

Article

Productivity in towns and travel to work areas, UK: 2019

An analysis of labour productivity data for towns and Travel to Work Areas (TTWAs) in the UK in 2019. Bringing together our productivity estimates for specific geographies and new analysis exploring the industry structure of towns.

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1 . Main points

- The most productive Travel to Work Areas (TTWAs) are mainly located on well-connected transport routes in the south of England, in particular motorway and rail routes heading to and from London, with a large town or small city as a focal point.
- Labour productivity is lowest in rural TTWAs or those with only small towns in relatively isolated locations such as coastal areas.
- Labour productivity is below the UK average in all TTWAs within the major conurbations of the north and midlands of England.
- Out of 363 towns in our analysis, labour productivity was above the UK average in 73 towns in 2019, 52 of which were located in the South East or East of England regions.
- High productivity towns and TTWAs gain some of their productivity advantage from their industry composition, however most of their advantage comes from them having higher average productivity within individual industries compared with the same industries located elsewhere in the country.

2 . Labour productivity: Travel to Work Areas

Experimental labour productivity data for Travel to Work Areas (TTWAs) and towns were made available for the first time in December 2021. They are available in our [UK GVA and productivity estimates for other geographies](#) dataset within our [Disaggregating annual subnational gross value added \(GVA\) to lower levels of geography](#) release. Data cover the period from 2009 to 2019.

These data complement the existing annual labour productivity estimates produced for local authorities, combined authorities and International Territorial Level (ITL) areas in the annual [Office for National Statistics \(ONS\) Subregional productivity](#) release.

This article provides analysis of both the TTWA and towns productivity data for 2019. The data for TTWAs cover the whole of the UK. For towns, data have been calculated for 363 towns on the same geographic basis as the ONS [Understanding towns series](#) (see our [Glossary](#) for more details). We also provide analysis using firm level data from the ONS Annual Business Survey for additional context.

Figure 1 shows gross value added (GVA) per filled job for UK TTWAs. This is a useful geography for exploring labour productivity data as TTWAs are built to approximate self-contained labour market areas. They aim to reflect areas where most people both live and work and that have relatively low levels of in- or out- commuting. The TTWA data shown here provide estimates of labour productivity averages for different labour market areas across the country.

Figure 1 shows that Slough and Heathrow TTWA had the highest GVA per filled job in 2019, followed by London and Reading TTWAs (44%, 39% and 36% above the UK average respectively). The lowest levels of productivity are typically found in rural or coastal areas, with Brecon, Bideford and Whitby TTWAs having the lowest labour productivity, at 49%, 43% and 41% below the UK average respectively.

Figure 1: The Travel to Work Areas (TTWAs) with highest productivity include London and areas to the west of London

Gross value added (GVA) per filled job, TTWAs, England and Wales, 2019

[Download the data](#)

Figure 2 shows labour productivity by TTWA for England and Wales using a classification that distinguishes the geographical context of TTWAs.

Academic evidence suggests that the size (or the population density) of an economic area (for example, a city) is one of the determinants of overall productivity levels. This is because firms from a range of industries benefit from the concentration of shared resources such as physical infrastructure, skilled labour and knowledge spill-overs that cities and dense urban areas provide. The classification distinguishes between four different labour market areas: rural, small town, large town, and conurbation TTWAs. See more details in the [Glossary](#).

Figure 2: Only two “conurbation Travel to Work Areas (TTWAs)” had average gross value added (GVA) per filled job levels above the UK average in 2019

Gross value added (GVA) per filled job, TTWAs by classification, England and Wales, 2019

Notes:

1. See [Glossary](#) for detailed breakdown of the TTWA classifications.

[Download the data](#)

Results for the major conurbation group include the two TTWAs (Slough and Heathrow, and London) with the highest labour productivity in the UK. However, labour productivity in the rest of the major conurbation TTWAs is below the UK average. This covers labour market areas in other major English cities such as Manchester, Birmingham, Leeds, and Liverpool. The results highlight the large productivity gap between England's largest city and its other conurbations.

Figure 2 shows that the large town TTWA group has the highest share of areas with relatively high labour productivity. Many of the large town TTWAs are on well-connected transport routes, in particular motorway and rail routes heading to and from London, with a large town or small city as a focal point. For example, Reading, Basingstoke, Swindon, and Milton Keynes have above average labour productivity.

The small towns TTWA group includes labour market areas where the majority of the population live in urban areas, but there are no large towns or cities with a population over 75,000 within the TTWA. These are often less well-connected locations, for example in coastal areas. While the group does include a few places with high productivity (Newbury, Leamington Spa, and Folkestone and Dover), the majority are below the UK average. Over half (58%) have average productivity levels 20% or more below the UK average.

We see a similar result for rural TTWAs, with the majority (70%) of these areas having productivity 20% or more below the UK average.

An important result in Figure 2 is the difference within the major conurbation category between the two TTWAs in the Greater South East (London, South East, and East of England regions) and those in the midlands and north of England. Table 1 shows this difference and how productivity in the other TTWA classification groups differs between the Greater South East and the rest of England and Wales. In each case, average productivity is higher in the Greater South East. The gap is largest for the major conurbation group and smallest for the small town group.

Table 1: Labour productivity is higher in the Greater South East for each classification of Travel to Work Area (TTWA)
Gross value added (GVA) per filled job, TTWA groups, England and Wales, 2019, UK=100

Travel to work area Classification	Greater South East	Rest of England and Wales	England and Wales
Rural TTWA	89	75	78
Small town TTWA	88	82	84
Large town TTWA	101	89	95
Major Conurbation TTWA	140	87	113

Source: Office for National Statistics

Notes

1. The Greater South East includes the regions of London, the South East and the East of England.

Sources of productivity in Travel to Work Areas

Differences in the average aggregate productivity between areas can come from two main sources. These are that:

- the areas can have a different industry mix, as different industries have different average levels of productivity
- within the same industries, average firm level productivity in one area can differ from that in other areas

Our [Understanding towns: industry analysis](#) article examined industry specialisations by town and TTWA. Using data from that article combined with the productivity data shows that almost all (13 out of 16) TTWAs with an above average productivity level specialise in high-tech services. They are also more likely to have high levels of relative employment in knowledge-intensive market services and high-tech manufacturing.

Figure 3 shows the relationship between the degree of specialisation in selected industries using location quotients (higher value infers a relative employment specialisation) and average productivity levels of TTWAs in 2019. It indicates that there is a weak relationship between specialisation in selected industries and average productivity in the TTWA geographies. Specialisation in high-tech services appears to have the strongest relationship with aggregate average productivity levels in TTWAs.

Figure 3: There is a weak relationship between specialisation in selected industries and average Travel to Work Area (TTWA) productivity

Gross value added (GVA) per filled job compared with selected industry group location quotients, TTWAs, Great Britain, 2019

Notes:

1. See the [Glossary](#) for a detailed breakdown of the high-tech and knowledge-intensive services (HTEC) industry groups.

[Download the data](#)

In our [Understanding spatial productivity in the UK](#) article, at the ITL2 geography it was shown that an area's industry structure appears to play a relatively small role in productivity differences. This section explores whether the same conclusions hold for TTWAs.

To explore the strength of local and industry factors, we analysed firm level data from the Annual Business Survey (ABS) for Great Britain (GB). The ABS excludes the agricultural sector, financial sector, some small firms, the self-employed and the public sector. Therefore, the estimates of productivity in this section cannot be compared directly with the estimates presented earlier in Table 1. However, the firm level data within the ABS allows us to investigate industry impact.

Similar to our previous publications, we use a decomposition technique to investigate these sources of productivity and how they relate to differences in aggregate productivity between different areas. The technique allows the decomposition of aggregate average labour productivity in each area into three indices, of which the following two are particularly relevant:

- the Firm Productivity Index, which shows the average level of productivity in an area (relative to the national average) assuming the industry composition in that region is the same as for the economy as a whole; this is designed to demonstrate the effect of the firm level productivities on the region's estimated average aggregate productivity
- the Industry Composition Index, which shows the average level of productivity in an area (relative to national average) assuming the productivity of each industry in that region equals nationwide average productivity for that industry; this is designed to demonstrate the effect of the industry composition on the region's estimated average aggregate productivity

The full technique is explained in the [Glossary](#).

A higher value of the Firm Productivity Index in a given area shows that productivity of the firms (industries in general) in that area are higher than firms in equivalent industries elsewhere. A higher value of Industry Composition Index implies that the more productive industries in GB have larger industry shares in that area.

Figure 4 shows that for all the TTWA groups, the Firm Productivity Index is more important in explaining overall average productivity in the area than the Industry Composition Index. For example, large town TTWAs on average have a productivity 9 percentage points lower than the GB average. Industry mix accounts for only 1 percentage point of this, while productivity differences within industries account for 8 percentage points. This pattern is seen in all TTWA groups. The differences in productivity within industries across the country explain most of the observed average productivity levels in each TTWA group compared with the GB average, and not the shares of industries in these areas.

Therefore, while it is true that there is some correlation between industry structure and TTWA productivity, as shown in Figure 3, it remains only a small source of overall productivity differences.

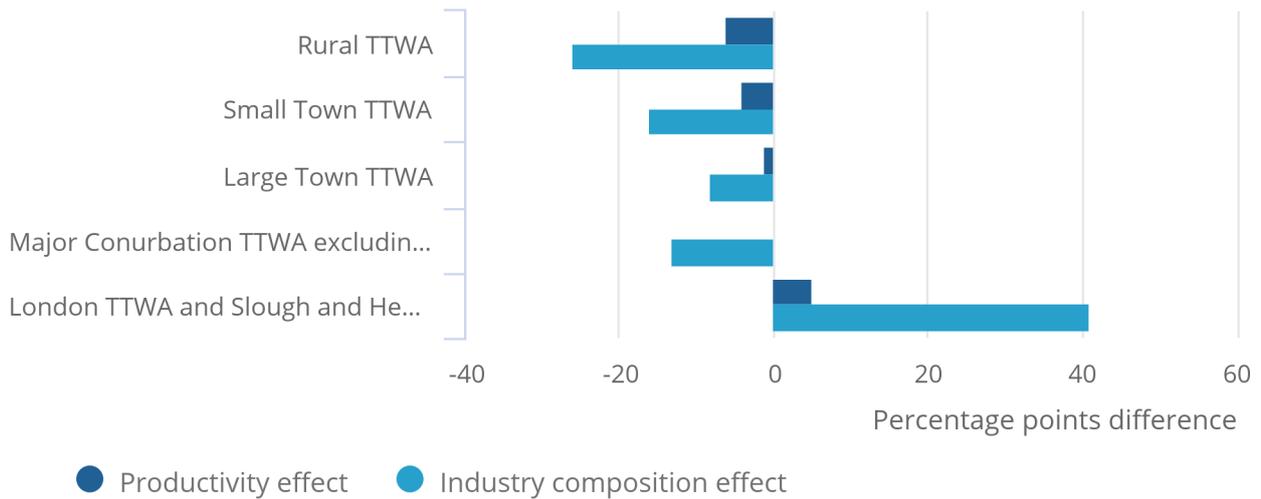
Figure 4 shows this industry composition impact is largest in the rural TTWAs, but even for these areas, the firm productivity effect is still larger. Read more in our [Understanding spatial productivity in the UK](#) article.

Figure 4: Productivity differences within industries are more important than industry composition in explaining Travel to Work Area (TTWA) productivity levels

Firm productivity and industry composition effects on average productivity levels, Travel to Work Area (TTWA) groups, non-financial business economy, 2019, England and Wales

Figure 4: Productivity differences within industries are more important than industry composition in explaining Travel to Work Area (TTWA) productivity levels

Firm productivity and industry composition effects on average productivity levels, Travel to Work Area (TTWA) groups, non-financial business economy, 2019, England and Wales



Source: Office for National Statistics, Annual Business Survey

Notes:

1. The calculation of labour productivity use firm level approximate gross value added (aGVA) and employment.
2. The Annual Business Survey excludes the agricultural sector, financial sector, some small firms, the self-employed and the public sector.
3. The estimates in this table cannot be compared directly with the estimates presented in Table 1.
4. The results are calculated on a GB=100 basis.
5. Industry composition for each area is calculated as employment share of broad industry group Standard Industrial Classification 2007 (SIC2007) in each area's total employment.

3 . Labour productivity: towns

In our analysis, gross value added (GVA) per filled job data have been provided for 363 towns, including 312 in England, 28 in Scotland, 12 in Wales and 11 in Northern Ireland.

Table 2 shows that overall, average GVA per filled job across towns in 2019 was £53,713, 7% below the UK average. This is much lower than the productivity in London (41% above UK average), but slightly above the average for the next 22 largest cities (excluding London), which we have calculated as a comparator. These 22 cities have an average productivity of 9% below the UK average with only Edinburgh and Southampton having productivity levels above the average.

Table 2: Gross value added (GVA) per filled job in UK towns was similar to UK cities outside London in 2019
Labour productivity (GVA per filled job), UK, 2019

	£	Index (UK = 100)
Towns	£53,713	93
Cities outside London	£52,396	91
London	£81,407	141
UK	£57,721	100

Source: Office for National Statistics

Notes

1. Towns data are for 363 UK towns, and includes the majority of towns, or small cities, with a population greater than 25,000 and less than 225,000. Cities data are for 22 cities with a population greater than 225,000. See further details in the [Glossary](#).

Previous analysis of labour productivity for various geographies has shown that there is an asymmetrical distribution with a small number of areas with productivity well above the UK average. However, the majority of areas have productivity below the UK average. We see a similar pattern when examining labour productivity for towns.

Figure 5 shows the average productivity distribution for the 363 UK towns. In 2019, the most recent year for which data are available, aggregate average labour productivity was above the UK average in 73 out of 363 towns (20%). Among these around half had aggregate average productivity levels over 20% above the UK average. Generally, towns in the south of England fared better than those elsewhere, with 52 of the 73 towns with labour productivity above the UK average located in the South East or East of England regions.

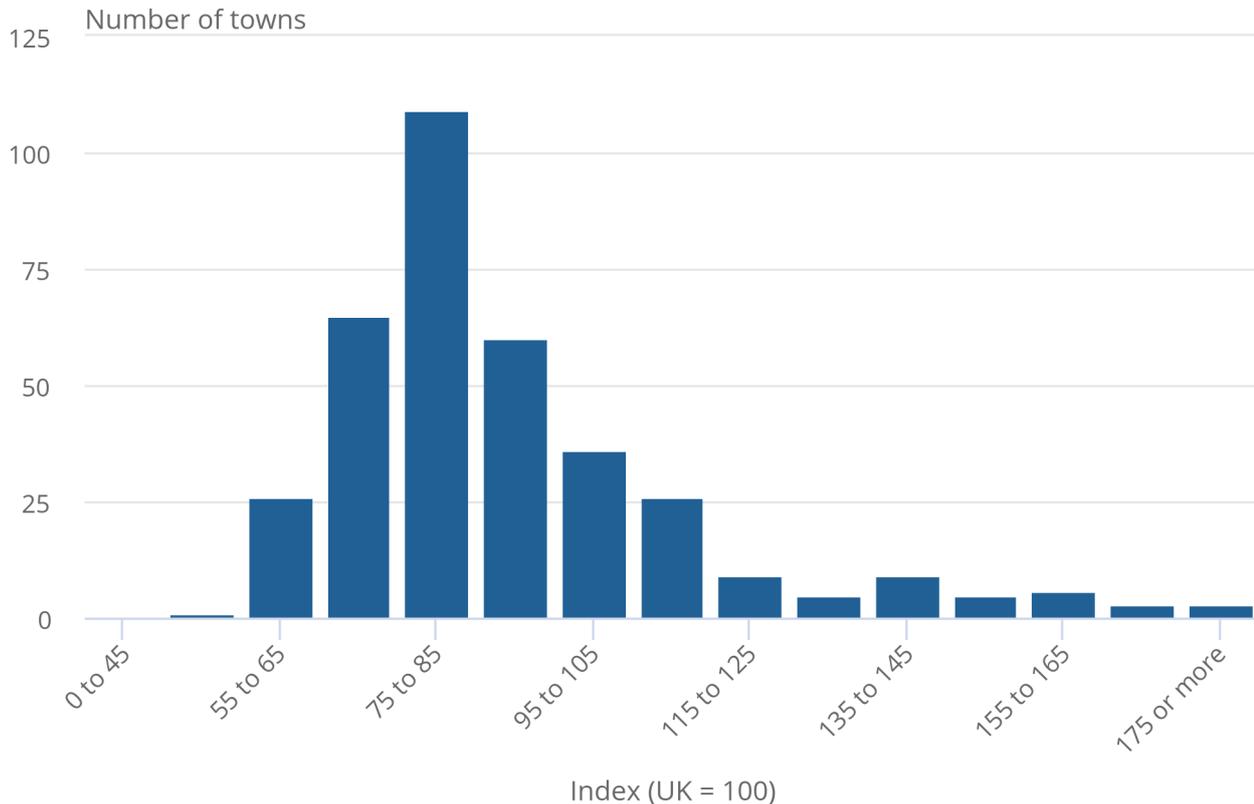
At the other end of the distribution, 39% of towns (141 out of 363) had average aggregate productivity levels 20% or more below the UK average in 2019. For the East of England, the South East, and Scotland, the share of towns which had productivity over 20% below the UK average was 15%, 20% and 21% respectively. For Wales, Northern Ireland, and the rest of the English regions this share was much higher, at between 46% to 67% of towns.

Figure 5: There are more towns with below UK average productivity levels than towns with above UK average productivity levels

Distribution of the gross value added (GVA) per filled job, towns, UK=100, 2019

Figure 5: There are more towns with below UK average productivity levels than towns with above UK average productivity levels

Distribution of the gross value added (GVA) per filled job, towns, UK=100, 2019



Source: Office for National Statistics

Notes:

1. Towns data are for 363 UK towns, and includes the majority of towns, or small cities, with a population greater than 25,000 and less than 225,000. See further details in the Glossary.

As discussed in our [What are the regional differences in income and productivity?](#) article, areas with high or low productivity are not always the same as areas with high or low household incomes. However, in many cases there is a link.

Table 3 shows that of the 73 high productivity towns (with productivity above UK average), around half (36) have low levels of income deprivation among residents. 31 of these towns are either in the South East or East of England regions. However, there are 17 towns that combine high labour productivity with high shares of income deprivation among residents, which shows there is not always a direct link between productivity and household income.

Of the 141 low productivity towns in England and Wales (those with productivity 20% or more below the UK average), 87 have high shares of income deprivation among residents, with 44 of these towns located in the north of England.

The income deprivation measure is taken from the income deprivation domain of the English Index of Multiple Deprivation (IMD) and the Welsh Index of Multiple Deprivation (WIMD). Further details on the indices are available in the [Glossary](#).

Table 3: The North West region of England has the most towns combining low productivity and high income deprivation
Distribution of high and low productivity towns across England and Wales by level of income deprivation, 2019

	High Productivity (UK Index>100)		Low Productivity (UK Index <80)		Total Towns
	High deprivation	Low deprivation	High deprivation	Low deprivation	
North East	1	0	10	1	21
North West	5	1	22	3	57
Yorkshire and The Humber	1	0	12	1	23
East Midlands	1	1	11	1	29
West Midlands	0	2	11	3	36
East of England	5	4	3	3	46
South East	4	27	6	3	76
South West	0	1	7	3	24
Wales	0	0	5	0	12
England and Wales	17	36	87	18	324

Source: Office for National Statistics

Notes

1. The total column includes towns not shown that have either medium productivity and/or medium deprivation.

Sources of productivity in towns

Similar to Travel to Work Areas (TTWAs), towns with relatively high productivity are more likely to specialise in high productivity industries, such as high-tech and knowledge-intensive services and high-tech manufacturing. For example, over half of the towns in the high productivity group have above average specialisation in high-tech services.

As discussed in Section 2, for geographies such as International Territorial Levels (ITL) regions and TTWAs, we find that the overall industry composition tends to be only a small source of productivity differences. One potential reason why it could be different for towns is that they are a smaller geography which means they are more likely to have a highly specialised industry structure (see [our Understanding towns: industry analysis article](#) for more details).

Figure 6 tests this hypothesis and shows the results from applying the same decomposition technique used in Figure 4 to towns. In this analysis we group the towns by their productivity levels, grouping together those with high productivity and comparing these with a grouping of towns of low productivity. We see what effect, if any, industry structure has as a source of these differences in productivity levels.

The results show that the higher productivity towns have a more favourable industry structure in comparison with the lower productivity towns. If productivity was constant within industries across the country, the highest productivity towns group would still have an average productivity level 8% above the Great Britain (GB) average because of their advantageous industry composition.

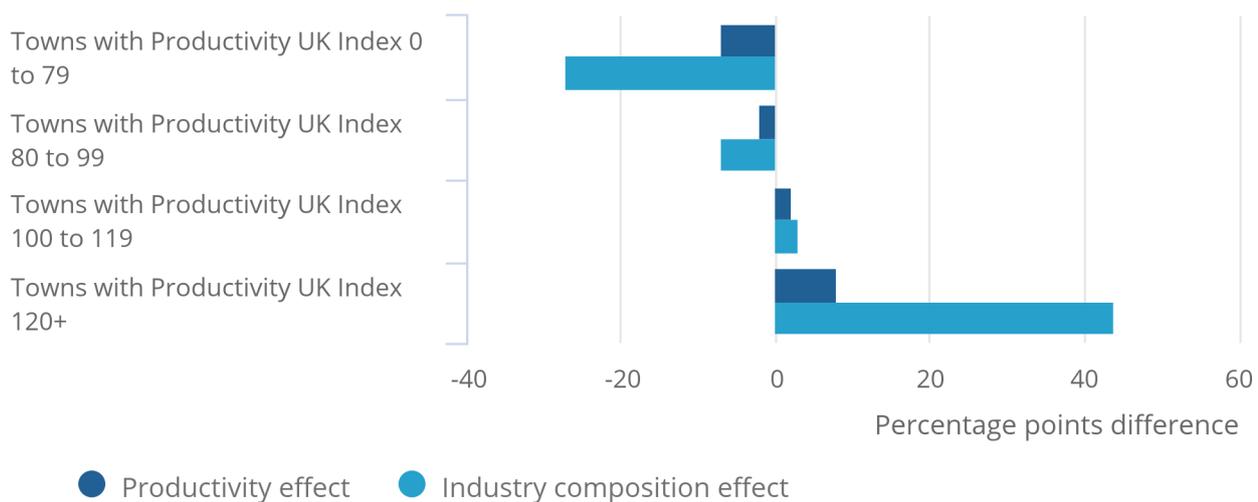
However, the firm productivity effect is much larger than the industry composition effect. If the high productivity towns had the GB industry composition, they would still have average productivity 44% above the UK average because of their higher productivities within industries.

Figure 6: High productivity towns have both an advantageous industry mix and higher firm level productivities within industries

Firm productivity and industry composition effects on average productivity levels, town groups, non-financial business economy, 2019, Great Britain

Figure 6: High productivity towns have both an advantageous industry mix and higher firm level productivities within industries

Firm productivity and industry composition effects on average productivity levels, town groups, non-financial business economy, 2019, Great Britain



Source: Office for National Statistics – Annual Business Survey

Notes:

1. The calculation of labour productivity use firm level approximate gross value added (aGVA) and employment.
2. The Annual Business Survey excludes the agricultural sector, financial sector, some small firms, the self-employed and the public sector.
3. The estimates in this table cannot be compared directly with the estimates presented in Table 2.
4. The results are calculated on a GB=100 basis.
5. Industry composition for each area is calculated as employment share of broad industry group Standard Industrial Classification 2007 (SIC2007) in each area's total employment.

Our analysis for towns is similar to that for TTWAs. High productivity towns and TTWAs gain some of their productivity advantage from their industry composition. However, the majority is from them having higher average productivity within individual industries compared with the same industries located elsewhere in the country.

4 . Productivity in towns and Travel to Work Areas data

[UK GVA and productivity estimates for other geographies](#)

Dataset | Released 13 December 2021

Estimated GVA for other user-specified geographies, for the period 1998 to 2019. Productivity estimates for TTWAs and towns and cities for the period 2009 to 2019.

[UK small area GVA estimates](#)

Dataset | Released 13 December 2021

The breaking down of GVA to lower-level geographies to represent a significant improvement in granularity allowing construction to more detailed geographic areas 1998 to 2019.

[Understanding towns: industry analysis](#)

Dataset | Released 13 December 2021

Location quotients data for travel to work areas, towns and cities, Great Britain.

5 . Glossary

Gross value added (GVA)

Gross Value Added (GVA) is a measure of economic output. Balanced UK regional gross value added (GVA(B)) balances the income and production approaches to measuring the economy into a single estimate at a regional level. The balanced measure of regional GVA has [National Statistics status](#) following a review by the Office for Statistics Regulation.

The balanced GVA(B) data used in this article are measured at current basic prices, which includes the effect of inflation.

Productivity (GVA per filled job)

Productivity defined by output per unit of input is a measure of the efficiency of the economy, or how effective resources such as labour or capital are at producing output. At a business level, it measures the efficiency of a company's production process. On a national level, it is a prime source of economic growth and international competitiveness.

GVA per filled job is a measure of labour productivity: GVA divided by the number of filled jobs used to create it.

Towns and cities

The definition of a "town" in this output, for England and Wales, follows on from our previous publications in the [Understanding towns](#) series by using built-up area subdivision boundaries (or built-up area boundaries where no subdivisions exist). Built-up areas (BUA) and built-up area subdivisions (BUASD) were created as part of the 2011 Census outputs and refer to urban areas defined as "irreversibly urban in character". To be classified as a town, the 2011 Census population of the BUASD (or BUA) had to be between 5,000 and 225,000. If the population was above 225,000 it has been termed a "city".

The BUA and BUASD geography does not exist for Scotland or Northern Ireland. However, a similar approach has been adopted using alternative geographies. For Scotland, the town boundaries used are based on localities, and for Northern Ireland, they are based on settlements.

It is not possible to produce productivity data for all towns because of the requirement to best fit data from Lower Super Output Areas (LSOA), Data Zones (Scotland), or Super Output Area (Northern Ireland) to town boundaries. As a result, all towns with a population below 25,000 are excluded from the productivity dataset and analysis. An additional 29 towns in England and Wales are also excluded because the fit between LSOA and town boundaries did not provide a sufficiently good fit to maintain data quality. In total, 363 towns have been included, of which 312 are in England, 28 in Scotland, 12 in Wales and 11 in Northern Ireland.

Travel to Work Areas

Travel to Work Areas (TTWAs) are a geography created to approximate labour market areas. They are derived to reflect self-contained areas in which most people both live and work.

Travel to Work Area classification

A labour market area in a sparse rural area will be very different from a labour market area based in a major city. Therefore, we have developed a simple classification that provides a description of a TTWA based on whether it exists in a conurbation, a rural area, a mostly urban area that includes a large town or city, or a mostly urban area that only includes smaller towns and villages.

To produce this classification, population data are combined with the Output Area (OA) version of the England and Wales Rural Urban Classification (RUC) to categorise each TTWA as follows:

- major conurbation TTWA, in which the majority of the population of the TTWA are resident in one of the UK's conurbations as defined by the RUC
- large town TTWA, in which a majority of the population of the TTWA live in an urban area (as defined by the OA version of the RUC), but not a conurbation and the TTWA includes at least one town or city of a population greater than 70,000
- small town TTWA, in which a majority of the population of the TTWA live in an urban area, but not a conurbation and the TTWA does not have any towns or cities of a population greater than 70,000
- rural TTWA in which a majority of the population of the TTWA live in a rural area as defined by the OA version of the RUC

More information about how this classification was produced together with a map is available in [Understanding towns in England and Wales: spatial analysis](#).

Note this classification is only available for Travel to Work Areas in England and Wales. Scotland and Northern Ireland use different categorisations of rural and urban so this TTWA classification, that is based on definitions used in England and Wales, has not been applied to TTWAs in Scotland or Northern Ireland.

High-tech industry and knowledge-intensive services (HTEC) industry groups

Analysis in this article is based on an aggregated industry structure classification that combines the two-digit level industries breakdown of the [2007 Standard Industrial Classification \(SIC\)](#) into 10 groups according to their technological or knowledge intensity (HTEC industry groups).

Manufacturing sectors were aggregated according to technological intensity (research and development expenditure or value added) and based on the [statistical classification of economic activities in the European Community \(NACE\)](#) at two-digit level. The level of research and development intensity served as a criterion of classification of economic sectors into high-, medium- and low-tech industries.

Services were mainly aggregated into knowledge-intensive services and less knowledge-intensive services based on the share of tertiary-educated persons at NACE two-digit level. Each of these groups can also be subdivided in further sub-sectors.

For more information visit the [Eurostat website](#).

The 10 HTEC industry groups are as follows.

Less knowledge intensive market services

This grouping is mostly services including wholesale and retail, land transport, accommodation, and administrative activities.

The groupings two-digit industry codes are 45, 46, 47, 49, 52, 53, 55, 56, 77, 79, 81, 82, 94, 95, and 96.

Other knowledge intensive services

This grouping is mostly services including arts, entertainment, human health, social work, education and public administration.

The groupings two-digit industry codes are 58, 75, 84, 85, 86, 87, 88, 90, 91, 92, and 93.

Knowledge intensive market services

This grouping is mostly services including other forms of transport, professional, scientific, technical and administrative activities.

The groupings two-digit industry codes are 50, 51, 69, 70, 71, 73, 74, 78, and 80.

Knowledge intensive financial services

This grouping is financial and insurance activities.

The groupings two-digit industry codes are 64, 65, and 66.

High technology services

This grouping is mostly services including information and communication and scientific research and development.

The groupings two-digit industry codes are 59, 60, 61, 62, 63, and 72.

High technology manufacturing

This grouping is mostly manufacture of pharmaceutical, computer, electronic and optical products.

The groupings two-digit industry codes are 21 and 26.

Medium technology manufacturing

This grouping is mostly manufacture of machinery, equipment, motor vehicles, metals, mineral, rubber and plastic products.

The groupings two-digit industry codes are 19, 20, 22, 23, 24, 25, 27, 28, 29, 30, and 33.

Low technology manufacturing

This grouping is mostly manufacture of food, beverages, textiles, apparel, paper and wood products.

The groupings two-digit industry codes are 10, 11, 12, 13, 14, 15, 16, 17, 18, 31, and 32.

Other

This grouping is construction and real estate activities.

The groupings two-digit industry codes are 41, 42, 43, and 68.

Location quotient

Location quotients (LQ) can be considered as measures of either concentration or specialisation. The results produced are equivalent whichever method is used.

In this case we are using it as a measure of industrial specialisation for local areas. In the context of specialisation, for each industry they compare the industry's share of local area employment with its share of total employment. The formula is:

where $E_{i,r}$ is the employment in industry i region r , E_r is the employment in region r , E_i is the employment in industry i and E is the employment in Great Britain.

A value of 1.0 means that an industry share of employment in region r is the same as its share of national employment in Great Britain. For example, industry i makes up 5% of employment in region r and also 5% of employment in Great Britain. A value greater than 1.0 means that industry i makes up a larger share of employment in the local area than at the national level.

Income deprivation

The English Index of Multiple Deprivation is a measure of multiple deprivation based on combining seven distinct domains of deprivation. For more detailed information on the English Index of Multiple Deprivation 2019 please see [The English Indices of Deprivation 2019 research report](#).

The Welsh Index of Multiple Deprivation is currently made up of eight separate domains (or types) of deprivation. Each domain is compiled from a range of different indicators. More detailed information on the [Welsh Index of Multiple Deprivation 2019 Technical Report \(PDF, 2MB\)](#) is available.

Industry composition

There are two widely accepted methods of defining industry composition. These are either by using output such as shares of gross value added or inputs such as the shares of employment of each industry. The focus of this article is on labour productivity in industry. Therefore, defining the industry structure in terms of the inputs such as employment appears to be more appropriate than using the output definition.

Decomposition analysis

This decomposition analysis technique is based on the original work of Olley and Pakes (1996)[note 1].

$$q^r \equiv \sum_r q_r^i \lambda_r^i = \sum_r q_r^i \bar{\lambda}^i + \sum_r \bar{q}^i \lambda_r^i - \sum_r \bar{q}^i \bar{\lambda}^i + \sum_r (q_r^i - \bar{q}^i) (\lambda_r^i - \bar{\lambda}^i)$$

r = region

i = industry

=share of industries in the region (defined as share of industry i employment in the total employment of the region)

= share of industries in Great Britain (defined as the national share of industry i employment in the total national employment)

qr = aggregate productivity in the region, that is weighted average of industry productivities in region r, using labour share of the firm as weight

= aggregate productivity in Great Britain

The equation shows the calculation of the indices that break down the aggregate productivity into two components. This can be calculated as follows.

Term 1 Productivity Index, which shows the average level of productivity in region r assuming the industry composition in that region is the same as for the economy as a whole.

Term 2: Industry Composition Index, which shows the average level of productivity in region r assuming the productivity of each industry in that region equals nationwide average productivity for that industry.

Term 3: average labour productivity in Great Britain.

Term 4: residual covariance between industry productivities and industry shares in region r. It shows the link between industry shares and productivity.

Notes for Glossary:

1. For more information see Olley GS and Pakes A (1996), "The Dynamics of Productivity in the Telecommunications Equipment Industry", *Econometrica*, Volume 64, Issue 6, pages 1,263 to 1,297.

6 . Data sources and quality

Gross value added per filled job for towns and Travel to Work Areas

Our estimates have two inputs which are gross value added (GVA) data in the numerator and labour market data (number of jobs) in the denominator. Data for both GVA and jobs are first estimated for Lower Super Output Areas in England and Wales, Data Zones in Scotland, and Super Output Areas in Northern Ireland.

They are then aggregated to towns and Travel to Work Areas (TTWAs), and GVA per filled job metrics are calculated. The final productivity data are then smoothed using a weighted moving average of up to five years where data allow. This reduces volatility in the final data arising from smaller sample surveys.

To calculate the jobs data used, we apportion local authority productivity jobs data, as published in [our Subregional productivity article](#), to the building block geographies based on proportions of employment calculated from the Business Register and Employment Survey (BRES). This approach ensures consistency with the jobs data used within our subregional and regional productivity calculations.

Microdata analysis: Annual Business Survey

Our Annual Business Survey (ABS) collects business and financial information of firms in the production, construction, distribution and services industries, representing approximately two-thirds of the UK economy. More information on [ABS quality and methods](#) including a [ABS technical report](#) is available.

ABS local unit dataset

The microdata calculations in this article use a tailored micro-dataset constructed from the ABS that provides coverage of Great Britain. It includes all the local units of the firms and their plants registered in the [Inter-Departmental Business Register \(IDBR\)](#), the postcode of their location and the approximate gross value added (aGVA) they have produced over a period of 12 months.

A firm or enterprise may have more than one plant in different locations. These are referred to as local units (LU). Local units may be engaged in different parts of the business such as production, accounting, or head office. Therefore, each local unit is assigned its own Standard Industrial Classification 2007 (SIC 2007) code, which corresponds to the local unit's principal activity. Note that this dataset apportions aGVA across the "LU universe" rather than the ABS LU sample.

The ABS provides detailed information on the turnover and intermediate consumption of firms in the non-financial business economy and turnover minus intermediate consumption is called approximate gross value added. The ABS is also the main source for GVA data in national accounts. However, several other data sources are added and some adjustments performed to obtain the final published regional and national accounts GVA numbers.

The ABS excludes the agricultural and financial sectors as well as some small firms, the self-employed and the public sector. As such, the ABS results represent approximately two-thirds of the UK economy in terms of gross value added.

Employment is used as the measure of labour input in calculating labour productivity. Employment includes employees and working proprietors and was obtained from the IDBR at the time of sample selection of the ABS. Employment from the IDBR is derived from several different sources (such as the BRES, HM Revenue and Customs records or imputed), and some of the employment information, especially for small businesses, may be several years old. Despite this limitation, the IDBR is at present the most comprehensive source of employment information for firm-level analysis because of its coverage.

Using the LU version of the ABS means this analysis may produce different results from analysis carried out using the reporting unit version, more commonly used for investigating national productivity issues. The advantage of using the LU version is that this is the dataset used for compiling regional accounts data by the Office for National Statistics (ONS). It allocates output to the site of each local plant or site (unit) operated by an enterprise, rather than simply allocating output to the location of the head office of the enterprise or to its reporting unit. The LU version of the dataset should therefore provide better geographical accuracy for analysis.

However, a degree of modelling of output data is necessary to produce the LU version of the ABS. For this, we apportion reporting unit data among the constituent LUs in line with a regression model. The covariates used in this model are industry, geography and employment size bands. The model parameter estimates are obtained by fitting the model that best predicts the data gathered from reporting units with very few LUs. More information can be found under regional apportionment in Section 5.8 of the [ABS technical report](#).

The data in this article are based on nominal terms such that any local variation in price level has not been considered.

7 . Future developments

This article is the seventh of a series of towns articles being produced by the Centre for Subnational Analysis at the Office for National Statistics (ONS). Further articles in this series will follow in 2022.

8 . Related links

[Understanding towns in England and Wales: population and demographic analysis](#)

Article | Released 24 February 2021

Data and analysis on towns in England and Wales, with a focus on population and demography.

[Understanding towns in England and Wales: spatial analysis](#)

Article | Released 7 December 2020

Data and analysis on towns in England and Wales, with a focus on population and employment growth.

[Understanding towns: industry analysis](#)

Article | Released 13 December 2021

Analysis of industry in towns and cities in England and Wales, localities in Scotland and travel to work areas in Great Britain.

[Subregional productivity in the UK: July 2021](#)

Article | Released 23 July 2021

Estimates for subregional labour productivity measured as gross value added (GVA) per hour worked and GVA per filled job.

[Understanding spatial labour productivity in the UK](#)

Article | Released 3 May 2019

Analysis of labour productivity across different areas of the UK, including discussion on the sources and drivers of productivity differences between areas.

[Exploring labour productivity in rural and urban areas in Great Britain](#)

Article | Released 5 April 2017

Analysis of productivity (GVA per worker), 2014, by Rural Urban Classification (RUC2011), Classification of Workplace Zones England and Wales (COWZ-EW) and Built-Up Areas (BUA).