Office for National Statistics

Introducing GDP for the countries of the UK and the regions of England

Methodology information for regional GDP estimates, including data sources, regionalisation, classification and future developments.

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1 . Introduction

Increasing devolution of powers to countries, cities and regions of the UK brings with it increasing demand for subnational statistics to monitor the economy. The Bean Review made various recommendations on the need for regional economic statistics in the face of growing devolution:

- a need for more timely regional statistics

- a need for greater flexibility to provide statistics for different geographic areas

- more use of administrative data sources in regional statistics

In response to this, on 5 September 2019, the Office for National Statistics introduced country and regional volume estimates of gross domestic product (GDP) for the first time, with additional granular industry-level information for Wales and the nine English regions. These estimates will make use of VAT returns for almost two million business units recently made available for use in official statistics, to show the economic performance at a regional level. These estimates will complement the annual estimates of regional gross value added (GVA, a close relation of GDP) that are currently available, but will be produced twice as fast and on a quarterly basis.

Estimating the size or change to the size of the economy is complex. The national estimates of UK GDP make use of many data sources and undergo extensive quality assurance before a final estimate is arrived at.

Estimating economic activity on a regional basis introduces additional challenges. Regional data is more volatile than national estimates and so regional GDP needs to be carefully interpreted alongside economic trends both in the regions and in the UK.

There are also significant challenges in forming regional estimates of GDP. This article explains how these challenges were overcome, as well as the future developments that will build upon the work already done.

2 . Data sources

In the national accounts, business survey information is the primary data source for short-term estimates of GDP. While these surveys are only based on a sample of the population, the data go through extensive quality assurance and are designed to produce good quality estimates of GDP at the level at which we publish. Subsequently, some of the survey information for smaller businesses, which have a low sampling rate, is replaced by VAT turnover information.

As an administrative data source, we have less control over the collection of VAT data, however, it has the benefit of holding information on every business registered for VAT in the UK (accounting for the vast majority of turnover generated). This means that the sampling error inherent in sample surveys that are based on data from far fewer businesses does not apply to the VAT data. Their inclusion therefore allows for overall better quality and more stable estimates of GDP.

Ideally, direct regional data would be readily available for us to use in estimates of regional GDP. This would accurately capture the amount of economic activity that was taking place at the regional level. While they are available for some industries, for large parts of the economy we only have data for the UK as a whole. In these cases, we need a method to regionalise the data that ensure they accurately represent the regions they are trying to measure.

Regionalising survey information, however, can be problematic, since the surveys we conduct are not designed to give regional estimates of GDP. This can lead to results which are of lower quality than the national estimates and potentially misleading for those looking to the estimates as a signal of economic performance within a region. For this reason, most industries covered by these estimates will be based entirely on VAT turnover information. Since this data source is effectively a census, this means that each region will have complete coverage and no sampling error, allowing for higher quality and more representative estimates of regional GDP.

3 . Regionalisation

The method of regionalisation is of equal importance as the choice of data source. No matter how good the quality is of the national data, a poor method of regionalisation can lead to the introduction of bias and overall lower quality estimates.

Regional estimates of GDP are regionalised using the Inter-Departmental Business Register (IDBR). The IDBR is the main sampling frame for business surveys in the ONS, but is also an invaluable source of information on the employment and structure of every business in the UK. In particular, it gives employment information for every site or workplace in the UK. This information allows us to apportion the VAT turnover for each business based on their employment share within any region.

For those interested in calculating estimates of regional economic performance, this has long been an established method of apportioning national data to regions, and is considered to be a very reliable model for doing so. However, there may be some cases where this relationship does not hold. For example, businesses in the financial industries may have large turnover and relatively low employment, and so apportioning the turnover based on employment may lead to inaccurate results. Therefore, where possible, alternative data sources are used in these cases, to ensure our estimates are representative of the regions they are aiming to measure.

4 . Industry classification

The regionalisation of the VAT turnover data means that our dataset consists of modelled turnover values for each site or workplace in the UK. As well as allowing us to produce regional estimates of GDP, it also gives us a choice as to how we classify the turnover to an industry or activity, either based on the activity of the site or based on the activity of the overall business.

As a stylised example, take a large retail chain that operates a bank in a region. The activity of the overall business would be retail, but the activity of the site would be in finance. Therefore, depending on which classification you choose, you could end up classifying the turnover generated by the bank to either retail or finance. If applied to all businesses, the industry estimates derived from the data would likely be different depending on the classification used.

Regional estimates of GDP will be based on the activity of the site, as our aim is to help users understand the economic activity actually taking place in their region. This is in line with the approach taken within our annual regional accounts estimates, but differs slightly to short-term estimates of economic activity published by Scotland (Quarterly Scottish GDP) and Northern Ireland (composite economic index). These are based on an industry classification that is a hybrid between the site-level activity and the overall business activity. It is worth noting that for most businesses the overall business and the site are the same so, while the actual difference between the estimates based on the two different classifications is not known, it is believed to be small.

5 . Consistency with national estimates

Regional GDP has been designed to produce good estimates of short-term movements in GDP at a regional level. However, we also produce regional accounts on an annual basis, which gives annual estimates of regional GVA. GVA is a close relative of GDP, with GDP being derived from GVA by adding taxes on products and subtracting subsidies on products. Regional accounts have a time lag of between one and two years, but represent our best estimates of regional economic performance because of the rich annual data sources that it utilises. For this reason, regional GDP will benchmark its results to these annual estimates up to the year that they are available. This means that regional GDP will align with the annual growth rates determined by regional accounts, while fitting a quarterly path based on the underlying regional GDP data. Since regional accounts themselves are constrained to national estimates of GDP, this process of benchmarking ensures that regional GDP are also broadly in line with the national estimates.

However, there may still be inconsistencies between our regional GDP data, post regional accounts benchmarking, and our short-term estimates of GDP. This is because there are some clear differences in the data sources and methods used (for example, in the extent to which VAT data is used).

This means that while regional GDP aims to produce the best estimates at a regional level, the sum of the regions (adding in published estimates for Scotland and Northern Ireland) may not equal the national total in the time period following the regional accounts benchmarking. To address this, we have constrained our regional GDP estimates to the all-industry national totals for this period in such a way that minimises changes to the region by industry quarter on quarter growth rates. The industry totals will not be constrained as they are on a different conceptual basis (see the Industry classification section). However, they will be broadly in line because of the benchmarking to regional accounts industry totals in earlier periods. The overall impact of the constraining on the regional estimates is small.

Additionally, in line with the short-term national estimates of GDP, regional GDP will use movements in turnover values as a proxy for movements in GDP.

6 . Data processing

Following data collection, a series of statistical techniques are applied to the data to arrive at our final estimates. These include deflation (removing the effect of prices), seasonal adjustment and constraining (see section above). Deflation is carried out using national level deflators, as regional price information is currently not available.

7 . Products

Regional GDP estimates will be provided as seasonally adjusted chained volume measures (with the effect of prices removed), broken down by broad industry grouping (20 categories) in the form of indices and growth rates. In addition to the data tables, a statistical bulletin will be made available highlighting the most interesting features of the dataset.

Only all-industry estimates for Scotland and Northern Ireland will be made available, since their industry estimates are produced on a conceptually different basis. However, industry estimates are available in the Scotland and Northern Ireland publications.

8 . Future developments

While this work represents a big step forward for the ONS as part of its transformational journey, additional work is planned to further build on these estimates. Over the coming months we will continue to refine our methods alongside the regular production of these statistics and will consult users on their use and need for these statistics. Over the longer term, we are aiming to produce these estimates at a more granular geographic level with plans to do so in the next five years.

Another planned development is to convert our annual estimates of GVA into estimates of GDP by adding taxes and subtracting subsidies on products. It is common to use movements in GVA as a proxy for GDP in the short term (because of the lack of information on taxes and subsidies for this time period). However, it is our aim that our most robust annual estimates of GVA – our regional accounts estimates – should measure as closely as possible the concepts required in short and longer term regional estimates of GDP.

9 . Annex

Table 1: Data Sources by Section

Section	Description	Data source(s)
A	Agriculture, Forestry and Fishing	Department for Environment, Food & Rural Affairs (DEFRA), Forestry Commission, Marine Management Organisation
B	Mining and Quarrying	VAT turnover, Coal Authority, Department for Business, Energy & Industrial Strategy (BEIS), Workforce Jobs
C	Manufacturing	VAT turnover, BEIS
D	Electricity, gas, steam and air conditioning	BEIS
E	Water supply, sewerage, waste management	VAT turnover, Monthly Business Survey
F	Construction	Output in the Construction Industry publication data
G	Wholesale and retail trade	VAT turnover
H	Transportation and storage	VAT turnover, Office of Road and Rail (ORR), Department for Transport (DfT), Civil Aviation Authority (CAA), Post Office
I	Accommodation and food service activities	VAT turnover
J	Information and communication	VAT turnover, Monthly Business Survey, Public Sector Employment
K	Financial and insurance activities	Bank of England
L	Real estate activities	VAT turnover, Household Final Consumption Expenditure
M	Professional, scientific and technical activities	VAT turnover, Workforce jobs
N	Administrative and support service activities	VAT turnover
O	Public administration and defence	General Government Final Consumption Expenditure
P	Education	VAT turnover, Department for Education, General Government Final Consumption Expenditure, Workforce Jobs
Q	Human health and social work activities	VAT turnover, General Government Final Consumption Expenditure, Workforce Jobs
R	Arts, entertainment and recreation	VAT turnover, General Government Final Consumption Expenditure, Labour Force Survey, ONS Family Spending report
S	Other service activities	VAT turnover, Workforce jobs, Labour Force Survey
T	Activities of households as employers	Labour Force Survey, Family Spending report

Source: Office for National Statistics – Regional GDP estimate