

Article

# Comparison of motor vehicle manufacturing output statistics, UK: 1997 to 2019

Comparing measures of motor vehicle manufacturing compiled by the Office for National Statistics (ONS) and published in the Index of Production (IoP) with outputs from the Society of Motor Manufacturers and Traders (SMMT).

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# 1 . Main points

- Despite the differences between the Index of Production (IoP) and outputs from the Society for Motor Manufacturers and Traders (SMMT), both estimates of motor vehicle manufacturing outputs indicate a general weakening in manufacturing growth across the motor vehicle industry since 2016.
- Both the Office for National Statistics (ONS) in its IoP and the SMMT produce monthly publications of motor vehicle manufacturing, but they have different functions and methodologies that make direct comparison difficult.
- The IoP collects monthly industry turnover as a proxy to measure the [gross value added \(GVA\)](#) of the motor industry in the manufacturing sector at constant prices; the SMMT measures nominal production figures of the number of motor vehicles manufactured.
- Differences in the coverage and classifications of motor vehicles, sample size, sampling frames, timeliness and removal of seasonality in the IoP result in differences in the conclusions that can be drawn from these two sources.

## 2 . Overview

Official monthly manufacturing statistics covering the motor vehicle industry are published within the [Index of Production \(IoP\)](#). More detailed motor vehicle manufacturing data are collected as part of annual surveys, including the [Annual Business Survey \(ABS\)](#) and the [UK Manufacturers' Sales by Product \(PRODCOM\)](#) survey.

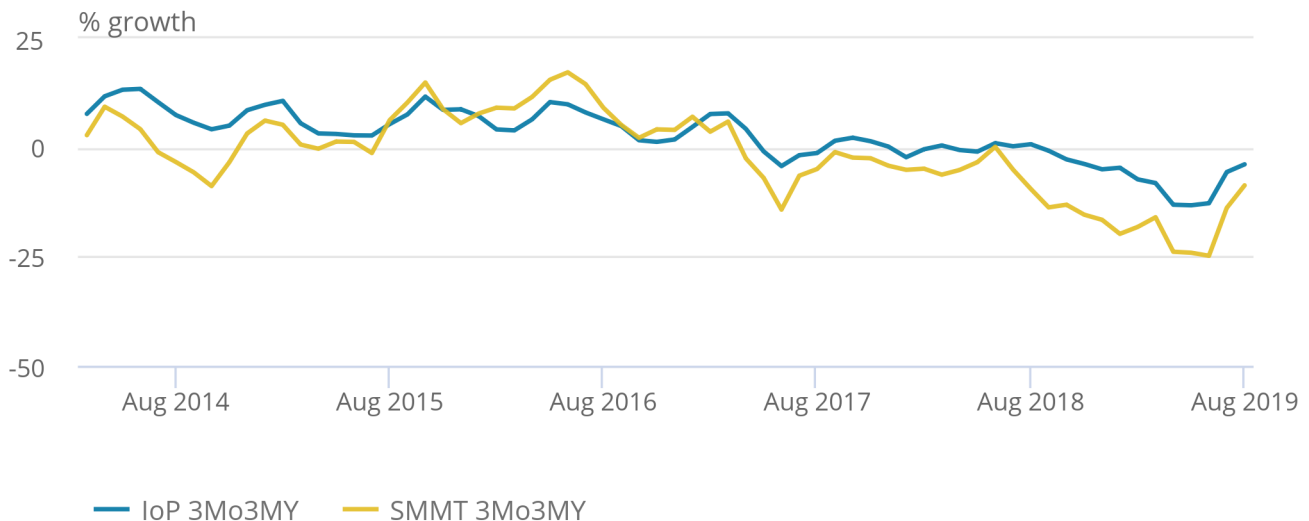
Manufacturing is the largest of the four main production sectors, accounting for approximately 75% of the total IoP. This includes the manufacture of motor vehicles, trailers and semi-trailers classified under division 29 of the [UK Standard Industrial Classification \(SIC\) 2007](#), which accounted for approximately 9% of the manufacturing sector in 2019. The manufacture of motor vehicles (29.1) contributes the largest proportion to the industry. Annual turnover figures collected from the ABS show that subclass 29.1 contributed approximately 80% of the total turnover for division 29 in 2018.

Users of motor vehicle manufacturing statistics can compare manufacturing output published in the IoP with monthly figures reported by the SMMT, which focuses specifically on nominal motor vehicle production. However, there are distinct differences in methodologies and the subsequent statistical outputs that need to be considered when using these manufacturing estimates to evaluate the performance of the motor industry.

In recognising these differences, it is clear that when comparing standardised volume percentage growth in motor vehicle manufacturing, similar weakening trends in manufacturing across the motor industry are being observed in the most recent years. This analysis is based on manufacturing statistics as published in the [IoP](#) and the SMMT's car production figures.

**Figure 1: Direction of growth rates between estimates of motor vehicle manufacturing in the IoP and that of growth in the SMMT's car production statistics is similar**

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**Source: Office for National Statistics – Index of Production; Society for Motor Manufacturers and Traders**

**Notes:**

1. Expresses growth rates in volumes of motor vehicle manufacturing rather than current price estimates.

After a period of strong growth from 2008, output in the motor vehicle manufacturing industry has been weakening from Quarter 3 (July to Sept) 2016 to the recent periods.

Although both output series show a similar broad direction of declining motor vehicle manufacturing output since 2016, the SMMT's series has been more volatile than the IoP and has shown a larger decline in motor vehicle manufacturing output.

Periods of differences in growth, for example, in Quarter 2 (Apr to June) to Quarter 3 2014 and again at the end of 2018 to Quarter 2 2019, can be explained by the conceptual differences across the two output measures. Divergence, particularly where growth rates have differing signs, can be explained by the difference between the manufacturing elements measured (for example, cars and car accessories); the difference in compilation of the output (for example, the mix of high- and low-value vehicles compared to the car production figures in single units); and other conceptual differences. [Section 3](#) explains the differences between these measures further.

Despite some divergence in growth between the data in 2014, the manufacturing indices converge in Quarter 4 (Oct to Dec) 2014; this trend is also observed in Quarter 4 2019. The long-term picture is fairly similar and only differs in direction very rarely between the two measures. These observations highlight an underpinning weakening trend in estimates of motor vehicle manufacturing.

Since Quarter 1 (Jan to Mar) 2008, data from official estimates show that the UK motor vehicle industry is consistently one of the top four industries underpinning growth across the manufacturing industries. Without growth in the manufacture of food, motor vehicles, other transport equipment and repair of machinery, [manufacturing output would still be below 2008 values](#).

The IoP aggregates all subclasses within the manufacture of motor vehicles industry into one index, as per the [UK SIC 2007](#). Therefore, the IoP includes subclass data for businesses across the motor manufacturing industry that are not included within the SMMT's car-specific output.

### **3 . Compiling estimates of motor vehicle manufacturing**

The Society of Motor Manufacturers and Traders's (SMMT's) data are collected and published independently of the Index of Production (IoP).

Both have their own sampling frames, coverage parameters and manufacturing surveys that underpin the differences in scope of motor vehicle manufacturing estimates. However, even with these differences, underpinning growth in motor vehicle manufacturing reveals the same weakening growth trends across both estimates.

Table 1 summarises the conceptual differences between the two main sources of monthly manufacturing data that explain why the manufacturing estimates are not the same.

Table 1: Summary of differences between monthly estimates of motor vehicle manufacturing outputs

	<b>Index of Production (IoP)</b>	<b>Society of Motor Manufacturers and Traders's (SMMT's) outputs</b>
<b>What is measured?</b>	<p>Current price and volume estimates of manufacturing output for the two-digit UK Standard Industrial Classification (SIC) 2007 division 29: Manufacture of motor vehicles, trailers and semi-trailers</p> <p>Businesses classified to division 29 are asked to provide the total monetary value of manufacturing turnover output in GBP for the latest month</p> <p>Aggregates of these turnover values are used as a proxy for measuring the motor industries' gross value added (GVA) relative to the rest of the manufacturing sector and subsequent production industry</p> <p>This then contributes to estimates of monthly gross domestic product (GDP)</p>	<p>Monthly and year-to-date nominal car, commercial vehicle and engine production from SMMT members of UK production bases</p> <p>The SMMT's data would only cover UK SIC 2007 division 29.1. This is not a complete picture of that sector, given the SMMT only reports member information</p>
<b>How is it presented?</b>	<p>Seasonally adjusted and non-seasonally adjusted index series are published in the monthly bulletins and associated datasets</p> <p>Total turnover, domestic sales and export data are also published at a division level in current price and non-seasonally adjusted outputs</p> <p>No business is ever disclosed</p>	<p>Monthly production output reports for cars (both commercial vehicles and engines), split by total, home market and export</p> <p>In additional, separate reports, the SMMT's data are split by manufacturer; for cars, model and aggregated fuel type data; and export destination</p> <p>Summary data are presented in other publications such as the Annual Facts Book</p> <p>The SMMT's data are also available to be purchased</p>
<b>Timeliness of releases</b>	<p>Published approximately six weeks after the reference period</p>	<p>Manufacturing figures are published approximately four weeks after the reference period</p>
<b>Coverage</b>	<p>The Monthly Business Survey (MBS) samples businesses registered for Pay As You Earn (PAYE), Companies House or Value Added Tax (VAT) from the Inter-Departmental Business Register (IDBR) for businesses classified in division 29 as per the UK SIC 2007</p>	<p>Based on SMMT members with UK vehicle or engine manufacturing operations</p>
<b>Sample Size</b>	<p>Approximately 230 businesses from the IoP's MBS</p> <p>Sample selection is stratified by UK SIC 2007 group and company workforce size</p>	<p>Consistent sample of members' UK vehicle or engine manufacturing facilities</p>

The sample is dynamic, using random sampling for small and medium businesses while large businesses are always surveyed

VAT data from HM Revenue and Customs (HMRC) are used as a benchmark for businesses within smaller employment bands. In the longer term, we will minimise the burden on small and medium businesses by using VAT data and not sampling them in the MBS

## Price adjustment

Turnover values are deflated to remove the effect of prices changes over time using a combination of the Producer Price Index (PPI) and the Export Price Index (EPI) to create a time series in constant prices

No adjustments for price changes as manufacturing output is nominal

The weight of the deflators changes monthly with variations in the domestic and export proportions of the industry

Prices are updated annually from the UK Manufacturers' Sales by Product (PRODCOM) survey

## Seasonal adjustment

Current price and chained volume measure (CVM) estimates are seasonally adjusted using X-13-ARIMA-SEATS to remove systematic calendar-related effects such as Easter and annual car plant shutdowns

Data reported in current month and year-to-date figures with percentage changes

## Weighting

Weights for all industry groups are calculated based on the contribution of each industry to the overall economy and the manufacturing sector

No weighted adjustments to production or registration figures

These are derived from GVA totals produced by the Office for National Statistics (ONS) in the supply and use tables

GVA for an industry group is divided by total GVA across the whole economy and then multiplied by 1,000, to give a parts per thousand weight for that industry group

Source: Office for National Statistics – Index of Production; Society for Motor Manufacturers and Traders

## Index of Production (IoP)

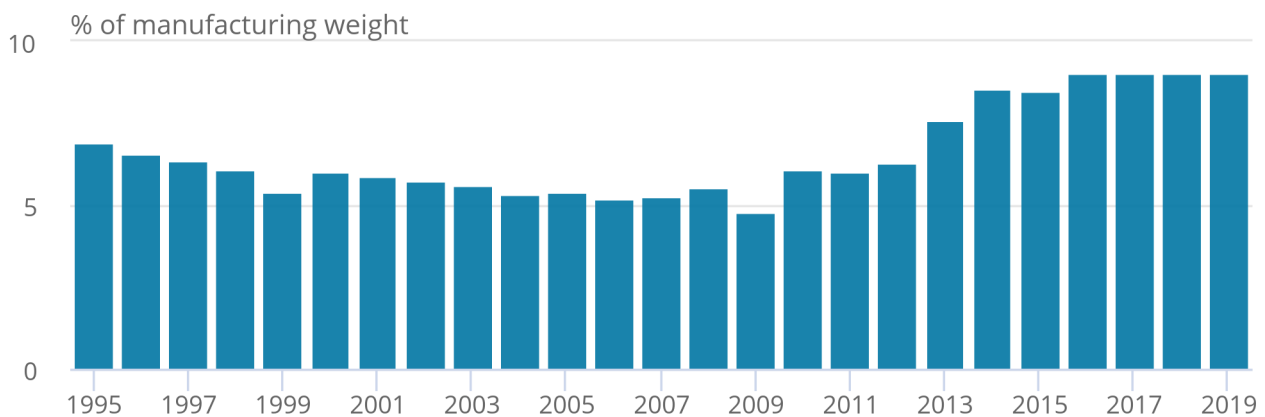
The IoP accounts for 14.6% of [GDP \(O\)](#) and is made up of four main industry groups, as per [the UK SIC 2007](#). These are then weighted to create a representative estimate of UK production output as a proxy for measuring the production industry's [GVA](#). These four groups are:

- mining and quarrying (B)
- manufacturing (C)
- water and waste (D)
- electricity and gas (E)

Manufacturing is the largest of the production sectors, accounting for approximately 75% of the total IoP. It consists of 13 manufacturing industries, including the manufacture of transport equipment. This includes the manufacture of motor vehicles, trailers and semi-trailers classified under division 29 of the UK SIC 2007 and as an industry, it contributed to approximately 9% of the manufacturing sector within the IoP in 2019.

**Figure 2: The weight of division 29 as a proportion of the weight of the manufacturing sector to the IoP has increased notably since 2009**

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Source: Office for National Statistics – Index of Production

Industry weights are derived from annual [supply and use tables](#) that show the relationship between components of value added, industry inputs and outputs, and product supply and demand. Further explanation of the methodology of the derivation of weights in supply and use tables can be found in the [Commentary on supply and use balanced estimates of annual GDP: 1997 to 2014](#). The most current balanced estimates are taken from 2016 supply and use tables, so the weight for division 29 within manufacturing is the same from 2016 onwards. This is because annual supply and use balancing uses more detailed indicators, which only become available after one to two years.

A notable rise in the percentage of the manufacture of motor vehicles' weight since 2009 highlights the increasing importance of the industry to the manufacturing sector and subsequent IoP. [Manufacturing sector performance, UK: 2008 to 2018](#) provides more detail on the positive impact of the top four manufacturing industries, including the manufacture of motor vehicles, trailers and semi-trailers.

Table 2 shows how [the UK SIC 2007](#) classifies business establishments and other statistical units by the type of economic activity in which they are engaged for division 29.

Table 2: Breakdown of division 29 to five-digits as per the UK SIC 2007

**UK SIC 2007 division 29 – Manufacture of motor vehicles, trailers and semi-trailers**

29.1. Manufacture of motor vehicles

29.2. Manufacture of bodies (coachwork) for motor vehicles, manufacture of trailers and semi-trailers

- 29.20/1 Manufacture of bodies (coach work) for motor vehicles (except caravans)
- 29.20/2 Manufacture of trailers and semi-trailers
- 29.20/3 Manufacture of caravans

29.3. Manufacture of parts and accessories for motor vehicles

- 29.31/0 Manufacture of electrical and electronic equipment
- 29.32/0 Manufacture of other parts and accessories for motor vehicles

Source: UK SIC 2007

The manufacture of motor vehicles (29.1) contributes the largest proportion to division 29. Turnover figures collected from the Annual Business Survey (ABS) for 2018 show that subclass 29.1 contributed approximately 80% of the total turnover for division 29.

The IoP only publishes data at a two-digit UK SIC 2007 industry level as the size of the survey sample is too small to deliver statistically robust estimates below that level. This limits the potential for greater detail from subclasses in the motor industry that extend beyond car manufacturing. However, businesses sampled for the monthly survey will cover car and engine production, the production of other vehicles including commercial vehicles, and the manufacture of parts and components for motor vehicles. The IoP therefore covers businesses in the supply chain, extending the parameters of the definition of motor vehicle production.

The IoP samples approximately 230 businesses from the MBS for division 29 from the population of approximately 3,400 businesses noted by the ABS for 2018 across the motor industry. The MBS samples businesses registered for PAYE, Companies House or VAT on the IDBR.

The sample is taken on a stratified basis, banded by number of employees, to collect a representative sample of each. Employment bands one to three cover small and medium enterprises, while enterprises in employment bands four and five cover the largest businesses that are permanently collected as part of the sample.

Table 3 shows that those businesses in employment band strata four and five accounted for approximately 93% of all turnover across division 29 in 2019.



Table 3: Estimated breakdown of businesses surveyed from division 29 by employment band in 2019

<b>Band by employee size</b>	<b>Number of businesses sampled</b>	<b>Estimated percentage of total turnover</b>
Band 1 (0 to 9)	30	7%
Band 2 (10 to 49)	30	
Band 3 (50 to 249)	30	
Band 4 (250 and over)	120	93%
Band 5 (£60 million and greater turnover)	20	
Total	230	100%

Source: Office for National Statistics – Index of Production

Businesses are asked to provide "turnover values" (excluding VAT) of their total and export turnover, from which domestic turnover is derived. The sample is dynamic: the use of random sampling means that companies are rotated in and out of the sample, which also takes account of new companies within the industry.

For businesses within employment bands one, two and three of division 29, since 2017, VAT data received from HMRC are now being used to benchmark estimates and eventually reduce the burden on small and medium businesses. VAT data revise short-term indicators' indices of growth on a quarterly basis only. Currently, VAT data are collected from HMRC from the small and medium businesses across subclass 29.2 (Manufacture of bodies (coachwork) for motor vehicles, manufacture of trailers and semi-trailers). This process uses the same methodology as that used for the MBS output data as explained in [VAT turnover data in National Accounts: background and methodology](#).

VAT returns increase the coverage and stability of the estimates based on the number of returns that are received relative to the number of businesses that respond to the MBS.

Implementation of this turnover data is part of a wider transformation of how the ONS collects administrative data to supplement survey data in national accounts; VAT turnover data are now being used to aid estimates of [GDP in the quarterly national accounts \(QNA\)](#) as part of the output approach to GDP. In the longer term, we will minimise the burden on small and medium businesses by using VAT data supplied by HMRC and not sampling these businesses in the MBS.

The headline IoP figures published by the ONS require businesses' total turnover values to be deflated to remove the effect of price changes, seasonally adjusted, and then indexed accordingly to show percentage change in growth over time. This accounts for the difference in contribution of mass market and premium market motor vehicles to the motor industry.

The deflator used to remove the effect of price changes is constructed from a combination of the [PPI](#) and the EPI. These deflators are derived from price changes in manufactured goods at the time they leave the manufacturer and the price for which goods are exported. The weights of the PPI and EPI used to create the dynamic combined deflator changes monthly with domestic and export proportions of the industry. They are updated annually from current prices in automotive production collected from the annual [PRODCOM survey](#).

For the motor industry, seasonal adjustment is used to estimate and remove systematic calendar-related effects, owing to the time of year, to enable appropriate comparisons over time. Particular care is needed as there can be reductions in motor vehicle manufacturing from car plant shutdowns, which occur for repairs and maintenance ordinarily in August each year, and new car registrations, which typically occur in March and September. Seasonally adjusted estimates are calculated using X-13-ARIMA-SEATS.

Official monthly manufacturing statistics are available in current prices and CVMs with each publication, along with all the related data series. The ONS advise that care should be taken when using monthly estimates to evaluate industry performance; instead use longer-term growth trends of data to make these judgements.

The outputs reported from these businesses are proportionately aggregated with other manufacturing industries to inform the total manufacturing index and subsequent IoP. This index then contributes to the monthly estimate of the performance of the production sector as part of the output approach to measuring the [GDP monthly estimate](#). This output is then used to inform decisions on fiscal and monetary policy within government.

## **Society of Motor Manufacturers and Traders's (SMMT's) outputs**

The SMMT is the principal automotive trade association in the UK.

On a monthly basis, the SMMT compiles historical nominal vehicle (and engine) production data from manufacturing reports across the automotive sector. These include details of vehicle type and market destination. Each vehicle and engine is treated as a single unit.

For cars and commercial vehicles, the SMMT produces separate [monthly production reports](#) for the preceding calendar month's volume of production. As the SMMT does not report manufacturing output in terms of turnover, it does not complete the same deflation or seasonal adjustments on the data as the IoP.

To observe trends in the data, the SMMT also reports production on a year-to-date basis, and comparisons are made on a year-on-year basis to show change over time.

Beyond the data in the monthly press releases, further details are available directly from the SMMT.

The SMMT also publishes numerous other automotive-related data, notably new vehicle registration reports on the number of newly registered cars and light commercial vehicles on a monthly basis. This includes data by manufacturer, model, and/or fuel type and sales type. These monthly figures are published on the fourth working day of each month for the preceding month's new registration figures (and include year-to-date data).

More in-depth information is available by contacting [data@smmt.co.uk](mailto:data@smmt.co.uk).

## **4 . Other ONS statistics on the motor vehicle manufacturing industry**

Alongside the Index of Production's (IoP) monthly estimates of motor vehicle manufacturing, businesses sampled from division 29 are also surveyed for data required for other official statistics on a quarterly and annual basis.

These include the [Annual Business Survey \(ABS\)](#); [UK Manufacturers' Sales by Product \(PRODCOM\)](#); [UK trade](#) (exports and imports within the motor industry); the [Index of Services \(IoS\)](#) (wholesale of motor vehicles); [Business investment in the UK](#); and [Labour market overview](#).

### **Annual Business Survey (ABS)**

The main annual publication that publishes information on motor vehicle manufacturing output is the ABS.

The ABS is an annual survey of non-financial businesses that covers two-thirds of the UK's economy. The first provisional results are published 11 months after the end of the calendar year reference period, and final revisions are published 28 to 29 months after the end of the reference period.

In total, the ABS collects data from approximately 73,000 businesses per year from approximately 2.7 million businesses in scope for the survey, relative to their proportion within the non-financial economy. This is a much larger sample than the [Monthly Business Survey \(MBS\)](#); for 2018, the ABS sampled approximately 460 businesses across the population of division 29 compared with approximately 230 in the MBS.

The ABS requires businesses to complete a much more detailed questionnaire on information for the calendar year (January to December). The first estimate for 2018 was published on 7 November 2019, [Non-financial business economy, UK: Sections A to S](#).

Sections B to E of the ABS cover the four main production sectors, in line with the [UK Standard Industrial Classification \(SIC\) 2007](#) classifications used in the IoP. From the survey, data provide an estimate of an industry's approximate [gross value added \(GVA\)](#), in current prices, by collecting total turnover and deducting businesses' reported intermediate consumption of goods and services used in order to produce their output. This output reflects the value and growth of an industry's contribution to the economy on an annual basis and includes the impact of inflation.

Owing to the greater level of industrial detail that can be collected in annual surveys, estimates are published down to a four-digit class level of the UK SIC 2007 at the national level (see Table 1 in [Section 3](#)). For the motor industry, the ABS publishes subclasses 29.1 to 29.3 distinctly, where 29.1 covers exclusively the manufacture of motor vehicles.

Essentially, subclass 29.1 would be the most appropriate for the purpose of comparison with the Society of Motor Manufacturers and Traders's (SMMT's) specific motor vehicle manufacturing figures. However, comparison would only be possible on an annual basis.

## **UK Manufacturers' Sales by Product (PRODCOM)**

The [PRODCOM](#) publishes annual statistics on the value and volume of select products manufactured in the UK.

The PRODCOM requires manufacturing businesses registered under the Inter-Departmental Business Register (IDBR) to report costs of sale of their goods by product type. The PRODCOM statistics relate to all manufactured products included in the EU Manufacturers' Sales by Product list as a Eurostat requirement. The survey covers approximately 21,500 businesses across the mining, quarrying and manufacturing industries. The PRODCOM outputs are used to inform part of the national accounts' supply and use tables, essential to the measurement of [gross domestic product \(GDP\)](#).

For the motor industry, the PRODCOM differentiates motor vehicle production by vehicle fuel type, a higher level than monthly manufacturing surveys. Sales of all motor vehicle products are reported in current prices, which provide the foundations to base the [Producer Price Index \(PPI\)](#) used to deflate turnover into volume form.

Where the PRODCOM focuses on products, the ABS focus on business activities and manufacturing output. The IoP collects total production in turnover but does not collect data about individual products manufactured. Numerous [official statistics](#) measuring manufacturing therefore provide information on the performance of the motor industry but via different outputs.

Effectively, the monthly IoP provides a short-term output of growth within the motor vehicle industry relative to the manufacturing sector within UK production; annual surveys publish manufacturing data from surveys with larger samples, more detailed surveys and rigorous data processing at lower UK SIC 2007 levels than that possible, or required, for the monthly IoP.

## 5 . Conclusion

Despite methodological and sampling differences between the Society of Motor Manufacturers and Traders's (SMMT) outputs and the Index of Production (IoP), both show a similar direction of declining manufacturing output across the motor industry from 2016.

For the SMMT, growth in car manufacturing in recent periods has seen a stronger decline than the estimates compiled by the Office for National Statistics (ONS) in the IoP. This may be explained by the coverage differences of motor vehicle manufacturing in the IoP and the SMMT and the impact of mass market versus premium market car manufacturing on the index.

Direct comparison of the two data sources are difficult as a consequence of the differences outlined in motor vehicle manufacturing estimates. Users must remain aware of all estimates of motor vehicle manufacturing outputs that can be used when comparing manufacturing statistics to evaluate the performance of the motor industry.

## 6 . Authors

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In collaboration with the Society of Motor Manufacturers and Traders.