

## Compendium

# Economic review: October 2018

Recent and future developments in the transformation of UK economic statistics. The economic review is a quarterly publication, usually published in January, April, July and October.

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## Chapters in this compendium

1. [Economic review introduction: October 2018](#)
2. [Transformation of Economic Statistics](#)
3. [Future uses of VAT](#)

# Economic review introduction: October 2018

A brief introduction to the Economic review: October 2018 edition and a summary of its focus on the transformation of Gross Domestic Product (GDP).

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## Table of contents

1. [Authors](#)
2. [Acknowledgements](#)
3. [Introduction](#)

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# 3 . Introduction

This edition of the Economic Review is the seventh following the introduction of economic statistics theme days in January 2017. Each Economic review in this new format will have an overarching analytical theme and follow a quarterly publication timetable.

The theme of this edition is transformation of economic statistics, looking back at some of our recent developments and what is being delivered in 2019. Also included is an article outlining further uses of Value Added Tax (VAT) and the progress in its use in short-term economic indicators.

Compendium

## Transformation of Economic Statistics

A summary of recent transformation of gross domestic product and economic statistics and a look ahead to changes in 2019.

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## Table of contents

1. [Introduction](#)
2. [Latest developments](#)
3. [Next steps](#)

# 1 . Introduction

We have embarked on an ambitious plan to transform our economic statistics over the coming years, informed by our Economic Statistics and Analysis Strategy, with the aim of increasing the robustness and quality of UK economic statistics. We have provided annual updates to users through the ONS Economic Statistics and Analysis Strategy publication, which sets out our priorities. This strategy has been published for [2016](#), [2017](#) and [2018](#).

In this article we provide an overview of progress against some of these priorities and highlight the next steps between now and the publication of Blue Book 2019. Topics include our move to a new publishing model for gross domestic product (GDP), changes to input-output and supply and use tables, inclusion of new data sources and the development of enhanced financial accounts.

Alongside this edition we also publish the scope of Blue Book 2019 changes and an article setting out our chosen approach for implementing double-deflation using supply and use tables in previous year's prices.

## 2 . Latest developments

Here we recap on our latest developments related to the transformation of gross domestic product (GDP), data sources and financial accounts. A wider assessment of progress across economic statistics is found in this year's [Economic Analysis Strategy](#).

### Blue Book

In July 2018 we introduced [improvements](#) as part of our annual Blue Book publication round. These changes included improvements to [trade processing systems](#), [pension calculations](#) and [net spread earnings](#). Real-time HM Revenue and Customs (HMRC) estimates of Pay-As-You-Earn (PAYE) total pay were used to help guide the growth of the wages and salaries component, whilst we continued to use [VAT turnover data](#).

Today we publish an article containing the [scope](#) of change for Blue Book 2019. 2019 is a significant year for our transformation with changes set to include:

- transformation of the GDP Framework
- improvements to trade statistics
- enhancements to data sources
- changes to methodology for the measurement of capital stock
- further use of VAT data

### Gross domestic product publishing model

This year we introduced a new publishing model for GDP following a [user consultation](#). This model moved us from three estimates of GDP for a quarter (month 1 – output, months 2 and 3 – output, income and expenditure), to two estimates. In pushing the first estimate back by around two weeks, we now include data from all three measures of GDP – output, income, and expenditure – as opposed to an output only estimate in the previous publishing model. Whilst the first estimate in our publishing model is now later by two weeks, estimates would be expected to be more accurate and see few revisions. Aligned to this change we have also introduced [monthly GDP](#), providing a more timely view of the key services sector and evolution of the economy over time.

# Supply and use and input-output analytical tables

## Input-output analytical tables

Updated [Input-output analytical tables](#) (IOATs) were published in March 2017 for reference year 2013, consistent with Blue Book 2016 and in March 2018 for reference year 2014, consistent with Blue Book 2017.

The IOATs are required to be delivered to Eurostat every five years, for years ending in 0 or 5. The next update of IOATs will be delivered to Eurostat by the end of 2018 for reference year 2015. There was therefore no legal requirement to update IOATs until 2018 for reference year 2015. However, in response to increased user demand and request from stakeholders following the EU Referendum, we took the decision to update the tables early, including an additional EU and non-EU split of trade for the 2013 reference year. These additional data are an important tool for policymakers in understanding supply chain impacts. The further update provided for 2014 tables is a step towards our aspiration to publish annual input-output analytical tables.

## Supply and use tables in previous year's prices

We have [previously published](#) our plans to implement double-deflation using supply and use tables in previous year's prices (PYP SUTs). Double-deflation is considered the optimum approach for setting GDP in volume terms. This implementation meets a key recommendation of the Bean Review.

Today (11 October 2018) we publish a further [article](#) on our chosen approach, which is consistent with guidelines set out in the [UN Handbook on Supply, Use and Input-Output Tables](#). The article sets out changes to source data, benefits, challenges and next steps. We also provide users with a timetable for future communications.

## Enhanced financial accounts

Working in partnership with the Bank of England and Financial Conduct Authority, a significant element of our transformation work is the development of enhanced financial accounts – in particular more detailed “flow of funds” (FoF) statistics – to meet evolving user needs and improve the quality, coverage and granularity of the UK financial statistics.

An [article published on 14 July 2016](#) sets out the rationale for the project and our plans and aspirations for the future. We aim to improve the quality, coverage and granularity of the UK financial accounts, including counterparty information using regulatory, administrative and commercial data sources.

We have made significant progress evaluating new data sources, trailblazing the potential use of commercial and regulatory data in addition to developing existing surveys to enhance financial accounts statistics. We have published regular update and analysis [articles](#) (over 30 in total) highlighting progress and seeking stakeholder views and feedback. These publications include experimental equity and credit reference data, experimental regulatory Solvency II insurance data, new experimental estimates of shadow banking, pensions in the national accounts as well as updates to the [existing FoF statistics](#).

Over the next 12 months, we will continue to share progress with, and seek feedback from, our stakeholders through articles and other stakeholder engagement activities culminating in the publication of a full suite of experimental statistics in Quarter 4 (Oct to Dec) 2019.

## New data sources

## Value Added Tax (VAT) data

In [December 2017](#), we implemented [VAT data into our measurement of GDP](#). This was one of the first steps towards the way we use large externally-sourced data instead of data collected via Office for National Statistics (ONS) surveys, in this case the Monthly Business Survey (MBS).

VAT was introduced into our measurement of GDP for smaller, less complex firms. Within this edition of the Economic Review we publish new analysis on future uses of VAT and explore how its use will be expanded, reducing the reliance on the MBS, allowing more disaggregated analysis whilst also reducing the burden on businesses.

## Annual Survey of Goods and Services

A key recommendation from the [Bean Review](#) of economic statistics was to improve the information and detail of the services provided by the UK service economy. As businesses are becoming more diverse, there is a need to understand secondary activities outside their main industrial classification as well as activities in their main classification. The recent creation of the Annual Survey of Goods and Services (ASGS) meets this need with the collection of business turnover, broken down into the goods and services that a business provides. The ASGS covers a large element of the service economy, with some exceptions such as public administration and certain elements of the financial sector.

In August 2018, the [ONS published for the first time](#) estimates produced from the ASGS 2016 dataset. This included high level product by industry group turnover estimates (15 product groups by 14 industry groups) with a further detailed product and industry level breakdown also provided. This more detailed level is consistent in structure, but not concept, with the combined use matrix within the supply and use tables (SUT) publication, although it does not map exactly as the ASGS only covers the service industries.

The information collected by ASGS will improve the quality of product breakdowns in the supply and use tables, and in turn the quality of balancing and GDP, a key economic indicator. Additionally, ASGS data will inform the Services Producer Prices Index (SPPI), which provides a measure of inflation for the UK service sector and are used as deflators in the [Index of Services \(IoS\)](#) and the output measure of [gross domestic product \(GDP\)](#).

An article describing the [development of the ASGS](#) was also released in August 2018 and describes the use of an electronic questionnaire to capture the detailed information required but in a user friendly and dynamic approach. This was the first time for this collection approach within ONS for such a large complex annual questionnaire and we were able to query data with the respondent whilst they were still completing the questionnaire. This approach also led to increased response in a shorter time frame.

In the first year of a survey, there are challenges in quality assuring and validating the data. In the ASGS the breakdown of service product turnover had never been collected at such a low level of detail. ONS surveys usually compare results to previous surveys, both at a micro- and macro- level. At the microdata level, it was possible to compare total turnover and total exports for businesses who returned for both the ASGS and the ABS. It was also possible to compare total exports for businesses who returned for both the ASGS and the International Trade in Services (ITIS) survey. Detailed product information was not available from existing data sources, however, a second year of ASGS estimates will aid in the validation process of both the 2016 and 2017 estimates.

This approach led to a successful data collection for the service sector, with an overall response rate of 78.1% for the 2016 ASGS, based on data returned from 40,000 respondents. The response for each UK country was:

- England – 78.6%
- Scotland – 74.5%
- Northern Ireland – 71.7%
- Wales – 77.5%

Further transformational changes are planned, for example, we are already focused on:

- improving the electronic questionnaire to make it easier for respondents to complete
- industry profiling where the product codes do not accurately capture all services typical of that industry
- increasing additional validation in the electronic questionnaire to aid data quality at the point of entry

The ASGS is currently in its second year, with data already being collected for reference period 2017. The comparison between first and second year data would further validate the data and determine any changes in the services industries, with the aim of a more detailed publication in 2019, once data has undergone further quality assurance.

## Annual Purchases Survey

The current breakdown of products purchased by businesses within the supply and use tables are based on estimates from the 2004 Purchases Inquiry. The main source for the total value of purchases is from the well-established Annual Business Survey (ABS). As the breakdown of products purchased in the production process and running of UK businesses is required to be updated more frequently given shifts in the economy, the Annual Purchases Survey (APS) was re-instated from the 2015 reference period to provide this comprehensive picture. The APS estimates will be constrained to the ABS industry totals, as set out in the [initial requirements](#), however, the APS will help us to adhere to international best practice outlined in the [European System of Accounts 2010: ESA 2010](#) and [Balance of Payments Manual: BPM6](#).

The APS covers a large element of the economy with some exceptions such as public administration and certain elements of financial industries. To note, there are additional sources included within the full SUTs, such as public-sector data and financial corporations, together with balancing adjustments.

A considerable amount of validation has taken place to ensure the estimates are at the required quality for this detailed data source. A set of core editing and validation rules were implemented to minimise errors and improve data quality. Atypical results were reviewed and amended as appropriate. These core checks included:

- invalid reporting periods, question numbers and non-responses
- sum of the products matched to totals
- non-rounded figures
- validation involved comparing the total intermediate consumption figure from the APS against a derived equivalent figure from the ABS
- comparison with results and data from 2016 to ensure consistency and accuracy

An overall response rate of 80.4% was achieved for the 2015 APS. When broken down by geography, the response was:

- England – 81.7%
- Scotland – 75.7%
- Northern Ireland – 74.7%
- Wales – 80.4%

An [article](#) detailing 2015 results at a detailed product and industry level together with analysis on these estimates was released in July 2018. In addition, this article includes detail on the next steps, providing detail around plans for the release of the 2016 and 2017 estimates, the use of the updated APS data for 2015 in the supply and use framework for Blue Book 2019, and the work being carried out to review and further develop the APS questionnaire.

### 3 . Next steps

As we move towards Blue Book 2019 we will publish a series of articles which will provide detail of the changes that will be implemented. Communications will also be delivered at seminars and working groups. A provisional timetable for the publication of these articles is included in the Blue Book 2019 scope article.

Compendium

## Future uses of VAT

The current and possible future uses of VAT turnover data in UK National Accounts.

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## Table of contents

1. [Introduction](#)
2. [What is the VAT data source?](#)
3. [Progress and current use of VAT turnover in short-term indicators](#)
4. [A new strategy for short-term indicators](#)
5. [VAT turnover data – what can it do now?](#)
6. [Beyond short-term indicators](#)
7. [Next steps](#)



# 1 . Introduction

Since 2015, we have been [developing our use of data from Value Added Tax \(VAT\) returns](#). This is an important step in transforming the data sources used to produce economic statistics. The use of such administrative data can deliver improvements in our statistical outputs whilst significantly reducing respondent burden.

This article describes our progress to date and the opportunities that exist in maximising this comprehensive data source for use within the production of economic statistics. We will focus on the impact of this change to the short-term indicators: construction output, Index of Production (IoP), Index of Services (IoS) and retail sales.

VAT turnover covering 735,000 businesses is now already used in the calculation of gross domestic product (GDP). But we will describe an ambitious strategy to use more VAT turnover data, fewer surveys, and deliver improvements – both in data quality and the capability to comprehend industrial and geographic detail.

## 2 . What is the VAT data source?

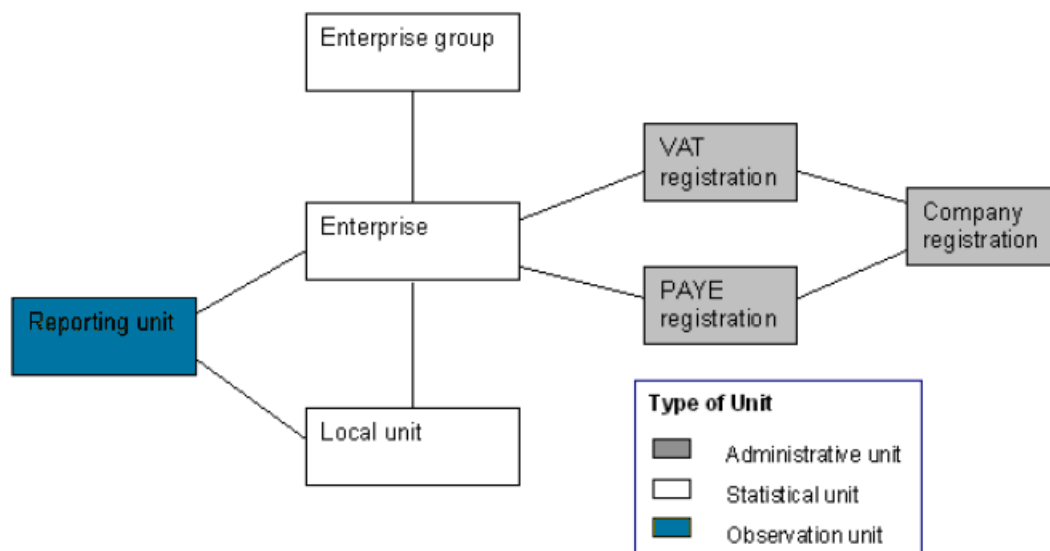
Each month we receive a fresh supply of turnover and expenditure data from HM Revenue and Customs (HMRC), sourced from Value Added Tax (VAT) returns. These are stored in a secure and confidential environment and only accessed by individuals with a business need to analyse the data. VAT returns are submitted on a monthly, quarterly or annual basis. Many large businesses submit monthly, most very small businesses (less than 1% of businesses that submit returns) submit annually, while 90% of businesses submit on a rolling quarterly basis. Our focus has been on how VAT turnover data can be used as an administrative data source for producing economic statistics.

There are currently some 8 million VAT returns completed in a year, covering 2 million registrations, available for use. This includes all businesses liable for VAT above the current threshold of £85,000 at April 2018 and for those businesses below the threshold who choose to register.

We maintain and use a business register, which is an important first step in ensuring all enterprises we know about are represented and their economic story can be told. This is known as the [Inter-Departmental Business Register \(IDBR\)](#). We have developed approaches that can link the VAT data to the IDBR.

The linked dataset allows us to assign the VAT turnover of corporate VAT returns to IDBR enterprises involving the same principles and practices that create the IDBR. An enterprise is an organisational unit producing goods or services that has a certain degree of independence in decision-making. An enterprise can carry out more than one economic activity and it can be situated at more than one location. An enterprise may consist of one or more reporting units and these may consist of multiple local units.

**Figure 1: Types of IDBR units**



Source: Office for National Statistics

We can then access the low-level industrial and geographic data connected to each reporting unit from the appropriate VAT turnover return. The scale of this dataset delivers a level of detail that is not attainable from either the 46,000 surveys despatched by us each month, or the variety of administrative data that support the [short-term indicators](#). For example, in November 2016, construction output estimates were based upon 8,000 survey forms while VAT data, linked to the IDBR, was available for 200,000 reporting units.

### 3 . Progress and current use of VAT turnover in short-term indicators

Our efforts to maximise the Value Added Tax (VAT) turnover data source have featured in the [Independent review of UK economic statistics](#) by Professor Sir Charles Bean and are closely aligned to the UK Statistics Authority strategy for UK statistics – [Better Statistics, Better Decisions](#).

VAT has been a successful pathfinder in the use of big administrative data in the processing and calculation of official statistics within the UK. VAT turnover data from January 2012 to the present can be linked to every business on the IDBR with a matching success rate of over 99% of VAT returns. To fully use such large datasets, we have developed our processing systems and technologies for use in a cloud computing environment, which is a pre-requisite for exploiting the potential of large administrative datasets.

#### Initial strategic use for short-term indicators

In [December 2017](#), VAT turnover from our new data source and method was used for the first time in gross domestic product (GDP) through the short-term indicators, as a quarterly benchmark for elements of construction output, Index of Production (IoP) and Index of Services (IoS). This was the first successful use of large administrative datasets as part of our transformation programme.

The survey for these outputs is split into sampling strata based on the registered employment of each business on the IDBR. Band 1 represents the smallest businesses in an industry and the sample is selected at random from the universe of businesses contained on the IDBR for the sampling period. Bands 2 and 3 similarly represent small- and medium-sized businesses that are selected at random, although for a few industries Band 3 can also be a comprehensive survey of activity. Band 4 represents the largest businesses in an industry, and the selection constitutes a census of businesses above the employment cut-off for that industry.

Bands 1 to 3 were in scope for being augmented with a VAT turnover benchmark. All industries at Band 4 level, normally representing 50 to 70% of the entire turnover of an industry, were excluded as the survey data are captured more quickly than through VAT returns. In December 2017, VAT turnover was used as a benchmark for the first time for 240 sampling strata following detailed analysis of impact, revisions and fit, or correlation, on growth. A further 21 strata were added for the [Index of Services, April 2018 bulletin](#).

Short-term indicators now use VAT turnover as a benchmark across 261 of the 488 sampling strata within construction output, IoP and IoS, which are measured using 10,100 surveys. This is based upon VAT turnover data covering 735,000 businesses or reporting units:

- in construction output 2,400 surveys are now supplemented by 86,500 VAT returns
- in IoP 1,800 surveys are supplemented by 76,500 VAT returns
- in IoS 5,900 surveys are supplemented by 572,000 VAT returns

The benchmark process entails using data over a quarter in arrears to align with the national accounts revision policy. For example, Quarter 1 (Jan to Mar) 2018 VAT turnover data was first published with the relevant short-term indicators for July 2018.

## 4 . A new strategy for short-term indicators

The use of administrative data has a long history within the compilation of economic outputs, stretching back to their formation. Administrative data other than Value Added Tax (VAT) turnover is already used widely within short-term indicators, particularly for Index of Services (IoS) but also in some Index of Production (IoP) elements. Our new strategy will clearly combine survey and administrative data for the first time.

In future, we will move towards a [model](#) where surveys are retained for larger businesses while smaller businesses will largely be covered using VAT turnover data. The combination of both survey and administrative data will provide benefits of both types of data sources. Retaining surveys will deliver quick, monthly data and allow us to talk to businesses to discover the reasoning behind fluctuations. But at present some of our survey data, particularly for small businesses, are impacted by sampling noise and variability. VAT turnover will allow us to overcome these occasional issues rather than relying upon quality adjustments. However, we will need to develop robust forecasting methods to overcome the slow accumulation of an appropriate number of VAT returns, as returns received in the first two to three months can be unrepresentative.

The use of VAT data gives us opportunities to achieve cost savings. The number of surveys needed to obtain the same information is expected to reduce, while the business burden will also decrease as there will be a reduced requirement to respond to the survey questionnaires. We may reinvest some of these savings in expanding the coverage of our surveys to the larger businesses in new industries within IoS, which are currently measured through other limited administrative sources.

### Distributive trades

In 2019 it is hoped to use the new model for measuring the retail, wholesale and motor trades industries, or distributive trades. The three industries currently derive their estimates from 12,000 surveys but it is planned that these will be reduced by around a half, which is a significant reduction of burden for existing businesses within our surveys. These would then be replaced by data from 200,000 VAT returns. VAT turnover benchmarks are not currently used for any of these industries. As this work progresses articles will be released to show the progress and explain the methodology.

## Extending the model

By the end of 2021 it is planned that the use of VAT data will be expanded to construction output, IoP and IoS. It is envisaged that the 46,000 surveys currently sent out per month will also be cut by around a half.

Based on detailed analysis, we will also consider extending the use of VAT turnover data to new industries currently measured largely by other administrative data such as:

- agriculture
- forestry
- fishing
- transport (rail, air, water)
- commercial property
- social care
- gambling
- membership organisations

We will also investigate whether improvements in data quality could be delivered through VAT turnover data alone. The industries listed above account for some 7.8% of gross value added in 2016.

## 5 . VAT turnover data – what can it do now?

One of the main advantages of the Value Added Tax (VAT) turnover dataset is that it can allow us to consider more detailed breakdowns of industries at a level and detail that has not previously been easy to achieve or have regularly available.

We use the [UK standard industrial classification 2007](#) (UKSIC07) and generally sample at the two- and three-digit level. Annex 1 shows some of the new industrial detail that we can potentially measure – at a lower level of detail. It also demonstrates that we can consider activity by business size with increased confidence.

The data in Annex 1 reflect early results and are subject to change based on further detailed analysis and methodological changes. These are provided to help demonstrate the potential future uses of this data source within the production of economic statistics:

- full quality assurance has not been completed, so there has not been any comparison with other sources of data, and there are periods where closer analysis of the returns may lead us to identify additional issues such as misreporting by businesses
- VAT turnover data are commonly at a higher level than surveys in part due to issues surrounding distribution of turnover for more complicated businesses
- industrial classification will be closely monitored and reviewed, particularly due to the historically low level of sampling of these industries and this may impact the quality of estimates with a low level of business activity where more accurate classifications could have a significant impact

For the analysis in this article, we have also included VAT turnover data for larger businesses where appropriate. This is not necessarily part of our future model for VAT turnover data usage in producing our estimates. We have yet to finalise our processes on how we will publish data combined from both survey and administrative data sources as nominal outputs.

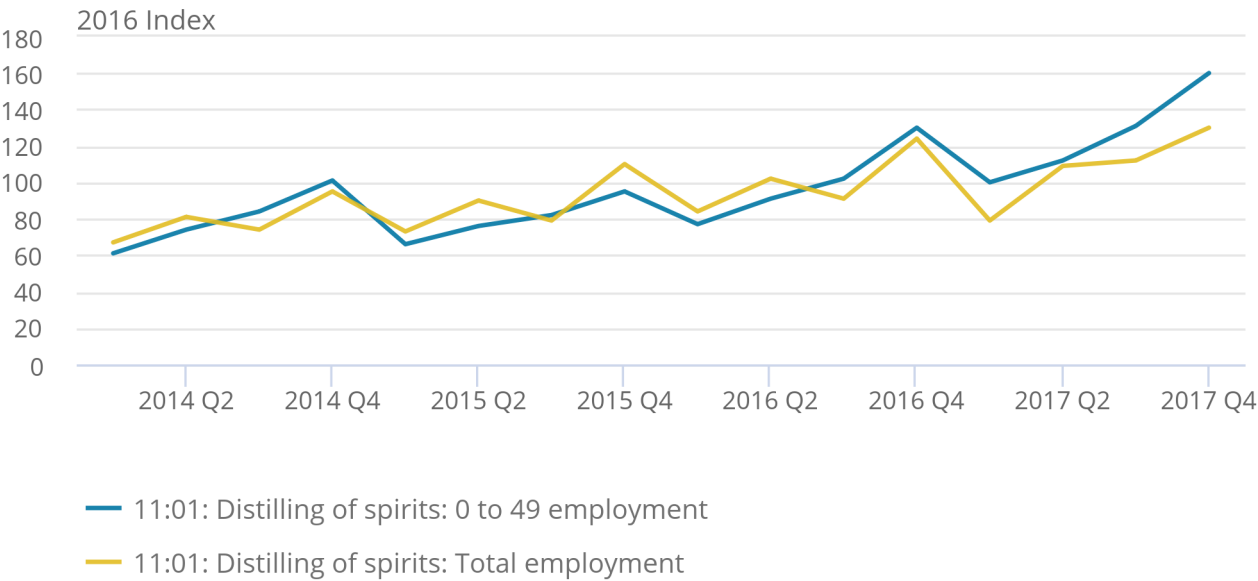
In addition, the data are shown at current prices and it is not seasonally adjusted so some caution is required in analysing the results.

Alcohol

Figure 2 shows the growth in distilling of spirits and the comparatively stronger performance for smaller businesses in recent periods, which may be attributed to craft distilleries.

Figure 2: Non-Seasonally Adjusted indexed turnover data: Distilling of Spirits

Figure 2: Non-Seasonally Adjusted indexed turnover data:  
Distilling of Spirits

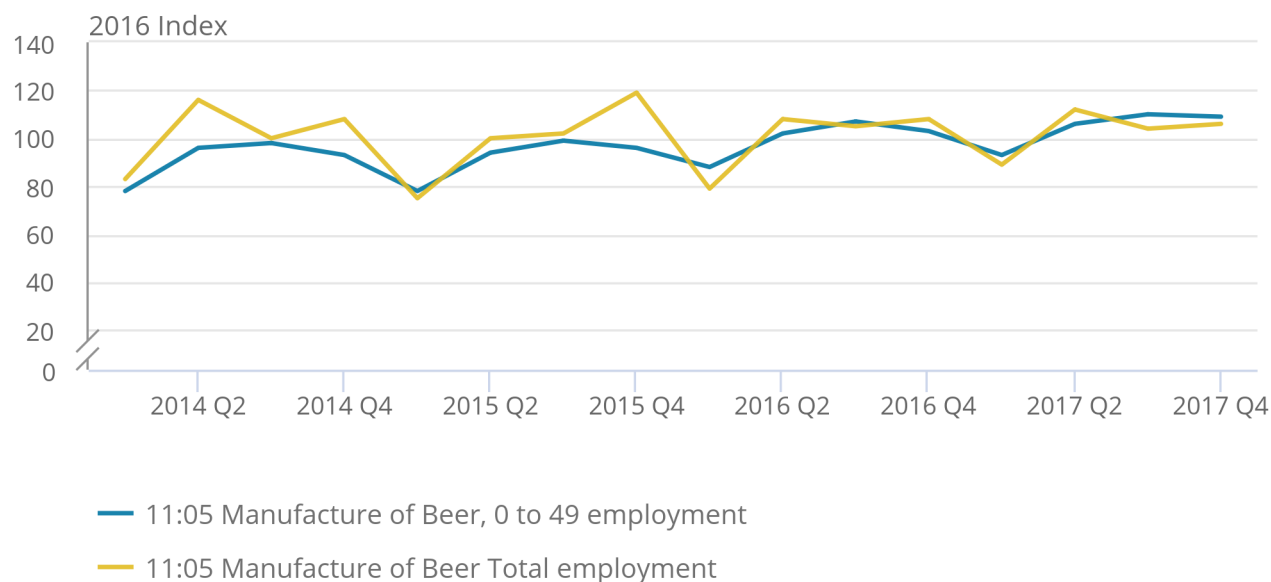


Source: HM Revenue and Customs

Figure 3 details the manufacture of beer that similarly has stronger growth for smaller businesses though to a lesser extent than distilling. A similar seasonality appears to be evident.

**Figure 3: Non-Seasonally Adjusted indexed turnover data: Manufacture of Beer**

Figure 3: Non-Seasonally Adjusted indexed turnover data:  
Manufacture of Beer



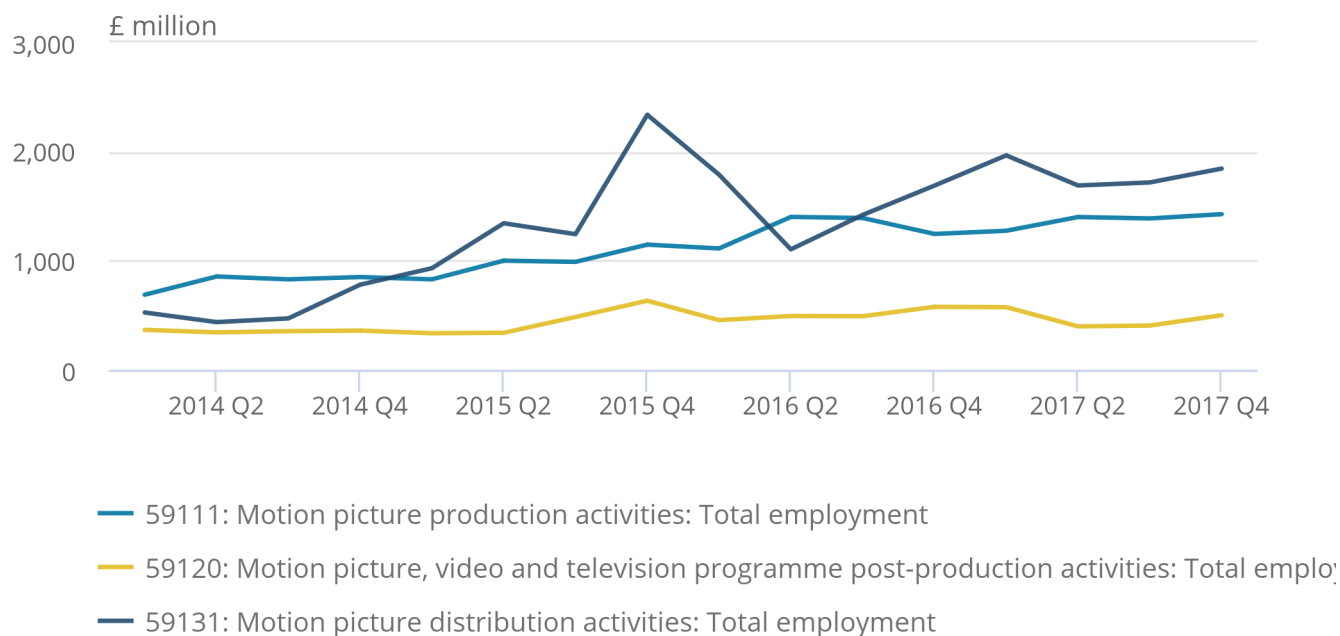
Source: HM Revenue and Customs

## Film industry

Figure 4 shows low-level detail surrounding the film industry, which has displayed strong growth in recent years. This is evident in the growth of film production (industry 59.111) at the five-digit level of UK SIC07 and is probably a contributory factor to growth in post-production (industry 59.12) at the four-digit level in 2015 and 2016. The expansion of film distribution activities (industry 59.131), again at the five-digit level, through confirmed new activity since 2015, is also evident with its erratic nature attributed to the release of global films.

**Figure 4: Non-Seasonally Adjusted Turnover: Film industry**

Figure 4: Non-Seasonally Adjusted Turnover: Film industry



**Source: HM Revenue and Customs**

These industries are dominated by large global corporations that may be impacted by a complex relationship between VAT units and reporting units, so caution should be used.

## Challenges

Although significant progress has been made, some methodological challenges remain. When an enterprise consists of more than one reporting unit the VAT turnover must be apportioned to each reporting unit. We currently use the proportion of registered employment of each unit to apportion or distribute the turnover. However, this assumes a direct relationship between VAT turnover and employment that is not appropriate for all industries.

VAT turnover data are primarily quarterly in profile while short-term indicators require monthly data. Methods, referred to as calendarisation, have been developed to use seasonal and trading day data from short-term indicator surveys.

In a survey, where fluctuations or changes in data occur with smaller-sized businesses, a dialogue can be formed to obtain respondent feedback. However, contact with smaller businesses will no longer be possible due to the changes from survey to VAT data. Although the level of cleaning is small, an improvement in automated cleaning of returns would manage this issue, while also overcoming the need for occasional human intervention in the VAT turnover data cleaning process.

## 6 . Beyond short-term indicators

In addition to Value Added Tax (VAT) turnover use in short-term indicators, we have also embarked on realising the potential of VAT turnover and expenditure data in two areas that may positively impact the quality and detail available of economic statistics.

### Improving regional data

In [December 2017](#), we published [Balanced Regional Gross Value Added \(GVA\(B\)\)](#) at level 1 and level 2 of the [Nomenclature of Units for Territorial Statistics \(NUTS\)](#), or NUTS1 and NUTS2, for the first time. This was achieved by using VAT turnover data to accelerate the production based measure of GVA, which was previously produced with a two-year lag due to the unavailability of survey data.

In December 2018, we will extend our publication of GVA(B) to include nominal and real estimates for NUTS3 areas and local authorities at a detailed industry level. The fine industry detail in the VAT data will allow us to do this.

In the future, we intend to use both VAT turnover and expenditure data to produce GVA(B) for "flexible geographies". This will use the detail of the VAT data to calculate GVA(B) for extremely small levels of geography which can then be built up into any area required by the user.

### Improving intermediate consumption

The monthly dataset available from HM Revenue and Customs (HMRC) to ONS includes data for VAT expenditure in addition to VAT turnover. Feasibility work is underway to explore how these data could be used as a proxy for purchases or intermediate consumption, although it is accepted that there are significant conceptual challenges to overcome.

If successful this could deliver a sub-annual supply of intermediate consumption to national accounts to potentially aid the balancing process. This could also be used to improve the supply of regional intermediate consumption in the production approach to GDP, improving the conceptual quality of the estimates.

## 7 . Next steps

We will publish articles on the progress, including methodology and statistical tools, at key points in the development of the strategic model.

An article on regional short-term indicators will similarly update users on progress in 2019.