Article

Subregional productivity in the UK: February 2020

The article provides estimates for subregional labour productivity measured as gross value added (GVA) per hour worked and GVA per filled job.

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Notice

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Subsequent releases of this productivity release were combined with other productivity measures into a single article. The latest figures from the combined article are published in the Productivity economic commentary page.

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1 . Main points

- Labour productivity increased in 32 out of 44 enterprise regions in the UK between 2010 and 2018; the highest productivity growth was in the Coventry and Warwickshire Local Enterprise Partnership, with 16% growth over the period.

- Labour productivity increased in 15 out of 18 city regions between 2010 and 2018; the highest productivity growth occurred in West Midlands City Region, in Edinburgh and South East Scotland City Region and in Stirling and Clackmannanshire City Region.

- Labour productivity increased in 105 out of 168 Nomenclature of Units for Territorial Statistics: NUTS3 regions in Great Britain between 2010 and 2018; the highest productivity growth over this period occurred in areas of West London followed by Warwickshire, Solihull and Milton Keynes.

- This year has seen some greater than usual revisions to the subregional productivity estimates for NUTS3 areas reflecting a move towards the use of administrative data in the calculation of the regional gross value added (GVA) estimates used to calculate the productivity measures.

- Experimental local authority data have been included in this article for the first time; GVA per hour worked data were highest in Hounslow, Tower Hamlets, Runnymede, and City of London; the lowest levels were found in Powys, Wyre Forest, and Richmondshire.

2 . Things you need to know about this release

This article provides experimental estimates for labour productivity measured as gross value added (GVA) per hour worked and GVA per filled job. The data are calculated, using the balanced GVA approach, for NUTS2 and NUTS3 (Nomenclature of Units for Territorial Statistics) subregions, enterprise regions and city regions in the UK with data provided up to 2018. For the first time, the output also includes local authority data.

The data in this release are classified as Experimental Statistics.

There is an accompanying NUTS1 publication that includes National Statistics for regional labour productivity at NUTS1 level together with experimental NUTS1 labour productivity by industry analysis.

Revisions

This year has seen some greater than usual revisions to the regional gross value added (GVA) estimates used in the subregional productivity estimates. One of the main causes of these revisions is the implementation of structural changes within the supply and use framework that underpins the UK National Accounts. This has resulted in certain industries having their GVA revised up or down across the entire span of years that we cover, and this change to the national figures filters down to all lower-level geographic areas.

In addition, there have been changes to the way GVA estimates for areas at the NUTS3 level and below are produced, and these changes also feed through to the city regions and enterprise areas that we compile from lower-level area building blocks.

In short, the changes reflect a further move towards the use of administrative data to inform the distribution of economic activity between areas. For the majority of industries we now use turnover provided in Value Added Tax (VAT) records, and allocated to each business site in the UK through matching to the Inter-Departmental Business Register (IDBR), to give a near-census level of coverage of economic activity across the entire nation.

While we believe this new method gives a stronger and more reliable picture of economic activity at low levels of geography, the revisions to some areas are quite large, and we understand that such changes can cause difficulties for users of the data. Having made this change, we expect future revisions to be much smaller, although we do still have to expect further changes to the UK National Accounts to filter down to the regional statistics over the next few years, as the new framework moves towards completion.

We also hope to improve our measurement of the finance and insurance industry at a subnational level, an area that presents particular challenges because of the nature of the industry. There may therefore be further revisions as we implement any improvements to these estimates.

Please note that the revisions outlined in this section are applied fully through the back series so that the whole time series is consistent, ensuring continuity between different years.

What is labour productivity?

Labour productivity is defined as the quantity of goods and services produced per unit of labour input, for example, per hour worked or per filled job. It is one of the most widely used measures of economic performance of a nation or an area.

Productivity matters because increasing productivity is critical to increasing economic growth in the long-run. This follows from the fact that economic output can only be increased by either increasing the amount of inputs or by raising productivity. Furthermore, changes in labour productivity are also related to changes in real wages. Increasing productivity is, therefore, an important aim for both national and local economies.

As shown in the "Results" sections in this article, there is currently a wide spatial divergence in levels of productivity between different subregions of the UK. For a discussion of the sources of these differences, please see our Understanding spatial labour productivity in the UK publication.

In this article, two measures of labour productivity are provided. The first is a ratio of output (measured as gross value added (GVA)) divided by the hours worked to create it. The second measure divides GVA by the number of filled jobs used to create it. In both cases, GVA is an estimate of the total amount of goods and services produced less the value of intermediate inputs.

Availability of data

A number of datasets accompany this release. There is one dataset covering NUTS1, NUTS2 and NUTS3 geographies, according to the Nomenclature of Units for Territorial Statistics (NUTS) classification (see "UK geographies" for more detail), and separate datasets covering enterprise regions, city regions and local authorities.

The NUTS, enterprise regions and city regions datasets provide current price "nominal" as well as constant price "real" productivity. The productivity jobs and hours data used in the calculations are also included with these datasets. An alternative calculation of current price productivity excluding imputed rentals is also included for NUTS geographies (see "Total GVA versus GVA excluding imputed rental income" part of this section for more detail).

A more limited set of data has been provided for local authorities.

Please note that for Northern Ireland, data are only available for the GVA per filled job metric. We do not have data available for the GVA per hour worked metric.

Local authority data

Selected data for local authorities are included for the first time in this year's publication. Because the volatility of the data increases as geographical areas (and therefore sample sizes) reduce, then we have focused on providing smoothed nominal data only in this initial release of the data. We would welcome feedback on these local authority data.

Real versus nominal productivity data

The balanced GVA(B) data used in this article are measured both at current basic prices, which includes the effect of inflation, and in "real terms" (constant prices) in chained volume measure (CVM), with the effect of inflation removed.

When available, the constant price "real" data are most useful for assessing time series trends. They allow us to understand whether there has been any increase in volumes of goods and services, with the effects of changes in prices removed. By contrast, when using nominal current price data, it is not possible to differentiate between the effects of price changes and quantity changes.

The constant price GVA(B) data have been derived by deflating the current price estimates for 112 industries using national industry deflators obtained from the UK gross domestic product (output) system. These deflators are consistent with the UK National Accounts, The Blue Book: 2019 and they are used because in most cases, regional price indices are currently not available.

The Eurostat Manual on Regional Accounts (2013) recommends that in the absence of regional prices the use of national deflators is acceptable, provided that deflation occurs at a minimum level of 38 industries. However, users should be aware that the "real" data in this article are mostly based on use of national industry deflators, rather than specifically regional price deflators.

Smoothed versus unsmoothed data

Ideally, all year-on-year change in the productivity estimates in this article would represent "true" changes. However, it is also possible that the data can reflect volatility because of sampling and non-sampling errors. This is more likely where sample sizes are small, which can occur at smaller geographical areas (for example, local authority districts and NUTS3 areas). For this reason, the datasets accompanying this release provide both temporally smoothed and unsmoothed estimates for most geographies and only smoothed data for local authorities.

In this article, the nominal data presented in the charts and tables use unsmoothed data for NUTS1 and NUTS2 geographies but use the smoothed data series for NUTS3 geographies, enterprise and city regions and local authority districts. However, for estimates of productivity in real terms, we use only unsmoothed data series for all geographies to avoid multiple averaging of data as the GVA(B) data are already chain-linked. For more information on the smoothing process, please refer to the "Quality and Methodology" section in this article.

GVA per head versus labour productivity measures – GVA per hour and GVA per filled job

When assessing regional economic performance, it is recommended to use the productivity measures in this article (GVA per hour worked or GVA per job filled) rather than GVA per head. The reason for this is that the productivity measures (GVA per hour worked or GVA per job filled) provide a direct comparison between the level of economic output and the direct labour input of those who produced that output. This is not the case, however, for GVA per head, as the GVA per head measure includes people not in the workforce (including children, pensioners and others not economically active) in the calculation and can also be very heavily biased by commuting flows. This is because if an area has a large number of in-commuters, the output these commuters produce is captured in the estimate of GVA, but the commuters are not captured in the estimate of residential population. This is especially true for main regional cities, for example, London where there are large net inflows of commuters. In this situation, a GVA per head measure would be artificially high if used as a proxy for economic performance or welfare of a region.

For these reasons, the labour productivity measures in this article are recommended for users directly investigating the economic performance of a region. These productivity measures are also recommended as part of a basket of indicators for investigating the wider economic performance or welfare of a region. In this context, they can be used alongside Office for National Statistics (ONS) regional gross disposable household income (GDHI) data, which provide "residence-based" estimates of total household incomes in an area. A further discussion of these issues can be found in the ONS blog post titled Mind the Gap.

Difference between GVA per hour worked and GVA per filled job

GVA per hour worked and GVA per filled job can both be used as measures of labour productivity, but these two measures are different. GVA per hour worked divides GVA by the total hours worked by the workforce in the subregion; while GVA per filled job apportions GVA to the number of jobs in the subregion.

There will be some small differences between the relative results for the two measures. This occurs because the average number of hours worked per job varies from subregion to subregion because of differences in labour market structure and working patterns. For example, a subregion with high levels of part-time employment will tend to have lower average hours worked per job.

GVA per hour worked is considered a more comprehensive indicator of labour productivity and the preferred measure at subnational level. This is because GVA per filled job does not take into consideration regional labour market structures or different working patterns, such as the mix of part-time and full-time workers, industry structure and job shares.

GVA per hour worked data are currently available in this publication for the period 2004 to 2018 and GVA per filled job data are available for the period 2002 to 2018. Data are available from 1998 for the NUTS1 regional geography and these can be found within the ONS Regional labour productivity, including industry by region, UK: 2018 publication.

Please note that for Northern Ireland, data are only available for GVA per filled job. We do not have Northern Ireland data available for GVA per hour worked.

Total GVA versus GVA excluding imputed rental income

The headline productivity calculations in this article use total GVA as a measure of output. This includes all components of GVA and is in line with national productivity estimates.

However, it can be argued that not all GVA components are equally relevant when assessing labour productivity, as some elements of GVA are not directly related to the input of labour. In particular, imputed household rental incomes, such as imputed rental values capturing the value of housing services accruing to owner-occupiers, could be excluded from the total GVA to obtain a measure of output more closely related to the measurable labour input.

Therefore, we have also provided data that exclude imputed household rentals from the GVA(B) "nominal" used in the productivity calculations. These data are discussed in the "Alternative results excluding rental income" section of this article and are also available in the datasets for NUTS regions accompanying the release.

Interpreting data in index form

Data are presented in index form in two different ways in the article. The first of these is in the presentation of constant price "real" labour productivity changes. When used in this way, the indices compare the "real" productivity in any region with its productivity in real terms in a base year. From these indices, year-on-year changes in "real" productivity can be calculated.

In the datasets accompanying this release, the base year used is 2016. However, in the article a number of charts are shown with the base year recalculated to 2010 to help better illustrate the trends. In both cases data are calculated at 2016 prices.

The second way in which indexed data are used is to show how the levels of current price productivity differ from the UK average for any region. Such data can show that a region's productivity is 10% higher or 15% lower than the UK average in any particular year.

It should be noted that when used in this context, a decrease in the productivity index number of a subregion does not necessarily mean that the subregion's productivity has decreased in actual terms; it rather means that the subregion has seen lower growth than the rest of the UK over the period. In other words, its actual productivity level may have improved, but at a slower rate than the UK overall, therefore declining relative to the UK equals 100 index. Similarly, an increase in the productivity index number means that the subregion has seen higher growth than the rest of the UK. Data on actual current price GVA per hour worked or GVA per filled job are available in pounds sterling if you wish to examine the data directly.

UK geographies

Subregional productivity data are published in this article for the NUTS1, NUTS2 and NUTS3 and local authority district geographies, as well as for city regions and the enterprise regions. For the purposes of the European regional statistics, geographical distinctions are made according to the European Union's Nomenclature of Units for Territorial Statistics (NUTS) boundary classification that exists to allow comparable economic statistics across Europe. There are three NUTS levels in the UK: NUTS1 (12 regions), NUTS2 (41 subregions), NUTS3 (179 subregions). There are also 382 local authorities or local council areas in the UK included in the article.

Enterprise regions include English local enterprise partnerships (LEPs), Welsh economic regions and Scottish enterprise regions. There are 44 enterprise regions in the UK included in this article.

We also present data for city regions. City regions include combined authorities with elected Mayors, and other city regions that do not yet have official status. Some other City Growth Deal areas are also included in this dataset.

3 . Results for NUTS2 subregions

There are 41 [NUTS2 (Nomenclature of Units for Territorial Statistics)](#) subregions of the UK. Figure 1 shows the real productivity growth over the 2004 to 2018 period, indexed to the year 2010 for selected NUTS2 regions along with the corresponding national time series.

The subregion of West Midlands is shown as an example of an area that exhibited productivity growth during the 2010 to 2018 period, while both Kent and Greater Manchester are examples of NUTS2 areas where levels of productivity in 2018 were largely unchanged from 2010.

Figure 1: The West Midlands subregion had shown productivity growth, whilst Kent and Greater Manchester were largely unchanged

Labour productivity (real GVA per hour worked) by selected NUTS2 subregion, 2004 to 2018

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Labour productivity (real GVA per hour worked) by selected NUTS2 subregion, 2004 to 2018

- Greater Manchester
- West Midlands
- Kent
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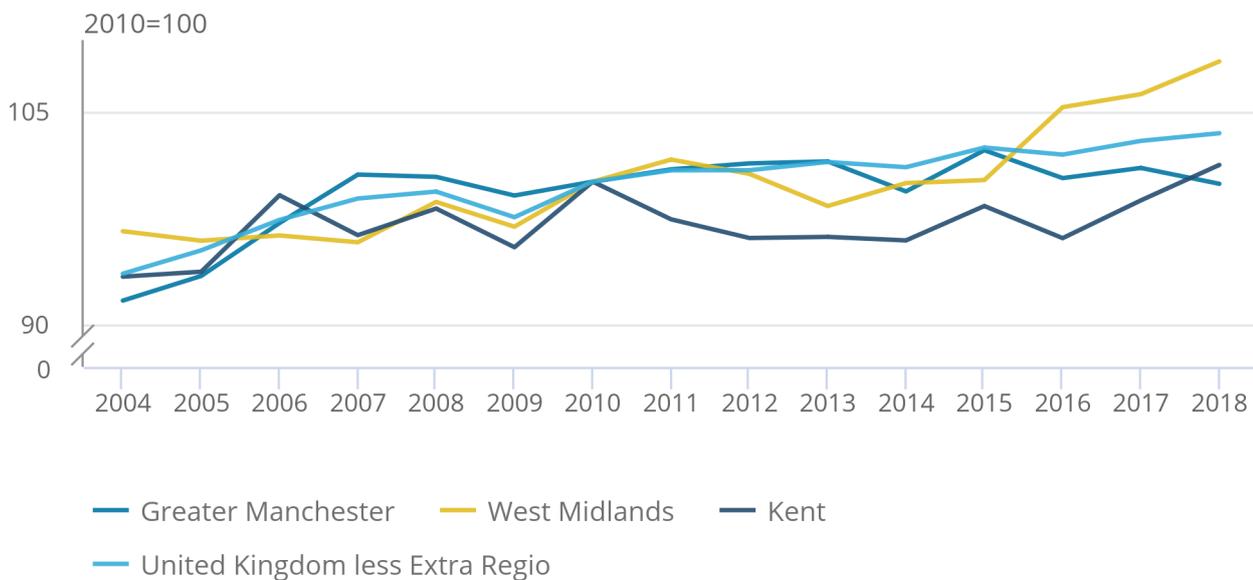
Source: Office for National Statistics – gross value added, productivity jobs and productivity hours

Figure 2 shows real economic output (gross value added (GVA)) growth plotted against changes in total hours worked for each of the 41 NUTS2 areas for the 2010 to 2018 period. The 45-degree line in the figure represents equal GVA growth and hours worked growth, for instance, a 5% GVA growth corresponding to a 5% hours growth resulting in a 0% change in productivity. Any points above this line represent an increase in productivity over this period while points below the line represent a decrease in productivity.

Figure 2: The largest increases in subregional productivity were in Herefordshire, Worcestershire and Warwickshire; Outer London West and North West; and Cornwall and Isles of Scilly

Scatter plot of real GVA growth versus hours worked growth for NUTS2 subregions, 2010 to 2018

Figure 2 shows that growth in productivity occurred in the majority of NUTS2 regions over the 2010 to 2018 period, albeit in most cases the increase was relatively small. Examples of places with relatively large increases in productivity over the period include Herefordshire, Worcestershire and Warwickshire; Outer London West and North West; and Cornwall and Isles of Scilly. By contrast, places with declining productivity included East Yorkshire and Northern Lincolnshire; and Outer London East and North East.

Figure 2 provides useful context to the productivity figures because it shows in each case the level of growth in the respective inputs (hours worked) and outputs (GVA) experienced over the 2010 to 2018 period. It shows how two areas can both experience productivity growth but still perform very differently in terms of overall economic growth.

For example, in Cumbria, GVA only rose 4% through the period with hours worked declining by 4% whilst in Inner London West, GVA rose by 37% over the same period and hours worked by 28%. Therefore, while both Cumbria and Inner London West experienced growth in productivity over the period, the change in the amount of economic activity (measured both by inputs and outputs) was much larger in Inner London West.

Nominal labour productivity rankings in 2018 by NUTS2 regions

Figures 1 and 2 give information on the growth rates of productivity by subregion. By contrast, Figures 3 and 4 provide information on the relative levels of productivity in different subregions across the country.
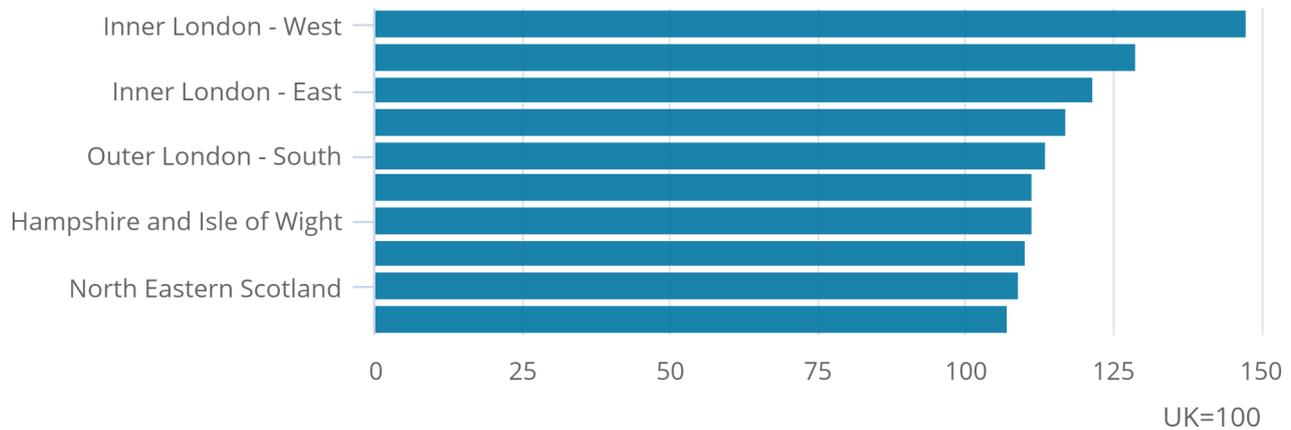
Figure 3 shows the NUTS2 regions with the highest nominal labour productivity in 2018. Inner London West had the highest level, at 48% above the UK average. There are four other areas of London in the top 10 subregions in Figure 3, while the highest labour productivity level outside of London was in Berkshire, Buckinghamshire and Oxfordshire, with labour productivity 17% above the UK average. Overall, 11 out of the 41 NUTS2 areas had labour productivity above the UK average.

GVA per hour worked – highest ranking, UK NUTS2 subregions, unsmoothed, current prices, 2018

UK=100

Source: Office for National Statistics – gross value added, productivity jobs and productivity hours

Figure 4 shows the NUTS2 subregions with the lowest nominal labour productivity levels. Each had productivity at least 15% below the UK average. Most of the places with the lowest productivity levels were relatively rural areas, for example, Cornwall and Isles of Scilly, and Southern Scotland. The lowest productivity in a predominantly urban subregion occurred in South Yorkshire.

Figure 4: The lowest-ranked NUTS2 subregions each had productivity at least 15% below the UK average

GVA per hour worked – lowest ranking UK NUTS2 subregions, unsmoothed, current prices, 2018
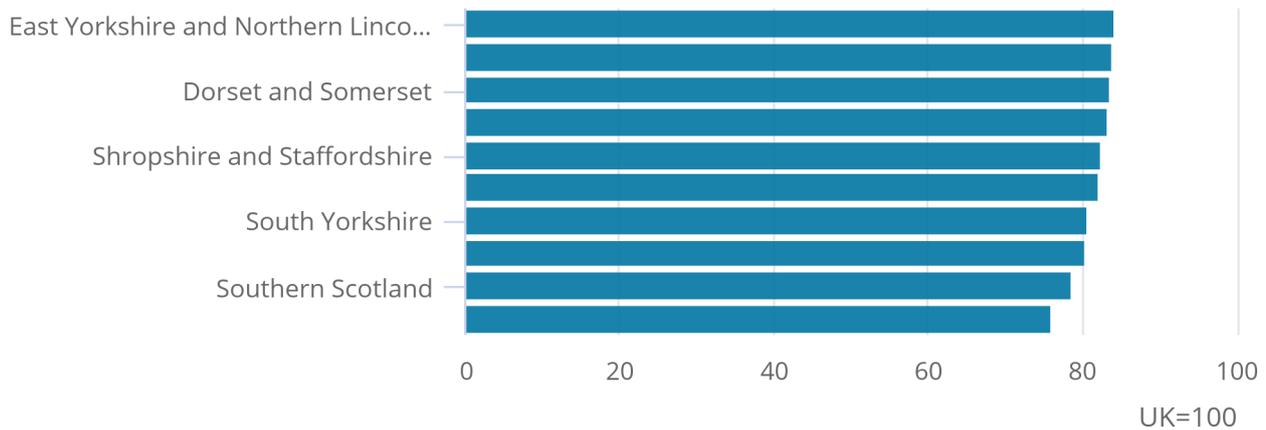
UK=100

Source: Office for National Statistics – gross value added, productivity jobs and productivity hours

4 . Results for enterprise regions

This section presents real and nominal results for 44 enterprise regions in the UK encompassing 38 English local enterprise partnerships (LEPs) and six enterprise regions covering Scotland and Wales or border regions.

Figure 5 shows the real productivity growth over the 2004 to 2018 period, indexed to the year 2010. The figure shows selected enterprise regions showing a variety of growth paths through the period. In the case of Coventry and Warwickshire LEP, productivity increased by almost 16% over the 2010 to 2018 period, making this the enterprise region with the highest productivity growth over the period. The Borderlands Partnership, meanwhile, is another enterprise region with productivity growth above the UK average.
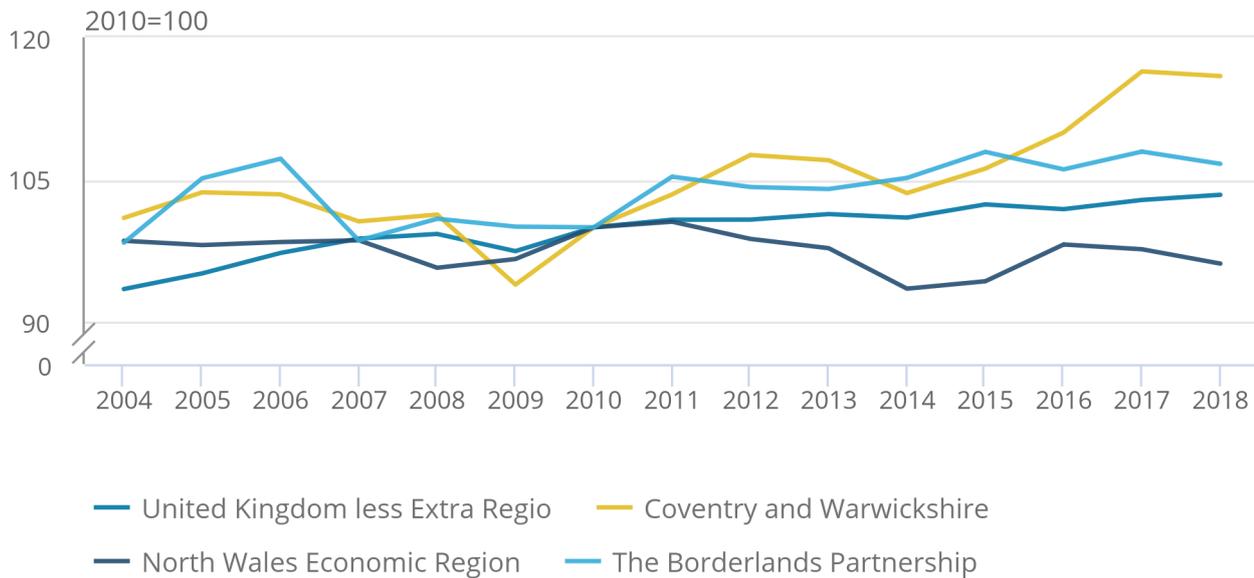
The North Wales Economic Region, by contrast, is one of 12 enterprise regions where productivity levels were lower in 2018 than in 2010.

Figure 5: Enterprise regions experienced different growth paths between 2010 and 2018

Labour productivity (real GVA per hour worked) by selected economic enterprise region, 2004 to 2018

Source: Office for National Statistics – gross value added, productivity jobs and productivity hours

The high productivity growth in Coventry and Warwickshire can also be seen in Figure 6, which illustrates that its productivity growth was because of a 34% growth in real gross value added (GVA) alongside a 16% growth in hours worked over the 2010 to 2018 period. By contrast, the productivity growth in the Borderlands Partnership was derived from only a 4% growth in GVA accompanied by a 2% decline in hours worked.

This illustrates that while productivity growth is an important metric in assessing local economic performance, it is always worthwhile examining a wider set of indicators to gain a full picture of what is happening in local economies.

Figure 6: Growth in Coventry and Warwickshire Economic Enterprise Region resulted from 34% growth in real GVA and 16% growth in hours

Scatter plot of real GVA growth versus hours worked growth for economic enterprise regions, 2010 to 2018

Figures 5 and 6 give information on the growth rates of productivity. By contrast, Figures 7 and 8 provide information on the relative levels of productivity between areas.

Figure 7 shows the enterprise regions with the highest labour productivity calculated relative to the UK average. In 2018, Thames Valley Berkshire was the economic enterprise region with the highest productivity level, at 35% above the UK average, closely followed by London, with a productivity level of 32% above the UK average.

Eight of the top 10 enterprise regions shown in Figure 7 are located within the regions of the Greater South East (East of England, South East, and London) with the exceptions being Cheshire and Warrington, and Coventry and Warwickshire.

Figure 7: Thames Valley Berkshire was the enterprise region with the highest productivity in 2018

GVA per hour worked – highest-ranking enterprise regions, smoothed, current prices, 2018

Figure 7: Thames Valley Berkshire was the enterprise region with the highest productivity in 2018

GVA per hour worked – highest-ranking enterprise regions, smoothed, current prices, 2018

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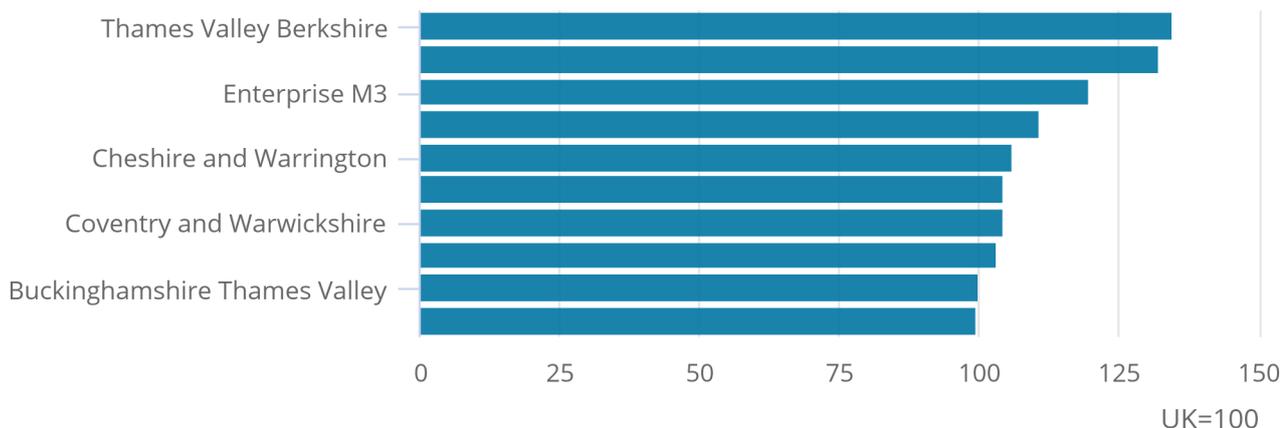
Source: Office for National Statistics – gross value added, productivity jobs and productivity hours

The enterprise regions with the lowest GVA per hour worked were a mix of rural and urban areas, as shown in Figure 8. The lowest labour productivity among the enterprise regions in 2018 was in the Black Country, followed by Cornwall and Isles of Scilly, both at 24% below the UK average. The largely rural enterprise regions with relatively low labour productivity included Cornwall and Isles of Scilly, Mid and South West Wales Economic Region, and The Marches. Meanwhile, the Black Country, and Sheffield City Region were examples of predominantly urban areas with relatively low productivity levels.

Figure 8: Black Country was the enterprise region with the lowest productivity in 2018

GVA per hour worked – lowest-ranking enterprise regions, smoothed, current prices, 2018
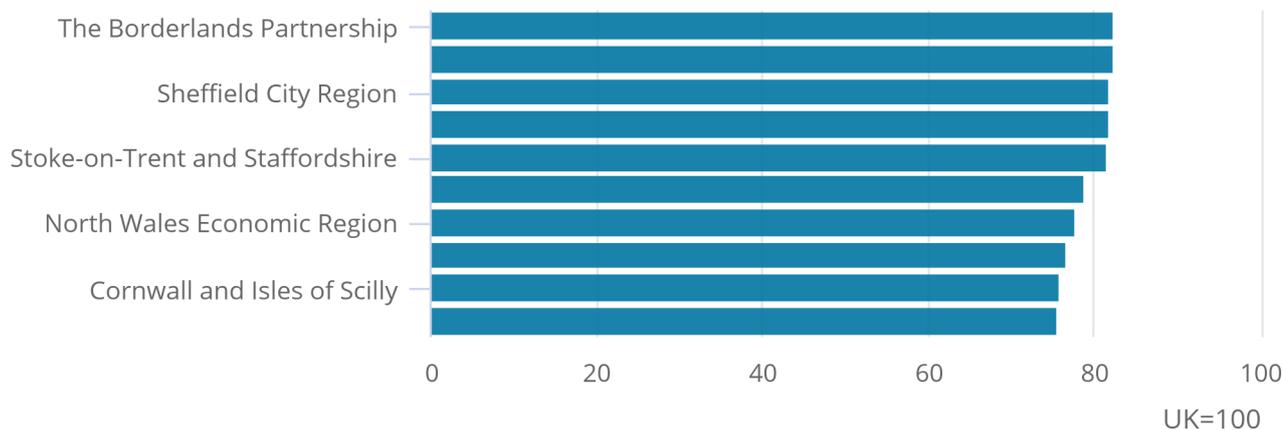
Source: Office for National Statistics – gross value added, productivity jobs and productivity hours

5 . Results for city regions

City regions include combined authorities with elected Mayors and other city regions that do not yet have official status. The accompanying dataset also includes some additional Growth Deal areas in the UK. In total, data for 25 city regions and growth areas are included in this article.

The analysis in this section excludes the more rural growth areas and focuses on the 18 areas in the tables based around urban centres in the UK for which gross value added (GVA) per hour worked data are available (for the two city regions in Northern Ireland, GVA per filled job data are available in the accompanying datasets).

Figure 9 shows 15 of the 18 city regions had an increase in labour productivity between 2010 and 2018. The highest productivity growth occurred in West Midlands, in Edinburgh and South East Scotland City Region and in Stirling and Clackmannanshire City Region. However, it is worth noting that GVA growth was relatively low in the latter case compared with West Midlands and Edinburgh.

Greater Manchester Combined Authority was one of the three areas without productivity growth over the period. It did, nevertheless, have one of the highest growths in both output and hours worked amongst the city regions. Liverpool City Region and North East Combined Authority were the other two city regions with a decline in average labour productivity over the period.

Figure 9: 15 of the 18 city regions had an increase in labour productivity

Scatter plot of real GVA growth versus hours worked growth for city regions, 2010 to 2018

Figure 9 gives information on the growth rates of productivity. By contrast, Figure 10 provides information on the relative levels of productivity between areas.

Figure 10 shows London had the highest labour productivity in 2018. It was followed by the Edinburgh and South East Scotland City Region, with a productivity level 10% above the UK average, and Aberdeen City Region, with a productivity level 7% above the UK average.

The city region with the lowest productivity level in 2018 was Swansea Bay City Region, with a productivity level 19% below the UK average. Sheffield City Region had the lowest productivity level in England at 18% below the UK average, and Glasgow City Region the lowest in Scotland at 14% below the UK average.

Figure 10: The Greater London Authority city region had the highest productivity, Swansea Bay City Region had the lowest

GVA per hour worked – highest and lowest ranking UK city regions, smoothed, current prices, 2018

Figure 10: The Greater London Authority city region had the highest productivity, Swansea Bay City Region had the lowest

GVA per hour worked – highest and lowest ranking UK city regions, smoothed, current prices, 2018

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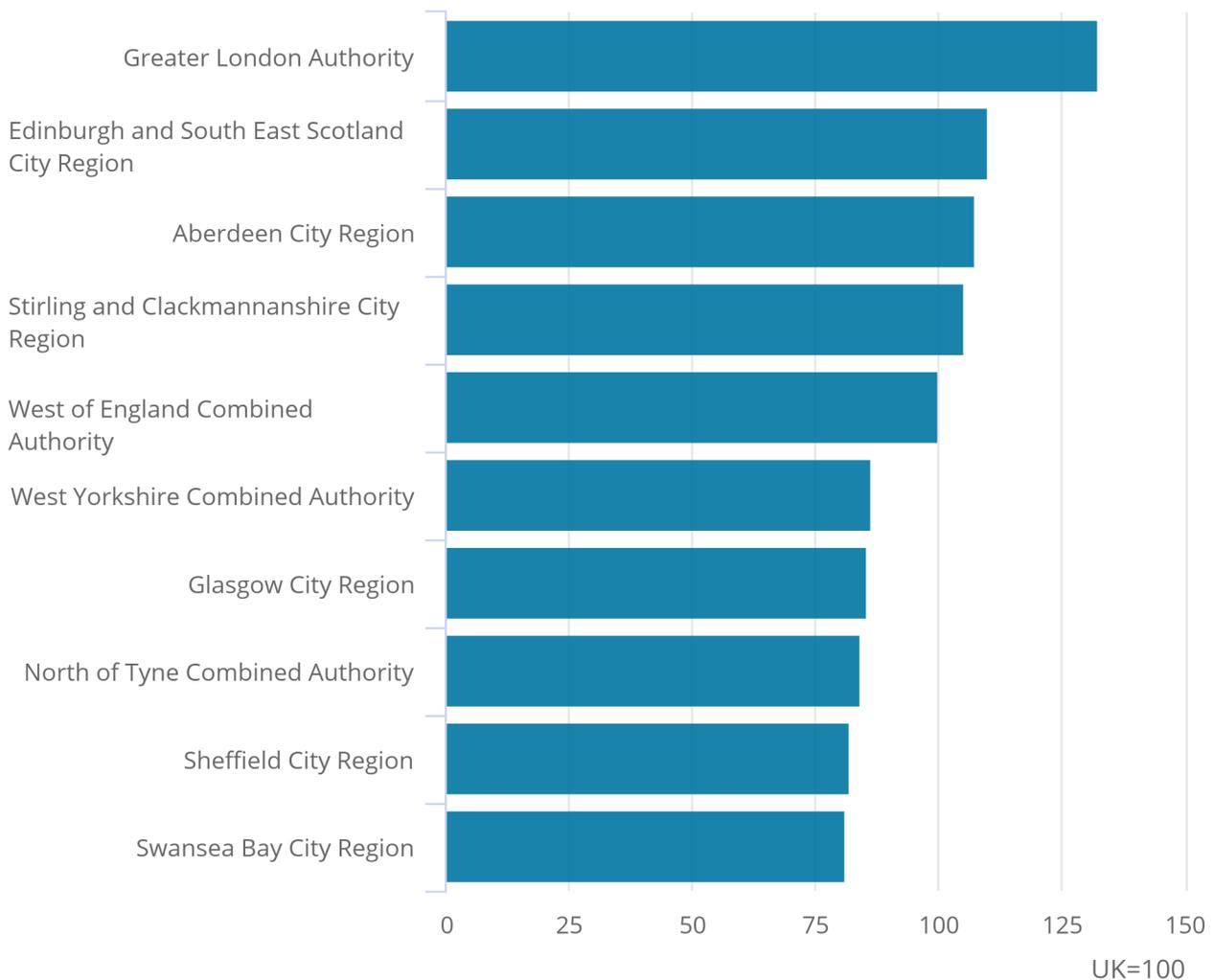
Source: Office for National Statistics – gross value added, productivity jobs and productivity hours

6 . Results for NUTS3 areas

Since the previous publication of [NUTS3 (Nomenclature of Units for Territorial Statistics)](#) data in February 2019, the methods used for calculating gross value added (GVA) for NUTS3 areas has changed leading to revisions to the data. These revisions are discussed in more detail in the "Things you need to know" section.

Figure 11 shows the change in real gross value added and hours worked for each NUTS3 area over the period 2010 to 2018. Labour productivity increased in 105 out of 168 NUTS3 regions in Great Britain between 2010 and 2018 and declined in 63. The highest productivity growth was in areas of West London (Kensington and Chelsea, and Hammersmith and Fulham; Hounslow and Richmond upon Thames) followed by Warwickshire, Solihull and Milton Keynes.

Figure 11: Real labour productivity increased in 105 out of 168 NUTS3 regions in Great Britain and declined in 63

Scatter plot of real GVA growth versus hours worked growth for NUTS3 subregions, 2010 to 2018

Table 1 shows the NUTS3 areas with the highest and lowest values of nominal labour productivity by region and country. The highest productivity overall in 2018 was in Tower Hamlets, with productivity three times greater than in rural Powys in Wales, which had the lowest level of productivity.

Table 1: GVA per hour worked by NUTS3 subregion, highest and lowest values, 2018, UK=100

NUTS1 Country/Region		Highest Ranked NUTS3	2018		Lowest Ranked NUTS3	2018
London	UKI42	Tower Hamlets	180.5	UKI41	Hackney and Newham	95.8
South West	UKK14	Swindon	141.1	UKK42	Torbay	75.7
South East	UKJ37	North Hampshire	140.2	UKJ22	East Sussex CC	74.8
West Midlands	UKG32	Solihull	137.9	UKG11	Herefordshire, County of	69.1
Scotland	UKM75	City of Edinburgh	125.3	UKM91	Scottish Borders	76.6
North West	UKD62	Cheshire East	120.58	UKD37	Greater Manchester North East	75.06
North East	UKC23	Sunderland	105.99	UKC21	Northumberland	78.89
East of England	UKH21	Luton	102.97	UKH31	Southend-on-Sea	72.66
Yorkshire and The Humber	UKE21	York	100.97	UKE41	Bradford	77.9
East Midlands	UKF16	South Nottinghamshire	97.33	UKF25	North Northamptonshire	74.33
Wales	UKL22	Cardiff and Vale of Glamorgan	96.2	UKL24	Powys	59.7

Source: Office for National Statistics – gross value added, productivity jobs and productivity hours

7 . Results for local authorities

Experimental data for local authorities are included for the first time in this year's publication. Because the volatility of the data increases as geographical areas (and therefore sample sizes) reduce, then initially we have focused on providing the smoothed datasets, rather than unsmoothed data and therefore just the "nominal" current price data are provided. We hope it will be a useful development for local authorities to have these data and we would welcome feedback on the results.

The rest of this section highlights results from these new data focusing on the gross value added (GVA) per hour worked measure for different countries and areas of England. In many cases, local authorities with relatively high labour productivity will be those with either a major manufacturing site (for example, car or aerospace production), a large utilities sector, or a focus on high-skill service sectors, reflecting the high labour productivity in these types of industries. Meanwhile, local authorities with the lowest productivity are typically in more rural or geographically isolated locations.

While noting that industry structure can make an impact on the productivity of a local authority, it is not the only explanatory factor. As explained in the Understanding spatial labour productivity in the UK article, differences across the country in productivity within industry sectors also play a significant role in the cross-country differences between areas.
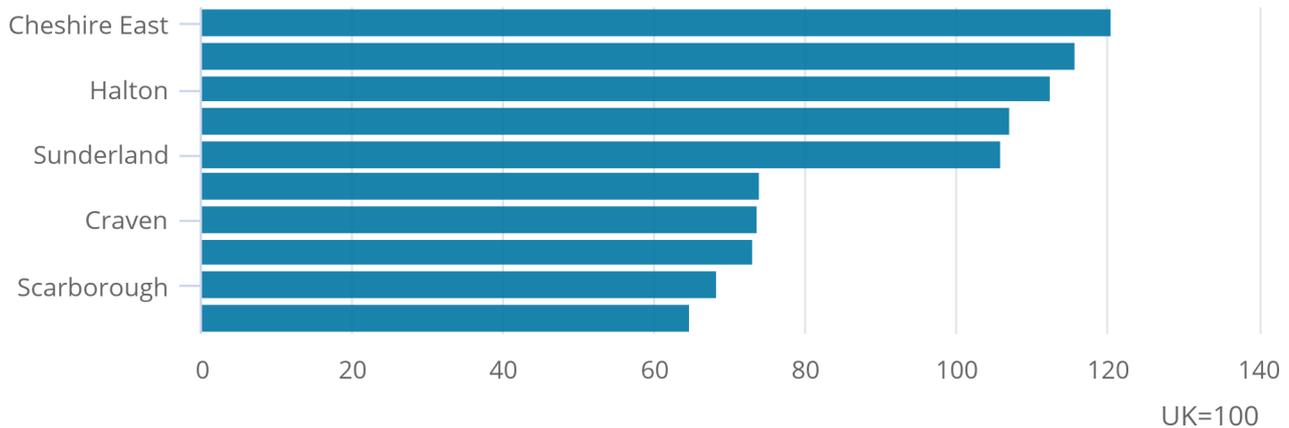
Figure 12 shows results for the north of England (North East, North West, and Yorkshire and The Humber regions) with Cheshire East having the highest labour productivity in 2018 and Richmondshire the lowest. Overall, out of 72 local authority districts in the north of England, only nine had productivity levels above the UK average in 2018.

Figure 12: Cheshire East had the highest productivity of local authority districts in the north of England, Richmondshire had the lowest

GVA per hour worked – highest- and lowest-ranking local authority districts in north of England, smoothed, current prices, 2018

UK=100

Source: Office for National Statistics – gross value added, productivity jobs and productivity hours

In Figure 13, results for the Midlands of England (West Midlands, East Midlands) show South Derbyshire and Solihull had the highest labour productivity whilst rural Wyre Forest had the lowest levels. Out of 70 local authority districts in the Midlands, nine had productivity levels above the UK average in 2018.

Figure 13: South Derbyshire had the highest productivity of local authority districts in the Midlands, Wyre Forest had the lowest

GVA per hour worked – highest- and lowest-ranking local authority districts in the Midlands, smoothed, current prices, 2018

Figure 13: South Derbyshire had the highest productivity of local authority districts in the Midlands, Wyre Forest had the lowest

GVA per hour worked – highest- and lowest-ranking local authority districts in the Midlands, smoothed, current prices, 2018

UK=100
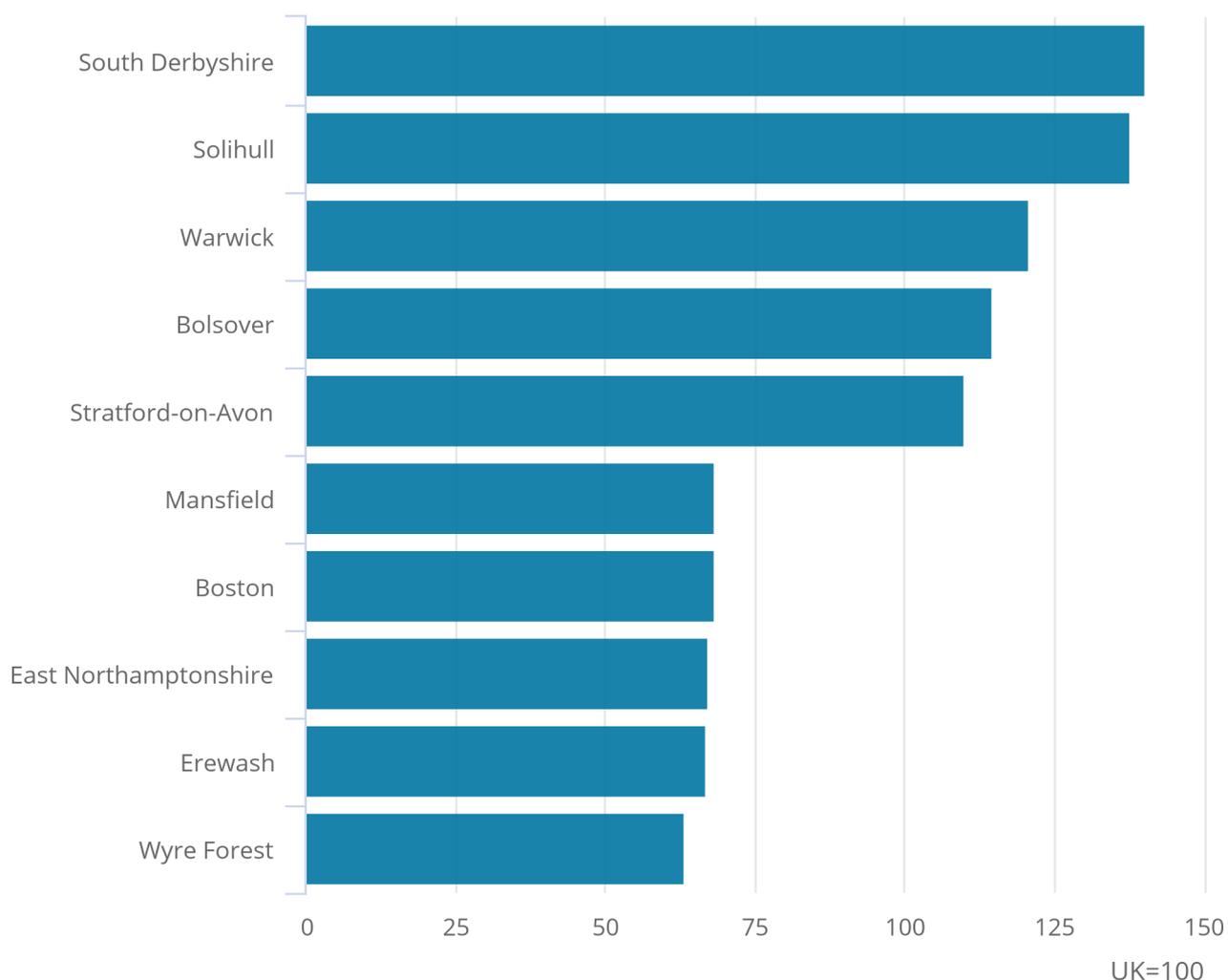
Source: Office for National Statistics – gross value added, productivity jobs and productivity hours

In the south of England excluding London (South East, South West and East of England regions), labour productivity was highest in Runnymede in Surrey whilst lowest in Mendip in Somerset as shown in Figure 14. The productivity in the higher performing local authorities in the South East region was similar to that of the higher performing London boroughs. Overall, 56 out of 142 local authorities in the south of England had productivity levels above the UK average.

Figure 14: Runnymede had the highest productivity of local authority districts in the south of England, Mendip had the lowest

GVA per hour worked – highest- and lowest-ranking local authority districts in south of England (excluding London), smoothed, current prices, 2018

Figure 14: Runnymede had the highest productivity of local authority districts in the south of England, Mendip had the lowest

GVA per hour worked – highest- and lowest-ranking local authority districts in south of England (excluding London), smoothed, current prices, 2018

UK=100
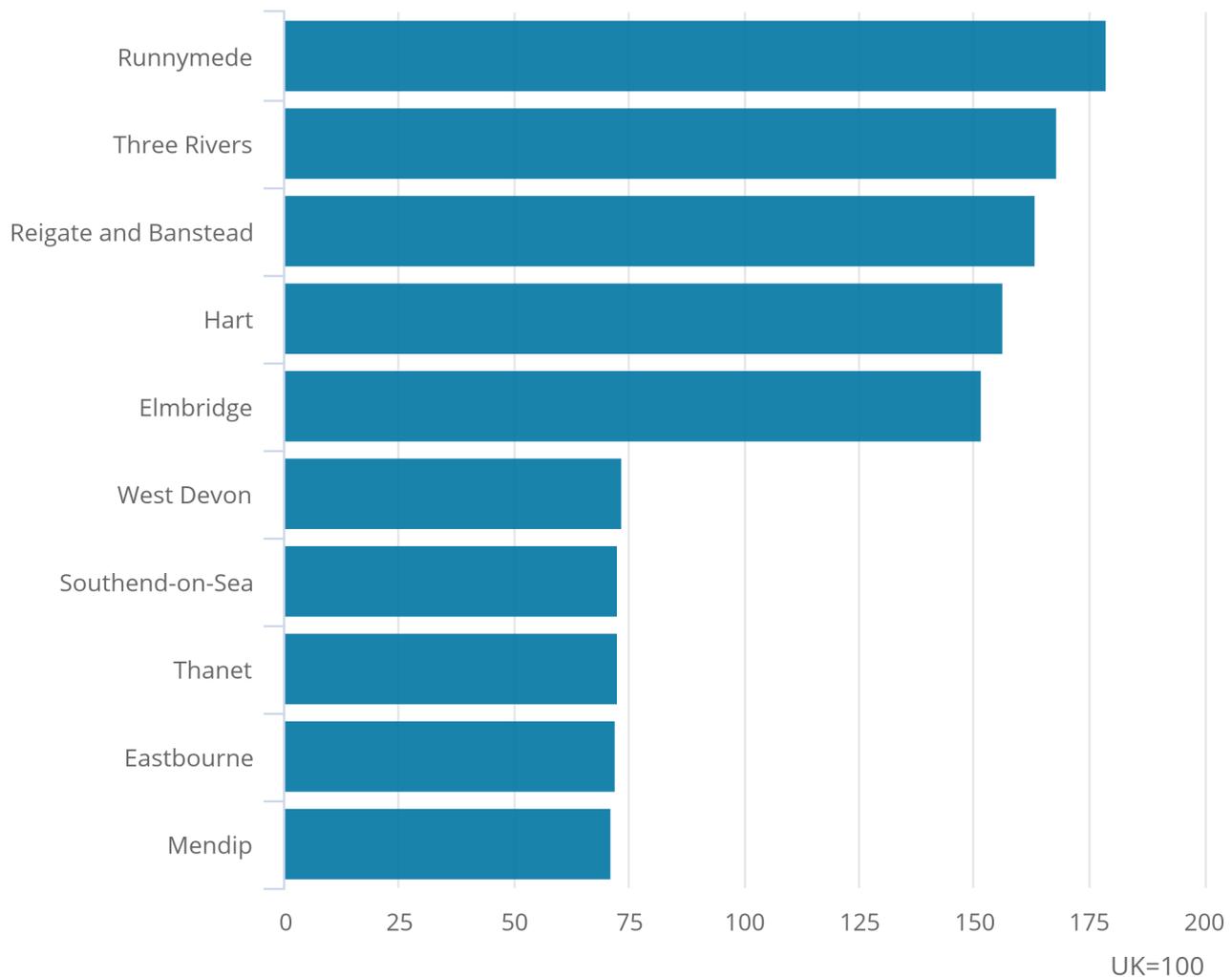
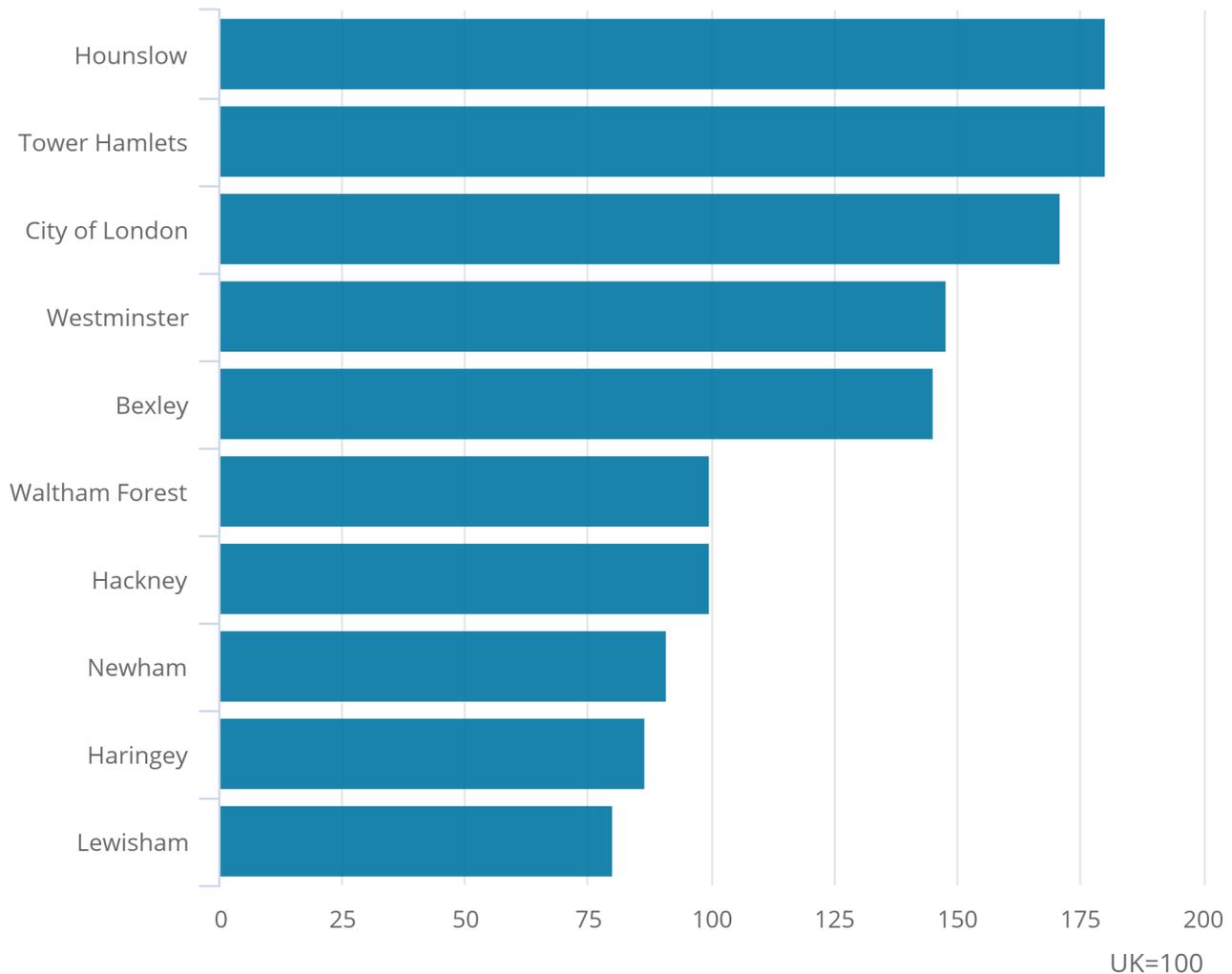**Source: Office for National Statistics – gross value added, productivity jobs and productivity hours**

The data for London boroughs (Figure 15) show Hounslow, along with Tower Hamlets (home of Canary Wharf), and City of London as having the highest labour productivity levels. The lowest is in Lewisham. Out of 33 boroughs in London, 28 had productivity levels either equal to or above the UK average in 2018.

Figure 15: Hounslow had the highest productivity of local authority districts in London, Lewisham had the lowest

GVA per hour worked – highest- and lowest-ranking local authority districts in London, smoothed, current prices, 2018

Figure 15: Hounslow had the highest productivity of local authority districts in London, Lewisham had the lowest

GVA per hour worked – highest- and lowest-ranking local authority districts in London, smoothed, current prices, 2018

UK=100

Source: Office for National Statistics – gross value added, productivity jobs and productivity hours

For Scotland, Figure 16 shows City of Edinburgh as having the highest labour productivity, with the lowest in East Ayrshire.

Figure 16: City of Edinburgh had the highest productivity of local authority districts in Scotland, East Ayrshire had the lowest

GVA per hour worked – highest- and lowest-ranking local authority districts in Scotland, smoothed, current prices, 2018

Figure 16: City of Edinburgh had the highest productivity of local authority districts in Scotland, East Ayrshire had the lowest

GVA per hour worked – highest- and lowest-ranking local authority districts in Scotland, smoothed, current prices, 2018

UK=100
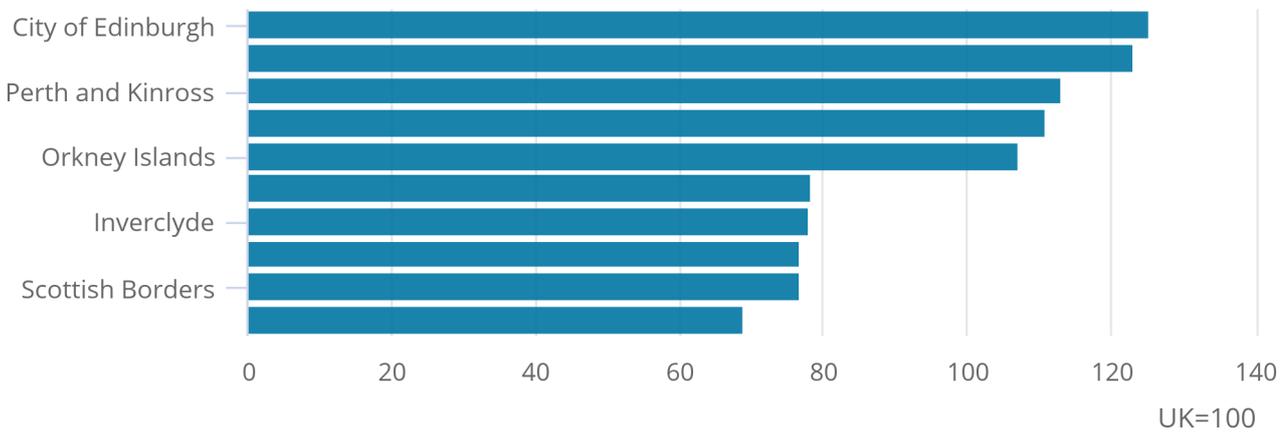
Source: Office for National Statistics – gross value added, productivity jobs and productivity hours
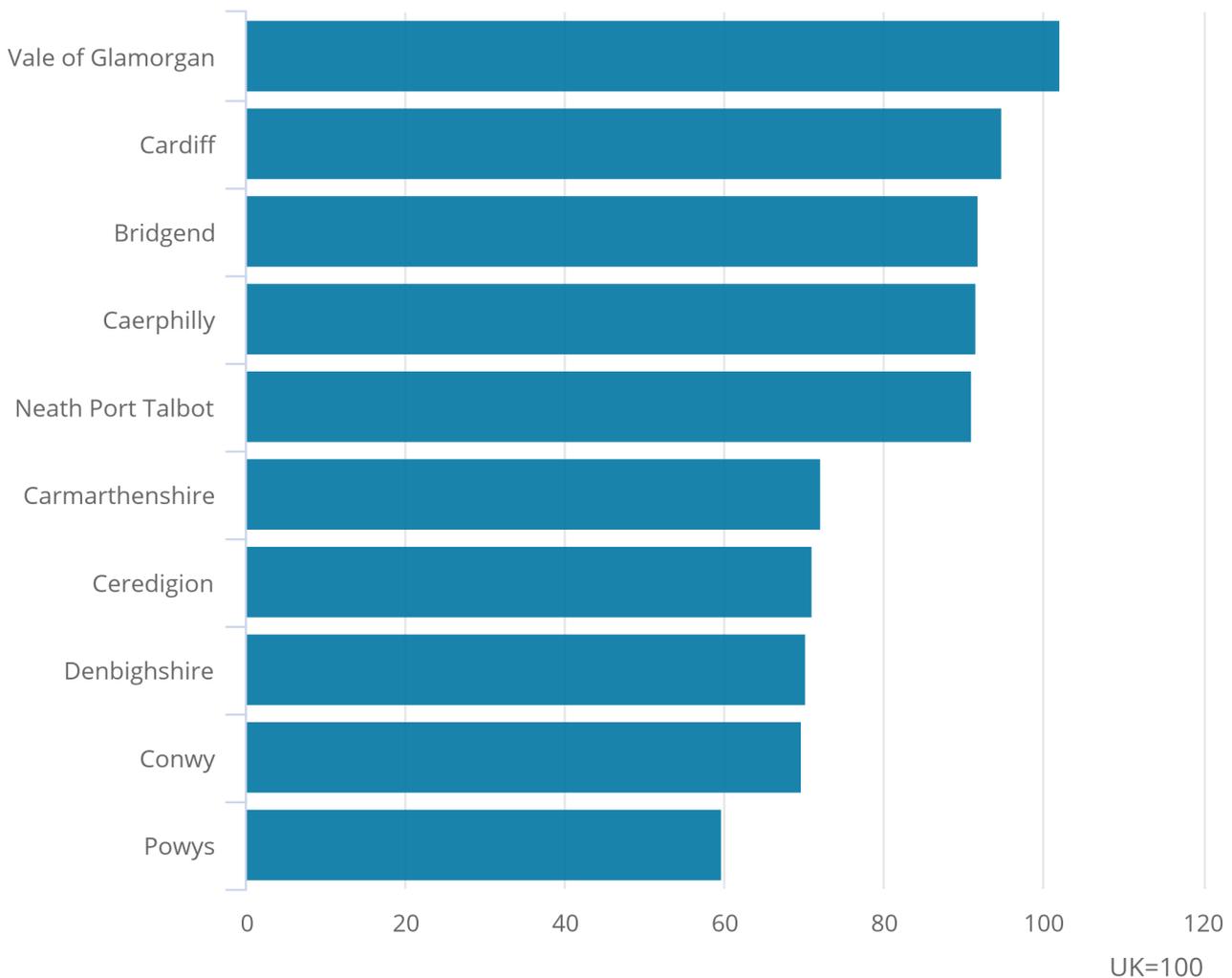
Finally, for Wales, the data in Figure 17 show labour productivity highest in Vale of Glamorgan and lowest in rural Powys.

Figure 17: Vale of Glamorgan had the highest productivity of local authority districts in Wales, Powys had the lowest

GVA per hour worked – highest- and lowest-ranking local authority districts in Wales, smoothed, current prices, 2018

Source: Office for National Statistics – gross value added, productivity jobs and productivity hours

Note that GVA per hour worked data is not available for Northern Ireland. However, GVA per job filled data can be found in the accompanying datasets.

8 . Alternative results excluding rental income

This section briefly assesses the impact on the labour productivity data from excluding imputed rental income from the calculations. The reason for including this section is that it can be argued that not all gross value added (GVA) components are equally relevant when assessing labour productivity, as some elements of GVA are not directly related to the input of labour. In particular, imputed rental incomes, such as imputed household rental income capturing the value of housing services accruing to owner-occupiers, could be excluded from the total GVA to obtain a measure of output more closely related to the measurable labour input.

Therefore, we have calculated data that exclude imputed household rentals from the GVA used in the productivity calculations. Figure 18 shows the effect of excluding rental incomes on GVA per hour worked data, highlighting the Nomenclature of Units for Territorial Statistics: NUTS3 areas where the change has the largest impact.

The largest NUTS3 changes are in London, where the exclusion of imputed rental incomes increases levels of relative labour productivity in some areas (for example, Camden and City of London, Westminster and Tower Hamlets), while reducing relative labour productivity in other areas (for example, Wandsworth, Redbridge and Waltham Forest, and Barnet).

Figure 18: NUTS3 subregions in London saw the largest differences in productivity when excluding rental income

Impact of excluding imputed rental incomes on GVA per hour worked – London NUTS3 subregions with the largest index change, 2018

Figure 18: NUTS3 subregions in London saw the largest differences in productivity when excluding rental income

Impact of excluding imputed rental incomes on GVA per hour worked – London NUTS3 subregions with the largest index change, 2018
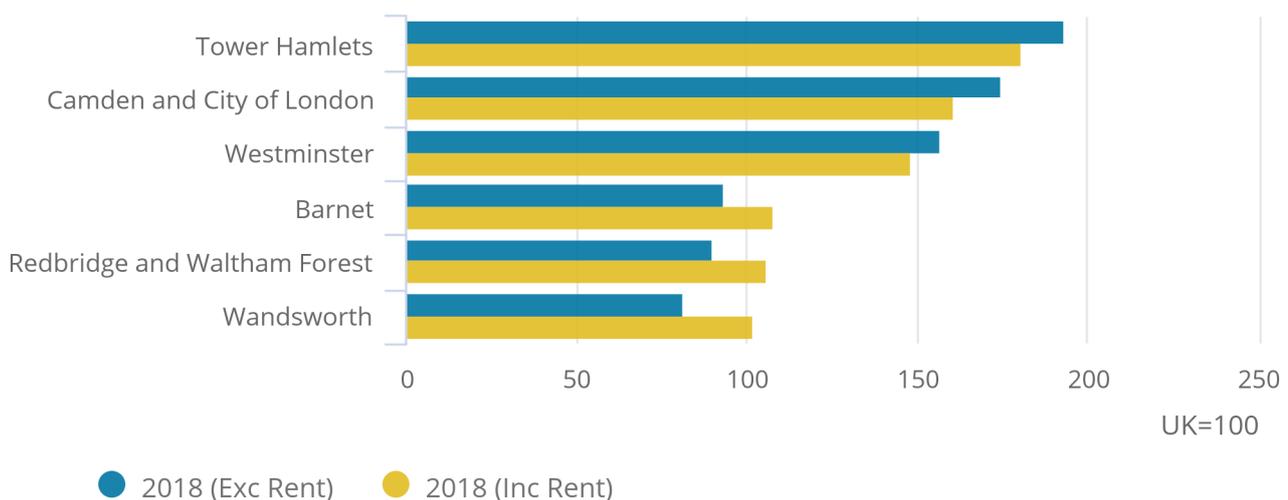
Source: Office for National Statistics – gross value added, productivity jobs and productivity hours

Excluding imputed rental incomes also affects areas outside of London, albeit to a smaller extent. Swindon, Milton Keynes and Manchester are the three non-London NUTS3 areas with the largest increase in their relative labour productivity if imputed rentals are removed. Meanwhile, East Sussex County Council, West Sussex (South West) and Buckinghamshire County Council have the largest reductions.

9 . Quality and methodology

Components of productivity data

Productivity estimates presented in this article use gross value added (GVA), productivity jobs and productivity hours data. The methodology requires ensuring that the subregional measures of GVA, jobs and hours are all consistent with the regional totals. The methodology is therefore concerned with how best to apportion the regional totals to the subregional areas. The approach taken is detailed in this section.

Gross value added

The productivity data included in this publication directly uses the GVA data provided for a range of geographies in the Office for National Statistics (ONS) Regional economic activity by gross domestic product, UK: 1998 to 2018 publication.

Since December 2017, a new methodology has been adopted in the production of regional GVA data, known as regional balanced GVA (GVA(B)). This measure "balances" the income and production approaches to measuring the economy into a single estimate at a regional level. This method was introduced to replace the previous method, which calculated regional GVA based on the income method alone.

An advantage of the new method is that it allows ONS regional labour productivity estimates to be calculated in "real" terms through the production of constant price estimates. These real data allow a greater understanding of time series growth in regional productivity. These estimates have been produced by deflating the current price estimates for 112 industries using national industry deflators. The balanced measure of regional GVA has National Statistics status following a review by the Office for Statistics Regulation.

Jobs

GVA per filled job is calculated using a "productivity jobs" series as the denominator. This is compiled from four components:

- employee jobs

- self-employed jobs

- government-supported trainees (GST)

- members of Her Majesty's Forces

At the NUTS1 regional level, quarterly data are benchmarked to the national "productivity jobs" series. To produce annual totals for regional productivity jobs, an average of the four quarters in the year is taken.

For subregional geographies, this NUTS1 productivity jobs series is disaggregated further using the "total jobs" data series. The total jobs measure is a workplace-based measure of jobs that is also used in the ONS for calculating job densities at regional and subregional level.

Total jobs data comprise employees (from the Business Register and Employment Survey (BRES)), self-employment jobs (from the Annual Population Survey (APS)), government-supported trainees (from the Department for Education and Department for Work and Pensions) and HM Forces (from the Ministry of Defence). The data are used to apportion regional productivity jobs down from NUTS1 level to the local authority districts geography level. These local authority data are then aggregated to NUTS2 and NUTS3 subregions, enterprise and city regions to make up the full "productivity jobs" data series for subnational levels.

Hours

At the national and regional level, GVA per hour worked data are calculated using a "productivity hours" series as the denominator. These data are calculated quarterly, based mostly on the Labour Force Survey (LFS), and an annual total is constructed as the average of the four quarters in the calendar year.

At subregional level, only annual productivity data are being produced. Therefore, the APS is used rather than the LFS as it has a larger sample size [1]. The process involves calculating total hours for NUTS3 subregions as the sum of employee hours, self-employment hours, hours worked in government training schemes and hours worked by HM Forces.

Employee hours are calculated by using the APS to estimate, for each subregion, the average hours worked per employee job by industry at NUTS3 subregion. These industry average hours at NUTS3 subregion are then multiplied by the number of employee jobs for each industry in the local authorities within the respective NUTS3 area, to obtain the total employee hours by local authority. For the period from 2009 onwards, the number of employee jobs by industry is derived from BRES. Prior to that, employee jobs by industry were derived from the Annual Business Inquiry (ABI)[2].

Self-employment hours are calculated by using the APS to estimate, for each subregion, the average hours worked by sex and by full-time and part-time classification for a job at NUTS3 subregion. These average hours by sex and by full-time and part-time classification for a job at NUTS3 subregion are then multiplied by the number of self-employed individuals at the local authority subregion, belonging to the respective NUTS3 area, to obtain the total hours at the local authority. For government training schemes and HM Forces, the regional totals are allocated to subregions based on each subregion's share of regional employee plus self-employment hours, as calculated in the previous stage.

Adding together the sum of employee hours, self-employment hours, hours worked in government-supported training schemes and hours worked by HM Forces provides a total hour estimate for each local authority.

Once calculated, these local authority data are then constrained regionally to the NUTS1 "productivity hours" data to ensure consistency with regional productivity data. The regionally constrained local authority data are then aggregated to NUTS2 and NUTS3 subregions, enterprise and city regions.

Please note that for Northern Ireland, hours data are only available at the NUTS1 level, but is not available for NUTS3 or local authority.

Smoothing

For current price "nominal" labour productivity, the data are provided both unsmoothed and smoothed. The reason for providing smoothed estimates is that, particularly for local authorities and NUTS3 geographies, there is volatility in the data that arise from smaller sample surveys inherent within estimates for smaller geographic areas. The smoothed data reduces the volatility by using weighted data from up to five years in producing the estimate for each year.

In this article, when discussing the current price data, we have used the smoothed data for local authorities and for NUTS3 estimates, and unsmoothed data for NUTS2 and NUTS1 estimates.

For the "real" estimates, the data used are unsmoothed for all geographies to avoid multiple averaging of data as GVA(B) data are already chain-linked. These "real" data allow for time series labour productivity growth to be examined. While this included the opportunity to examine single year-on-year changes, we would generally recommend analysing the data over a longer time period, particularly in examining data for smaller geographies such as local authorities and NUTS3. Trends over a longer period are less likely to be the result of the volatility around any single year estimate and more likely to be demonstrating a change in the economic performance of the subregion.

Geographies

A number of our regional and subregional outputs are produced based on the Nomenclature of Units for Territorial Statistics (NUTS) geographies. These include regional and subregional GVA. Each NUTS3 subregion covers the same area as either a single local authority or a combination of two or more adjacent local authorities. The data accompanying this article are published on the NUTS geographical classification that came into force on 1 January 2018. In the UK the areas are:

- NUTS1: Wales, Scotland, Northern Ireland and the nine English regions

- NUTS2: 41 subregions – mainly groups of counties and unitary authorities

- NUTS3: 179 local areas – primarily individual counties and unitary authorities

- LAU1: 382 local authority or local council areas

- some areas appear at more than one level, for example, Northern Ireland appears at NUTS1 and NUTS2 level

- the term Extra-Regio is applied to an economic activity that cannot be assigned to any specific region within a country

As of 1 January 2019, there are 382 local authorities in the UK. Since 2019, 14 local authorities have been combined to form four new local authorities. The local authorities of Bournemouth, Poole and Christchurch have combined to form one local authority of "Bournemouth, Christchurch and Poole". Similarly, the five local authorities, East Dorset, West Dorset, North Dorset, Purbeck and Weymouth, and Portland have combined to form one local authority of "Dorset". The local authorities of Taunton Deane and West Somerset have combined to form "Somerset West and Taunton". Forest Heath and St Edmundsbury have combined to form the local authority of "West Suffolk". Suffolk Coastal and Waveney local authorities have combined to form the local authority of "East Suffolk".

City regions include combined authorities with elected Mayors, other city regions that do not yet have official status, and other comparable areas such as Growth Deal areas. Each UK city region is a combination of local authority areas.

Enterprise regions include English local enterprise partnerships, Welsh economic regions, Scottish enterprise regions and other comparable areas of economic interest. There are currently 44 enterprise regions in the UK. Please note that the boundaries of many of the local enterprise partnerships in England are currently being reviewed and may change in the year ahead.

Revisions

Revisions to the productivity data, compared with last year's publication, can arise either through revisions in the GVA or labour market data.

The regional GVA data are revised each year to reflect changes in the national GVA estimates published annually in UK National Accounts, The Blue Book. There are also sometimes changes to the methods of regional disaggregation adopted that can lead to revisions in the final data. Please see the "Tthings you need to know" section for more detail on the revisions made to the GVA data feeding into this year's publication.

Please also note that the most recent year of data is marked as provisional in the regional GVA tables and can be expected to be revised the following year as further input data are received by the ONS. In other words, the 2018 data in this output use provisional GVA data, which can be expected to be revised next year. As part of the release of GVA data, revisions triangles are available highlighting the size of revisions made for current basic prices and for chained volume measures.

Subregional productivity jobs and hours data have also been revised in comparison with last year's subregional productivity publication. The main revision comes from the reweighting of the Labour Force Survey (LFS) to match with the latest population data. Based on the 2018 reweighting exercise, the labour market estimates have been revised back to 2012. Note that in future, the LFS and Annual Population Survey (APS) reweighting is to be carried out biennially.

Timeliness

The timeliness of the data is determined by the release calendar of the regional GVA data, the total jobs data and the APS, from which the hours worked are extracted. Subregional GVA data for 2019 will be available in December 2020 and an update to this article will follow shortly afterwards.

Notes for: Methodology

1. For 2005, it was not possible to use Annual Population Survey (APS) data, therefore Labour Force Survey (LFS) data were used – with the average taken of the four LFS surveys carried out in 2005.

2. Business Register and Employment Survey (BRES) data are used for 2009 onwards based on the 2007 UK Standard Industrial Classification (SIC 2007). For data up to 2008, the Annual Business Inquiry (ABI) is used and this is based on the 1992 UK Standard Industrial Classification (SIC 1992).