

Regional gross value added (production approach) QMI

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1 . Methodology background

National Statistic	No
Frequency	Annual: December
How compiled	Various sample based surveys and administrative data
Geographic coverage	UK countries and regions (NUTS1 and NUTS2 – Nomenclature of Units for Territorial Statistics)
Last revised	31 March 2017

2 . Executive summary

Regional gross value added (GVA) is a legal requirement of the European Union (EU) statistical body, [Eurostat](#). Estimates are compiled in compliance with the [European System of Accounts 2010 \(ESA 2010\)](#) and are consistent with the standards set out in the United Nations [System of National Accounts 1993 \(SNA 1993\)](#).

Regional GVA is the value generated by any unit engaged in the production of goods and services. It is measured at current basic prices, excluding taxes (less subsidies) on products. GVA plus taxes (less subsidies) on products is equivalent to gross domestic product (GDP).

Regional GVA is measured by both the income and production approaches, this document relates to the production approach (regional GVA(P)). Estimates are measured as the total of all goods and services produced during the reference period (output), less goods and services used up or transformed in the production process (intermediate consumption).

There are two main types of output:

- output produced for the market (mainly by corporations); market output is simply the total sales plus changes in inventories (as the amount produced, rather than sold, is what is required for GVA(P))
- services that are not for market sale (mainly by government and non-profit institutions serving households (NPISH)); non-market output is difficult to value as there is often no meaningful selling price, so by convention, it is therefore valued as the sum of the costs of production

Intermediate consumption is defined as all goods and services used up or transformed in a process of production. This includes raw materials, power and fuel, rental on buildings and business services such as advertising, recruitment consultancy, and cleaning. It specifically excludes staff costs and capital investment.

Regional GVA(P) is produced using both current and constant prices. When looking at the economy over time, the main focus is often whether more goods and services are actually being produced now than at some time in the past. For example, how far the changes over time are “real” and how far they are the result of inflation. Current prices combine the effects of changes in both prices and quantities and do not allow for different regional price levels or changes in prices over time, so include the effects of inflation.

The production approach allows deflation of current price estimates, since the production components can be broken down into price and volume indices. The resulting regional constant price GVA(P) series removes the effects of inflation by deflating the current price values with price indices and can be used to show the “real” change in the quantity or volume of goods. This is often referred to as “real GVA”.

The regional GVA(P) estimates cover the UK as a whole and are broken down to [Nomenclature of Units for Territorial Statistics \(NUTS\)](#) regions. NUTS is a hierarchical classification of spatial units that provides a breakdown of the European Union’s territory for producing regional statistics, which are comparable across the EU. Regional GVA(P) estimates are compiled at two levels of NUTS geography:

- NUTS1: 12 regions – Wales, Scotland, Northern Ireland and the nine English regions can be collectively referred to as regions and there is a 13th region known as Extra-Regio, which accounts for economic activity that cannot be assigned to any specific region; for UK regional GVA(P), this consists mainly of oil and gas extraction on the continental shelf and the activities of UK embassies and armed forces overseas
- NUTS2: 40 sub-regions – mainly groups of counties and unitary authorities

National totals are allocated to regions using the most appropriate available regional indicators. A regional indicator is a dataset that provides data for calculating regional proportions, which in turn are used to allocate national totals. They can be acquired from administrative sources and structural surveys. The national totals are consistent with those in the latest published [UK National Accounts Blue Book](#).

Estimates are produced annually in December and are published on our website in the form of a statistical bulletin. The [Regional GVA\(P\) Statistical bulletin](#) can be downloaded for free from our website at 9.30am on the day of publication. These GVA(P) estimates are then delivered to [Eurostat](#) at the end of December.

This report contains the following sections:

- Output quality
- About the output
- How the output is created
- Validation and quality assurance
- Concepts and definitions
- Other information, relating to quality trade-offs and user needs
- Sources for further information or advice

3 . Output quality

This report provides a range of information that describes the quality of the data and details any points that should be noted when using the output.

We have developed [Guidelines for Measuring Statistical Quality](#); these are based upon the five European Statistical System (ESS) quality dimensions. This report addresses these quality dimensions and other important quality characteristics, which are:

- relevance
- timeliness and punctuality
- accuracy
- coherence and comparability
- output quality trade-offs
- assessment of user needs and perceptions
- accessibility and clarity

More information is provided about these quality dimensions in the following sections.

4 . About the output

Relevance

(The degree to which the statistical outputs meet users' needs.)

The project to develop a measure of regional gross value added (GVA) using the production approach was initiated in response to the Review of Economic Statistics for Policymaking by Christopher Allsopp in 2003. One of the recommendations of the review was for the development and publication of regional GVA at constant prices, which involves deflating annual data that are produced at current prices.

Early work on the project concerned the development of appropriate methodology and the identification of suitable data sources for regional GVA production approach (GVA (P)). This stage of the project culminated in the publication of an article in 2007. The article discussed possible methods and concluded that the best option would be a hybrid approach involving several data sources and deflation methods, based upon their availability and suitability as measures for each industrial sector of the economy. The first experimental results were compiled in 2008, but initial results raised some issues of data quality. Subsequent improvements in the Annual Business Survey (ABS) have led to improved data quality in regional GVA(P).

More recently there has been renewed interest in the GVA(P) project because of the development of the new [European System of Accounts \(ESA 2010\)](#), which came into force in 2014. This includes the legal requirement for EU member states to provide real measures of annual regional GVA growth to Eurostat by 2017. Such measures are provided by the use of current and constant price GVA(P) and their subsequent processing into a chained volume measure (CVM).

Current price estimates are published for regional GVA(P) as a time series from 1998.

An index of CVM (where CVM is presented as a proportion of a base year) time series is also published. Both time series are produced for NUTS1 and NUTS2 levels.

Both regional GVA estimates are published using the [Standard Industrial Classification 2007 \(SIC 2007\)](#), in keeping with EU regulations. For both NUTS1 and NUTS2 levels, data are provided for 20 industries plus 13 manufacturing sub-sections. Regional GVA(P) estimates have also proved to be of interest to UK government, the devolved administrations of Northern Ireland, Scotland and Wales, and several government departments.

Meeting future needs

A project to produce a balanced estimate of current price regional GVA using both the established estimates by the income approach and regional GVA(P) estimates is under way. This will take the different strengths of the two approaches to produce a single stronger estimate. This balanced current price estimate will then be used to produce constant price estimates and CVMs.

Reviews and changes

In keeping with the UK National Accounts commitment to meeting the European Commission definition of [Gross National Income](#) and the new [European System of Accounts \(ESA 2010\)](#), there have been changes made to the UK National Accounts measure of GVA. These impact upon the regional GVA estimates in the form of different national totals for the various components of income, even where no explicit changes to the regional allocation have been needed. Of these, a change to the treatment of [owner-occupied imputed rental](#) has resulted in the greatest impact on the national figures in the December 2016 release. There are currently no regional data available to allow us to implement this change in our regional GVA estimates; however, we hope to make this change in 2017 to become consistent with the UK National Accounts methodology.

For the December 2016 release, we carried out a review of the way we measure the manufacture of coke and refined petroleum industry (SIC sub-section CD) in regional GVA and have made some changes to improve consistency with the reality of the industry. A discrepancy was found between the conversion to SIC 2007 in GVA income approach (I) compared with GVA production approach (P), with the GVA(P) conversion found to be the better of the two. The GVA(I) series was re-converted, bringing the two measures closer together. Alongside this, extensive industry research has been carried out to influence adjustments made to the raw data in both GVA(I) and GVA(P) to reflect reality as accurately as possible.

In the 2015 release, there was a change in the average house prices used to calculate the regional allocation of imputed rental of owner-occupied dwellings. The new data used ONS median house prices instead of mean house prices, which reduces the impact of the most expensive houses and improves the consistency of estimates over time. The exception at the time was Northern Ireland: mean house prices were used for Northern Ireland as median house prices were unavailable. However, we have now been able to source median house price data for Northern Ireland consistent with the rest of the UK regions and countries. This has had an impact on GVA estimates for real estate activities (SIC Section L) in Northern Ireland.

In the December 2016 release, we changed the way we treat public sector industries in GVA(P). We have a new National Control for the sector, using an indicator of Annual Survey of Hours and Earnings (ASHE) in the public sector multiplied by public sector employees from the Business Register and Employment Survey (BRES) to regionally distribute the national total.

Information on changes made to each release are included in the statistical bulletin.

Main data sources

The primary input datasets for the compilation of regional GVA(P) are listed in Table 1. The data are acquired from both internal (ONS) and external sources.

Table 1: Summary of main data sources for indicators used in regional apportionment

Data source	Nature of data	Uses
Annual Business Survey (ABS)	An ONS structural business survey, a sample survey of enterprises	Allocates output and intermediate consumption for bulk of the UK economy
Annual Survey of Hours and Earnings (ASHE)	An ONS workplace-based sample survey of wages and salaries	Used in conjunction with BRES data to allocate public expenditure
Business Register and Employment Survey (BRES)	An ONS structural business survey, a sample survey of enterprises. Used to define regional public employment numbers	Used in conjunction with ASHE data to allocate public expenditure
Agricultural Accounts from Department for Environment, Food and Rural Affairs (Defra)	Structural business survey of the agricultural sector, a sample survey	Used for output and intermediate consumption for part of agricultural sector (crops and livestock)
Self-Assessment (Pay As You Earn and Self Assessment), Her Majesty's Revenue and Customs (HMRC)	Administrative data provided by HMRC, the national tax authority. Derived from self-assessment tax returns completed by self-employed sole traders	This forms an indicator that is used to apportion gross value added for sole traders
Regional estimates of bank and building society fees and commission and FISIM (Bank of England)	Administrative data supplied by the Bank of England at NUTS1	Allocates GVA for monetary intermediation (SIC 64.1)
Labour Force Survey (LFS)	Labour Force Survey data on regional employee numbers in component finance industries	Used as an indicator for remainder of financial services (SIC 64), and temporarily for insurance industries (SIC 65) and auxiliary financial activities (SIC 66)

Timeliness and punctuality

(Timeliness refers to the lapse of time between publication and the period to which the data refer. Punctuality refers to the gap between planned and actual publication dates.)

We currently publish estimates of regional GVA(P) at NUTS1 and NUTS2 levels annually in December. All estimates are constrained to the latest published [UK National Accounts Blue Book](#).

At NUTS1 and NUTS2 levels, estimates of 20 industry sections (plus 13 manufacturing sub-sections) are published 24 months after the end of the reference period. Estimates are available from 1998.

The availability of important datasets in the production process is a factor in the publication timetable. For example, HM Revenue and Customs self-assessment data become available at the end of October. The availability of balanced Blue Book UK totals dictates the provision of industrial estimates published 24 months after the reference period.

For more details on related releases, the [UK Government Statistics Release Calendar](#) is available online and provides 12 months' advance notice of release dates. In the unlikely event of a change to the pre-announced release schedule, public attention will be drawn to the change and the reason for the change will be explained fully at the same time, as set out in the [Code of Practice for Official Statistics](#).

5 . How the output is created

The production of regional Nomenclature of Territorial Units for Statistics (NUTS2) real gross value added is a legal requirement of [Eurostat](#).

A detailed description of the methodology used to compile regional GVA production approach (P) estimates can be found in the [Regional Accounts Methodology Guide](#).

Regional GVA(P) estimates are produced at current basic prices and measured using the production approach.

The components of production-based GVA(P) are output and intermediate consumption. GVA(P) is then calculated as output less intermediate consumption.

The UK regional GVA(P) estimates are constrained to the latest published [UK National Accounts Blue Book](#) totals. The Blue Book is our annual publication of the UK National Accounts.

Data sources used as regional indicators are collated, analysed and validated. Outliers are identified using graphical analysis and quality adjustments are assigned where necessary. Where appropriate, any queries are referred back to the suppliers. The resulting validated datasets are then included in the Statistical Analysis System (SAS) output production system.

The production system then creates the regional GVA(P) estimates (including published variables and components). For the first time, in 2015 these were submitted to established peer reviewers for feedback, prior to the publication phase. Any changes resulting from this feedback were implemented via further production.

National totals

National aggregates (national control totals) for components are allocated to NUTS1 and NUTS2 regions using appropriate regional indicators. The control totals are consistent with those in the latest published [UK National Accounts Blue Book](#). Control totals for public expenditure and for sole traders are also supplied and treated separately from the rest of the economy. These control totals are supplied to regional accounts branch by our national accounts branches. Industry totals are obtained from [UK Supply and Use Tables](#). These estimates are then revised in the following year's publication.

The national aggregates are split and re-allocated to regions using the most appropriate regional indicator available.

6 . Validation and quality assurance

Accuracy

(The degree of closeness between an estimate and the true value.)

All regional GVA(P) estimates are constrained to the published [UK National Accounts Blue Book](#) totals. Below the UK level, NUTS1 to NUTS2 estimates are constrained to sum to the UK totals.

As mentioned in the “How the output is created” section, national totals for gross value added (production approach) (GVA(P)) components (consistent with the latest Blue Book publication) are collated and allocated to regions using the most appropriate regional indicators. Consistency checks are built into the processing system to ensure that regional aggregates tally with national totals.

The important regional indicators are acquired from published administrative data and structural business surveys. These data are subject to a rigorous validation process that entails a mechanism for referral back to data suppliers where appropriate.

Sample sizes can vary. These variations are unavoidable in the collation of reliable time series data for the calculation of GVA(P). Improvements in the GVA(P) methodology or changes in administrative source data allow for reviewing the available sources for higher quality datasets or more timely publications. This is an ad hoc and continuous process that does not include major revisions to the methodology of GVA(P).

The vast majority of source data are updated annually, but some datasets are published biennially or on an ad hoc basis. These missing values are imputed as stated in the validation process. As with sample size, potential improvements to the methodology are reviewed whenever new data become available or when significant changes to the source data affect the final values. Where no recent estimate is available, the previous year's data may be used. It is important to note, however, that these issues are rare because of the completeness of the main source data.

The quality assurance process

Input datasets are compared to the data received in previous years' deliveries. Large fluctuations against previous years are investigated. Following investigation, any anomalous data that remain unexplained are followed up, where appropriate, with the relevant data providers for clarification.

The regional accounts team then makes adjustments to the source datasets where necessary.

The output variables for publication are subject to rigorous scrutiny, including looking at growth and shares, graphical depictions and comparisons with previous data. Resulting anomalies are investigated and rectified where necessary. Feedback from this process is documented on the regional accounts database and any actions implemented within the results.

The regional accounts team has links with an established peer reviewer network, and the regional GVA(P) project consulted this network in 2015. The network includes the devolved administrations of Northern Ireland, Scotland and Wales, Her Majesty's Treasury (HMT), the Office for National Statistics (ONS) London regional presence stationed at the Greater London Authority (GLA), and an ONS regional economist. Regular dialogue has resulted in significant refinements to the peer review process. Regional intelligence will be shared and we will keep peer reviewers informed of any significant developments.

A Regional Accounts Government User Group (RAGUG) was established in June 2014 and meets biannually. This group consists of experts from devolved administrations, central and local government departments, and the regional accounts production team. Its remit is to review the work of regional accounts production (including GVA income approach (I) and gross disposable household income (GDHI)) and to offer feedback on our work and on future developments and improvements.

Revisions

The complex process by which the GVA estimates are produced means that it is not currently possible to define the accuracy of the estimates in terms of detailed statistical properties, for example, through their standard errors. Therefore, the reliability of the estimates is measured by the extent of revisions. UK estimates will be affected by revisions to the published [UK National Accounts Blue Book](#) control totals, while revisions to NUTS1 and lower-level estimates will come from revisions to the data used to apportion the UK GVA(P) estimates and revisions to the Blue Book.

The regional accounts revisions policy mirrors that of published [UK National Accounts Blue Book](#), where national totals are subject to revision in “open” years. The whole time series is open to revisions from the Blue Book. In addition, revisions to the regional indicator datasets will impact the regional GVA estimates.

In [UK National Accounts Blue Book 2016](#), the totals for national GVA by industry were revised as far back as 1997 and included methodological changes to meet the European Commission’s definition of gross national income and the new [European System of Accounts \(ESA 2010\)](#).

It is important to note that there are other aspects of accuracy, which revisions analysis cannot attempt to measure. A value can be reliable (as in, not revised) without being accurate.

Coherence and comparability

(Coherence is the degree to which data that are derived from different sources or methods, but refer to the same topic, are similar. Comparability is the degree to which data can be compared over time and domain for example, geographic level.)

Coherence

Estimates of approximate GVA are also published as part of the [Annual Business Survey](#) release. These estimates are used in the production of annual [Supply and Use Tables](#) for the compilation of the UK gross domestic product (GDP). The ABS GVA estimates differ from the UK Regional Accounts estimates in a number of ways:

- Regional Accounts GVA(P) estimates are constrained to National Accounts Blue Book totals
- Regional Accounts GVA(P) estimates are analysed and produced as a time series
- ABS estimates represent the UK business economy, which is around two-thirds of the UK economy but excludes agriculture, public sector and financial sector

A [paper has been published](#) elaborating on these differences.

Comparability

The production of regional GVA is a legal requirement under the European System of Accounts 2010. Currently this is fulfilled by the outputs of the regional gross value added (income approach) (GVA(I)) system, which is an accredited National Statistic. Regional GVA(P) is currently an Experimental Statistic. Although conceptually identical, the different methods and data sources used in the two measures inevitably result in differences between the regional GVA(I) and regional GVA(P) estimates.

GVA(I) estimates published in December 2016 are available on a consistent basis at all NUTS levels back to 1997 on a [Standard Industrial Classification \(SIC\) 2007](#) basis.

A comparison of regional GVA(I) and regional GVA(P) current price estimates was made and published in the Statistical Bulletin [Regional gross value added \(production approach\)](#). This demonstrated that the estimates made by the two approaches were similar. However, it does also indicate where differences between the estimates exist, across industries and regions and provides advice on the appropriate use of the experimental statistics.

The Scottish Government (SG) produces an index of chained volume measures (CVM) of Scottish GDP in basic prices (equivalent to GVA), which is a National Statistic using methods and sources consistent with ONS GDP statistics for the [UK Gross Domestic Product \(GDP\) for Scotland](#). The SG estimate provides the best estimate of total Scottish GVA and GDP.

The [Northern Ireland Composite Economic Index \(NICEI\)](#) is an experimental quarterly measure of the performance of the Northern Ireland economy based on official statistics. The NICEI provides an appropriate short-term indicator for the Northern Ireland economy in advance of more complete figures such as the annual regional accounts information for Northern Ireland from ONS.

The Welsh Government (in conjunction with ONS) produces a quarterly [index of production and construction](#) and a quarterly [index of market services](#) series for short-term output indices covering most of the private sector economy in Wales. These show quarterly growth in output in real terms from 1998.

7 . Concepts and definitions

(Concepts and definitions describe the legislation governing the output, and a description of the classifications used in the output.)

Regional gross value added (GVA) is a legal requirement under EU law and supplied to [Eurostat](#) consistent with the standards set out in the [European System of Accounts 2010](#).

Since December 2013, annual regional GVA production approach (P) estimates have been published using [Standard Industrial Classification \(SIC\) 2007](#), in keeping with EU regulations.

The regional GVA(P) estimates cover the UK as a whole and are broken down to [Nomenclature of Territorial Units for Statistics \(NUTS\)](#) regions. NUTS is a hierarchical classification of spatial units that provides a breakdown of the EU's territory for producing regional statistics, which are comparable across the EU. Regional GVA(P) estimates are compiled at two levels of NUTS.

Geography

NUTS1: 12 regions – Wales, Scotland, Northern Ireland and the nine English regions can be collectively referred to as regions. There is a 13th region known as Extra-Regio, which accounts for economic activity that cannot be assigned to any specific region. For the UK, this consists mainly of oil and gas extraction on the continental shelf and the activities of UK embassies and armed forces overseas.

NUTS2: 40 sub-regions – mainly groups of counties and unitary authorities.

8 . Other information

Output quality trade-offs

(Trade-offs is the extent to which different dimensions of quality are balanced against each other.)

Regional gross value added (production approach) (GVA(P)) results are published 24 months after the reference period. The time lag between publication and the period to which the data refer is the minimum required to produce estimates of a high enough quality to meet all user needs. These results are revised when improved data become available.

Further information on release dates can be found in the “Timeliness and punctuality” section of this article.

Assessment of user needs and perceptions

(The processes for finding out about uses and users, and their views on the statistical products.)

In July 2011, the UK Regional Accounts team met with [Eurostat](#) as part of a quality initiative aimed at encouraging harmonisation of compilation methods for regional statistics. Regional accounts have participated in a Eurostat Task Force of Member States to develop a [regional accounts methodology manual](#), which is now complete and published. The team has frequent dialogue with Eurostat.

The regional accounts team has developed links with the devolved administrations of Northern Ireland, Scotland and Wales, the Office for National Statistics (ONS) London regional presence stationed at the Greater London Authority (GLA), and an ONS economist. As previously mentioned, these are some of the main domestic users of the regional GVA statistics.

The “How the output is created” section of this article provides more information on the use of regional GVA outputs and the peer review process.

From 2014, the Regional Accounts Government Users Group (RAGUG), composed of representatives of the main government users, has met biannually to discuss data, methods and user needs and to advise the regional GVA(P) project.

9 . Sources for further information or advice

Accessibility and clarity

(Accessibility is the ease with which users are able to access the data, also reflecting the format in which the data are available and the availability of supporting information. Clarity refers to the quality and sufficiency of the release details, illustrations and accompanying advice).

The [Regional gross value added \(production approach\) \(GVA\(P\)\) statistical bulletin](#) is available for download after 9.30am on the day of publication.

The [Regional gross value added \(income approach\) \(GVA\(I\)\) statistical bulletin](#) and [ONS Data Explorer tool](#) are available for download after 9.30am on the day of publication.

The [Regional GVA\(P\) statistical bulletin](#) conforms to the standards set out in the [Code of Practice for Official Statistics](#) for the protocol on release practices.

For queries on the regional GVA(P) series, compilation methods, quality information, or if you are experiencing difficulties in finding the latest figures, contact the regional accounts team by e-mail at regionalaccounts@ons.gsi.gov.uk or by telephone on +44 (0)1633 456878.

Our recommended format for accessible content is a combination of HTML webpages for narrative, charts and graphs, with data being provided in usable formats such as CSV and MS Excel files. We also offer users the option to download the narrative in PDF format. In some instances other software may be used, or may be available on request. Available formats for content published on our website but not produced by us, or referenced on our website but stored elsewhere, may vary. For further information please contact us via email at regionalaccounts@ons.gsi.gov.uk.

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