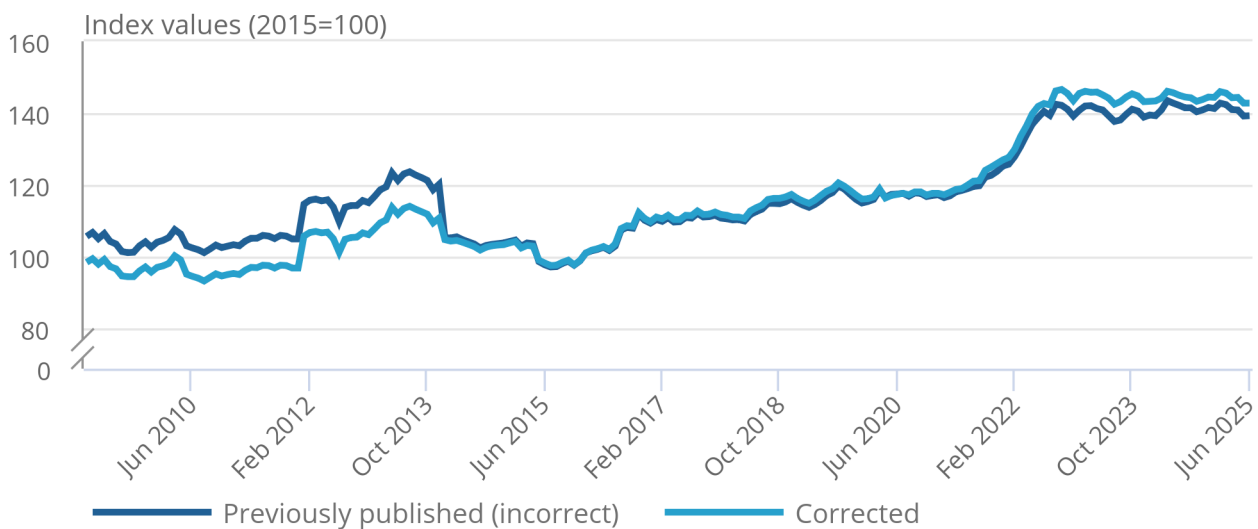
- The percentage change in headline EPI from June 2020 to June 2025 has been corrected up from 18.6% to 21.6% because of the change in methodology.
- There is a large deviation in January 2014, which is the first period in the data where the base period is updated from 2010 to 2013; this is because of a large price decrease in January 2014, which has a reduced effect caused by the updated base period.
- This correction is presented as a deviation until January 2014, because the published index values are referenced to 2015 equals 100.

Figure 11: Previously published (incorrect) headline EPI index values and the corrected index values

Headline EPI index values, UK, December 2008 to June 2025

Figure 11: Previously published (incorrect) headline EPI index values and the corrected index values

Headline EPI index values, UK, December 2008 to June 2025



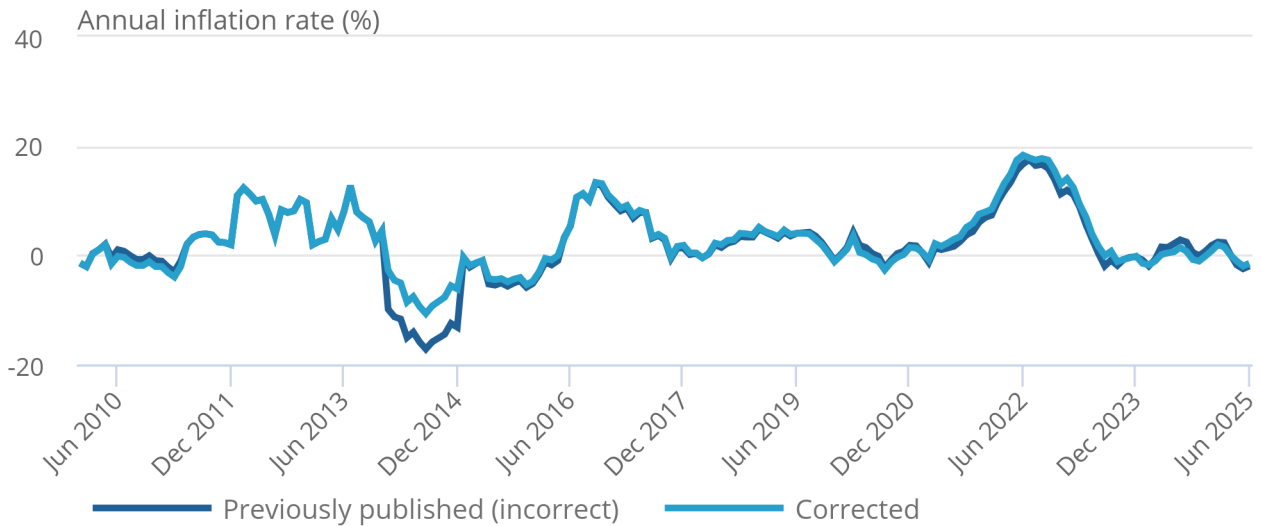
Source: Producer Price Index (PPI) from the Office for National Statistics

Figure 12: Previously published (incorrect) headline EPI annual inflation rate and the corrected inflation rate

Headline EPI annual inflation rates, UK, December 2009 to June 2025

Figure 12: Previously published (incorrect) headline EPI annual inflation rate and the corrected inflation rate

Headline EPI annual inflation rates, UK, December 2009 to June 2025



Source: Producer Price Index (PPI) from the Office for National Statistics

Headline Import Price Index

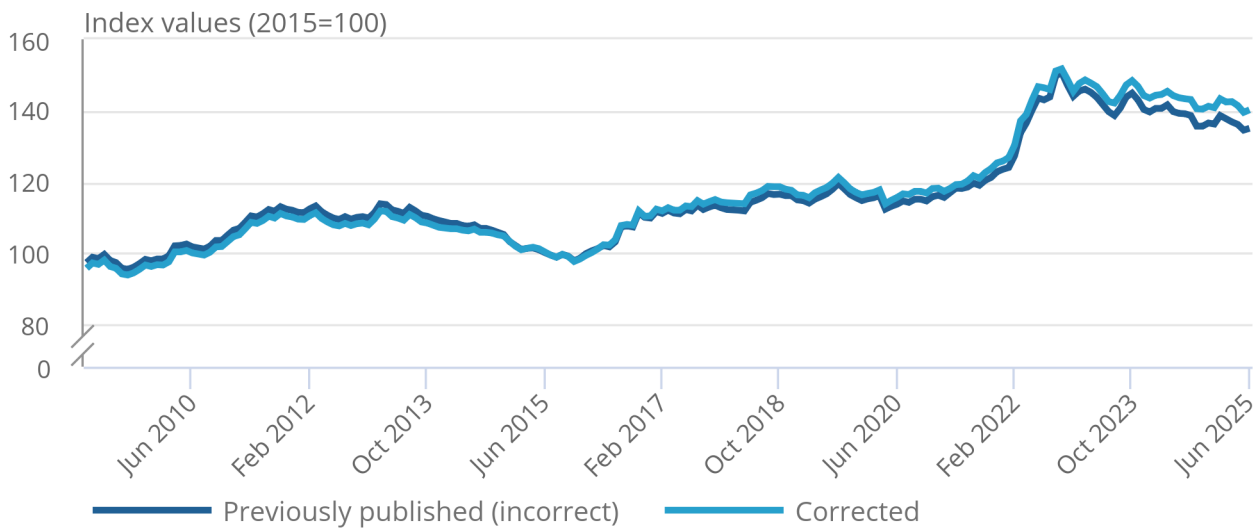
- The percentage change in headline IPI from June 2020 to June 2025 has been corrected up from 18.7% to 21.3% because of the change in methodology.

Figure 13: Previously published (incorrect) headline IPI index values and the corrected index values

Headline IPI index values, UK, December 2008 to June 2025

Figure 13: Previously published (incorrect) headline IPI index values and the corrected index values

Headline IPI index values, UK, December 2008 to June 2025



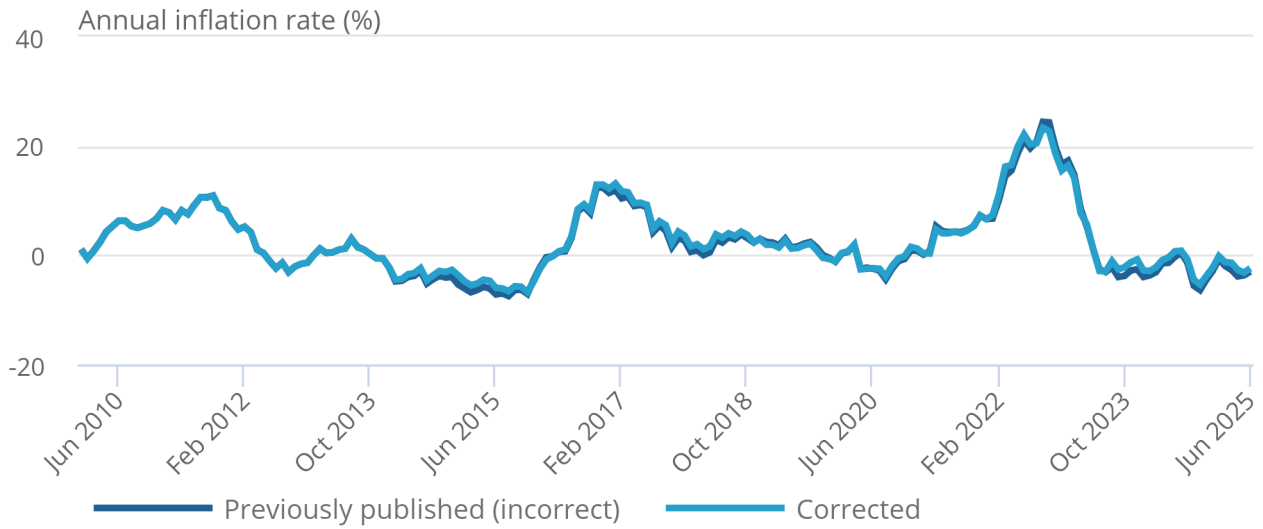
Source: Producer Price Index (PPI) from the Office for National Statistics

Figure 14: Previously published (incorrect) headline IPI annual inflation rate and the corrected inflation rate

Headline IPI annual inflation rates, UK, December 2009 to June 2025

Figure 14: Previously published (incorrect) headline IPI annual inflation rate and the corrected inflation rate

Headline IPI annual inflation rates, UK, December 2009 to June 2025



Source: Producer Price Index (PPI) from the Office for National Statistics

Headline Services Producer Price Index

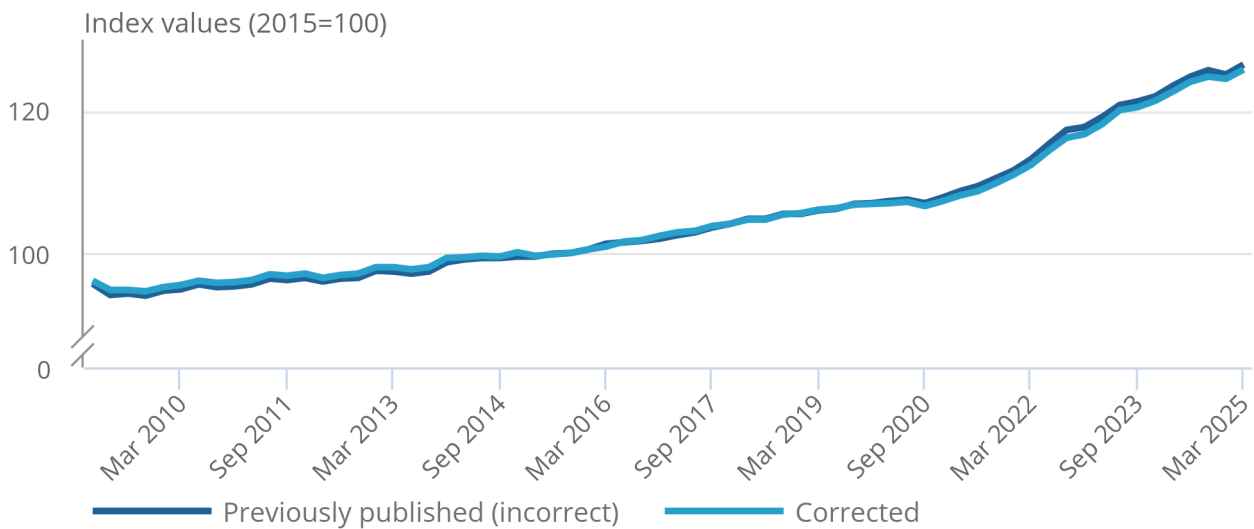
- The percentage change in headline SPPI from Quarter 1 2020 to Quarter 1 2025 has been corrected down slightly from 17.9% to 17.6% because of the change in methodology.
- The SPPI data is less volatile and more consistent within index groups than the PPI, EPI, and IPI data; this means the impact of the index methods correction on the headline series is minimal.
- The SPPI weights were not changed, so there are no corrections because of weights changes.

Figure 15: Previously published (incorrect) headline SPPI index values and the corrected index values

Headline SPPI index values, UK, Q4 2008 to Q1 2025

Figure 15: Previously published (incorrect) headline SPPI index values and the corrected index values

Headline SPPI index values, UK, Q4 2008 to Q1 2025



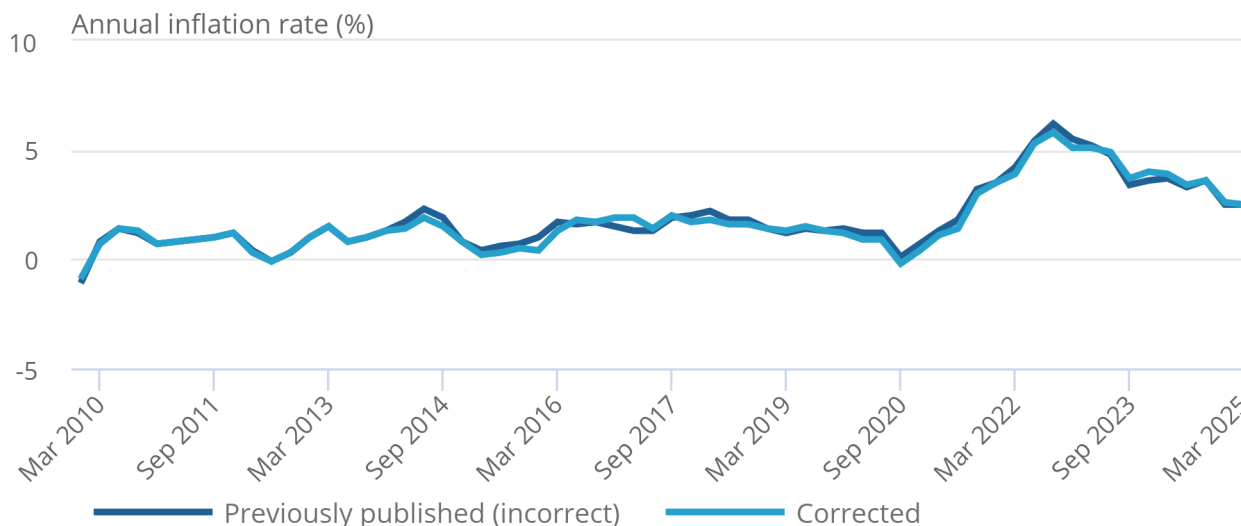
Source: Services Producer Price Index (SPPI) from the Office for National Statistics

Figure 16: Previously published (incorrect) headline SPPI annual inflation rate and the corrected inflation rate

Headline SPPI annual inflation rates, UK, December 2009 to June 2025

Figure 16: Previously published (incorrect) headline SPPI annual inflation rate and the corrected inflation rate

Headline SPPI annual inflation rates, UK, December 2009 to June 2025



Source: Services Producer Price Index (SPPI) from the Office for National Statistics

4 . Process and impact of the index methods correction

This section describes a worked example compiled using synthetic data and does not include any actual published data. The example comprises two products being aggregated together - one from an index that has seen large price increases since 2010 and another that has remained relatively stable.

This example demonstrates the impact of the incorrect methods on the way a product experiencing high inflation contributed to the index, and how this has been corrected.

Worked example

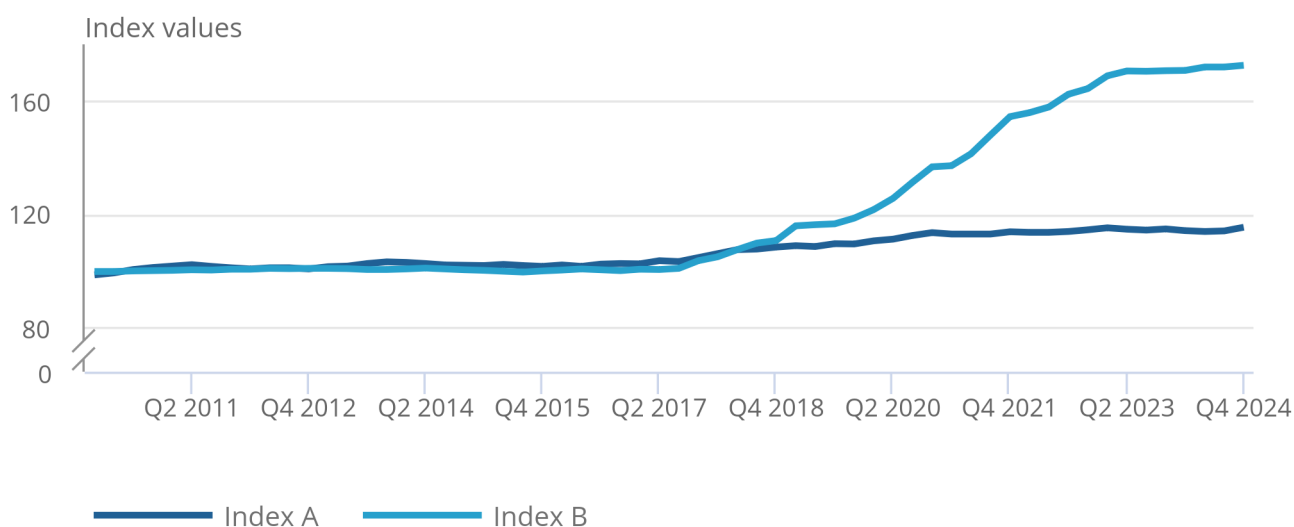
This example uses two indices that are the only components of a parent index. Index A has shown steady price increases since 2010, and at the end of 2024 has an index level 15.5% higher than 2010. Index B has increased 72.8% across the same period (Figure 17).

Figure 17: Synthetic index values based on products that remain stable and those with high inflation

Synthetic index values, UK, Q1 2010 to Q4 2023

Figure 17: Synthetic index values based on products that remain stable and those with high inflation

Synthetic index values, UK, Q1 2010 to Q4 2023



Source: Office for National Statistics

The sample is updated in 2025 and each index is now composed of a single new product (A1 and B1). Prices for these new products are collected from the beginning of 2024. The products are not allocated a weight into their parent index until Quarter 4 2024.

Index A has a weight of 0.3 and index B has a weight of 0.7 in 2025, which is reflective of sales data for the 2024 base year.

Table 1: Product price data (£s)

Period	A1	B1
Q1 2024	10.4	7.5
Q2 2024	10.6	7.5
Q3 2024	10.6	8
Q4 2024	10.6	8
Q1 2025	10.6	7
Q2 2025	10.7	5
Q3 2025	11	4.8
Q4 2025	11	4.5

Source: Office for National Statistics

The new product within Index B decreases in price by 44% across 2025.

Table 2: Product price relatives (2010=100)

Period	A1	B1
Q1 2024	114.8	162
Q2 2024	117.1	162
Q3 2024	117.1	172.8
Q4 2024	117.1	172.8
Q1 2025	117.1	151.2
Q2 2025	118.2	108
Q3 2025	121.5	103.7
Q4 2025	121.5	97.2

Source: Office for National Statistics

Using the previously applied incorrect index methods, the price relatives in the Quarter 4 2024 link period are assigned on a 2010 equals 100 basis using the parent index movement since 2010.

Table 3: Product price relatives (2024=100)

Period	A1	B1
Q1 2024	98.6	96.8
Q2 2024	100.5	96.8
Q3 2024	100.5	103.2
Q4 2024	100.5	103.2
Q1 2025	100.5	90.3
Q2 2025	101.4	64.5
Q3 2025	104.3	61.9
Q4 2025	104.3	58.1

Source: Office for National Statistics

However, in the corrected methods the price relatives are referenced to the average price in the base period. Therefore, the index values for both indices average 100 in 2024. The period-on-period index movement between the two methods is the same.

Table 4: Index values and annual inflation rates

Parent raw index (2010=100)		Parent raw index (base year=100)	
Index value	Annual inflation rate (%)	Index value	Annual inflation rate (%)
Q4 2024	156.1	102.4	
Q1 2025	141	93.4	
Q2 2025	111.1	75.6	
Q3 2025	109	74.6	
Q4 2025	104.5	71.9	-29.8

Source: Office for National Statistics

The parent index is calculated by multiplying each product's price relative by its weight and summing these values in each period.

When calculating the raw index value for the parent index in 2025, using 2024 equals 100 price relatives from Table 3, rather than 2010 equals 100 price relatives in Table 2, the contribution of the large price decrease in Index B is reduced. Therefore, the annual inflation rate for the parent index in Quarter 4 2025 is calculated as negative 29.8%. This is an upward correction from negative 33.1%, as calculated when using the incorrect method.

Because the price relatives are referenced to a specific base period, the weights must also reflect that same base period to ensure a conceptual consistency of a like-for-like comparison of current period prices in base period quantities.

The 2024 index weights will have been influenced by products in Index B, which have increased in price since 2010. Using these new weights, as well as price relatives with a 2010 base period, the previously used incorrect method essentially double counts this effect.

5 . Cite this article

Office for National Statistics (ONS), released 22 October 2025, ONS website, [Impact of correction to chain-linking methodology used in Producer Price Indices and Services Producer Price Indices: October 2025](#)