

Statistical bulletin

Index of Production, UK: September 2015

Movements in the volume of production for the UK production industries: manufacturing, mining and quarrying, energy supply, and water and waste management. Figures are seasonally adjusted.



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1 . Main points

- Total production output is estimated to have increased by 0.2% between Quarter 2 (Apr to June) 2015 and Quarter 3 (July to Sep) 2015. Manufacturing, the largest component of production, is estimated to have decreased by 0.4% between these periods. However, when comparing September 2015 with August 2015, manufacturing is estimated to have increased by 0.8%, the largest monthly rise since April 2014. This followed a slightly smaller increase of 0.4% in August 2015 and a decrease of 0.7% in July 2015
- The largest contribution to the quarterly growth came from mining & quarrying, which increased by 2.8%, the 4th consecutive quarterly increase since Quarter 3 (July to Sep) 2014
- Total production output is estimated to have increased by 1.1% in September 2015 compared with September 2014. There were increases in 3 of the 4 main sectors, with mining & quarrying output being the largest contributor, increasing by 8.6%
- Manufacturing output decreased by 0.6% in September 2015 compared with September 2014. The largest contribution to the decrease came from the manufacture of machinery & equipment not elsewhere classified, which decreased by 13.7%
- Total production output in September 2015 is estimated to have decreased by 0.2% compared with August 2015. There were decreases in 2 of the 4 main sectors, with the largest contribution coming from mining & quarrying, which decreased by 4.9%
- In the 3 months to September 2015, production and manufacturing were 9.3% and 6.4% respectively below their figures reached in the pre-downturn GDP peak in Quarter 1 (Jan to Mar) 2008
- The preliminary estimate of GDP, published on 27 October 2015, contained a forecasted increase of 0.3% for production output in Quarter 3 (July to Sep) 2015. This release of data estimates that production output increased by 0.2% between Quarter 2 (Apr to June) 2015 and Quarter 3 (July to Sep) 2015 and the impact on the previously published GDP estimate for Quarter 3 (July to Sep) 2015 is minimal

2 . Index of Production headline figures

This bulletin presents the monthly estimates of the Index of Production (IoP) for the UK production industries, September 2015. The IoP is one of the earliest indicators of growth and it measures output in the manufacturing (the largest component of production), mining & quarrying, energy supply and water supply & waste management industries. The production industries account for 14.9% of the [output approach to the measurement of gross domestic product](#).

IoP values are referenced to 2012 so that the average for 2012 is equal to 100. Therefore, currently an index value of 110 would indicate that output is 10% higher than the average for 2012. The index estimates are mainly based on a 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 seasonally adjusted estimates, unless otherwise stated.

This release presents:

- the most recent IoP figures
- the economic context to the IoP
- 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 June 2013 to September 2015.

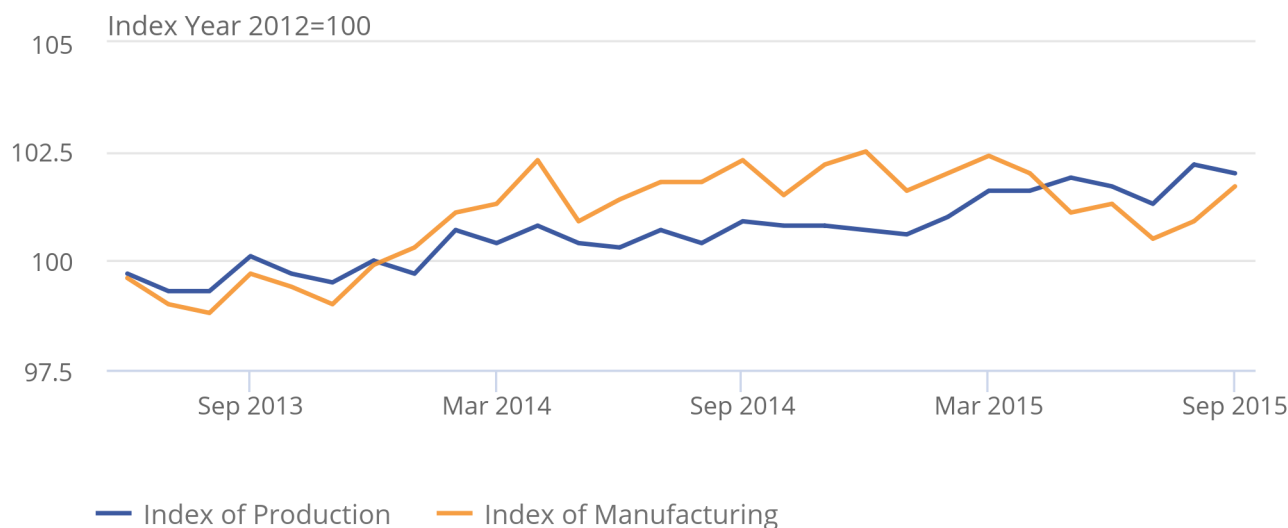
Table 1: Index of Production main figures, September 2015, UK

	Index number 2012=100	Most recent month on a year earlier	Most recent 3 months on a year earlier	Percentage change	
				Most recent month on previous month	Most recent 3 months on previous 3 months
Production	102.0	1.1	1.2	-0.2	0.2
Manufacturing	101.7	-0.6	-0.9	0.8	-0.4

Source: Office for National Statistics

Figure 1: Seasonally adjusted production and manufacturing, June 2013 to September 2015, UK

Figure 1: Seasonally adjusted production and manufacturing,
June 2013 to September 2015, UK



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

3 . 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 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, still as in all survey-based estimates, by definition, its estimates 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. The IoP however, is constructed from a variety of data sources, some of which are not based on random samples. As a result, we currently do not publish a measure of the sampling error associated with the IoP underlying data, mainly the monthly business survey (MBS). However, research is currently under way to attempt to measure the standard error and the results of this will be published on completion.

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 MBS response rates for data included in the IoP publication were published in the background 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 \(34.5 Kb Excel sheet\)](#).

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 background note.

It should be noted that 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 [QMI paper \(247.9 Kb Pdf\)](#). 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.

4 . Economic context

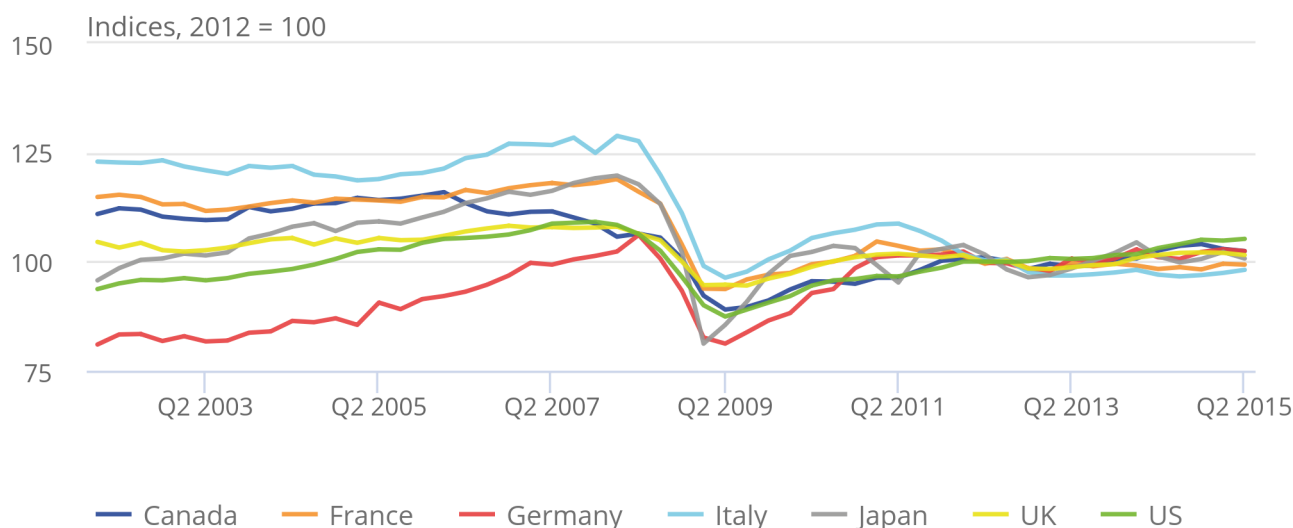
Between January and May 2015, production output increased at a moderate pace. This upward trend was partially reversed in June and July 2015 (the contraction in output over these 2 months was smaller than the increases observed since the beginning of the year). The latest data show that production output increased strongly between July and August 2015, but fell back slightly in September with the value of the index remaining just above the level seen in May 2015.

In 2015, the performance of the manufacturing industry has been more volatile than that of the Index of Production (IoP) as a whole. Despite a moderate increase from July to August 2015 and a strong increase between August and September 2015, manufacturing output is only slightly above the level seen at the start of the year (for more information and analysis of the latest figures see the production and sectors supplementary analysis section of the bulletin).

Figure 2 shows that the UK manufacturing industry grew steadily between Quarter 1 (Jan to Mar) 2002 and Quarter 1 (Jan to Mar) 2008 at an average compound growth rate of 0.1% per quarter. The economic downturn impacted the industry severely, with output contracting by 12.3% between the economy's peak in Quarter 1 (Jan to Mar) 2008 and the economy's trough in Quarter 2 (Apr to June) 2009. Following the economic downturn in 2008 and 2009, manufacturing returned to growth for a short period, before falling again in 2011 and 2012.

Figure 2: Quarterly international manufacturing output, Quarter 1 (Jan to Mar) 2002 to Quarter 2 (Apr to June) 2015

Figure 2: Quarterly international manufacturing output, Quarter 1 (Jan to Mar) 2002 to Quarter 2 (Apr to June) 2015



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

Notes:

1. Data for the UK are consistent with the September ONS Index of Production bulletin, while data for all other remaining G7 economies have been sourced from OECD
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)

Between Quarter 3 (July to Sep) 2014 and Quarter 3 (July to Sep) 2015, the IoP experienced relatively steady growth. The manufacturing industries also experienced quarter-on-quarter growth in 2014, however, the industry then contracted in the 3 quarters of 2015 (for more information and analysis on the latest quarterly data see the production and sectors supplementary analysis section of the bulletin).

Headline GDP surpassed its pre-downturn peak in Quarter 2 (Apr to June) 2013, but services (which account for over 78% of total GDP) remain the only headline industry grouping to have achieved this. Output in the production and manufacturing industries still remains below levels experienced just before the onset of the downturn (according to [Gross Domestic Product Preliminary Estimate, Quarter 3 \(July to Sep\) 2015](#)). 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 [Labour Productivity, Quarter 2 \(Apr to June\) 2015](#)). The slower output growth and increased productivity, therefore, reflect the falling share of the labour force employed in manufacturing, which fell from 16.5% in 1997 to 9.8% in 2014 ([Labour Market Statistics, October 2015, reference table EMP13](#)).

Over the past year the manufacturing industry has experienced low price inflation, both 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 fell by 13.3% in the year to September 2015, compared with a fall of 14.6% in the year to August 2015. Output prices have also experienced deflation, falling by 1.8% in the year to September 2015, with crude oil impacting input prices. This feeds through to petroleum products, contributing to the decrease in their output prices ([more information can be found in Producer Price Inflation, September 2015](#)).

International perspective

Globally, the performance of manufacturing output has varied across the G7 nations since the onset of the economic downturn (Figure 2). Japan experienced the largest average annual fall in output during 2008 and 2009 (12.5% per annum), whereas the smallest decline was in the UK (6.1% per annum).

Following the economic downturn in 2008 and 2009, all G7 nations' manufacturing industries returned to growth. However, almost all members experienced subsequent declines in growth between the second half of 2012 and the first half of 2013, particularly in Italy and Japan. More recently, in Quarter 2 (Apr to June) 2015, Italy and the USA experienced growth in manufacturing output at 0.8% and 0.4%, respectively. However, the manufacturing output in the other G7 countries contracted to varying degrees, with the largest contractions taking place in Japan at 1.5%, while France, Canada, Germany and the UK contracted to a lesser extent.

For most G7 countries, manufacturing output in Quarter 2 (Apr to June) 2015 remained below their respective pre-downturn levels experienced in 2007. Output in Italy, France, Japan and Canada remained 22.6%, 15.7%, 14.1% and 7.2% below the countries' pre-downturn levels respectively. In Quarter 2 (Apr to June) 2015, the UK and the USA were also below their respective pre-downturn levels, but to a lesser extent, while Germany was above its pre-downturn level, by 2.2% (more information can be found on the OECD website).

Figure 3 presents month on same month a year ago growth rates in 8 of the 13 UK manufacturing sub-industries for August 2015, alongside comparable growth rates achieved in Germany, France, Italy and the euro area. This shows that the UK manufacturing output contracted by 0.9%, compared with total euro area manufacturing growth of 1.2%. Manufacturing output also increased in France, Germany and Italy by 2.3%, 2.2% and 0.7% respectively.

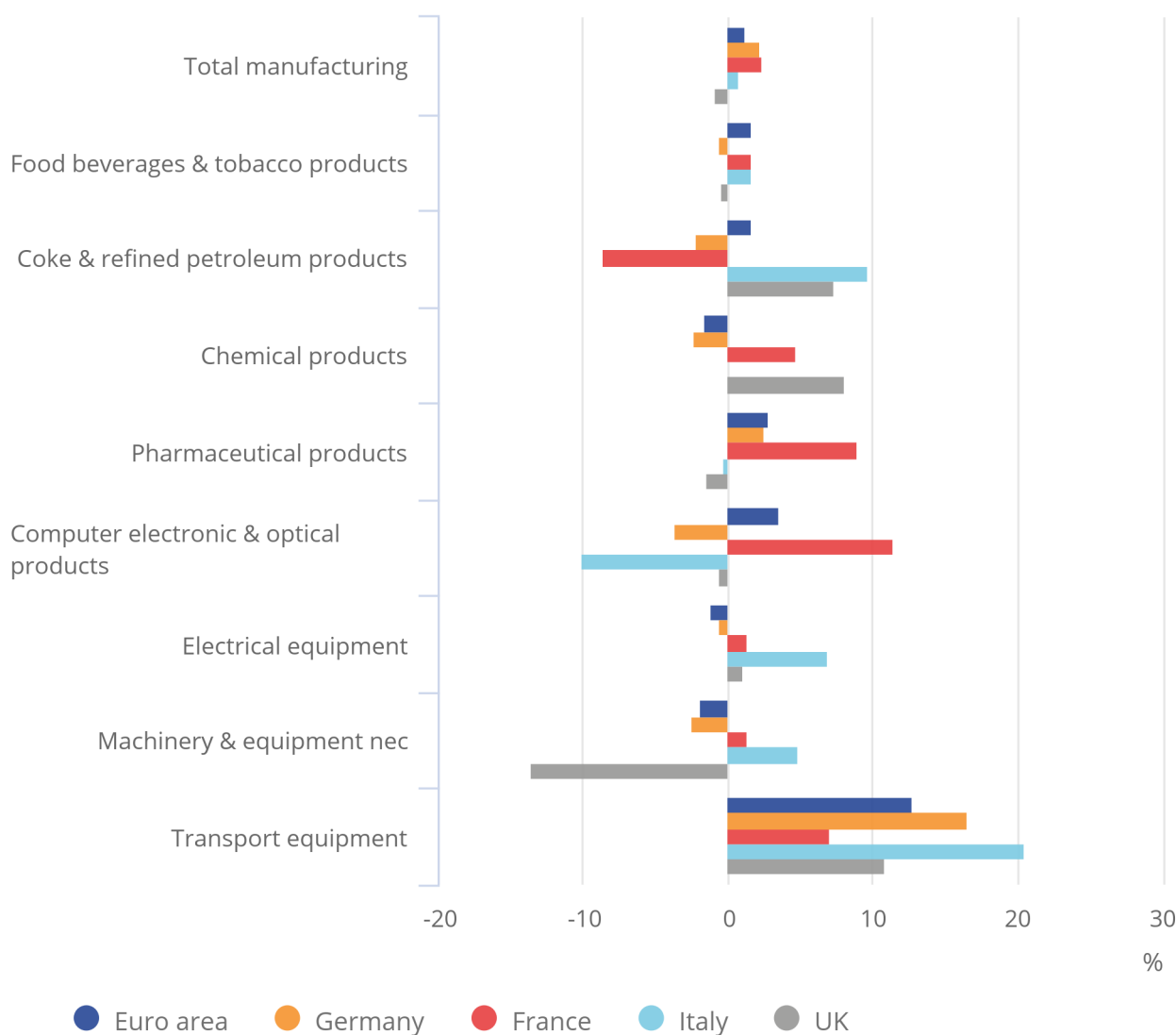
Figure 3 also shows that the UK's comparable strength was concentrated in the manufacture of "chemical products", which was offset by relative weakness in the manufacture of "machinery & equipment not elsewhere classified".

Figure 3: Month on same month a year ago manufacturing sub-sector percentage growth in the UK and the euro area

August 2015 compared with August 2014

Figure 3: Month on same month a year ago manufacturing sub-sector percentage growth in the UK and the euro area

August 2015 compared with August 2014



Source: Monthly Business Survey (Production and Services) - Office for National Statistics, Eurostat

Notes:

1. Data for the UK are consistent with the September ONS Index of Production bulletin, while data for all other remaining economies have been sourced from Eurostat

5 . Gross domestic product (GDP) impact and components

In this release, periods back to July 2015 were open for revision, in line with the [National Accounts revisions policy \(41.6 Kb Pdf\)](#).

The [preliminary estimate of GDP](#), published on 27 October 2015, contained a forecasted increase of 0.3% for production in Quarter 3 (July to Sep) 2015. This release of data estimates that production increased by 0.2% between Quarter 2 (Apr to June) 2015 and Quarter 3 (July to Sep) 2015. The rise in IoP was lower than forecasted primarily due to revisions in 2 sectors. Firstly, the fall in manufacturing was revised down from -0.3% to -0.4% following the receipt of actual data to replace estimates in the manufacture of basic iron & steel. Secondly, the forecasted rise of 1.2% in the water supply, sewerage & waste management sector was revised to an estimated fall of 0.2%, as a result of actual data to replace estimates. Due to the weight of the production industries within the economy, the impact on the recently published GDP preliminary estimate was minimal.

The estimates for the production industries are generally the first of the main components for the output approach to the measurement of GDP to be published (agriculture, [construction](#) and [services](#) are the other components). All the components are available for Quarter 2 (Apr to June) 2015. 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 September 2015 will be published on 13 November 2015 and services output for the same period on 27 November 2015.

Table 2: Components of GDP, September 2015, UK

Publication	Percentage of GDP ⁴	Release date	Month or quarter of GDP ²	Most recent quarter on a year earlier ³	Percentage change		
					Most recent quarter on the previous quarter ³	Most recent month on the same month a year ago	Most recent month on the previous month
Index of Production ¹	14.9	06 Nov	Sep	..	..	1.1	-0.2
			Q3 2015	1.2	0.2	..	..
			Q2 2015	1.2	0.7	..	..
Construction	5.9	09 Oct	Aug	..	..	-1.3	-4.3
			Q2 2015	3.9	1.4	..	..
Index of Services	78.6	27 Oct	Aug	..	..	2.8	0.0
			Q2 2015	2.7	0.6	..	..
Retail Sales		22 Oct	Sep	..	..	6.5	1.9
			Q3 2015	5.0	0.9	..	..
			Q2 2015	4.3	0.8	..	..
Agriculture	0.7		Q3 2015	-0.1	0.5	..	..

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 4. 'Percentage of GDP' column may not add up to 100 due to rounding

6 . Production and sectors supplementary analysis

Table 3: Headline growth rates for the Index of Production, September 2015, UK

Description	% of production	Month on same month a year ago growth (%)	Month on previous month growth (%)	Quarter on previous quarter growth (%)
IoP	100.0	1.1	-0.2	0.2
Sector B	13.5	8.6	-4.9	2.8
Division 06	10.6	12.9	-6.3	3.2
Sector C	69.1	-0.6	0.8	-0.4
Sector D	9.3	1.4	0.6	1.0
Sector E	8.1	3.0	-1.1	-0.2

Source: Office for National Statistics Notes: 1. Headline figures for the Index of Production are: Total Index of Production; Sector B Mining & quarrying; and within this Division 06 Oil & gas extraction; Sector C Manufacturing; Sector D Electricity, gas, steam & air conditioning; Sector E Water supply, sewerage & waste management

Figure 4: Contribution to production percentage growth, between Quarter 2 (Apr to June) 2015 and Quarter 3 (July to Sep) 2015, UK

Growth rates can be found in the attached IoP 5 tables

Figure 4: Contribution to production percentage growth,
between Quarter 2 (Apr to June) 2015 and Quarter 3 (July to Sep)
2015, UK

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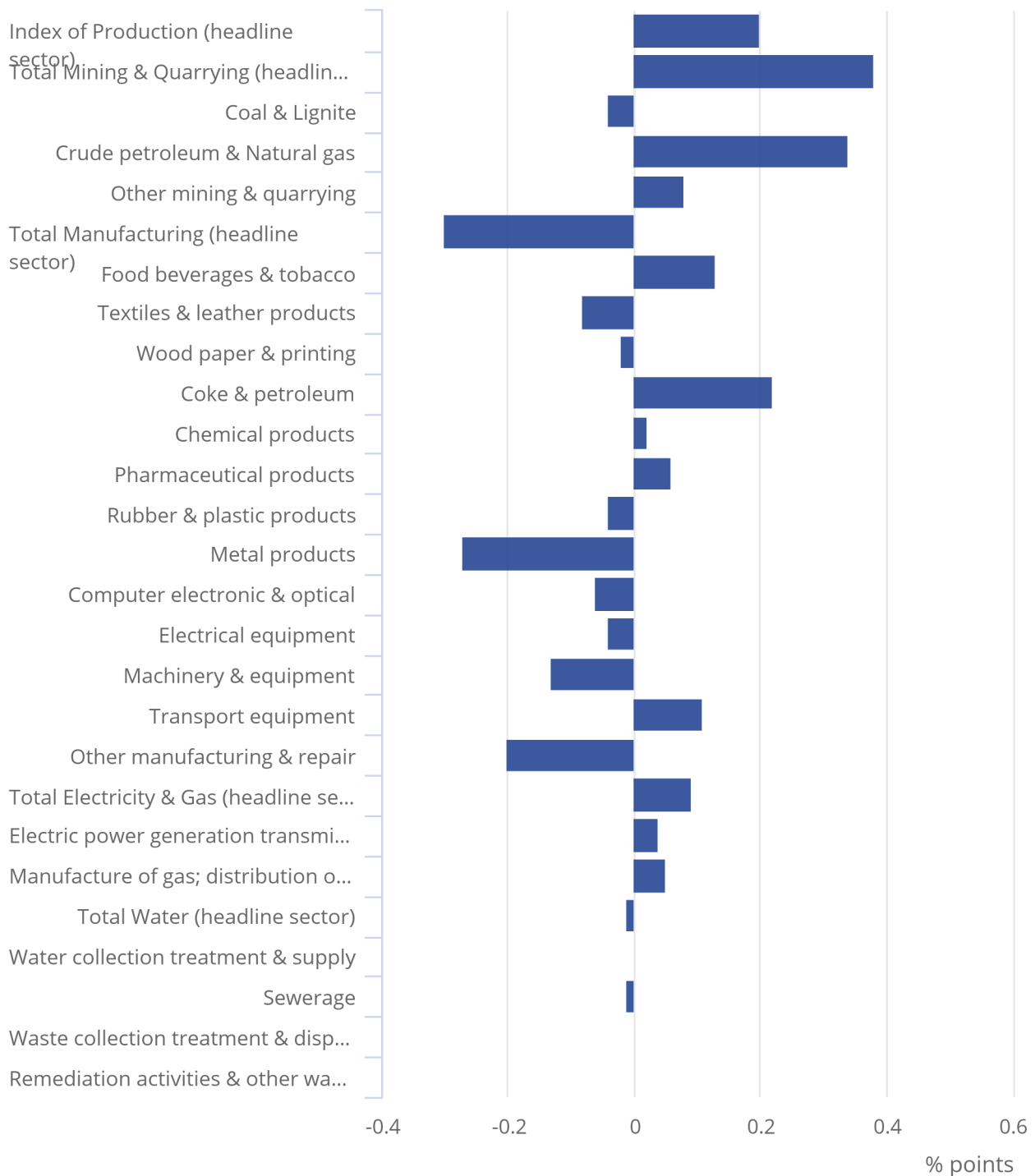


Figure 5: Contribution to production percentage growth, between September 2014 and September 2015, UK

Growth rates can be found in the attached IoP 5 tables

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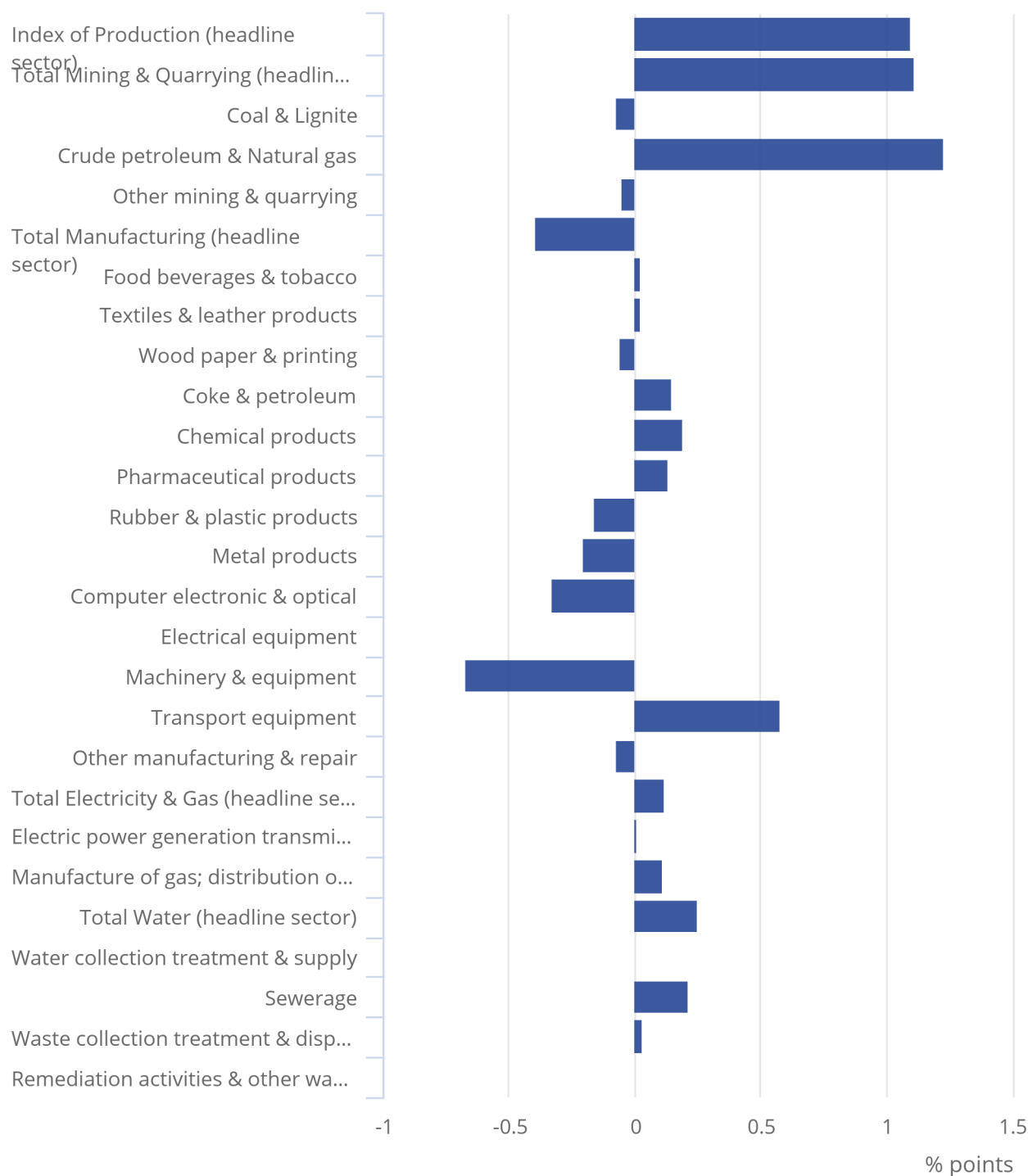
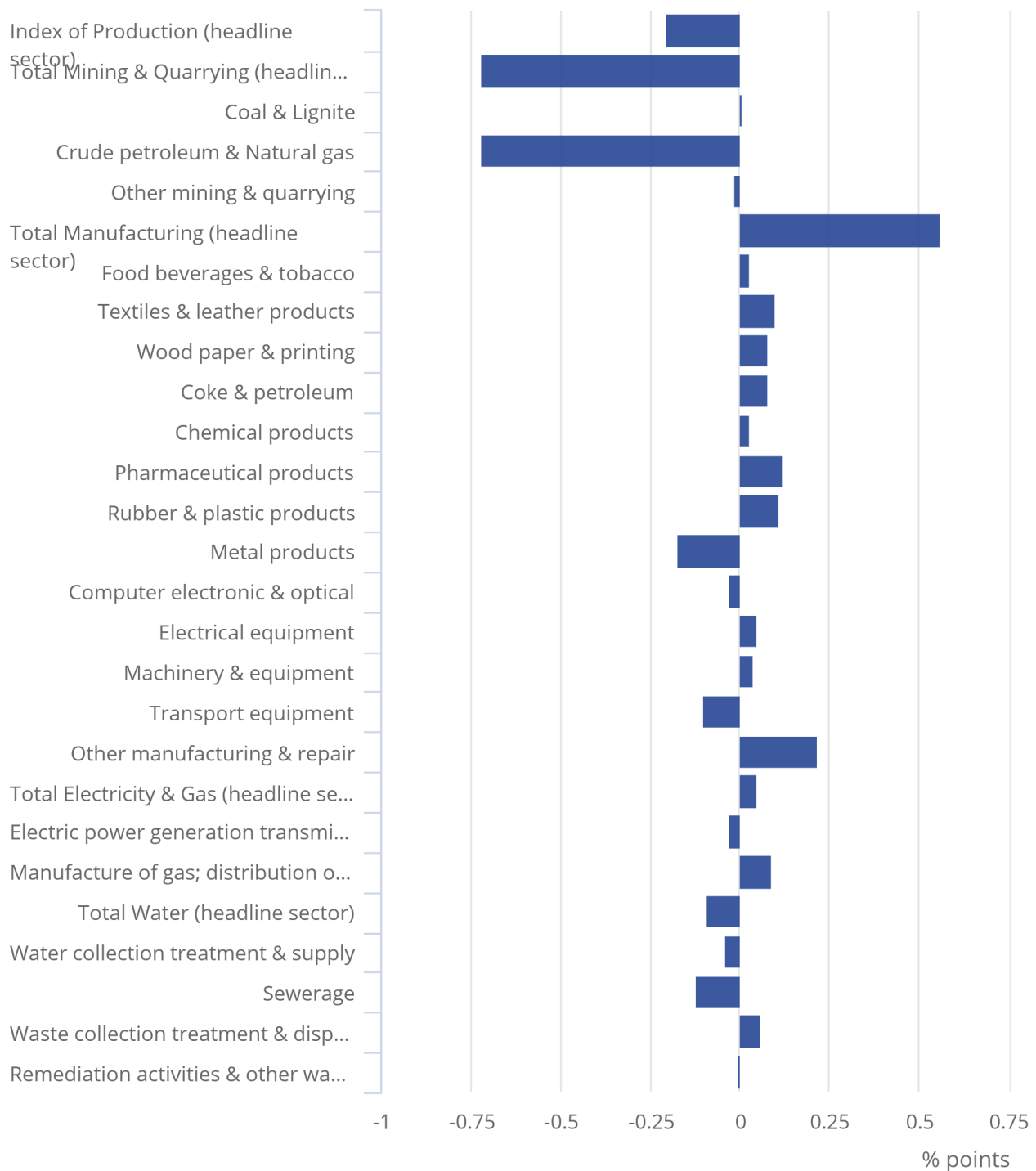


Figure 6: Contribution to production percentage growth, between August 2015 and September 2015, UK

Growth rates can be found in the attached IoP 5 tables

Figure 6: Contribution to production percentage growth,
between August 2015 and September 2015, UK

Growth rates can be found in the attached IoP 5 tables



Total production

As seen in Table 3, total production output increased by 0.2% in Quarter 3 (July to Sep) 2015 compared with Quarter 2 (Apr to June) 2015. This increase was lower than the forecasted increase of 0.3% contained within the recent preliminary estimate of GDP. This was due to downward revisions both to manufacturing and water supply, sewerage & waste management, caused by the receipt of new and revised data to replace early estimates. The quarterly increase in total production reflected increases of 2.8% in mining & quarrying output and 1.0% in electricity, gas, steam & air conditioning output. Partially offsetting these increases were decreases in manufacturing (the largest component in production) of 0.4% and of 0.2% in water supply, sewerage & waste management.

Total production output in September 2015 increased by 1.1% compared with September 2014 (Table 3). This increase reflected rises in 3 of its 4 main sectors, with mining & quarrying having the largest contribution on a year ago, increasing by 8.6% and contributing 1.1 percentage points to total production (see the sector analysis for details). The rises were partially offset by a fall in manufacturing, which decreased by 0.6% and contributed 0.4 percentage points to total production.

Between August 2015 and September 2015, total production output decreased by 0.2% (Table 3). There were decreases in 2 of its 4 main sectors. The downward contributions came from mining & quarrying, which decreased by 4.9% and contributed 0.7 percentage points and water supply, sewerage & waste management, which decreased by 1.1% and contributed 0.1 percentage points to total production. Partially offsetting the decreases were increases in manufacturing, which increased by 0.8% and contributed 0.6 percentage points to total production and electricity, gas, steam & air-conditioning output, which increased by 0.6% and contributed 0.1 percentage points (Figure 6).

Manufacturing

Manufacturing decreased by 0.4% in Quarter 3 (July to Sep) 2015 compared with Quarter 2 (Apr to June) 2015, a slightly larger fall than the estimate contained within the preliminary estimate of GDP. This was primarily due to estimates being replaced by actual data for the manufacture of basic iron & steel. This is the third quarterly decrease since Quarter 4 (Oct to Dec) 2014. In Quarter 3 (July to Sep) 2015, the sub-sector with the largest downward contribution was the manufacture of basic metals & metal products, which decreased by 3.5% and contributed 0.3 percentage points to total production (Figure 4). The main contributor to this decrease was the manufacture of iron & steel, which decreased by 13.7% and contributed 0.1 percentage points to total production. This followed a decrease of 6.7% in the previous quarter. Anecdotal evidence cited the closure of steelworks as a contributing factor to the decrease this quarter.

In contrast, the manufacturing sub-sector with the largest quarterly upward contribution to total production in Quarter 3 (July to Sep) 2015 was the manufacture of coke & refined petroleum products, which increased by 13.8% and contributed 0.2 percentage points to total production, having decreased by 5.3% in the previous quarter. Anecdotal evidence suggested that lower crude oil prices in recent months were the main contributing factor to this strength.

Manufacturing output decreased by 0.6% between September 2014 and September 2015 with a downward contribution of 0.4 percentage points to total production growth. Output decreased in 6 of the 13 manufacturing sub-sectors compared with a year ago (Figure 5 shows the contribution to production growth from each of the main sectors and sub-sectors). The manufacturing sub-sector with the largest downward contribution to total production growth was the manufacture of machinery & equipment not elsewhere classified, which decreased by 13.7% and contributed 0.7 percentage points to total production. This was the 10th consecutive decrease on a year ago and anecdotal evidence highlighted widespread general weakness as a contributing factor.

In contrast, the manufacturing sub-sector with the largest upward contribution to total production between September 2014 and September 2015 was the manufacture of transport equipment, which increased by 6.8% and contributed 0.6 percentage points to total production. This was the 13th consecutive increase on a year ago, having increased by 10.8% in the previous month.

Manufacturing output increased by 0.8% between August 2015 and September 2015 and contributed 0.6 percentage points to total production. There were increases in 10 of the 13 manufacturing sub-sectors (Figure 6). The manufacturing sub-sector with the largest contribution to the increase in total production was other manufacturing & repair, which increased by 3.5% and contributed 0.2 percentage points to total production, having decreased by 2.4% in the previous month. Anecdotal evidence suggested the strength is widespread and mainly contract-related.

In contrast to the above increases, the manufacturing sub-sector with the largest downward contribution to total production between August 2015 and September 2015 was the manufacture of basic metals & metal products, which decreased by 2.2% and contributed 0.2 percentage points to total production. Within this sub-sector, the main contributor to the decrease was the manufacture of iron & steel, which decreased by 23.8% and contributed 0.2 percentage points to total production. Anecdotal evidence cited recent plant closures as the main reason for the fall.

Mining & quarrying

Mining & quarrying output increased by 2.8% in Quarter 3 (July to Sep) 2015 compared with Quarter 2 (Apr to June) 2015 and contributed 0.4 percentage points to total production. This increase was slightly higher than the forecasted increase contained within the latest preliminary estimate of GDP. The main contributor to the increase in mining & quarrying was the extraction of crude petroleum & natural gas, which increased by 3.2% (the 4th consecutive quarterly increase) and contributed 0.3 percentage points to total production (Figure 4). Evidence from the Department of Energy and Climate Change (DECC) suggested a reduction in major maintenance compared with the previous year, the tax changes announced in the March 2015 Budget together with the opening of new facilities, for example, the opening of the Golden Eagle oil field at the end of 2014, have been contributing factors to the strength in production in recent quarters.

Mining & quarrying output increased by 8.6% between September 2014 and September 2015 and contributed 1.1 percentage points to total production. The sub-sector with the largest upward contribution was the extraction of crude petroleum & natural gas, which increased by 12.9% and contributed 1.2 percentage points to total production (Figure 5). This was due to increases in crude oil production compared with last year, when major planned maintenance and shutdowns in a number of terminals hampered production.

Mining & quarrying output decreased by 4.9% in September 2015 compared with August 2015 and contributed 0.7 percentage points to total production. This was the largest decrease since January 2014 and followed an increase of 6.2% in the previous month. The sub-sector with the largest downward contribution was the extraction of crude petroleum & natural gas, which decreased by 6.3% and contributed 0.7 percentage points to total production (Figure 6). This was also the largest decrease since January 2014 and followed an increase of 9.1% in the previous month.

Electricity, gas, steam & air conditioning

Electricity, gas, steam & air conditioning output increased by 1.0% in Quarter 3 (July to Sep) 2015, having decreased by 3.0% in the previous quarter. This was reflected in both of its sub-sectors: electric power generation, transmission & distribution, which increased by 0.6% and had a negligible contribution to total production; and the manufacture of gas & distribution of gaseous fuels through mains, which increased by 2.2% and contributed 0.1 percentage points to total production (Figure 4).

Electricity, gas, steam & air conditioning output increased by 1.4% in September 2015 compared with September 2014 and contributed 0.1 percentage points to total production (Figure 5). This reflected an increase in both of its sub-sectors: electric power generation, transmission & distribution, which increased by 0.2% and had a negligible contribution to total production; and the manufacture of gas & distribution of gaseous fuels through mains, which increased by 4.9% and contributed 0.1 percentage points to total production. Electricity, gas, steam & air conditioning output increased by 0.6% in September 2015 compared with August 2015 and contributed 0.1 percentage points to total production (Figure 6). This was the 3rd consecutive increase and followed an increase of 0.6% in the previous month. The increase was in 1 of its 2 sub-sectors, the manufacture of gas & distribution of gaseous fuels through mains, which increased by 3.9% and contributed 0.1 percentage points to total production. The cooler than average temperature and the increase in the use of gas for the purpose of generating electricity were cited as factors contributing to the rise.

Water & waste management

Water supply, sewerage & waste management output decreased by 0.2% in Quarter 3 (July to Sep) 2015 compared with Quarter 2 (Apr to June) 2015, having increased by 3.7% in the previous quarter. This was lower than the forecasted rise contained within the GDP preliminary estimate and was due to actual data replacing estimates. This fall reflected decreases in 3 of its 4 sub-sectors. The largest contributor to the decrease was sewerage, which decreased by 0.5% with a negligible contribution to total production (Figure 4), having increased by 8.3% in the previous quarter.

Water supply, sewerage & waste management output increased by 3.0% in September 2015 compared with September 2014 and contributed 0.2 percentage points to total production. This increase reflected a rise in all of its 4 sub-sectors' output (Figure 5), with the largest contribution coming from sewerage, which increased by 10.1% and contributed 0.2 percentage points to total production.

Water supply, sewerage & waste management output decreased by 1.1% between August 2015 and September 2015 and contributed 0.1 percentage points to total production. This followed a decrease of 2.8% in the previous month. This decrease reflected a fall in 2 of its 4 sub-sectors (Figure 6), with the largest downward contribution coming from sewerage, which decreased by 4.9% and contributed 0.1 percentage points to total production.

Revisions to IoP

Revisions to the Index of Production follow the [National Accounts Revisions policy \(41.6 Kb Pdf\)](#). 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 background note 6.

In this release of data, the earliest period open for revision was July 2015. There were no revisions to IoP month-on-month growth rates greater than 0.1 percentage points.

In August 2015, there was a downward revision of 0.1 percentage points. The month-on-month growth rate was revised from a rise of 1.0% to 0.9%. This was attributed primarily to a revision to the manufacture of basic iron & steel as a result of late responses.

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

7 . Spotlight: The impact of the Blue Book 2015 changes on the manufacturing sub-sectors

The release of Blue Book 2015 constitutes the ONS annual update of the National Accounts. These (methodological and data) changes are designed to ensure that official statistics reflect the changing nature of the UK and global economies, to enable fair and meaningful international comparisons and to permit analysis of current economic trends on the best available data. While the scope and impact of these changes is smaller than in previous years – and notably less than in Blue Book 2014 – there are a range of important measurement developments (more information about the Blue Book changes can be found in [Impact of methods changes to the National Accounts and Sector & Financial Accounts, Q1 1997 to Q2 2015](#)).

The Blue Book 2015 revisions, which go back to January 1997, have affected the Index of Production (IoP) and its components to different extents. [October's spotlight](#) focused on the effect of the Blue Book changes on the IoP and its 4 headline industries, while this issue's spotlight focuses on the effect of the Blue Book changes on the manufacturing sub-sectors. The main sources of the data revisions are the annual update of weights and seasonal adjustment models, re-referencing of the published indices from 2011 to 2012, methodological improvements and updated source data.

Manufacturing, which is the dominant sector within production, has 13 sub-sectors. Table 4 shows that between 1997 and 2012, the shares of these 13 sub-sectors within manufacturing have varied to different extents, which can be a result of either weight changes, price changes or volume changes. The manufacture of food products, beverages & tobacco (sub-sector CA) has the largest share within manufacturing and this increased from 14.2% in 1997, to 15.4% in 2011, and rose further to 15.9% in 2012. The manufacture of coke & refined petroleum products (sub-sector CD) has the smallest share of manufacturing, although the share grew from 1.5% in 1997 to 2.9% in 2011 before falling to 2.8% of manufacturing in 2012.

Between 1997 and 2012, the manufacture of basic pharmaceutical products & pharmaceutical preparations (sub-sector CF) saw the biggest share increase within manufacturing at 5.1 percentage points, while the biggest decrease in share was observed in the manufacture of textiles, wearing apparels & leather products (sub-sector CB) at -2.6 percentage points. Between 2011 and 2012, the largest increase in manufacturing share took place in the manufacture of chemicals & chemical products (sub-industry CE) at 0.5 percentage points, with the largest share decrease taking place in manufacture of transport equipment (sub-industry CL) at -1.2 percentage points.

Table 4: Share of the manufacturing sub-sectors within manufacturing between 1997 and 2012

	%		
	1997	2011	2012
	1		
CA: Manufacture of food products, beverages & tobacco	14.2	15.4	15.9
CB: Manufacture of textiles, wearing apparel & leather products	5.8	3.2	3.3
CC: Manufacture of wood, paper products & printing	8.3	7.4	7.4
CD: Manufacture of coke & refined petroleum products	1.5	2.9	2.8
CE: Manufacture of chemicals & chemical products	7.5	5.0	5.5
CF: Manufacture of basic pharmaceutical products & pharmaceutical preparations	3.7	9.4	8.8
CG: Manufacture of rubber & plastic products & other non-metallic mineral products	9.1	7.8	8.1
CH: Manufacture of basic metals & metal products	11.9	10.8	11.2
CI: Manufacture of computer, electronic & optical products	8.0	5.9	6.2
CJ: Manufacture of electrical equipment	3.8	3.1	3.0
CK: Manufacture of machinery & equipment nec	8.0	7.8	7.8
CL: Manufacture of transport equipment	11.0	12.4	11.2
CM: Other manufacturing & repair	7.3	8.9	8.8

Source: Office for National Statistics Notes: 1. Figures do not add up to 100 due to rounding

Table 5 shows that the Blue Book has led to minimal revisions to the quarterly average compound growth rates of the manufacturing sub-sectors. In the period leading to the economic downturn (Quarter 1 (Jan to Mar) 1997 to Quarter 1 (Jan to Mar) 2008) the quarterly average compound growth rates remain unchanged to 1 decimal place. However, during the economic downturn (Quarter 1 (Jan to Mar) 2008 and Quarter 2 (Apr to June) 2009) there are small downward revisions to the quarterly average compound growth rates of 0.1 percentage points in sub-sector CE, manufacture of electrical equipment (sub-sector CJ), manufacture of machinery & equipment not elsewhere classified (sub-sector CK) and sub-sector CL.

Moreover, during the recovery (Quarter 2 (Apr to June) 2009 to Quarter 2 (Apr to June) 2015) there are upward revisions to the quarterly average compound growth rates of 0.1 percentage points in sub-sector CE, sub-sector CB and sub-sector CH (manufacture of basic metals & metal products). In Quarter 2 (Apr to June) 2015, these sub-sectors were 7.2%, 15.3% and 10.4% below their Quarter 1 (Jan to Mar) 2008 value respectively, revised up from 8.1%, 17.3% and 13.6% respectively in the previously published data.

However, during the recovery (Quarter 2 (Apr to June) 2009 to Quarter 2 (Apr to June) 2015) the quarterly average compound growth rate of sub-sector CL was revised down by 0.2 percentage points. The most pronounced revision took place in the period Quarter 4 (Oct to Dec) 2013 to Quarter 2 (Apr to June) 2015 and as a result of the downward revision to growth in Quarter 2 (Apr to June) 2015, sub-sector CL was 33.6% above its Quarter 1 (Jan to Mar) 2008 value, revised down from 39.2% in the previously published data.

Between Quarter 1 (Jan to Mar) 2015 and Quarter 2 (Apr to June) 2015, almost all of the manufacturing sub-sectors with the exception of sub-sector CH experienced some revisions to their quarterly average compound growth rates. The biggest positive revision to growth over this period took place in sub-sector CB at 1.6 percentage points while the biggest negative revision took place in sub-sector CL at -1.2 percentage points.

Table 5: Percentage point difference between the quarterly average compound growth rates of the previously published and Blue Book 2015 consistent data for the manufacturing sub-sectors, 1997-2015

	% change			
	Q1 1997 - Q1 2008	Q1 2008 - Q2 2009	Q2 2009 - Q2 2015	Q1 2015 - Q2 2015
CA: Manufacture of food products, beverages & tobacco	0.0	0.0	0.0	0.3
CB: Manufacture of textiles, wearing apparel & leather products	0.0	0.0	0.1	1.6
CC: Manufacture of wood, paper products & printing	0.0	0.0	0.0	0.4
CD: Manufacture of coke & refined petroleum products	0.0	0.0	0.0	1.1
CE: Manufacture of chemicals & chemical products	0.0	-0.1	0.1	-0.2
CF: Manufacture of basic pharmaceutical products & pharmaceutical preparations	0.0	0.0	0.0	1.4
CG: Manufacture of rubber & plastic products & other non-metallic mineral products	0.0	0.0	0.0	-0.1
CH: Manufacture of basic metals & metal products	0.0	0.0	0.1	0.0
CI: Manufacture of computer, electronic & optical products	0.0	0.0	0.0	-0.4
CJ: Manufacture of electrical equipment	0.0	-0.1	0.0	0.3
CK: Manufacture of machinery & equipment nec	0.0	-0.1	0.0	-0.1
CL: Manufacture of transport equipment	0.0	-0.1	-0.2	-1.2
CM: Other manufacturing & repair	0.0	0.0	0.0	-0.6

Source: 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).

8. Background notes

1. What's new?

The tobacco products index has been merged with alcoholic beverages under a single index, labelled "Alcoholic beverages & Tobacco products", in the Food Products, Beverages and Tobacco sub-sector. This change is to ensure the confidentiality of statistical outputs as defined in Section 9 of The Statistics of Trade Act (1947), Section 39 of the Statistics and Registration Service Act (2007) and Principle 5 of the Code of Practice for Official Statistics. Please see the 'Disclosure control policy' in section 9 of these background notes.

The [GDP Output Improvement Report](#) published on 30 September 2015, provides a detailed update of the implementation of improvements for Blue Book 2015, progress on industry reviews and wider cross-cutting improvements, a comprehensive timetable for the industry review project and progress on experimental statistics.

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

[This article](#) submitted by the Department of Energy & Climate Change (DECC) highlights the oil and gas industry annual investment allowance. Source: Offshore Energy Today.com.

We published [Impact of Blue Book 2015 Changes on Chained Volume Measure Gross Domestic Product Estimates](#), this article details estimates of the total impact of all the improvements to chained volume measure (CVM or "real") gross domestic product (GDP) implemented in September 2015.

Upcoming changes

The Index of Production release for October 2015, to be published on Tuesday 8 December 2015, will have a revisions period back to January 2014.

VAT Project update

An article, [Feasibility study into the use of HMRC turnover data within Short-term Output Indicators and National Accounts](#), was published on 14 August 2015. The project is exploring ways in which HM Revenue & Customs (HMRC) administrative data could be used to quality assure, supplement or replace the current turnover-based ONS surveys. This article is the first of a series of planned articles into this work.

2. Special events

We maintain a list of candidate special events in the [Special Events Calendar](#). 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 2012=100 and are classified to the [2007 Standard Industrial Classification](#) (SIC). The production industries, which accounted for 14.9% of GDP in 2012, cover mining & quarrying (Section B), manufacturing (Section C), gas & electric (Section D) and water supply & 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 are listed:

- 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

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 & quarrying, manufacturing, energy and water supply & sewerage. The total IoP estimate and various breakdowns are widely used in private and public sector institutions, particularly the Bank of England, Her Majesty's Treasury and the Office for Budget Responsibility, to assist in informed policy and decision making.

4. Methods

An article about the [Index of Production methodology \(66.5 Kb Pdf\)](#) is available on our website.

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 \(34.5 Kb Excel sheet\)](#) back to 2010.

Table 6: Monthly business survey (MBS) Response Rates, September 2015, UK

		%	
	Year Period	Turnover	Questionnaire
MBS overall	2015 Sep	87.4	72.8
	Aug	95.1	82.5
	Jul	95.6	84.4
	Jun	96.7	85.6
MBS production only	2015 Sep	87.2	76.7
	Aug	95.7	85.8
	Jul	96.1	88.1

Source: Office for National Statistics

Seasonal adjustment

The index numbers in this statistical bulletin are all seasonally adjusted in line with international best practise 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.

5. 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.

6. 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 which 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 do occur.

Quality and methodology information report

A [quality and methodology information](#) report for this statistical bulletin is available on our website.

Revision triangles

One indication of the reliability of the key 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 presents a summary of the differences between the first estimates published between October 2009 and September 2014 and the estimates published 12 months later.

Table 7: Revisions, September 2015, UK

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	0.28
Manufacturing - 3 month	-0.4	-0.10	0.26
Production - 1 month	-0.2	-0.11 *	0.25
Manufacturing - 1 month	0.8	-0.06	0.23

[Spreadsheets give revisions triangles \(4.74 Mb ZIP\)](#) of estimates for all months from March 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.

7. Publication policy

Details of the policy governing the release of new data are available from our media relations office. Also available is a [list of those given pre-publication access](#) to the contents of this release.

A complete set of series in the statistical bulletin are available to download free of charge on the [Data section](#) of our website. Alternatively, for low-cost tailored data, call Online Services on 0845 601 3034 or email [Customer Contact Centre](#).

8. 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 the ONS Time Series Data service. Users can download the complete bulletin in a choice of zipped formats, or view and download their own selections of individual series.

We provide an [analysis of past revisions in the IoP and other statistical bulletins \(244.6 Kb Pdf\)](#) which present time series. Details can be found on our website.

We [publish revisions triangles \(65.8 Kb Pdf\)](#) for all the main published key indicators on our website.

9. [The Assessment of Short-Term Economic Output Indicators: Preliminary Estimate of GDP, Indices of Production and Services, and Retail Sales](#) has been published on the UK Statistics Authority website. See assessment report number 278 for further details.

On 7 January 2015, the following papers were published on our website:

[Impact of quarterly employment question on monthly survey response](#). (110 Kb Pdf)

[Monthly Business Survey variance of change](#). (163.7 Kb Pdf)

In November 2014, [Government Statistical Service \(GSS\) uncertainty guidance](#) was published.

[Disclosure control policy](#) (337 Kb Word document)

[The UK has one of the fastest growing economies in the G7](#)

We have [published a short story](#) describing how the pharmaceuticals industry has changed over time.

[Impact on National Accounts of Producer Price Index Rebasing](#)

On 31 October 2014, we published [updated methodology](#) for the IoP on the guidance and methodology web pages. The updated documentation includes a new and comprehensive source catalogue detailing the methods, data and weights used to compile IoP, IoS and GDP(O).

On 6 November 2014 we published a short story looking at the changing shape of the UK aerospace manufacturing industry.

10. 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 plans to take, to address these concerns:

- users 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](#) is now available
- users 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

- users 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 \(875 Kb Pdf\)](#) to the [National Statistics Quality Review of National Accounts \(570.9 Kb Pdf\)](#).

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

11. Following ONS

Follow @ONS on [Twitter](#) and receive up to date information about our statistical releases.

Like our [Facebook page](#) to receive our updates in your newsfeed and to post comments on our page.

12. Next publication: Tuesday 8 December 2015

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13. Details of the policy governing the release of new data are available by visiting www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html or from the Media Relations Office email: media.relations@ons.gsi.gov.uk