Office for National Statistics

Statistical bulletin

# UK index of production: Aug 2016

Measures the volume of production at base year prices for the manufacturing, mining and quarrying, energy supply, and water and waste management industries. These are seasonally adjusted figures on the index of output of the production industries.

## Table of contents

# 1 . Main points

This is the second release of Index of Production (IoP) covering data post EU referendum. This release shows production decreased month-on-month in August 2016, with a fall in mining and quarrying partially offset by a rise in manufacturing. Users should note that ONS always warns against overly interpreting one month's figures.

In August 2016, total production output was estimated to have increased by 0.7% compared with August 2015. There were increases in 2 of the 4 main sectors, with the largest contribution coming from water supply, sewerage and waste management output, which increased by 7.0%.

Manufacturing was estimated to have increased by 0.5% on a year ago. Other manufacturing and repair provided the largest contribution to growth, increasing by 5.9%.

Comparing August 2016 with July 2016, production output is estimated to have decreased by 0.4%. There were decreases in 2 of the 4 main sectors, with the largest contribution coming from mining and quarrying, which decreased by 3.7%.

Manufacturing was estimated to have increased by 0.2% between July and August 2016. Transport equipment provided the largest contribution to growth, increasing by 2.5%.

In the 3 months to August 2016, production and manufacturing were 7.7% and 5.5% respectively below their level reached in the pre-downturn gross domestic product (GDP) peak in Quarter 1 (Jan to Mar) 2008.

The earliest period open for revision in this release was July 2016 hence no change to previously published GDP growth rates.

# 2 . Changes to publication schedule for economic statistics

From January 2017 we are improving the way we publish economic statistics, with related data grouped together under new "theme" days. This will increase the coherence of our data releases and involve minor changes to the timing of certain publications. For more information see Changes to publication schedule for economic statistics.

# 3 . Index of Production headline figures

This bulletin presents the monthly estimates of the Index of Production (IoP) for the UK production industries, for August 2016. The IoP is one of the earliest indicators of growth and it measures output in the manufacturing (the largest component of production); mining and quarrying; energy supply; and water supply and waste management industries. In this publication, the production industries weight accounts for 14.6% of the output approach to the measurement of gross domestic product (GDP).

IoP values are referenced to 2013 so that the average for 2013 is equal to 100. Therefore, an index value of 110 would indicate that output is 10% higher than the average for 2013. The index estimates are mainly based on the Monthly Business Survey (MBS) of approximately 6,000 businesses, covering all the territory of the UK without geographical breakdown. The total IoP estimate and various breakdowns are widely used in private and public sector institutions. Care should be taken when using the month-on-month growth rates due to their volatility. All figures contained within this release are chained volume seasonally adjusted estimates, unless otherwise stated.

This release presents:

- the most recent IoP figures

- the economic context to the IoP

- gross domestic product (GDP) impact and components

- a supplementary analysis to the IoP

- spotlight

- background notes section including an assessment of the quality of the IoP, as well as an explanation of the terms used in this bulletin

Table 1 shows the main figures for this release. Figure 1 shows the production and manufacturing series from May 2014 to August 2016.

**Table 1: Index of Production main figures, August 2016, UK**

| | | | | | Percentage change |
|---|---|---|---|---|---|
| | Index number (2013=100) | Most recent month on a year earlier | Most recent 3 months on a year earlier | Most recent month on previous month | Most recent 3 months on previous 3 months |
| Production | 104.2 | 0.7 | 1.4 | -0.4 | 0.2 |
| Manufacturing | 102.8 | 0.5 | 0.6 | 0.2 | -0.4 |

Source: Office for National Statistics

**Figure 1: Seasonally adjusted production and manufacturing, May 2014 to August 2016, UK**
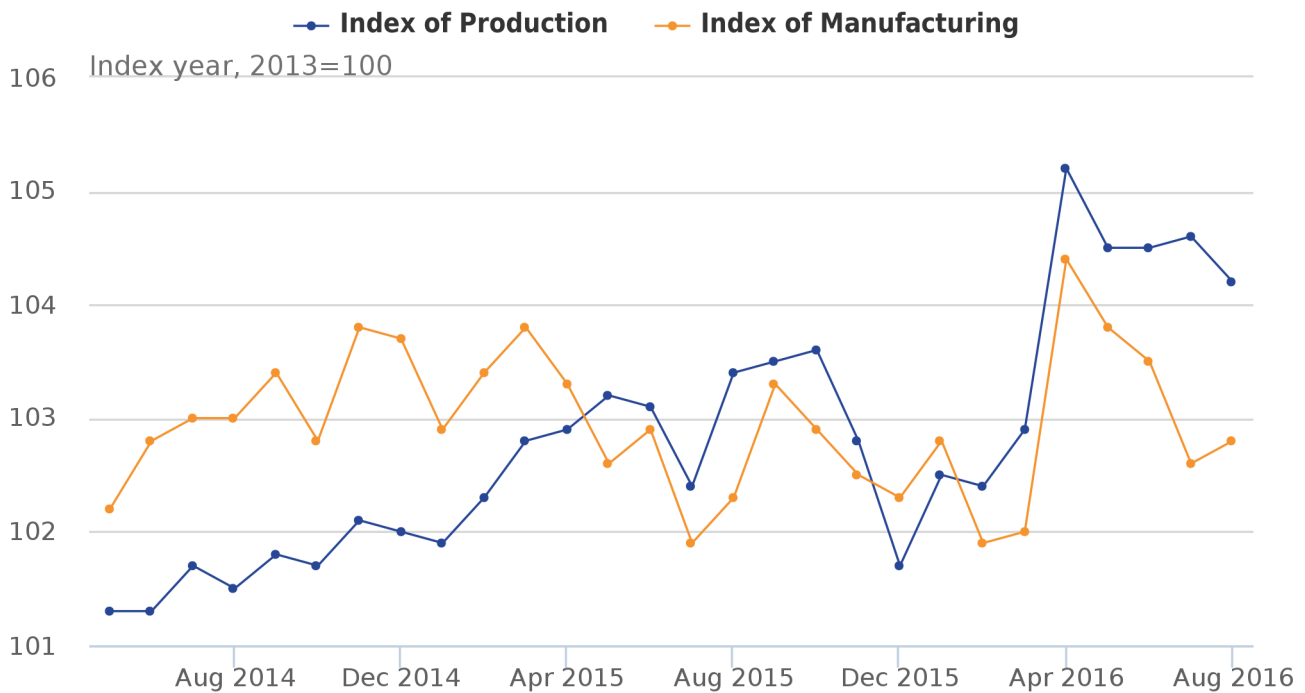


**Source: Primarily Monthly Business Survey (Production and Services) - Office for National Statistics**

# 4 . Quality of the Index of Production

We have developed [guidelines for measuring statistical quality](#); these are based upon the 5 European Statistical System (ESS) quality dimensions. The Index of Production (IoP) in its current form adheres to these requirements. One important dimension for measuring statistical quality is accuracy. That is, the extent to which the estimate measures the underlying "true" value of the output growth (of the production industries) in the UK for a particular period. Although the IoP meets its legal requirements for statistical accuracy, all survey-based estimates, by definition, are subject to statistical uncertainty or errors. These errors consist of 2 main elements: the sampling error and the non-sampling error.

For many well-established statistics we measure and publish the sampling error associated with the estimate, using this as an indicator of accuracy. However, the IoP is constructed from a variety of data sources, some of which are not based on random samples. We previously announced that research was under way to attempt to measure the standard error; this work has been completed and published in [Survey Methodology Bulletin No.75 Spring 2016](#) using the standard errors of the growths for the year 2014. We are working on updating this for regular publication as part of this release.

Non-sampling errors are not easy to quantify but can be caused by coverage issues, measurement, processing and non-response. The response rate gives an indication of the likely impact of non-response error on the survey estimates. From January 2015, the Monthly Business Survey (MBS) response rates for data included in the IoP publication have been published in the background notes "methods" section of the statistical bulletin. This is to give further information of the percentages of the amount of turnover and questionnaire forms returned. We publish [MBS historical response rates](#) back to 2010.

A further dimension of measuring accuracy is reliability, which can be measured using evidence from analyses of revisions to assess the closeness of early estimates to subsequent estimated values. Revisions are an inevitable consequence of the trade-off between timeliness and accuracy.

Figures for the most recent months are provisional and subject to revision in light of:

- late responses to surveys and administrative sources

- forecasts being replaced by actual data

- revisions to seasonal adjustment factors, which are re-estimated every month and reviewed annually

Revisions to the IoP are typically small (around 0.1 to 0.2 percentage points), with the frequency of upward and downward revisions broadly equal.

Further information on the most recent revisions analysis can be found in the revisions to IoP section and in the revision triangles section in the bulletin.

Care should be taken when using the month-on-month growth rates, due to their volatility. Further information on the latest quality and methodology information (QMI) for the IoP can be found in the [Quality and Methodology Information report](#). Furthermore, the IoP is constantly being reviewed and improved for accuracy and uncertainty as part of the GDP(O) improvement project; further details of improvements are published each year as part of a suite of Blue Book articles. A full list of the GDP(O) improvement project articles can be found on the [Improvements](#) page of our website.

# 5 . Economic context

Production output fell slightly in August 2016, following flat growth in June and July and growth of 0.7% since August 2015. In the latest quarter (Quarter 2 (Apr to June) 2016), production output increased by 2.1% compared with Quarter 1 (Jan to Mar) 2016 following 2 quarters of contraction.

Since early 2014, manufacturing – the largest component of production – has experienced alternating periods of expansion and contraction, remaining broadly flat over this period. In August 2016, manufacturing grew by 0.2% compared with July 2016, with output now at roughly the same level as the average in 2015. (For more information and analysis of the latest figures see the production and sectors supplementary analysis section of the bulletin.)

Figure 2 shows that production and its main components have followed very different paths over time.

**Figure 2: Index of production and sub-components, Quarter 1 (Jan to Mar) 1997 to Quarter 2 (Apr to June) 2016, UK**
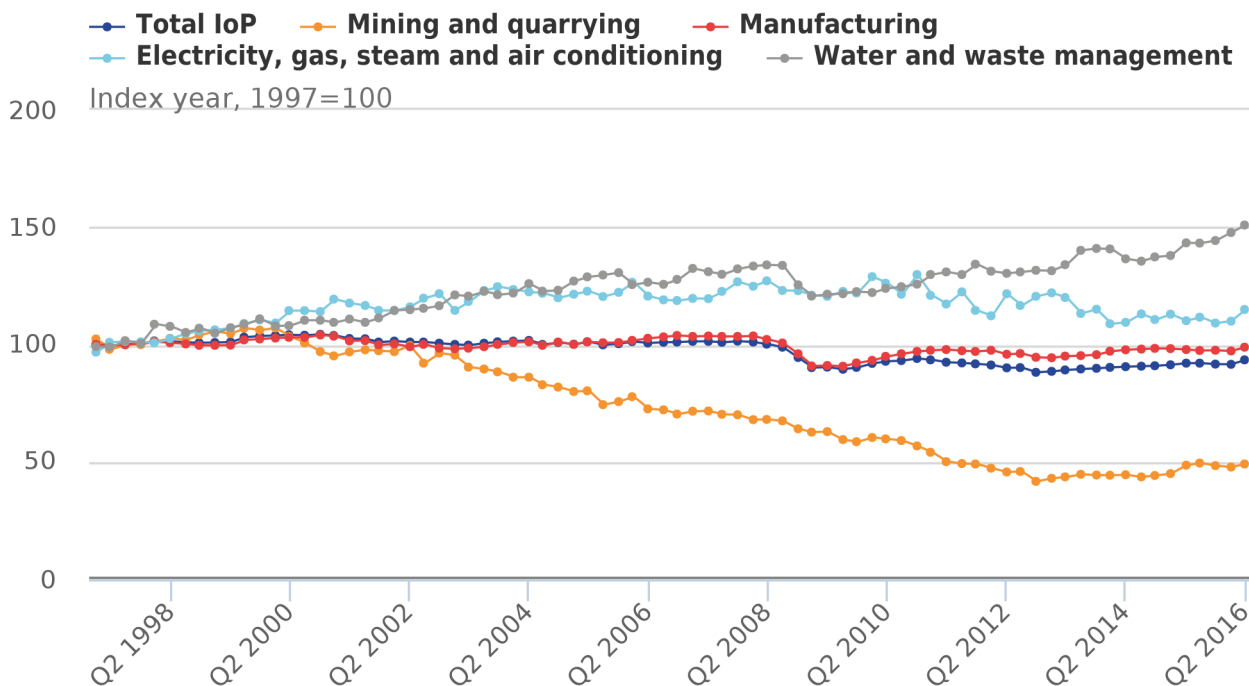


**Source: Primarily Monthly Business Survey (Production and Services) - Office for National Statistics**

**Notes:**

1. Throughout this release Q1 refers to Quarter 1 (January to March), Q2 refers to Quarter 2 (April to June), Q3 refers to Quarter 3 (July to September) and Q4 refers to Quarter 4 (October to December).

Looking over the entire period (Quarter 2 1997 to Quarter 2 2016), electricity, gas, steam and air conditioning supply, and water supply, sewerage and waste management industries grew fastest, at compound average growth rates of 0.2% and 0.5% per quarter, respectively, while production as a whole contracted at a compound average growth rate of 0.1% per quarter. Over the same period, mining and quarrying contracted at a compound average growth rate of 0.9% per quarter while manufacturing output was broadly unchanged.

During the economy's downturn (between Quarter 1 2008 and Quarter 2 2009), production and all of its components contracted. However, the path of mining and quarrying showed little sign of the economy's downturn, with its output continuing to decline (Figure 2). Between the economy's peak in Quarter 1 2008 and the economy's trough in Quarter 2 2009, manufacturing experienced the largest contraction (12.2%) followed by total production (10.5%), water supply, sewerage and waste management (9.0%), mining and quarrying (7.5%) and electricity, gas, steam and air conditioning (3.5%).

In Quarter 2 2016, production and manufacturing output remained below their Quarter 1 2008 levels by 7.5% and 4.7%, respectively. Mining and quarrying, and electricity, gas, steam and air conditioning output were also below their values in Quarter 1 2008 by 27.8% and 7.9%, respectively. In contrast, water supply, sewerage and waste management is the only main industry within production to have surpassed its value in Quarter 1 2008, by 13.1%, as of Quarter 2 2016.

Headline GDP surpassed its pre-downturn peak in Quarter 3 (July to Sept) 2013 and while services have performed well since the downturn, the other headline industry groupings have struggled to recover, with manufacturing and production still below their pre-downturn peak. This is consistent with the historical trend of services growing at a faster rate than production and manufacturing, despite the fact that productivity in the production industries (manufacturing in particular) has on average grown at a faster rate than in the service industries since 1997 (more information can be found in Quarterly National Accounts: Quarter 2 (Apr to June) 2016) and Labour productivity: Jan to Mar 2016). The slower output growth and increased productivity, therefore, reflect the falling share of the labour force employed in manufacturing, which fell from 16.5% to 9.6% between 1997 and 2015 (UK Labour Market: September 2016, EMP13).

In August 2016, the manufacturing industry experienced inflation in terms of the prices manufacturers pay for materials and fuels used in the production process (input prices) and the prices they charge for the goods they produce (output prices). Input prices paid by UK manufacturers rose by 7.6% in the year to August 2016, from a rise of 4.1% in the year to July 2016. Output prices for goods produced by UK manufacturers rose by 0.8% in the year to August 2016, from a rise of 0.3% in the year to July 2016. Both input and output prices have been rising in recent months and this is the second consecutive month of positive price growth in both series (more information can be found in Producer Price Inflation: August 2016 and this month's spotlight section).

Figure 3 shows the share of nominal gross value added (GVA) accounted for by production in the UK and a selection of other major economies (more information on data for France, Germany, Italy, Japan and the USA can be found on the Organisation for Economic Co-operation and Development (OECD) website).

**Figure 3: Production as a percentage of nominal gross value added in comparable economies to the UK, 1997 to 2014**
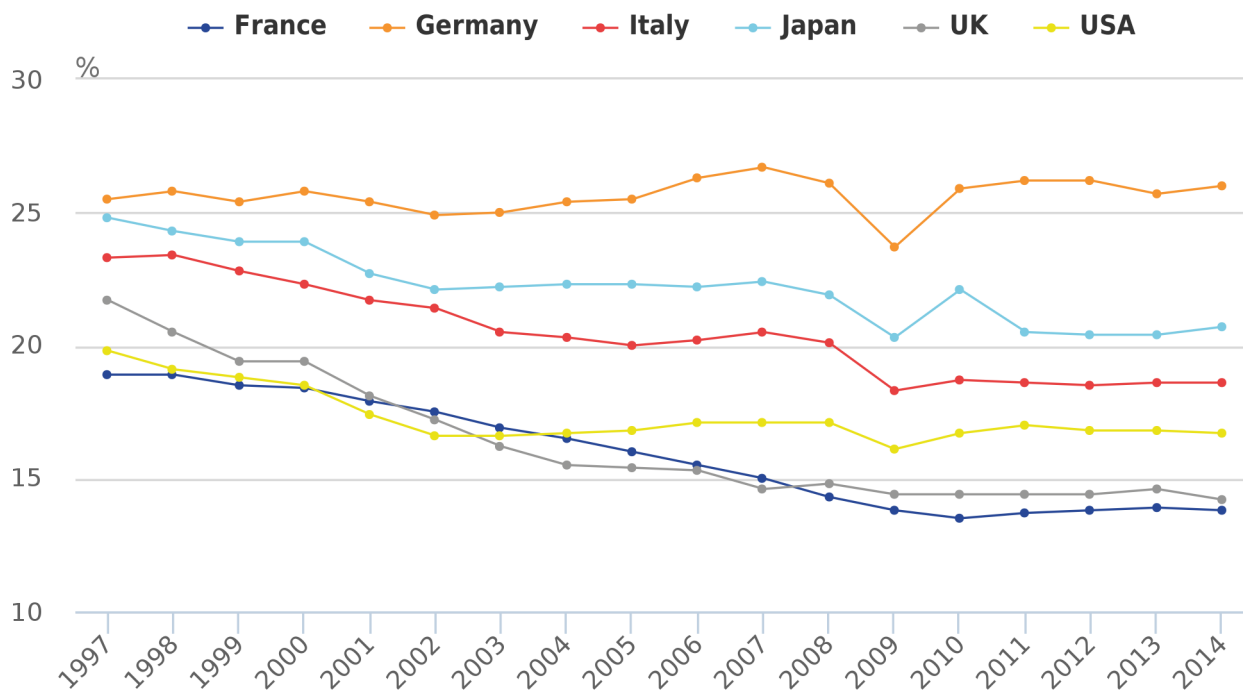


Source: Office for National Statistics, Organisation for Economic Co-operation and Development (OECD)

In 1997, the share of nominal GVA accounted for by production in the UK was 21.7%, around the middle of the range relative to the other economies. By 2014, the UK had become relatively less reliant on production, as its share fell to 14.2% of nominal GVA.

The same trend was observed in manufacturing, where the share of nominal GVA fell from 17.1% in 1997 to 10.2% in 2014. Moreover, between 1997 and 2014, the composition of production in the UK changed, with the share of production attributed to manufacturing decreasing from 78.7% in 1997 to 71.6% in 2014.

# 6 . Gross domestic product (GDP) impact and components

In this release, the only period open for revision was July 2016, in line with the National Accounts revisions policy.

The estimates for the production industries are generally the first of the main components for the output approach to the measurement of gross domestic product (GDP) to be published (agriculture, construction and services are the other components). Details of the data already published can be found in Table 2.

The Retail Sales Index reported in Table 2 is not a direct component of the output approach to measuring GDP. It does, however, feed into estimates of GDP in 2 ways. Firstly, it feeds into the services industries when GDP is measured from the output approach. Secondly, it is a data source used to measure household final consumption expenditure, which feeds into GDP estimates when measured from the expenditure approach.

Output in the construction industry for August 2016 will be published on 14 October 2016 and services output for the same period on 27 October 2016.

**Table 2: Components of GDP, August 2016, UK**

Percentage change

| Publication | Percentage of GDP | Release date | Month or quarter of GDP[2] | Most recent 3 months on a year earlier | Most recent 3 months on 3 months earlier [3] | Most recent month on the same month a year ago[3] | Most recent month on the previous month |
|---|---|---|---|---|---|---|---|
| Index of | 14.6 | 07 Oct | Aug 2016 | 1.4 | 0.2 | 0.7 | -0.4 |
| Production [1] | | | Jul 2016 | 1.6 | 1.0 | 2.1 | 0.1 |
| Construction | 5.9 | 09 Sep | Jul 2016 | -0.7 | -1.2 | -1.5 | 0.0 |
| | | | Jun 2016 | 0.4 | -0.1 | -0.7 | -1.0 |
| Index of | 78.8 | 30 Sep | Jul 2016 | 2.7 | 0.6 | 2.9 | 0.4 |
| services | | | Jun 2016 | 2.7 | 0.6 | 2.6 | 0.3 |
| Retail | | 15 Sep | Aug 2016 | 5.5 | 1.6 | 6.2 | -0.2 |
| Sales | | | Jul 2016 | 5.3 | 2.0 | 6.3 | 1.9 |
| Agriculture | 0.7 | | Q2 2016 | -0.7 | -1.0 | .. | .. |
| | | | Q1 2016 | 1.4 | -0.1 | .. | .. |

Source: Office for National Statistics

Notes:

1. The data for the index of production reflects the latest revisions published as part of this release.

2. Throughout this release Q1 refers to Quarter 1 (January to March), Q2 refers to Quarter 2 (April to June), Q3 refers to Quarter 3 (July to September) and Q4 refers to Quarter 4 (October to December).

3. Any apparent inconsistencies between this table and the latest GDP estimate are due to rounding.

# 7 . Production and sectors supplementary analysis

**Table 3: Headline growth rates and contributions for the Index of Production, August 2016, UK**

| Description [1] | % of production [2] | Month on same month a year ago growth (%) | Contribution to production (% points) | Month on previous month growth (%) | Contribution to production (% points) |
|---|---|---|---|---|---|
| IoP | 100.0 | 0.7 | 0.7 | -0.4 | -0.4 |
| Sector B | 12.0 | -0.6 | -0.08 | -3.7 | -0.51 |
| Division 06 | 9.6 | -0.2 | -0.02 | -4.4 | -0.51 |
| Sector C | 70.0 | 0.5 | 0.33 | 0.2 | 0.13 |
| Sector D | 10.4 | -0.5 | -0.05 | 0.2 | 0.02 |
| Sector E | 7.5 | 7.0 | 0.53 | -0.2 | -0.02 |

Source: Office for National Statistics

Notes:

1. IoP Total Index of Production; Sector B mining and quarrying; and within this, Division 06 oil and gas extraction; Sector C manufacturing; Sector D electricity, gas, steam and air conditioning; and Sector E water supply, sewerage and waste management.

2. "% of production" column does not add up to 100 due to rounding.

**Table 4: Growths and contributions to production, month on same month a year ago, August 2016, UK**

| Sector | Summary description | Month on same month a year ago growth (percentage) | Contribution to production (percentage points) |
|---|---|---|---|
| IoP | Index of Production | 0.7 | 0.73 |
| Sector B | Total Mining and Quarrying | -0.6 | -0.08 |
| 5 | Coal and Lignite | -40.0 | -0.01 |
| 6 | Crude petroleum and Natural gas | -0.2 | -0.02 |
| 789 | Other mining and quarrying | -1.9 | -0.05 |
| Sector C | Total Manufacturing | 0.5 | 0.33 |
| CA | Food, beverages and tobacco | 0.6 | 0.07 |
| CB | Textiles and leather products | 4.5 | 0.10 |
| CC | Wood, paper and printing | 0.3 | 0.01 |
| CD | Coke and petroleum | -6.5 | -0.06 |
| CE | Chemical products | -2.6 | -0.11 |
| CF | Pharmaceutical products | -2.2 | -0.12 |
| CG | Rubber and plastic products | 2.0 | 0.12 |
| CH | Metal products | -3.0 | -0.24 |
| CI | Computer, electronic and optical | -2.8 | -0.10 |
| CJ | Electrical equipment | -8.3 | -0.16 |
| CK | Machinery and equipment | 2.3 | 0.10 |
| CL | Transport equipment | 3.5 | 0.35 |
| CM | Other manufacturing and repair | 5.9 | 0.37 |
| Sector D | Total Electricity and Gas | -0.5 | -0.05 |
| 35.1 | Electric power generation, transmission and distribution | -4.6 | -0.32 |
| 35.2-3 | Manufacture of gas; distribution of gaseous fuels through mains; steam and aircon supply | 9.8 | 0.27 |
| Sector E | Total Water | 7.0 | 0.53 |
| 36 | Water collection, treatment and supply | -1.8 | -0.04 |
| 37 | Sewerage | 9.1 | 0.20 |
| 38 | Waste collection, treatment and disposal activities; materials recovery | 11.5 | 0.36 |
| 39 | Remediation activities and other waste management services | 16.0 | 0.01 |

Source: Office for National Statistics

**Table 5: Growths and contributions to production, month on previous month, August 2016, UK**

| Sector | Summary description | Month on previous month growth (percentage) | Contribution to production (percentage points) |
|---|---|---|---|
| IoP | Index of Production | -0.4 | -0.38 |
| Sector B | Total Mining and Quarrying | -3.7 | -0.51 |
| 5 | Coal and Lignite | -2.8 | 0.00 |
| 6 | Crude petroleum and Natural gas | -4.4 | -0.51 |
| 789 | Other mining and quarrying | -0.1 | 0.00 |
| Sector C | Total Manufacturing | 0.2 | 0.13 |
| CA | Food, beverages and tobacco | -0.2 | -0.02 |
| CB | Textiles and leather products | -0.3 | -0.01 |
| CC | Wood, paper and printing | 0.0 | 0.00 |
| CD | Coke and petroleum | 0.3 | 0.00 |
| CE | Chemical products | -0.2 | -0.01 |
| CF | Pharmaceutical products | 2.2 | 0.11 |
| CG | Rubber and plastic products | -0.7 | -0.04 |
| CH | Metal products | -0.1 | -0.01 |
| CI | Computer, electronic and optical | -0.6 | -0.02 |
| CJ | Electrical equipment | -1.1 | -0.02 |
| CK | Machinery and equipment | 0.9 | 0.04 |
| CL | Transport equipment | 2.5 | 0.25 |
| CM | Other manufacturing and repair | -2.1 | -0.14 |
| Sector D | Total Electricity and Gas | 0.2 | 0.02 |
| 35.1 | Electric power generation, transmission and distribution | 0.1 | 0.01 |
| 35.2-3 | Manufacture of gas; distribution of gaseous fuels through mains; steam and aircon supply | 0.3 | 0.01 |
| Sector E | Total Water | -0.2 | -0.02 |
| 36 | Water collection, treatment and supply | -0.9 | -0.02 |
| 37 | Sewerage | -0.3 | -0.01 |
| 38 | Waste collection, treatment and disposal activities; materials recovery | 0.2 | 0.01 |
| 39 | Remediation activities and other waste management services | 5.4 | 0.00 |

Source: Office for National Statistics

## Total production

Total production output in August 2016 increased by 0.7% compared with August 2015 (Table 4). This increase reflected rises in 2 of its 4 main sectors, with water supply, sewerage and waste management output having the largest upward contribution, increasing by 7.0% and contributing 0.5 percentage points to total production. This increase was followed by a rise in manufacturing (the largest component of production), which increased by 0.5% and contributed 0.3 percentage points to total production. The increase in manufacturing was the fifth consecutive rise, since March 2016 compared with a year ago. These increases were partially offset by decreases in mining and quarrying, which decreased by 0.6% and in electricity, gas, steam and air-conditioning output which decreased by 0.5%.

Total production output in August 2016 decreased by 0.4% compared with July 2016 (Table 5). This decrease reflected falls in 2 of its 4 main sectors, with mining and quarrying having the largest contribution, decreasing by 3.7% and contributing a downward 0.5 percentage points to total production. The decrease in mining and quarrying was followed by a fall in water supply, sewerage and waste management output, which decreased by 0.2% and had a negligible contribution to total production. These decreases were partially offset by increases in manufacturing, which increased by 0.2% and in electricity, gas, steam and air-conditioning output, which also increased by 0.2%.

## Manufacturing

Manufacturing output increased by 0.5% between August 2015 and August 2016, contributing 0.3 percentage points to total production. Output increased in 7 of the 13 manufacturing sub-sectors compared with a year ago (Table 4). The manufacturing sub-sector with the largest upward contribution to total production output was other manufacturing and repair, which increased by 5.9% and contributed 0.4 percentage points to total production. The largest contribution within this sub-sector came from the manufacture of furniture, which increased by 9.5% and contributed 0.2 percentage points to total production. This was the seventh consecutive increase on a year ago and anecdotal evidence attributed the increase to broad-based strength in the majority of the industry.

In contrast, the manufacturing sub-sector with the largest downward contribution to total production output between August 2015 and August 2016 was the manufacture of basic metals and metal products, which decreased by 3.0% with a downward contribution of 0.2 percentage points to total production. The largest contribution to the decrease within this sub-sector came from the manufacture of basic iron and steel, which decreased by 31.1% and had a downward contribution of 0.2 percentage points to total production compared with a year ago. This was the 14th consecutive decrease on a year ago.

Manufacturing output increased by 0.2% between July 2016 and August 2016 and contributed 0.1 percentage points to total production (Table 5). This followed a decrease of 0.9% in the previous month. There were increases in 4 of the 13 manufacturing sub-sectors. The largest upward contribution came from the manufacture of transport equipment, which increased by 2.5% and contributed 0.2 percentage points to total production. This followed a decrease of 1.6% in the previous month. The largest contribution within this sub-sector came from the manufacture of motor vehicles, trailers and semi trailers, which increased by 4.1% and contributed 0.2 percentage points to total production. This increase followed a decrease of 0.9% in the previous month.

In contrast, the manufacturing sub-sector with the largest downward contribution to total production in August 2016 compared with July 2016 was other manufacturing and repair, which decreased by 2.1%, having decreased by 1.9% in the previous month, contributing a downward 0.1 percentage points to total production. The largest contribution within this sub-sector came from other manufacturing and repair, which decreased by 2.5% and contributed a downward 0.1 percentage points to total production. This decrease was in line with the usual fluctuations and followed an increase of 0.3% in the previous month. For more information on the characteristics of the other manufacturing and repair industry see the previously published spotlight.

## Mining and quarrying

Mining and quarrying output decreased by 0.6% in August 2016 compared with August 2015 and contributed a downward 0.1 percentage points to total production. This followed an increase of 9.4% in the previous month. The sub-sector with the largest contribution to the decrease was the other mining and quarrying sub-sector, which decreased by 1.9% with a negligible contribution to total production (Table 4).

Mining and quarrying output decreased by 3.7% in August 2016 compared with July 2016 and contributed a downward 0.5 percentage points to total production. This followed an increase of 6.8% in the previous month, revised up from 4.7% in the previous publication. The Department for Business, Energy and Industrial Strategy (BEIS) advised this was due to revised and updated data from the source. The sub-sector with the largest contribution to the decrease was the extraction of crude petroleum and natural gas, which decreased by 4.4% and contributed a downward 0.5 percentage points to total production (Table 5). This decrease followed an increase of 8.3% in the previous month. BEIS advised the decrease can largely be attributed to maintenance in several oil fields in the North Sea.

## Electricity, gas, steam and air conditioning

Electricity, gas, steam and air conditioning output decreased by 0.5% in August 2016 compared with August 2015 with a negligible downward contribution to total production (Table 4). This decrease reflected a fall in output in 1 of its 2 sub-sectors. The electric power generation, transmission and distribution sub-sector decreased by 4.6% and contributed a downward 0.3 percentage points to total production. This was the ninth consecutive year-on-year decrease since November 2015 and followed a similar decrease of 4.6% in the previous month. Evidence from BEIS indicated the decrease in August 2016 was a result of a fall in outputs due to fall in demand, along with an increase in the cost of the fuel mix used for the purpose of generating electricity.

Electricity, gas, steam and air conditioning output increased by 0.2% in August 2016 compared with July 2016 and had a negligible contribution to total production (Table 5). This reflected an increase in output in both of its sub-sectors; the largest contribution came from the manufacture of gas and distribution of gaseous fuels though mains, which increased by 0.3% with a negligible contribution to total production (Table 5). Evidence from BEIS cited the increased use of gas for the purpose of generating electricity was a contributing factor to the increase in the manufacture of gas and distribution of gaseous fuels through mains.

## Water and waste management

Water supply, sewerage and waste management output increased by 7.0% in August 2016 compared with August 2015, continuing the pattern of increasing year-on-year growth rates from March 2015. This increase reflected a rise in 3 of its 4 sub-sectors' output (Table 4), with the largest contribution coming from waste collection, treatment and disposal activities, which increased by 11.5% and contributed 0.4 percentage points to total production.

Water supply, sewerage and waste management output decreased by 0.2% between July 2016 and August 2016 providing a negligible downward contribution to total production. This decrease reflected falls in 2 of its 4 sub-sectors, with the largest downward contribution coming from water collection, treatment and supply, which decreased by 0.9% and had a negligible contribution to total production (Table 5).

## Revisions to IoP

Revisions to the Index of Production (IoP) follow the National Accounts revisions policy. Revisions are caused by a number of factors including, but not limited to revisions to source data due to late responses to the Monthly Business Survey (MBS), actual data replacing forecast data and revisions to seasonal factors that are re-estimated every period.

We produce revisions triangles of production and manufacturing growth to provide users with one indication of the reliability of this important indicator. Statistical tests are performed on the average revision to test if it is statistically significantly different from zero. Further information can be found in section 9 quality and methodology.

In this release of data, the only period open for revision was July 2016.

The IoP monthly growth rate for July 2016 was unrevised at 0.1%. However, there were larger than usual revisions to 2 main sectors; namely mining and quarrying, and electricity, gas, steam and air conditioning, which largely offset each other. Within these, the electric power generation, transmission and distribution sub-sector was revised down by 3.5 percentage points from an increase of 1.1% to a fall of 2.4%. The extraction of crude petroleum and natural gas sub-sector was revised up by 2.7 percentage points, from an increase of 5.6% to an increase of 8.3%. The Department for Business, Energy and Industrial Strategy (BEIS) advised this was as a result of updated data from the source.

Further details on the revisions to IoP components can be found in the IOP5R tables, located within the  dataset section of this release.

# 8 . Spotlight: Note on the impact of the depreciation of sterling on the Index of Production

Following the EU referendum vote on 23 June 2016, the pound depreciated sharply, such that sterling was 6.0% lower against the euro and 7.5% lower against the US dollar in July compared with June (on average). Large movements in the value of sterling can affect the price that manufacturers pay for intermediate inputs, which in turn can affect headline production output figures both in price and volume terms.

Figure 4 shows price indices for exports and imported inputs taken from the UK Producer Price Inflation: August 2016 – the large uptick in both series in July 2016 is closely related to the depreciation of the exchange rate. Import prices have risen in pounds terms as more pounds are needed to purchase a given quantity of foreign currency. Export prices might also rise (in pounds) if firms keep the price of their exported goods fixed in foreign currency terms.

The levelling off of export and import prices in August 2016 reflects the fact that exchange rate movements between July 2016 and August 2016 were much smaller than the movements between June 2016 and July 2016 (that is, the rate of price changes have reverted closer to historical trends). More information on the effect of exchange rate changes on ONS price indices can be found in the October edition of the ONS Economic Review.

**Figure 4: Total import and export price indices, August 2014 to August 2016, UK**
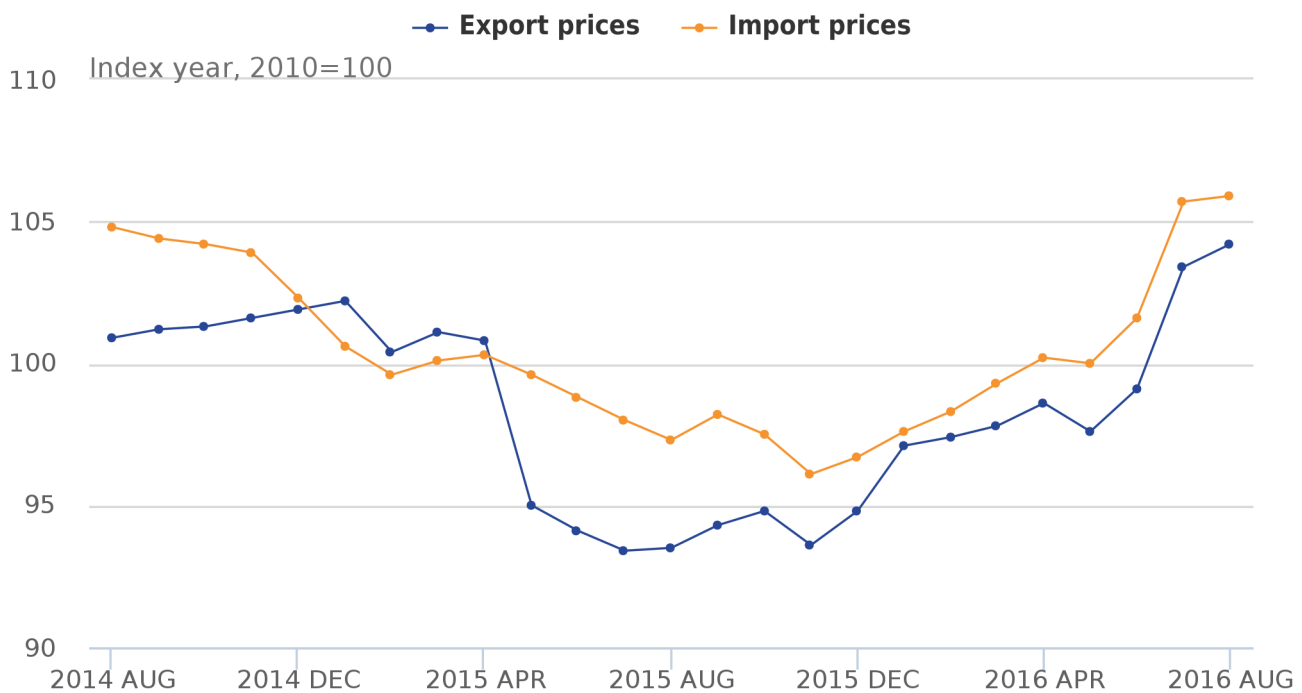


Source: Office for National Statistics

Import and export prices are both used to deflate the nominal value of production output (that is, current prices) into real output (or a volume measure). The weight at which this is applied is dependent on export share of turnover and may vary by product. For example, the chemical industry is one of the most heavily export orientated, selling approximately 70% of turnover to overseas buyers. The corresponding price index (and deflator) for this industry has risen faster than total manufacturing. The deflators for other highly export orientated industries, such as pharmaceuticals and transport, have also risen faster.

Conversely there are other industries which are less export orientated, where the corresponding deflator effect will have been smaller in July 2016. For example the manufacture of dairy products industry typically exports less than 10% of products (potentially reflecting the fact that food products can be perishable). But in general the export share across the overall manufacturing industry has been broadly stable at around 30%.

Any upward pressure to export prices in July 2016 will have resulted in downward pressure on the published volume measures of production output. However, the longer run impact of improved price competitiveness, which may arise from the devalued sterling on the volume of UK manufacturing, will only be made clear once a longer run of data post EU referendum is obtained.

# 9 . Quality and methodology

The Index of Production Quality and Methodology Information document contains important information on:

- the strengths and limitations of the data and how it compares with related data

- users and uses of the data

- how the output was created

- the quality of the output including the accuracy of the data

# Methods

The [Index of Production methodology](#) is published on our website within our methodology web pages. These include details on improvements, a sources catalogue detailing methods, data and weights used to compile IoP, Index of Services and output approach to gross domestic product (GDP(O)).

# Composition of the data

The Index of Production uses a variety of different data from sources that are produced on either a quarterly or monthly basis.

Most of the series are derived using current price turnover deflated by a suitable price index. This includes the Monthly Business Survey (MBS) data, our short-term survey of various industries in the economy. It is one of the main data sources used in the compilation of the Index of Production.

Approximately 70% of the IoP estimates are based on data collected through MBS. The remainder are based on data received from external sources. The MBS response rates for data included in this publication are presented in Table 6 for the current month and the 3 months prior. The response rates for the historical periods are updated to reflect the current level of response, incorporating data from late returns. We have included 2 response rates: one percentage for the amount of turnover returned and the other percentage for the amount of questionnaire forms. We have also published [MBS historical production industries response rates](#) back to 2010.

**Table 6: Monthly Business Survey (MBS) response rates, August 2016, UK**

|  |  |  |  | % |
| --- | --- | --- | --- | --- |
|  | Year | Period | Turnover | Questionnaire |
| MBS overall | 2016 | Aug | 87.8 | 75.2 |
|  | 2016 | Jul | 95.2 | 82.9 |
|  | 2016 | Jun | 96.4 | 84.5 |
|  | 2016 | May | 96.8 | 85.4 |
| MBS production only | 2016 | Aug | 86.9 | 78.5 |
|  | 2016 | Jul | 95.3 | 85.7 |
|  | 2016 | Jun | 96.7 | 87.4 |
|  | 2016 | May | 96.9 | 88.6 |

Source: Office for National Statistics

# Seasonal adjustment

The index numbers in this statistical bulletin are all seasonally adjusted in line with international best practice, using X-13-ARIMA-SEATS software. This aids interpretation by removing annually recurring fluctuations, for example, due to holidays or other regular seasonal patterns. Unadjusted data are also available.

Seasonal adjustment removes regular variation from a time series. Regular variation includes effects due to month lengths, different activity near particular events such as shopping activity before Christmas, and regular holidays such as the May bank holiday. Some features of the calendar are not regular each year, but are predictable if we have enough data, for example, the number of certain days of the week in a month may have an effect, or the impact of the timing of Easter. As Easter changes between March and April, we can estimate its effect on time series and allocate it between March and April depending on where Easter falls. Estimates of the effects of day of the week and Easter are used respectively to make trading day and Easter adjustments prior to seasonal adjustments.

Although leap years only happen every 4 years, they are predictable and regular and their impact can be estimated. Hence, if there is a leap year effect, it is removed as part of regular seasonal adjustment.

## Deflation

It is common for the value of a group of financial transactions to be measured in several time periods. The values measured will include both the change in the volume sold and the effect of the change of prices over that year. Deflation is the process whereby the effect of price change is removed from a set of values.

All series, unless otherwise quoted, are chained volume measures. Deflators adjust the value series to take out the effect of price change to give the volume series.

## Quality

## Basic quality information

A common pitfall in interpreting data is that expectations of accuracy and reliability in early estimates are often too high. Revisions are an inevitable consequence of the trade off between timeliness and accuracy. Early estimates are based on incomplete data.

Very few statistical revisions arise as a result of "errors" in the popular sense of the word. All estimates, by definition, are subject to statistical "error" but in this context the word refers to the uncertainty inherent in any process or calculation that uses sampling, estimation or modelling. Most revisions reflect either the adoption of new statistical techniques, or the incorporation of new information that allows the statistical error of previous estimates to be reduced. Only rarely are there avoidable "errors" such as human or system failures and such mistakes are made quite clear when they occur.

## Revision triangles

One indication of the reliability of the main indicators in this bulletin can be obtained by monitoring the size of revisions. Table 7 is based on the revisions which have occurred over the last 5 years. Please note that these indicators only report summary measures for revisions. The revised data may themselves be subject to sampling or other sources of error.

**Table 7: Revisions, August 2016, UK**

Percentage change

| Growth rates | Value in latest period | Revisions between first publication and estimates 12 months later | |
| | | Average over the last 60 months | Average over the last 60 months without regard to sign (average absolute revision) |
|---|---|---|---|
| Production - 3 month | 0.2 | -0.14 | 0.27 |
| Manufacturing - 3 month | -0.4 | -0.14 | 0.26 |
| Production - 1 month | -0.4 | -0.10 * | 0.24 |
| Manufacturing - 1 month | 0.2 | -0.08 | 0.20 |

Source: Office for National Statistics

Datasets give revisions triangles of estimates for all months from April 1998 through to the current month.

A statistical test has been applied to the average revisions to find out if they are statistically significantly different from zero. An asterisk (*) indicates if a figure has been found to be statistically significant from zero.

The table uses historical data for the most recent 60 months, comparing the estimate at first publication with the estimate as published 12 months later. The numbers which underpin these averages include normal changes due to late data and re-seasonal adjustment, but also significant methodological changes, the most recent being the introduction of the 2007 Standard Industrial Classification in October 2011.

The result, presented in Table 7, suggests that the average revision for our 3 monthly estimates is not statistically significantly different from zero and that there are small downward revisions for our monthly production estimates over 12 months. In other words, the initial estimates for any given period provide a good indication of the later IoP estimates once more data have become available.

# 10. Background notes

1. **What's new?**

   UK economic review: October 2016 was published on 5 October 2016, providing further commentary on the economy. This edition of the Economic Review provides a summary of ONS data covering the post-EU referendum period which have been published since the last Review.

   This supplements the assessment of the post-referendum economy published on 21 September and the previous edition of the Economic Review which provided a summary of data published in August.

   The Index of Production (IoP) is constantly being reviewed and improved, a full list of the output approach to gross domestic product (GDP(O)) improvement project articles can be found on the Improvements page of our website.

**Upcoming changes**

The Index of Production release for September 2016, to be published on 8 November 2016, will contain revisions back to July 2016.

Due to the recent events affecting the steel industry, we are aiming to review current seasonal adjustment for the industry. This is in line with our continuous improvement programme and we will report on results when available.

The standard error for the Index of Production has been calculated based on growth rates from 2014 and published in Survey Methodology Bulletin No.75 Spring 2016. We are working on updating this for regular publication as part of this release.

**VAT project update**

HM Revenue and Customs (HMRC) VAT update October 2016 was published on 4 October 2016 and shared early VAT turnover analysis and data for manufacturing and 6 industries within the services sector at 2-digit SIC (51 air transport services, 55 accommodation and food services, 56 food and beverage serving services, 73 advertising and market research services, 79 travel agency tour operator and other related services, 93 sports services and amusement and recreation services).

The research article represents the first significant publication of new VAT turnover statistics as part of our commitment to develop a diverse range of administrative data sources for use in the national accounts. The 5 previous VAT articles outlined progress in the development of this administrative data source and its tactical use in a pilot which was planned to launch in September. We are now adopting a more strategic approach and developing the methods and data to allow us to use VAT turnover in the national accounts by the end of 2017. It describes the current methodology but also the data challenges which we have so far identified. The next article will be published in January 2017 and we would welcome feedback on how we could potentially improve our methods and data. Please contact us with your views: vatdev@ons.gsi.gov.uk

2. **Special events**

We previously maintained a list of candidate special events in the special events calendar up to 2014. As explained in our special events policy, it is not possible to separate the effects of special events from other changes in the series.

3. **Understanding the data**

**Short guide to the Index of Production**

This statistical bulletin gives details of the index of output of the production industries in the UK. Index numbers of output in this statistical bulletin are on the base 2013=100 and are classified to the 2007 Standard Industrial Classification (SIC). The production industries, which accounted for 14.6% of GDP in 2013, cover mining and quarrying (Section B), manufacturing (Section C), electricity, gas, steam and air conditioning (Section D) and water supply and sewerage (Section E).

**Interpreting the data**

The non-seasonally adjusted series contain elements relating to the impact of the standard reporting period, moving holidays and trading day activity. When making comparisons it is recommended that users focus on seasonally adjusted estimates as these have the seasonal effects and systematic calendar-related components removed. Figures for the most recent months are provisional and subject to revision in light of:

- late responses to surveys and administrative sources

- revisions to seasonal adjustment factors which are re-estimated every month and reviewed annually (changes from the latest review are included in this release)

**Definitions and explanations**

Definitions found within the main statistical bulletin:

Chained volume measure

An index number from a chain index of quantity; the index number for the reference period of the index may be set equal to 100 or to the estimated monetary value of the item in the reference period.

Index number

A measure of the average level of prices, quantities or other measured characteristics relative to their level for a defined reference period or location; it is usually expressed as a percentage.

Seasonally adjusted

Seasonal adjustment aids interpretation by removing effects associated with the time of the year or the arrangement of the calendar, which could obscure movements of interest.

Compound average growth

Compound average growth is the rate at which a series would have increased or decreased if it had grown or fallen at a steady rate over a number of periods. This allows the composition of growth in the recent economic recovery to be compared to the long run average.

Use of the data

The IoP is an important economic indicator and one of the earliest short-term measures of economic activity. The main output is a seasonally adjusted estimate of total production and broad sector groupings of mining and quarrying; manufacturing; energy; and water supply and sewerage. The total IoP estimate and various breakdowns are widely used in private and public sector institutions, particularly the Bank of England, HM Treasury and the Office for Budget Responsibility, to assist in informed policy and decision making.

4. **Code of Practice for Official Statistics**

National Statistics are produced to high professional standards set out in the Code of Practice for Official Statistics. They undergo regular quality assurance reviews to ensure that they meet customer needs. They are produced free from any political interference.

5. **Accessing data**

The complete run of data in the tables of this statistical bulletin is also available to view and download in electronic format free of charge using our Time Series Data service. You can download the complete bulletin in a choice of zipped formats, or view and download your own selections of individual series.

We publish revisions triangles of all the main published main indicators on our website.

6. **Relevant links**

On 2 December 2015, we published a short story on the British steel industry since the 1970s.

On 1 September 2015, we published an article on the performance of the UK's motor vehicle manufacturing industry.

A methodological note on leap year adjustments was published on 29 February 2016, explaining how leap years might affect our time series and the methods used to adjust for them as part of seasonal adjustment.

7. **Customer feedback**

We have received some comments from users regarding the Index of Production. These have mainly been in 3 areas and the bullet points detail the action we have taken, or plan to take, to address these concerns:

- you commented that longer time series would be useful so long run time series of data for the main IoP industries are available - furthermore, data at 4 decimal places for IoP and the main sub-sectors are now available

- you would like more information on data content - from the bulletin published on 11 March 2015, response rates for the monthly business survey data feeding in to IoP were included

- you also raised concerns that the IoP is not benchmarked to annual data through the supply and use framework - this is being addressed as part of our response to the National Statistics Quality Review of National Accounts

As a reader and user of our statistics we welcome your feedback on the content of this publication, your views for improvement and on the way you use our statistics currently. If you would like to get in touch or send your feedback, please contact us.