

Article

# Producer price weight changes

The impact of introducing chain-linking and the other new methods on weights used in Producer Price Indices.

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# 1 . Executive summary

We are implementing annually chain-linked business prices in line with international best practice and to improve consistency with other price indices such as the Consumer Prices Index (CPI). This is a significant improvement to the weighting and linking of business inflation statistics, which we previously [announced](#) as part of a consultation in 2017. The implementation of [chain-linking is recommended by Eurostat](#) over the current method of rebasing for price statistics, as the weighting structures are updated more frequently.

This article focuses on the impact of introducing chain-linking and the other new methods on weights used in Producer Price Indices (PPIs). This article is part of a collection of articles we are publishing. Other articles published are:

- [producer price inflation methods changes](#): this outlines the move from net to gross basis to measure the headline producer price index, removal of duty and the sources used to compile the weights required for chain-linking
- [services producer price inflation methods changes](#): this outlines the sources used to compile the weights required for chain-linking and a change to the classification framework
- [chain-linking in business prices](#): this focuses on the methodology and practical implementation of chain-linking for business prices, including the technical process of price updating sales data to forecast more representative weights
- [services producer price weight change impacts](#): this discusses the impact of introducing chain-linking and the other new methods on weights used in the Services Producer Price Index (SPPI)

To complete the collection of articles, we will publish a further two articles to provide the impact of implementing the new methods on the PPI and SPPI. We are planning to publish the PPI and SPPI using the new methods towards the end of 2020.

## 2 . Introduction

Business prices are a collection of inflation statistics that measure the inflation across the manufacturing and service sectors and include the Producer Price Index (PPI), Export Price Index (EPI), Import Price Index (IPI) and Services Producer Price Index (SPPI). To meet international regulations, the weighting structure has been updated every five years to reflect changes in the economy. Annual chain-linking is the method of updating weights on an annual basis and statistically linking them to produce a continuous time series. This article compares weights over time and discusses the impact of methods changes described in [Chain-linking business prices](#) and [PPIs methods changes](#). The changes discussed in this article apply to the following outputs:

- PPI
- EPI
- IPI

Throughout this article, the weights used to calculate the PPI, EPI and IPI series between 2008 and 2013 will be referred to as 2010 rebasing weights, as this is the method and year the data are sourced from. From 2014 onwards, the weights are calculated using price-updated sales from the December of the previous year. These weights will be referred to by the year they are used in the index calculation. For example, weights sourced from December 2018 price-updated sales are used in the 2019 index calculations and will be referred to as 2019.

### 3 . Weights changes in the PPI

This section describes the extent of weight changes in the Producer Price Index (PPI) over the period 2008 to 2019 because of both changes in the structure of the UK economy and changes to methodology and data sources used to produce the weights with the introduction of annual chain-linking. The changes in weights are relative; a large movement in one division leads to the realignment of weights elsewhere in the basket of goods. Details of the sources used, the coverage and processing of the weights are published in [PPIs methods changes](#).

Table 1 provides 2010 weights for the divisional groups for the PPI gross sector output (GSO) series, which is based on the last [rebasings exercise](#). These are the weights currently in use to calculate the PPI and were introduced in 2013 retrospectively from 2008 onwards. Table 1 also shows the weights for 2019 that were generated for the new annual chain-linking methodology. Weights in a chain-linked system target the link period, which for the PPI is the December immediately prior to the year the weights will be used to calculate indices. For example, 2019 weights were calculated using December 2018 price-updated sales. For further details, see [Chain-linking in business prices](#).

Table 1: Divisional group weight for Producer Price Index gross sector output without duty, Classification of Products by Activity 2.1 UK, 2010 and 2019

| <b>CPA Division Groups (2-digit divisions included in group)</b>   | <b>2010</b> | <b>2019</b> |
|--|-------------|-------------|
| Manufacture of food products, beverages and tobacco products (10, 11, 12)  | 25.82%      | 28.63%      |
| Manufacture of textiles, wearing apparel, leather and related products (13, 14, 15)  | S           | 1.39%       |
| Manufacture of wood and products of wood and cork except furniture, paper and paper products, and printing and recording services (16, 17, 18)                 | 9.37%       | 9.47%       |
| Manufacture of coke and refined petroleum products, chemical and chemical products, basic pharmaceutical products and pharmaceutical preparations (19, 20, 21) | 17.90%      | 11.86%      |
| Manufacture of rubber and plastic products, other non-metallic mineral products (22, 23)   | 7.51%       | 9.78%       |
| Manufacture of basic metals and fabricated metal products, except machinery and equipment (24, 25)   | S           | 12.03%      |
| Manufacturing of computer, electronic and optical products, and electrical equipment, and machinery and equipment nec (26, 27, 28)                             | 8.28%       | 6.29%       |
| Manufacture of transport equipment (29,30)   | S           | 11.14%      |
| Other manufacturing and repair (31, 32, 33)  | 7.53%       | 9.42%       |

Source: Office for National Statistics – Producer price weight changes

#### Notes

1. Because of the smaller number of manufacturing and production businesses in the UK and disclosure it is not possible to publish the individual division weights. We have created groups to enable us to be able to publish weights at an aggregated level for the Producer Price Index (PPI) gross sector output (GSO); these are not official groupings. We have not been able to produce the same level for the Import Price Index (IPI) or Export Price Index (EPI) because of disclosure. [Back to table](#)
2. Nec refers to not elsewhere classified. [Back to table](#)
3. "S" entries are suppressed. [Back to table](#)

The most significant change has been the decrease in manufacture of coke and refined petroleum products, chemical and chemical products, basic pharmaceutical products and pharmaceutical preparations (divisions 19, 20 and 21). This has been driven by a combination of both lower prices and volume of UK domestically produced refined petroleum products; further details are provided later in this section.

Table 2 provides the top 10 2010 and 2019 weighted product groups in rank order for the PPI GSO series. [Appendix 6.3](#) details all the PPI GSO weight ranks for each year and product group, from 2010 and 2013 to 2019.

Table 2: Top 10 weights by rank for Producer Price Index gross sector output without duty, Classification of Products by Activity 2.1 UK, 2010 and 2019

| <b>Rank</b> | <b>2010 weights</b>  | <b>2019 weights</b>  |
|-------------|--|--|
| 1           | Food products (division 10)                                      | Food products (division 10)                                      |
| 2           | Coke and refined petroleum products (19)                         | Fabricated metal products, except machinery and equipment (25)   |
| 3           | Fabricated metal products, except machinery and equipment (25)   | Motor vehicles, trailers and semi-trailers (29)                  |
| 4           | Other transport equipment (30)                                   | Coke and refined petroleum products (19)                         |
| 5           | Motor vehicles, trailers and semi-trailers (29)                  | Repair and installation services of machinery and equipment (33) |
| 6           | Chemicals and chemical products (20)                             | Rubber and plastics products (22)                                |
| 7           | Repair and installation services of machinery and equipment (33) | Other non-metallic mineral products (23)                         |
| 8           | Rubber and plastics products (22)                                | Chemicals and chemical products (20)                             |
| 9           | Machinery and equipment nec (28)                                 | Beverages (11)   |
| 10          | Printing and recording services (18)                             | Other transport equipment (30)                                   |

Source: Office for National Statistics – Producer price weight changes

#### Notes

1. Because of the smaller number of manufacturing and production businesses in the UK and disclosure it is not possible to publish the weights. [Back to table](#)
2. Ranks are based on weights, where rank 1 is the highest weight. [Back to table](#)
3. Nec refers to not elsewhere classified. [Back to table](#)

## Large change movements

This subsection discusses the larger changes in the weight's ranking in the PPI GSO excluding duty between the rebased weights used between 2008 and 2013 and the new chain-linked weights used from 2014 onwards. Tables 2 and 7 ([Appendix 6.3](#)) outline the changes in the position of each product across the years.

## **Coke and refined petroleum products (division 19)**

Coke and refined petroleum products decreased in rank between 2010 and 2019. This is because of a combination of both lower prices and volume of UK domestically produced refined petroleum products. Prices for both crude oil and refined petroleum products [decreased worldwide](#) from Quarter 4 (Oct to Dec) 2014 to Quarter 1 (Jan to Mar) 2016. Crude oil is the raw input into the production of refined petroleum products; therefore, a price change for crude oil will result in similar price effect for refined petroleum products. The price change was driven by a significant increase in the supply of crude oil and refined petroleum products from countries outside the Organization of the Petroleum Exporting Countries (OPEC), particularly US shale oil, as well as high output from countries belonging to OPEC.

In addition, there was a 4.8% drop in volume of UK production as [reported by the Department of Energy and Climate Change](#) during the same period, which can be partly attributed to the closure of the production refinery at Milford Haven. This is also consistent with the long-term decline of UK refined petroleum production.

There was an increase in the price of crude oil and refined petroleum products from 2016 onwards but not to the same levels seen before December 2014. The primary driver for this increase was an [agreement](#) across the OPEC member countries to reduce production to drive up the price per barrel.

## **Chemicals and chemical products (division 20)**

The UK production of chemicals and chemical products saw a decrease in rank. Analysis shows a decrease in sales especially between Quarter 4 (October to December) 2014 and Quarter 2 (April to June) 2016. This was primarily due to the drop in the price of key commodities used in the production of chemical products, lowering the price of final output. A major component of chemical products is petroleum, which saw a decrease in price during the same period (section 3.1.1). The division saw a recovery in sales from 2016 onwards, driven by [growth in production volume](#), as well as a rise in value of chemicals and chemical products caused by the recovery in price for input manufacturing components and commodities, primarily crude oil, refined petroleum products and petrochemicals.

## **Machinery and equipment not elsewhere classified (division 28)**

The rank of the mechanical equipment industry has decreased between 2010 and 2019. Machinery and equipment products are primarily sold to other manufacturing industries; therefore, demand is dependent on [continuous investment](#) in UK manufacturing. Since the 2008 financial crisis, there has been limited investment because of several factors, possibly including a more cautious business mindset.

The price of UK machinery and equipment has also declined since 2013; this is linked to diminished demand but also because of the decrease in the value of metals, particularly iron, which is used to create steel, a major material consumed by the industry. The drop in value of iron from 2013 to 2016 can be linked to the [over production](#) of the metal.

## **Motor vehicles, trailers and semi-trailers (division 29)**

The rank of the motor vehicles, trailers and semi-trailers product group has increased between 2010 and 2019. This is because of the UK production for motor vehicles continuing to grow consistently during this period, as recorded by [UK manufacturers' sales by product \(ProdCom\) estimates](#). Based on the growth of UK production, an even higher growth could have been expected in the PPI GSO weights, but the UK has seen a faster increase in exports of motor vehicle products compared to the increase in domestic demand (see [Section 5](#)).

## Other transport equipment (division 30)

The rank of other transport equipment increased between 2010 and 2016. This was driven by the consistent increase in the sales of air, spacecraft and related machinery, following a rise in [production levels \(PDF, 2.41MB\)](#) and investments in skills, technology and productivity.

Between 2016 and 2019, there has been a decrease in the weight of other transport equipment. [Production](#) of other transport equipment has actually consistently risen, but this has been mainly for the [exports](#) market, which has increased for the product group (see [Section 5](#)).

## 4 . Changes to the IPI ranks since 2010

Table 3 provides the top 10 2010 weighted product groups in rank order for the Import Price Index (IPI) series, which is based on the weight dataset used for the previous rebasing exercise in 2013. Table 3 also lists the top 10 ranked weighted product groups that were generated from the new chain-linking methodology. Tables 8, 9 and 10 ([Appendices 6.4, 6.5 and 6.6](#)) detail all IPI weight ranks for each year and product group.

Table 3: Top 10 weights by rank for total Import Price Index, Classification of Products by Activity 2.1 UK, 2010 and 2019

| Rank | 2010 Weights  | 2019 Weights  |
|------|---|---|
| 1    | Computer, electronic and optical products (division 26)               | Motor vehicles, trailers and semi-trailers (division 29)              |
| 2    | Motor vehicles, trailers and semi-trailers (29)                       | Computer, electronic and optical products (26)                        |
| 3    | Petroleum oils and oils obtained from bituminous minerals, crude (06) | Machinery and equipment nec (28)                                      |
| 4    | Machinery and equipment nec (28)                                      | Other transport equipment (30)  |
| 5    | Chemicals and chemical products (20)                                  | Food Products (10)  |
| 6    | Food Products (10)  | Chemicals and chemical products (20)                                  |
| 7    | Basic pharmaceutical products and pharmaceutical preparations (21)    | Basic pharmaceutical products and pharmaceutical preparations (21)    |
| 8    | Basic metals (24)   | Petroleum oils and oils obtained from bituminous minerals, crude (06) |
| 9    | Wearing Apparel (14)  | Electrical equipment (27)   |
| 10   | Electrical equipment (27)   | Wearing Apparel (14)  |

Source: Office for National Statistics – Producer price weight changes

### Notes

1. Because of the smaller number of manufacturing and production businesses in the UK and disclosure it is not possible to publish the weights. [Back to table](#)
2. Ranks are based on weights, where rank 1 is the highest weight. [Back to table](#)
3. Nec refers to not elsewhere classified. [Back to table](#)

## Large change movements

This subsection discusses the larger changes in ranks for the IPI between the rebased weights in 2010 and the new chain-linked weights used from 2014 onwards.

### Crude oil, coke and refined petroleum products (divisions 6 and 19)

The rank of UK-imported crude oil, coke and refined petroleum products decreased between 2010 and 2019. This was caused by a decrease in price for the products as discussed in [Section 3](#).

### Basic metals (division 24)

The rank for UK-imported basic metals decreased between 2010 and 2019. This was driven primarily by the fluctuation in both price and volume of precious metals, specifically silver, while gold also provides a limited contribution. The sales for gold bars, gold rods and gold wires are removed from the IPI and Export Price Index (EPI) sales, as explained in [Producer Price Indices \(PPIs\) methods changes](#).

After the gold adjustment, precious metals are the highest-weighted product group within this division, with basic iron, steel and ferro-alloys following closely behind. It is [widely estimated](#) that half of the world's gold and silver is consumed by the jewellery industry, with a further 10% consumed by other industries, primarily electronics. [Palladium is another significant precious metal](#) import because of its use in the production of automotive catalytic converters, in petroleum refineries and in the chemical industry. All of these have an active presence in UK.

### Computer, electronic and optical products and Electrical equipment (divisions 26 and 27)

The rank of UK-imported computer, electronic and optical products and electrical equipment has increased between 2010 and 2019. This is driven by a rise in demand, as the UK production for this industry is relatively small compared with other leading economies. Almost half of electronic imports are from EU countries, but China is the single largest supplier providing a fifth of all [imports \(PDF, 2.84MB\)](#).

### Other transport equipment (division 30)

The rank for UK imports of other transport equipment has increased between 2010 and 2019. Over this period, production of air, spacecraft and related machinery in the UK has seen consistent growth ([Section 3](#)). This has led to the UK [importing \(PDF, 2.41MB\)](#) more partially worked components, primarily parts for turbojets or turbo-propellers.

## 5 . Changes to EPI weights since 2010

Table 4 provides the top 10 2010 weighted product groups in rank order for the Export Price Index (EPI) series, which is based on the weight dataset used for the previous rebasing exercise in 2013. Table 4 also lists the top 10 ranked weighted product groups that were generated from the new annual chain-linking methodology. Tables 9, 10 and 11 ([Appendices 6.7, 6.8 and 6.9](#)) detail all EPI weight ranks for each year and product group.

Table 4: Top 10 weights by rank for total Export Price Index, Classification of Products by Activity 2.1 UK, 2010 and 2019

| Rank 2010 Weights |  | 2019 Weights   |
|-------------------|--|--|
| 1                 | Computer, electronic and optical products (division 26)            | Motor vehicles, trailers and semi-trailers (division 29)           |
| 2                 | Motor vehicles, trailers and semi-trailers (29)                    | Other transport equipment (30)                                     |
| 3                 | Basic pharmaceutical products and pharmaceutical preparations (21) | Machinery and equipment nec (28)                                   |
| 4                 | Machinery and equipment nec (28)                                   | Chemicals and chemical products (20)                               |
| 5                 | Chemicals and chemical products (20)                               | Basic pharmaceutical products and pharmaceutical preparations (21) |
| 6                 | Coke and refined petroleum products (19)                           | Computer, electronic and optical products (26)                     |
| 7                 | Basic metals (24)  | Basic metals (24)  |
| 8                 | Other transport equipment (30)                                     | Food Products (10)   |
| 9                 | Electrical equipment (27)  | Electrical equipment (27)  |
| 10                | Food Products (10)   | Other manufactured goods (32)                                      |

Source: Office for National Statistics – Producer price weight changes

#### Notes

1. Because of the smaller number of manufacturing and production businesses in the UK and disclosure it is not possible to publish the weights. [Back to table](#)
2. Ranks are based on weights, where rank 1 is the highest weight. ,Nec refers to not elsewhere classified. [Back to table](#)

## Large changes movements

This subsection discusses the significant changes in the weight's rankings for the EPI between the rebased weights in 2010 and the new chain-linked weights used from 2014 onwards.

### Coke and refined petroleum products (division 19)

Like the Producer Price Index (PPI) gross sector output (GSO) ([Section 3](#) and Import Price Index (IPI) ([Section 4](#)), UK-exported coke and refined petroleum products saw a decrease in rank in EPI because of a decrease in price.

Additionally, from 2013 UK exports of diesel, kerosene, kerosene-type jet fuel and gasoline to EU countries experienced a fall in export volume. Diesel exports to non-EU countries experienced a continuous drop in volume from 2013. Gasoline, the largest export in division 19 to non-EU countries in terms of volume, experienced a reduction in volume from 2013 and recovered in 2016. Opposite trends can be observed instead for exports to EU countries for light petroleum oils and fuel oils, which have experienced consistent growth since 2010. [Trade data are available from HM Revenue and Customs \(HMRC\)](#) detailing these product movements.

## Chemicals and chemical products (division 20)

As with the PPI GSO ([Section 3](#)), UK exports of chemicals and chemical products saw a decrease in sales from Quarter 4 (Oct to Dec) 2014 to Quarter 2 (Apr to June) 2016.

The division saw a recovery in sales from 2016 onwards, driven by growth in [production volume](#) as well as a rise in chemical product value caused by the recovery in the price for input manufacturing components and commodities, primarily crude oil, refined petroleum products and petrochemicals.

## Basic pharmaceutical products and preparations (division 21)

UK-exported basic pharmaceutical products and preparations saw a decrease in rank between 2010 and 2019. This can be partly attributed to a [reduction in productivity](#) between 2010 and 2015, although the division did recover slightly between 2015 and 2018.

## Motor vehicles, trailers and semi-trailers (division 29)

The rank of UK-exported motor vehicles, trailers and semi-trailers has increased since 2010. Since the economic downturn in 2009, export sales of motor vehicles has almost doubled, reaching a value of [£40 billion in 2018](#) ([PDF, 425KB](#)). Exports to non-EU countries are [growing faster](#) than exports to the EU.

## Other transport equipment (division 30)

The rank of UK-exported other transport equipment increased between 2010 and 2019. Like the PPI GSO ([Section 3](#)), this was driven by the consistent increase in the sales of air, spacecraft and related machinery.

Unlike the PPI GSO ([Section 3](#)), the export rank for the division does not decrease from 2016 onwards. This is because of an increase in exports over domestic sales, with the [UK being the fourth largest exporter](#) of aerospace parts in the world. This could be linked in part to the [depreciation of British pounds](#), making UK air, spacecraft and related machinery products cheaper for foreign purchasing.

# 6 . Appendices

Details of the weights and weight rankings for the Producer Price Indices (PPIs), Export Price Index (EPI) and Import Price Index (IPI) are available in the [PPIs weights changes: appendices](#).

# 7 . Authors

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