

Article

Impact of methodological improvements on Producer Price Inflation

Analysis of the impact of the changes to the PPI methodology, notably annually chain-linking the Producer Price Index (PPI) and the redefinition of headline values from a net sector coverage to a gross sector coverage.

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1 . Main points

- The two major improvements to the Producer Price Index (PPI) that have an impact on the headline values are annual chain-linking and the change from net sector series to gross sector series.
- The output and input series are now, and will continue to be, more representative and valuable economic indicators.
- There is minimal overall change to the trend of the output PPI headline value, however the scope has changed.
- There is a more substantial change for the input series, and this is mostly driven by the reduced weight of “inputs of crude oil” as a result of the move from a net to a gross sector basis.
- A similar article regarding the impact of changes to the Services Producer Price Index (SPPI) will follow in early 2021.

2 . Overview of methodological improvements

Changes to the Producer Price Index

The Producer Price Index (PPI) will be annually chain-linked and referenced to 2015=100. It will be first published in the PPI statistical bulletin on 18 November 2020. Chain-linking is the process of joining together two indices that overlap in one period by rescaling one of them to make its value equal to that of the other in the same period, combining them into single time series for indices within the index framework. This process will now occur annually.

Over time, new products enter the market and the relative volumes of products bought and sold by UK manufacturers change. The PPI has previously updated weights to reflect changes in the patterns of industry and purchases every five years. Annual chain-linking updates the weights every year. Updating to a more recent weighting pattern ensures that the PPI is more reflective of the current structure of the economy and the relative size of industries within the manufacturing sector.

The move to annual chain-linking coincides with a transition from net to gross sector basis for the input and output headline figures. This improvement is in order to maintain international best practice and ensure producer prices are in line with UK National Accounts (Index of Production) for improved use as deflators on supply and use.

Following on from [a series of user consultations](#) where the proposed changes were explained in detail to users, the headline output measure will be transitioning from a rebased net sector output (NSO), to a chain-linked gross sector output (GSO). Similarly, the headline input measure will be transitioning from a rebased net sector input (NSI), to a chain-linked gross sector input (GSI). Gross sector PPIs include products sold by one business to another business classified to the same industry sector. Net sector PPIs exclude (net out) products sold by a business to another business classified to the same industry sector. This proposed change from a net to a gross basis has been highlighted to users throughout 2020 in [Section 5 of the monthly PPI bulletin](#).

Data sources and index weights

The Producer Price Index weights are calculated using sales data from several sources, including the annual Products of the European Community (ProdCom) survey, the Annual Business Survey (ABS), International Steel Statistics Bureau (ISSB), Balance of Payments and Financial Sectors (BoPFS) surveys (HMRC), as well as data provided by the Department for Business, Energy and Industrial Strategy (BEIS), and the Department for Environment Food and Rural Affairs (Defra).

The weights are calculated as the sales for each product group divided by the total sales for the category in which the product group belongs. The PPI only considers sales within the UK, referred to as “home sales”, when calculating these weights. Because of this, when a source of sales data includes export sales these are removed from the totals before the weights are calculated.

Upon implementing annual chain-linked data for Producer Price Indices (PPIs), one of the challenges experienced for many data sources has been the timeliness and availability of these data sources as well as mapping their classification systems to the Classification of Products by Activity 2.1 (CPA 2.1) framework. This has been achieved by mapping sales data from suppliers’ classification frameworks to Classification of Products by Activity 2008 (CPA 08) using the same methods used during the 2010 rebasing.

A further step has now been introduced that ensures data sources are price updated and mapped to the CPA 2.1 classification framework. This method has been applied to calculate chain-linked weights from 2014. Further details on these improvements are available in the [July 2020 Producer Price Indices methods changes](#) article.

3 . Effect of annual chain-linking and the move from net to gross sector output basis on headline output PPI and high-level components

Output Producer Price Index (PPI): changes in factory gate prices.

In addition to the broader structural changes to the PPI, the “outputs of alcoholic beverages and tobacco products” and “outputs of coke and refined petroleum products” indices are now reported as excluding duty where the output headline previously used the “including duty” index. This improves the quality of PPI as an economic indicator, removing the direct impact of government policy.

Table 1: Comparison of old NSO and 2020 GSO chain-linked weights

Descriptions	Net Rebased Weight (%)	Gross Chain-linked Weight (%)	Difference (p.p.)
Outputs of Food Products	14.79	25.00	10.21
Outputs of Alcoholic Beverages and Tobacco Products	8.29	2.70	-5.59
Outputs of Textiles, Wearing Apparel and Leather Products	..	1.30	..
Outputs of Paper, Paper Products and Printed Material	3.93	6.80	2.87
Outputs of Coke and Refined Petroleum Products	8.21	6.10	-2.11
Outputs of Chemicals and Pharmaceutical Preparations	7.64	5.40	-2.24
Basic Metals, Fabricated Metal Products and Machinery	..	14.20	..
Outputs of Computer, Electronic and Electrical Products	12.48	3.20	-9.28
Outputs of Motor Vehicles and Other Transport Equipment	..	11.80	..
Other Outputs from Manufacturing	14.67	23.60	8.93

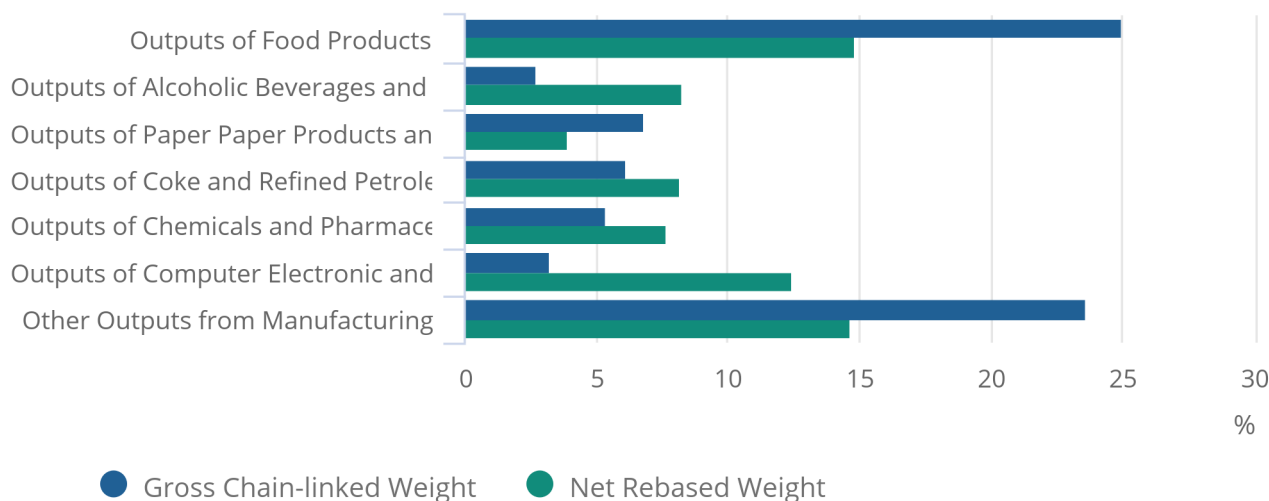
Source: Office for National Statistics - Producer Price Inflation (PPI)

Notes

1. The 2010 index weights and weight changes for "Outputs of Textiles, Wearing Apparel & Leather Products", "Basic Metals, Fabricated Metal Products & Machinery" and "Outputs of Motor Vehicles & Other Transport Equipment" have been suppressed due to potential disclosure issues.

Figure 1: Comparison of old NSO and the 2020 GSO chain-linked weights

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Source: Office for National Statistics - Producer Price Inflation (PPI)

Notes:

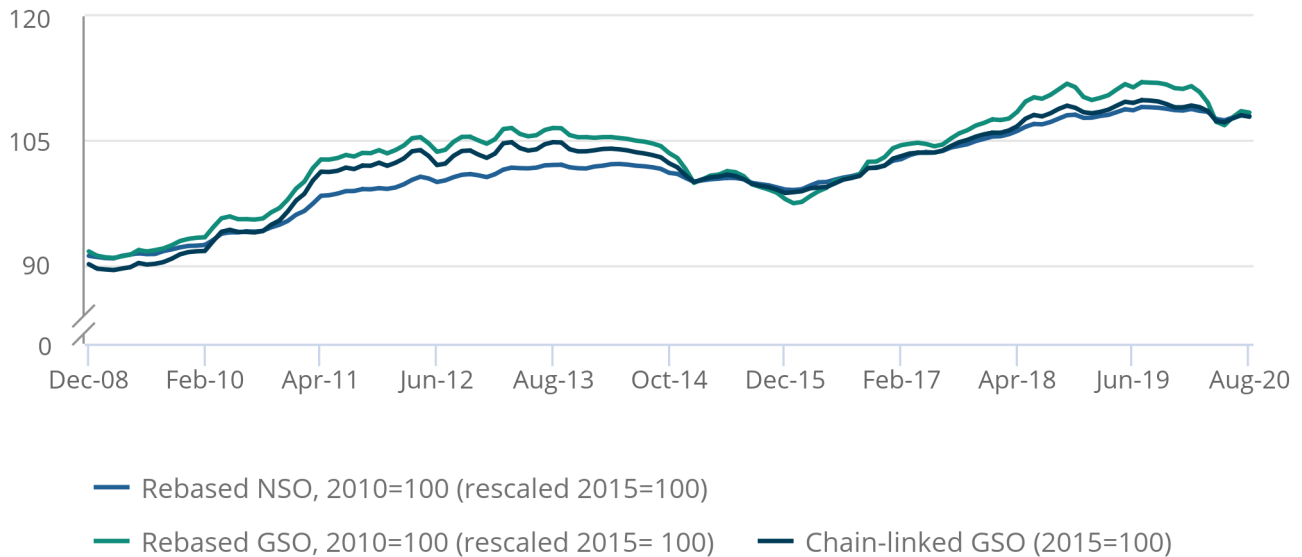
1. Not including the above component indices with suppressed 2010 weights.

Figure 1 and Table 1 show the difference between the current output component weights based on 2010 sales data (not including products sold on a business to business basis, within the same industry sector) and the new 2020 weights, based on price updated 2018 sales data. An explanation of price updating can be found in the [July methodological article](#). Both the transition to chain-linking and the transition from net to gross contribute to the weight changes, however the instances of large changes in weights are predominantly the result of the net to gross change.

For example, the weight of “outputs of food products” increases by 10.21 percentage points, however this does not imply a marked change in the relative composition of the industrial market. When comparing the lower level components of the rebased 2010 gross sector output (GSO) index with the chain-linked index, the difference is not substantial ([Producer Price Indices weights changes: appendices – Annex 6.2 and 6.3](#)). Rather this change captures the large quantity of intra-industry transaction within this classification relative to other component indices, thereby increasing the overall weight of “outputs of food products”.

Figure 2: Comparison of old NSO rebased 2010=100 (rescaled 2015=100), old GSO rebased 2010=100 (rescaled 2015=100) and new GSO chain-linked 2015=100 index values

Figure 2: Comparison of old NSO rebased 2010=100 (rescaled 2015=100), old GSO rebased 2010=100 (rescaled 2015=100) and new GSO chain-linked 2015=100 index values



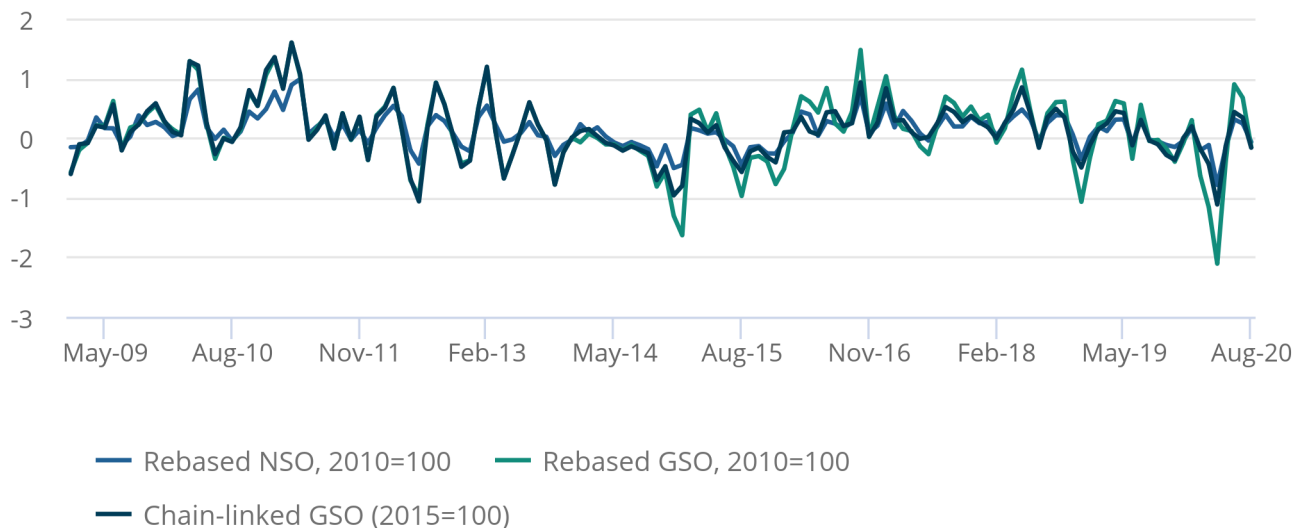
Source: Office for National Statistics - Producer Price Inflation (PPI)

Notes:

1. Index values are subject to revision, please refer to the latest Producer Price Index (PPI) monthly bulletin for up to date figures, the first of which to include chain-linked data will be released on 18 November 2020.

Figure 3: Comparison of old NSO rebased 2010=100, old GSO rebased 2010=100 and new GSO chain-linked 2015=100 month on month growth

Figure 3: Comparison of old NSO rebased 2010=100, old GSO rebased 2010=100 and new GSO chain-linked 2015=100 month on month growth



Source: Office for National Statistics - Producer Price Inflation (PPI)

Notes:

1. Index growth rates are subject to revision, please refer to the latest Producer Price Index (PPI) monthly bulletin for up to date figures, the first of which to include chain-linked data will be released on 18 November 2020.

The impact of the move from a net rebased output index to a chain-linked gross sector output on index values is illustrated in Figure 2 and Figure 3. Index values for the rebased 2010 series and chain-linked 2015=100 series are plotted from the link month (December 2008) onwards. To aid comparison both 2010=100 series have been rescaled so that index values average 100 across 2015.

Figure 2 shows that the chain-linked GSO series follows a similar trend to the rebased 2010=100 series. However, the peaks and troughs in the rebased 2010 series are more pronounced, showing greater volatility than is present with the chain-linked series. Between August 2015 and August 2020 GSO prices are now estimated to have grown by 8.1% instead of the 8.7% that was estimated for the gross market using 2010 weights. This shows very similar growth to the current net headline value (rebased NSO = 8.11% growth, chain-linked GSO = 8.13%).

Between December 2008 and December 2013, all indices will use the weights applied in the last rebasing, using 2010 turnover data. Therefore, the rebased and annually chain-linked series match almost completely until January 2014, when new weights are applied annually. The only differences being driven by small mapping differences between CPA08 and CPA2.1, and changes to imputation methodology.

The annually chain-linked gross headline output value is less volatile than the gross 2010=100 value, and because of the increased frequency with which weights are updated it is a more reliably responsive economic indicator.

4 . Effect of annual chain-linking and the move from net to gross sector input basis on headline input PPI and high-level components

Input Producer Price Index (PPI): changes in the prices of goods bought and sold by UK manufacturers including price indices of materials and fuels purchased.

Table 2: Comparison of the rank of old NSI and 2020 GSI chain-linked weights

Descriptions	Net Rebased Weight - Rank	Gross Chain-Linked Weight - Rank	Rank Change
Inputs of Fuel	5	8	-3
Inputs of Crude Oil	1	6	-5
Inputs of Food (Domestic)	4	4	0
Inputs of Food (Imported)	8	9	-1
Inputs of Other Home Produced Material	9	5	4
Inputs of Metals and Non-Metallic Mineral Products	7	2	5
Inputs of Chemicals	3	3	0
Inputs of Other (imported) Parts /Equipment	2	1	1
Other Inputs	6	7	-1
Inputs of Beverages & Tobacco	10	10	0

Source: Office for National Statistics - Producer Price Inflation (PPI)

Notes

1. Due to potential disclosure issues the component weights for the input series have had to be suppressed. Therefore we are displaying the change in weight ranking for each series.
2. The ranking system is ordered from 1: The highest weighted component through 10: The lowest weighted component.
3. A positive 'Rank Change' indicates an increase in the relative weight of that index.

For the input series, the effect on the weights resulting from the transition from net to gross has a greater effect on the headline values than with the output series. As shown in Figure 2 and Figure 3 there is a notable effect of re-weighting for the gross output headline index movement.

However, with the input series, as shown in Figure 4 and Figure 5, the net index value shows far greater movement than either gross model. The overall trend continues to follow a similar path. This implies a lesser effect of the more regular re-weighting process afforded by annual chain-linking for the input series compared with the output series. Full details on the weight changes can be found in the [July 2020 Producer price weight changes](#) article.

Figure 4: Comparison of old NSI rebased 2010=100 (rescaled 2015=100), old GSI rebased 2010=100 (rescaled 2015=100) and new GSI chain-linked 2015=100 index values

Figure 4: Comparison of old NSI rebased 2010=100 (rescaled 2015=100), old GSI rebased 2010=100 (rescaled 2015=100) and new GSI chain-linked 2015=100 index values



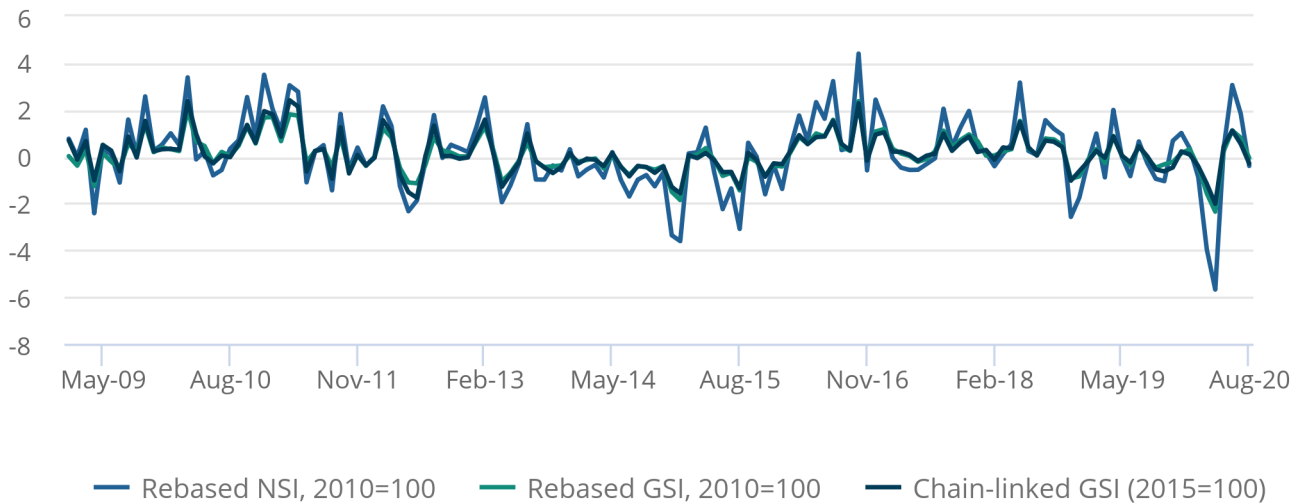
Source: Office for National Statistics - Producer Price Inflation (PPI)

Notes:

1. Index values are subject to revision, please refer to the latest Producer Price Index (PPI) monthly bulletin for up to date figures, the first of which to include chain-linked data will be released on 18 November 2020.

Figure 5: Comparison of old NSI rebased 2010=100, old GSI rebased 2010=100 and new GSI chain-linked 2015=100 month on month growth

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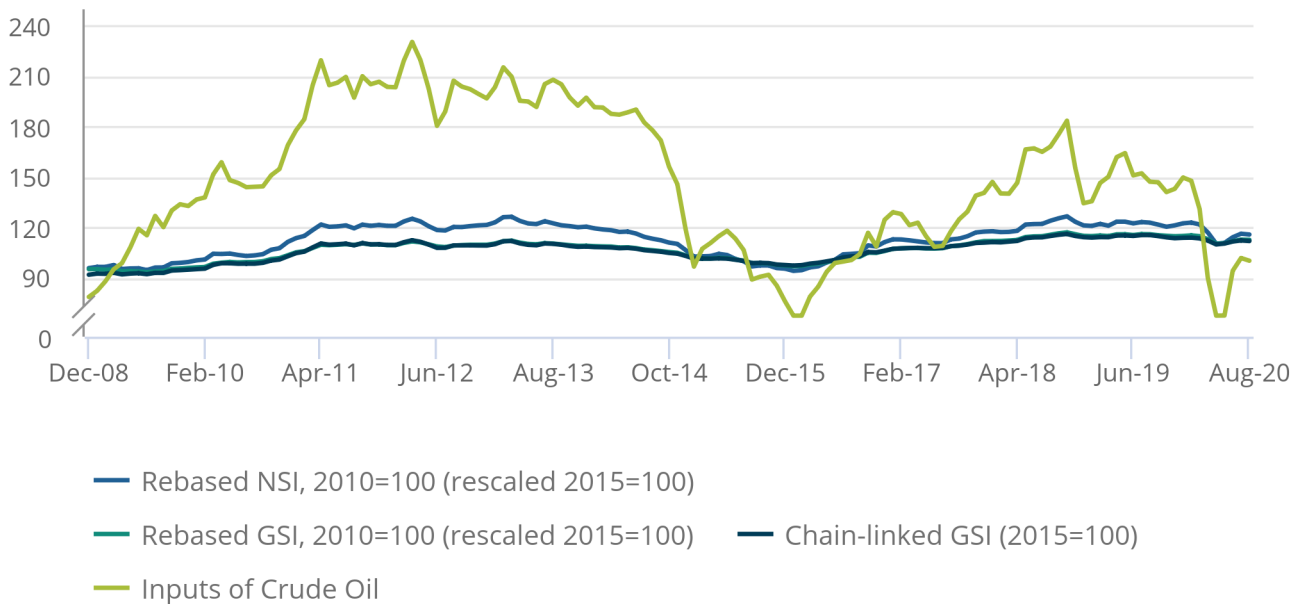
Source: Office for National Statistics - Producer Price Inflation (PPI)

Notes:

1. Index growth rates are subject to revision, please refer to the latest Producer Price Index (PPI) monthly bulletin for up to date figures, the first of which to include chain-linked data will be released on 18 November 2020.

Figure 6: Comparison of old NSI rebased 2010=100 (rescaled 2015=100), old GSI rebased 2010=100 (rescaled 2015=100), new GSI chain-linked index values

Figure 6: Comparison of old NSI rebased 2010=100 (rescaled 2015=100), old GSI rebased 2010=100 (rescaled 2015=100), new GSI chain-linked index values



Source: Office for National Statistics - Producer Price Inflation (PPI)

Notes:

1. Index values are subject to revision, please refer to the latest Producer Price Index (PPI) monthly bulletin for up to date figures, the first of which to include chain-linked data will be released on 18 November 2020.

As shown in Figure 6, this difference is driven by the weight of “inputs of crude oil”. This is by far the most volatile price index, and as shown in Table 2, it is the component that carries the most weight in the net sector input. In the gross calculations the weight is lower as crude oil has a wide market reach, and as such the effect of including intra-industry transactions is to lower the relative market share of “inputs of crude oil”.

This is not to suggest that the decreased weight of “inputs of crude oil” implies a decrease in the absolute market share of crude oil. In the calculation of the two gross headline values the lower level component index “domestic inputs of coke and refined petroleum products” sees a notable increase in weight from the gross rebased (2010=100) series, to the chain-linked series.