productivity insights network

PIN - Productivity Projects Fund

Small Project Report

What Places Do vs. What Places Have
Understanding the Role of Sub-Sectoral Specialisation in Inter-Regional Sectoral Productivity Disparities

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About PIN

The Productivity Insights Network was established in January 2018 and is funded by the Economic and Social Research Council. As a multi-disciplinary network of social science researchers engaged with public, private, and third sector partners, our aim is to change the tone of the productivity debate in theory and practice. It is led by the University of Sheffield, with co-investigators at Cambridge Econometrics, Cardiff University, Durham University, University of Sunderland, SQW, University of Cambridge, University of Essex, University of Glasgow, University of Leeds and University of Stirling. The support of the funder is acknowledged. The views expressed in this report are those of the authors and do not necessarily represent those of the funders.

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1. Introduction and purpose

1.1 Context

Spatial variations in productivity across the UK continues to be a challenge (Zymek and Jones 2020, Martin et al. 2019, McCann 2020, Nguyen 2019). Policy makers are currently faced with trends of widening regional disparities, which are being exacerbated by the uneven impacts of the COVID-19 crisis, alongside a strong imperative to "level up" left-behind places. In this context, exploring the roots of differences in productivity between places can make an important contribution to policy debates and, ultimately, the design of policy responses.

1.2 Purpose of this study

This project focuses on one important aspect of productivity differences: sectoral structure. Briefly, because different sectors exhibit different levels of productivity it is reasonable to assume that the mix of sectors in each region might contribute to productivity differences. That is, regions with higher proportions of higher productivity sectors will have higher overall productivity.

However, this assumes that the activities associated with each sector are the same in each region (albeit at different proportions) even though, empirically, we know that this is not the case. This project builds on existing research highlighting this effect to explore the impact of sectoral structure using microdata. Specifically, it was designed to explore the degree to which differences sectoral productivity levels between geographies (in this case, English LEP areas) can be explained by differences in the underlying sub-sectoral employment structure using 5-digit SIC sectoral data.

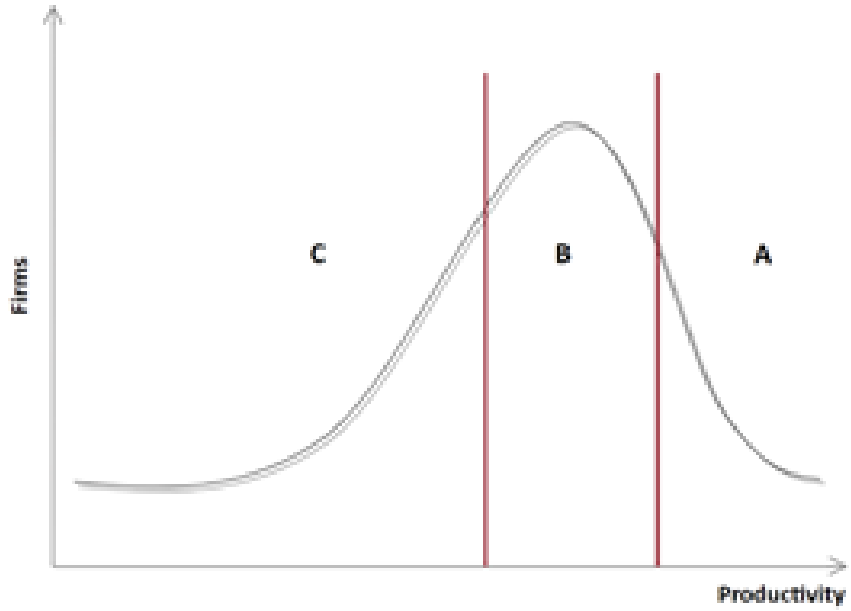
For every sectoral grouping we ask what kinds of effects explain deviations of performance across places. In doing so, we not only draw conclusions about which sectors appear to be most impacted by variations in mix and productivities of sub-sectoral activities but have compiled a database and rich appendix of data to serve as a foundation for future analysis.

1.3 The role of sectors spatial variations in productivity

As Figure 1.1 (below) shows, the productivity profile of places can be depicted as a curve that can be divided into (usually) a smaller number of high productivity firms (A), larger midsection of medium productivity firms (B), and a longer tail of lower productivity firms (C).

There are a variety of explanations for the differences in the profiles of these curves from place to place, some of which focus on factors such as firm attributes and capabilities, international orientation (e.g., FDI), internal practices, etc. Aside from these firm-level approaches, researchers have also explored how characteristics of places, holding other factors equal, might also influence regional productivity (Harris and Moffat 2021). Others, including this study, focus on what the mix of firms might contribute to spatial productivity.

Figure 1.1: Regional productivity profiles



Source: Driffield (2020).

This simplified framework (Gal and Egeland 2018, Rocks 2019) provides one explanation for the distributions of firms of different levels of productivity:

1. **Different sectoral mixes (structural composition)**

   Larger or smaller proportions of lower productivity sectors/industries can skew regional productivity outcomes.

   AND/OR

2. **Different activities or functions within sectors**

   Firms within the same industry may perform different functions or engage in different activities in different regions. Here a higher proportion of lower productivity activities may affect productivity measures regardless of broad sectoral mix. In other words, Concentrations of lower productivity functions within an overall higher productivity sector in a region may result in lower productivity performance overall.

Broad sectoral data shows that there are wide variations in productivity across categories. Data on GDP per hour shows that sectors like mining and quarrying, finance and insurance, ICT, construction, and manufacturing tend to top the list while others like agriculture, hotels and catering, administrative services, and recreation and culture generally exhibit lower productivity (ONS 2021).

There is general agreement that some of the productivity difference between regions is likely attributable to sectoral mix (Haldane 2017). Regions that are more focused on tourism, for

instance, will likely have higher proportions of the hotel and catering or recreation and cultural facilities that may skew their aggregate productivity statistics lower. In their investigation of sectoral structure change, Martin et al. (2017) suggest that the shift away from manufacturing towards services in many UK cities had significant implications for city (TTWA) aggregate productivity.

Recent estimates suggest that 4 percentage points of London's productivity advantage and 3 points of the East Midlands' disadvantage can be attributed to sectoral structure (Zymek and Jones 2020, 33). However, even though such estimates are possible they explain only slight variations of productivity outcomes between places, as the above figures attest.

Consequently, scholars have explored other factors that might explain subnational variations in productivity even when holding sectoral mix constant. Zymek and Jones' analysis finds that a much greater degree of spatial variation in productivity outcomes can be explained by these differences between industries. Similarly, Martin et al. (2017) found evidence that the same sector performs differently across city regions. Rocks (2019) noted that firms in London outperform peers in the same industry groups.

Beatty and Fothergill (2020, 10) find significant variations in productivity between the same sectors in different regions. They demonstrate that there are variations in sub-regional productivity in all sectors, but they also show that these variations are more pronounced in certain sectors. Among the sectors with the greatest spatial variations are professional, scientific, and technical; information and communication; arts, entertainment, and recreation; finance and insurance; and administrative and support services. They concede that, at this scale of analysis, they may not be comparing like-with-like. These sectoral categories are very broad indeed and so sectors such as finance can include high-value investment banking, but also back offices, call centres, and high-street retail banking.

Similarly, they observe that manufacturing can include diverse activities with very different capital intensities and functions within supply chains. Their analysis of productivity differences between four manufacturing groups revealed even more divergence in sub-regional levels of productivity. While they were attempting to control for capital-intensiveness of various manufacturing industries these four categories still pose the potential of issue of failing to compare like-for-like across places.

Understanding what causes those variations requires digging much deeper into the data to try to unpack how the different mix of activities that get aggregated under those broad (and even, as we see from above, more narrow) sectoral headings may be contributing to broader productivity variations between places than might be expected based on sectoral or industry composition alone. This is where things get fuzzy.

Confronted with the difficulty of sorting out the diversity of activities that can occur within one sectoral or industrial category some have adopted the concept of functional differentiation. Gervais et al (2021) acknowledge that the concept of functions has been generally ill-defined and measured. They note that some have attempted to proxy this concept using occupational and employment data (Rice, Venables, and Patacchini 2006, Beatty and Fothergill 2019).

This is based on the observation that within industries certain roles, that add different amounts of value to productivity figures, tend to be concentrated in some places - i.e., management and professional roles tend to be concentrated in large (capital) cities while more routine functions are located elsewhere. This means that all else being equal, places with similar industries that perform different functions may exhibit different productivity profiles as a result of occupational

mix. The most frequent breakdown separates out these higher productivity (white collar) occupations from lower productivity (blue collar) ones or into finer categories.

Similarly, studies on the influence of FDI have relied on distinctions between headquarter and production functions (Markusen 2004). Function has also been equated with "task" or stage of production (Autor 2013) and linked to productivity by separating routine and non-routine tasks, and those vulnerable (or suited) to automation or offshoring. Gervais et al. (2021) are themselves critical of this diversity of measures of function but adopt an only slightly narrower definition of sector ("function intensity") such as legal and engineering services.

Even in this short review, it is clear that the concept of function can be quite useful for getting at this idea of within-sector variations it is also evident that it lacks a clear definition and has been measured using vastly different proxies. In this short project, we do not seek to resolve this terminological confusion. However, we do want to explore productivity patterns within sectors and across places in more detail.

1.4 This report

This project was partly inspired by the following observation:

> *"It is not the case that all industries in the same place have equally high or low productivity and, even where there is some consistency, we may be observing the impact of wage levels and prices rather than output. It is also not the case that any given industry, even quite narrowly defined, is exactly the same in all places, so making comparisons in productivity between places is fraught with difficulty. Simplistic assertions, based on cursory appraisals of aggregate statistics, are unlikely to offer a useful guide to the way forward" (Beatty and Fothergill 2020, 19).*

This suggests to us that an exploration of spatial differences at the finest grain possible will help better understand these various effects. By examining within-sector disparities at a very fine scales – 5-digit SICs, which would allow a level of detail over 20 times that currently available from official productivity statistics – we can investigate the degree to which sectoral productivity outcomes in Local Enterprise Partnership (LEP's) areas are influenced by the mix of activities versus other place-based effects.

To do this, we compare a sector's *unadjusted productivity* (GVA per worker) relative to its *specialisation-neutral productivity* (assuming a LEP's sub-sectoral structure mirrors the national average) and *performance-neutral productivity* (assuming unadjusted sub-sectoral structure but a LEP's sub-sectoral productivity mirrors the national average) to decompose a LEP areas sectoral productivity performance into *specialisation* and *local capacity effects*.

Specialisation effects are those that stem from the different mix of employment in sub-sectors between different places. What we term local capacity effects are the differences that our decomposition failed to explain. While these are likely to be attributable to local characteristics – such as amenities, skills profiles, etc. – there may be other explanations due to the structure of the data. We discuss the caveats that accompany our interpretation of these results in more detail in the analysis.

This analysis of sectors showed that almost all sectors had mixes of higher and lower productivity activities at the sub-sector scale, which suggested that the spatial distribution of sub-sectors could hold important clues to inter-regional disparities. However, sectors varied substantially in terms of which effects dominated explanations for deviations of LEP area

performance from national averages. Local capacity effects dominated in a little over half of the sectors but in most cases a mix of effects were present.

Looking at this data in aggregate across LEPs, the analysis shows that, as with the sectoral analysis, in most places both effects influence productivity outcomes. However, overall, local capacity effects tend to have the greatest influence. While this holds generally, we found that the most productive places tended to benefit more from positive specialisation effects than local capacity effects.

This analysis adds significantly to our understanding of what is driving spatial disparities in productivity. However, more insights are possible. With this data, we can investigate which sub-sectors are driving productivity performance most significantly within each LEP area and which are underperforming relative to expectations. This could indicate which place-based interventions to boost local capacity might be most effective and highlight specific sub-sectors that might be drags on productivity.

1.5 Report structure

The report starts with an overview of the methodological approach and data used. It then proceeds to summarise the key observations and findings from the application of the methodology (with the accompanying detail provided in the appendix). A summary conclusion and the related appendices and references can also be found at the end of the report.

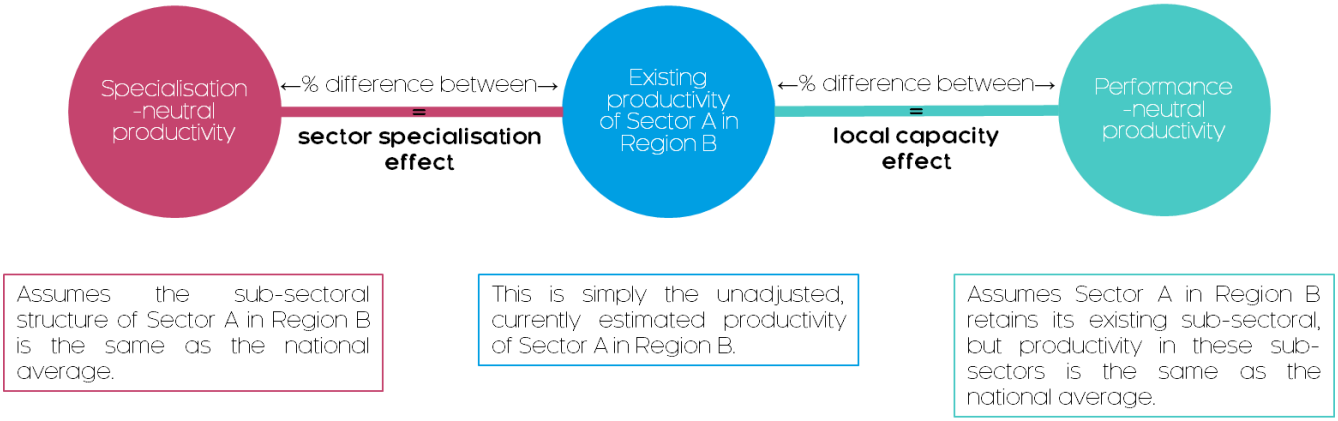
2. Methodology and data

2.1 Methodology

We have applied a concise but robust methodology to investigate the role of sub-sectoral specialisation in inter-regional sectoral productivity disparities, illustratively summarised in Figure 2.1.

The methodology is built around the interaction of a series of sectoral productivity scenarios that can be estimated for individual regions (in this case, using the firm-level sub-sectoral dataset described in *2.2 Data collection, sources and definitions*).

Figure 2.1: Illustrative methodology summary



Source: Cambridge Econometrics.

For each broad sector, the following scenarios have been estimated (it should be noted that any further discussion of productivity within this report refers to labour productivity; specifically, that of GVA per worker):

- *Existing productivity:* this is simply the unadjusted, currently estimated productivity of a sector in a region, and acts as a baseline for the other scenarios.
- *Specialisation-neutral productivity:* this scenario assumes the sub-sectoral structure of a sector in a region is the same as the national average. As a result, relative sub-sector specialisations are constant across regions. Productivity in these sub-sectors stays the same as the baseline scenario.
- *Performance-neutral productivity:* this scenario assumes a region retains its existing sub-sectoral structure and sub-sectoral specialisations (i.e. the same as in the baseline scenario), but productivity in these sub-sectors is the same as the national average.

From these scenarios, a regions sectoral productivity performance can be broadly decomposed into the following:

- **A sector specialisation effect:** this captures the role and effect of local sub-sectoral structure and specialisation in determining a regions sectoral productivity performance.

  It is simply calculated as the difference between a sectors specialisation-neutral productivity and its existing productivity.
- **A local capacity effect:** this captures the role of intrinsic productivity effects (regardless of sectoral structure and specialisation) in determining a regions sectoral

productivity performance. This could for instance reflect local characteristics such as human capital, innovation, capital investment, geography etc.

It is simply calculated as the difference between a sectors performance-neutral productivity and its existing productivity.

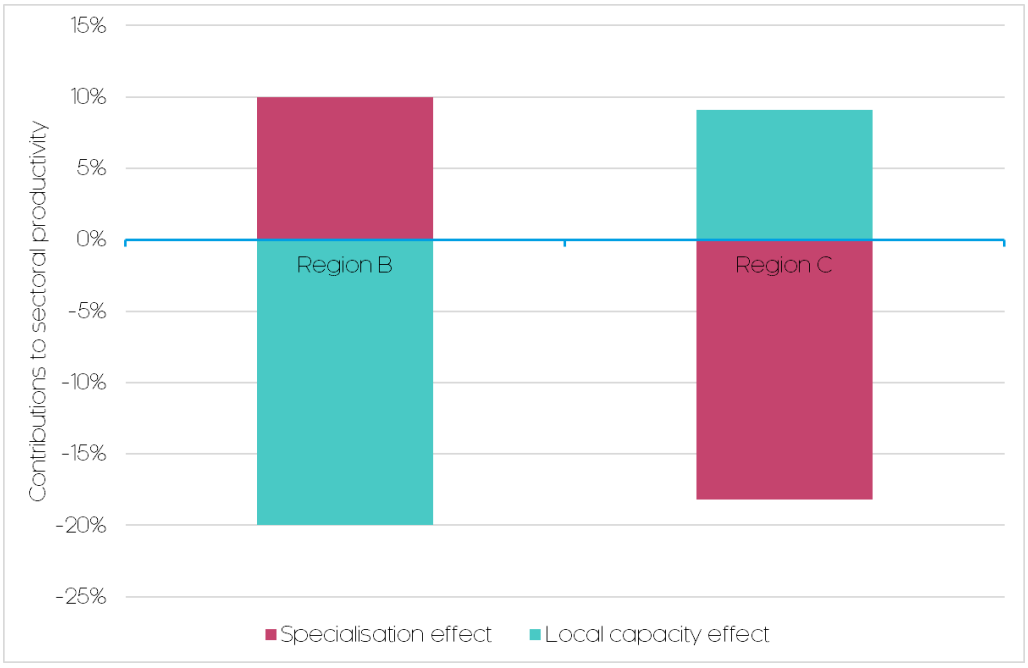
For regions that have productivity above the national average, we would expect to see significant and positive specialisation and/or local capacity effect(s). Likewise, places that have productivity below the national average, we would expect to display significant and negative specialisation and/or local capacity effect(s). The sign and magnitude of the effects is important; if a place has a positive specialisation effect but a larger negative local capacity effect, their productivity will typically be below the national average. For places with productivity very close to the national average, the effects tend to be either very small and insignificant, or significant but broadly equal (i.e., they counterbalance each other).

Significantly, we can easily and consistently calculate and study these effects across a diverse range of geographies and alternative sectoral groupings. As such, this methodology is relatively flexible and can be used to explore these questions at different scales. For the purpose of this study, we have calculated these effects for the 38 Local Enterprise Partnership (LEP) regions in England using 5-digit SICs to get at the most granular sub-sectors currently available.

For our analysis, we have grouped these into the 32 broad SIC-based sectors currently defined by the ONS for official productivity statistics. We use these groupings to organise the analysis and to provide a baseline description of the broader sector. This standard is helpful for comparative purposes, but it is also notable that if the sectors were defined in different ways (i.e., with sub-sectoral activities arranged in different groupings) we would also see variations in the relative importance of specialisation and local capacity effects across places.

Methodology example

Figure 2.2: Methodology example - composition of regional productivity disparities



Source: Cambridge Econometrics.

To provide an example of the types of data that we can generate from this analysis; assume

Sector A in Region B has an existing productivity of £50,000 (GVA per job), a specialisation-neutral productivity of £45,000, and performance-neutral productivity of £60,000.AaA

To provide an example of the types of data that we can generate from this analysis; assume *Sector A* in *Region B* has an existing productivity of £50,000 (GVA per job), a specialisation-neutral productivity of £45,000, and performance-neutral productivity of £60,000.

For *Region C*, *Sector A* has an existing productivity of £55,000 (GVA per job), a specialisation-neutral productivity of £65,000, and performance-neutral productivity of £50,000.

By calculating the difference between these values, the individual effects can be estimated, as shown in Figure 2.2.

Large and negative local capacity effects are the greatest determinant of *Sector A's* productivity in *Region B*. This indicates *Region B's* productivity performance is being held back by poor productivity within the sector, and not an unfavourable sectoral structure.

Given a large, negative specialisation effect, and only a small positive local capacity effect, sectoral specialisation is the greatest determinant of *Sector A's* productivity in *Region C*.

This indicates *Region C's* productivity performance is being held back by poor specialisation (e.g., perhaps an over-specialisation in low productivity sub-sectors), despite the sector being generally competitive and productive relative to the national average.

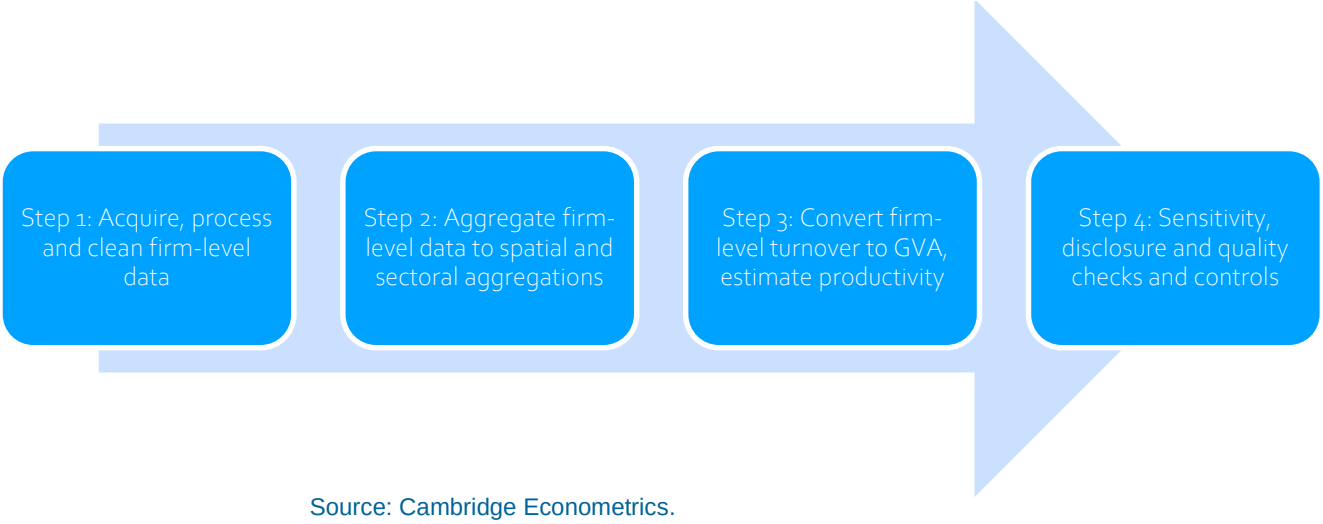
Naturally, these conclusions have important implications for productivity-related policy and investment within *Sector A*:

For *Region B*, the priority is productivity-boosting interventions such as supporting more/better-targeted investment, developing human capital, improving infrastructure and connectivity, any other sector-specific needs etc.

For *Region C*, the sector already appears to be benefitting from a competitive advantage. Instead, the focus should be developing improved sector specialisation by moving current activities up the value chain, for example, or attracting related higher productivity activities.

2.2 Data collection, sources and definitions

Figure 2.3: Approach to data collection and processing



Source: Cambridge Econometrics.

Figure 6.2 summarises the approach taken to prepare the novel, firm-level dataset utilised for this study. The respective steps and actions taken are explained in more detail below.

Step 1: Acquire, process and clean firm-level data

Firm-level data, extracted from the *Inter-Departmental Business Register (IDBR)*, provides the foundation for the research and analysis presented in this study. Maintained by the Office for National Statistics (ONS), the IDBR is a comprehensive list of UK businesses used by government for statistical purposes.

The IDBR covers around 2.7 million businesses in any sector of the economy, and provides key information relating to a business's size, performance (in terms of both employment and turnover), location and ownership. Critically for the purposes of this study, it provides information to a detailed sectoral level.

An extract from the IDBR was provided to CE in March 2021, covering firm-level data up to December 2020, for businesses in England only. Given the size and complexity of the data, extensive processing, cleaning and sorting was required.

The steps taken, and the implications for the final dataset used in the study, is explored in more detail in *Appendix A: data collection and processing*.

Step 2: Aggregate firm-level data to spatial and sectoral aggregations

Having undertaken the necessary processing, cleaning and sorting of the raw IDBR data, the next step was to aggregate the processed firm-level data to the required spatial and sectoral aggregations for this study, which would result in a cross-region, cross-sector dataset containing the key variables presented in the IDBR.

For the purpose of this study, the chosen spatial definition is the 38 Local Enterprise Partnership regions in England, which are broadly analogous to functional economic areas. Though more detailed geographies are available (e.g. Unitary and Local Authority areas), these often map poorly to functional economic areas, and decrease data quality whilst increasing disclosure risks.

For sectoral aggregations, given the aim of the study is to explore the role of sub-sectoral specialisation in inter-region productivity difference, data has been sorted according to 5-digit Standard Industrial Classification (SIC), the most detailed sector classification available – there are 728 5-digit SIC sectors (or 'sub-sectors').

Additional detail on the approach and sources for the spatial and sectoral aggregations is provided in *Appendix A: data collection and processing*.

Step 3: Convert firm-level turnover to GVA, estimate productivity

Taking this aggregated cross-region, cross-sector dataset, an additional adjustment has been made to convert aggregated turnover to Gross Value Added (GVA). This ensures better alignment and comparability with other regional productivity statistics and analysis, whilst avoiding the distortion commonplace in turnover-based analysis (particularly in high sales, low-value added activities).

To convert the firm-level turnover data to GVA, sectoral converters have been derived from the UK National Accounts *Input–output supply and use tables*. The converters are simply calculated as the ratio between a sectors total output at basic prices (effectively gross turnover) and GVA at basic prices. A full list of the sectoral converters is provided in *Appendix A: data collection and processing*.

Dividing these GVA estimates by accompanying employment resulted in sub-regional estimates of productivity ('GVA per worker') for more than 700 sub-sectors – a level of detail over 20 times that currently available. Resultantly, it should be emphasised the definition of productivity used within this report refers to labour productivity; specifically, that of GVA per worker.

Step 4: Sensitivity, disclosure and quality checks and controls

To ensure the dataset was of sufficient quality and to avoid any disclosure issues (given the firm-level nature of the data), extensive sensitivity and quality control checks were undertaken.

This process, and the implications for the final dataset used in the study, is explored in more detail in *Appendix A: data collection and processing*.

3. Summary of findings

3.1 Overview

In this report, we focus on understanding the role of specialisation and local capacity effects by exploring the productivity performance of 723 sub-sectors, and how this contributes to LEP area productivity disparities across 32 broad sectors. The choice of these 32 broad sectors, for which each of the 723 sub-sectors correspond to, aligns with the current level of sectoral productivity detail provided by official statistics.

For each of these 32 broad sectors we present three tiers of analysis: (1) An overview of specialisation and local capacity effects; (2) A breakdown and analysis of the sector by sub-sector (5-digit SIC); and (3) An analysis of the relative influence of specialisation and local capacity effects within the sector across the 38 LEP areas.

These more detailed analyses for each of the individual 32 sectors can be found in *Appendix B: Sector decomposition summaries*. Instead of presenting this detail analysis, this section summarises the key observations and explores the broader patterns and interpretations based on this data.

We then conclude by comparing the relative importance of these effects by LEP area and draw out some reflections on what these findings mean for productivity policy with particular reference to the levelling up debate.

3.2 Sectoral patterns

The primary purpose of this research was to explore the degree to which sector mix effects provide insights into the reasons for spatial disparities in productivity performance. The preceding analysis provides details about the relative productivity of each sub-sector in this dataset and spatial patterns in each of the 32 broad sectoral divisions. Taken together, we can draw some interesting conclusions about which sectors tend to be more subject to specialisation versus local capacity effects.

In Table 3.1, we present the average of the absolute ratio of specialisation versus local capacity effects across the 38 LEP areas for each of the 32 broad sectors. Higher numbers (highlighted in pink) indicate greater specialisation effects while lower numbers (in turquoise) suggest greater place based local capacity effects.

Table 3.1: Relative importance of specialisation vs. local capacity effects in explaining deviations in productivity performance from the national average in LEP areas, by sector

Sector	Sub-sectoral productivity deviation (rank, of 32 sectors)	Spatial productivity deviation (rank, of 32 sectors)	LEP areas where specialisati-on effects predominate	LEP areas where productivity effects predominate	Specialisati-on-local capacity ratio
Agriculture, mining, electricity, gas, water and waste	3	4	24	14	1.93
Manufacture of food, beverages, textiles and clothing	12	21	19	19	0.98
Manufacture of wood, petroleum, chemicals and minerals	5	5	23	15	1.42

Manufacture of metals, electrical products and machinery	16	23	27	11	1.43
Other manufacturing, repair and installation	26	27	16	22	0.78
Construction of buildings	31	28	1	37	0.10
Civil engineering	32	12	6	32	0.34
Specialised construction activities	29	25	3	35	0.09
Motor trades	7	6	5	33	0.18
Wholesale trade	1	1	5	33	0.15
Retail trade	17	30	3	35	0.24
Land, water and air transport	6	15	16	22	0.78
Warehousing, transport support, postal and courier activities	19	22	16	22	0.81
Accommodation and food service activities	27	29	5	33	0.34
Information and communication	13	20	2	36	0.20
Financial and insurance activities	2	2	9	29	0.41
Real estate activities, excluding imputed rental	22	17	0	38	0.12
Legal and accounting activities	24	14	1	37	0.15
Head offices and management consultancy	20	11	1	37	0.08
Architectural and engineering activities	23	18	4	34	0.17
Other professional, scientific and technical activities	8	8	5	33	0.32
Rental and leasing activities	9	3	5	33	0.32
Employment activities; tourism and security services	10	16	6	32	0.20
Services to buildings and landscape activities	11	19	21	17	1.26
Office administration and business support activities	25	9	3	35	0.23
Public administration and defence	21	10	10	28	0.33
Education	18	24	15	23	0.59
Human health and residential care activities	28	32	12	26	0.52
Social work activities	30	31	2	36	0.26
Arts, entertainment and recreation	4	7	18	20	1.17
Membership organisations; repair of household goods	14	13	6	32	0.36
Other personal service activities	15	26	12	26	0.44

Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share. Ratio calculated as the absolute difference between average specialisation effect and average local capacity effect across 38 LEP areas. Sector definitions as defined by ONS in Regional Accounts.

The sectors where sectoral mix has the greatest effect on spatial productivity include agriculture (where the effect is strongest), all manufacturing sectors, transport and logistics sectors, arts and entertainment, and, to a lesser degree, service-based sectors such as health, education, and other personal service activities. These tend to be sectors with relatively high

specialisation deviations – most are in the top half of the rankings table. Given the high amount of productivity variance between sub-sectors within the sector grouping it is not unexpected that relative mixes of these activities appear to have more of an effect on productivity outcomes.

For sectors such as accommodation and food services, public administration, membership organisations, rental and leasing activities, civil engineering, other professional activities, and financial and insurance activities, neither of the effects is particularly dominant. These tend to be areas with less productivity variance within the sector, with the notable exception of financial and insurance activities. The weakness of both effects in this sector is a bit of a puzzle, as this is one area where we expected the greater variance that we observed but also anticipated greater specialisation effects.

This is due to two factors. First, the sector as a whole exhibits a high variance between places with high productivity across sub-sectors and lower productivity, but this is driven predominantly by sub-sectors with lower employment. Banks, which represent 27% total employment tend to have higher productivity overall and have low variance. Banks represent the plurality (or nearly) of employment in almost all LEP areas, and so the sub-sector with the least variance – and therefore, potential for specialisation effects – dominates the sector. Secondly, the sub-sectors with the most variance represent a tiny percentage of total employment in a few places. There are also some activities that are overwhelmingly concentrated in a few places (notably London, Oxford, and other financial centres). However, since most of the high employment sub-sectors are relatively high productivity the precise mix that each LEP area has in this sector is less important to its productivity overall than the relative concentration of activity there.

Finally, local capacity effects dominate in thirteen sectors – most significantly in head offices and consultancy, construction sectors, real estate, retail and wholesale trades, and employment activities; tourism and security services, and real estate activities. For the most part, these are sectors with lower productivity variance (with the very notable exception of wholesale trades, which we suspect might be being overestimated in some way). These tend to be activities that are not as spatially concentrated generally and that are necessary and not terribly different from one place to another, either in offer or productivity profile, such as construction and restaurants.

However, there are some interesting entries into this category where we might have expected to see more influence of sectoral mix effects. Sectors such as ICT and legal and accounting both contain a wide variety of activities. In ICT, like the other sectors in this category, there are some sub-sectoral activities that are more ubiquitously distributed with relatively high productivity and low variance (e.g., computer consultancy services), and others that are highly concentrated but represent lower proportions of employment even as they have higher variance (e.g., new agency activities and television programming and broadcasting). The former examples tend to have the highest percentage of employment, both at the national scale and within each LEP area. Consequently, while the mix of these potentially higher productivity sub-sectors do contribute to specialisation effects, the weighted effect is relatively small.

These findings highlight an interesting artifact of the data and how we have processed it. First, we have interpreted and aggregated these at the sectoral level, which means that the categories and patterns are only evaluated internally. As such, *what is included under each sectoral umbrella matters*. One could classify and group sub-sectors into different categories,

which may significantly influence the ratio of specialisation to local capacity effects for that group.

Secondly, the sectoral groups vary dramatically in the degree of granularity of their constituent sub-sectors. Manufacturing, for instance, is divided across four separate sectoral groups and a total of 259 sub-sectors (36% of all sub-sectors – despite the sector accounting for only 8% of employment). Other significant sectors of the economy, such as accommodation and food services or ICT have fewer than 30 sub-sectors total.

While in some cases, these might be sufficient to capture the diversity of activities (and productivity profiles) of the sector, in others the lack of granularity at the sub-sectoral scale might be skewing results. For instance, the head offices and management consultancy sector has only four sub-sectors at the 5-digit level, where management consultancy is one monolithic category representing 73% of sectoral employment, and likely covers a diverse range of activities and disciplines.

It is not difficult to imagine that a more detailed division of the industry might reveal that it contains a stratification of functions with different spatial characteristics and productivity profiles. In aggregate, these differences in sectoral granularity may not have significant impacts on the overall patterns. However, the fact that we found a strong correlation between number of sub-sectors within a given sector and strength of sectoral mix effects suggests that we should interpret these findings with caution.

For each of the individual 32 sectors studied in this report, full and detailed decomposition analysis is provided in *Appendix B: Sector decomposition summaries*, and can be directly accessed using the below hyperlinks:

1. Agriculture, mining, electricity, gas, water and waste
2. Manufacture of food, beverages, textiles and clothing
3. Manufacture of wood, petroleum, chemicals and minerals
4. Manufacture of metals, electrical products and machinery
5. Other manufacturing, repair and installation
6. Construction of buildings
7. Civil engineering
8. Specialised construction activities
9. Motor trades
10. Wholesale trade
11. Retail trade
12. Land, water and air transport
13. Warehousing, transport support, postal and courier activities
14. Accommodation and food service activities
15. Information and communication
16. Financial and insurance activities
17. Real estate activities

18. Legal and accounting activities
19. Head offices and management consultancy
20. Architectural and engineering activities
21. Other professional, scientific and technical activities
22. Rental and leasing activities
23. Employment activities; tourism and security services
24. Services to buildings and landscape activities
25. Office administration and business support activities
26. Public administration and defence
27. Education
28. Human health and residential care activities
29. Social work activities
30. Arts, entertainment and recreation
31. Membership organisations; repair of household goods
32. Other personal service activities

3.3 Spatial patterns

While the sectoral mix was our primary focus in this project, with the data that we have we can also make some preliminary observations about how patterns play out across places. Table 3.2 computes a similar ratio of average specialisation versus local capacity effects by place rather than sector.

This table permits some interesting observations. First, as with the sectoral comparison, local capacity effects appear to be slightly more significant but only by a small margin. Secondly, this table is structured in descending order by area productivity and shows that the top third tend to exhibit stronger specialisation than local capacity effects. By contrast, the middle productivity places tend to show stronger local capacity effects, while the bottom third exhibit a relatively weak mix of both effects.

Table 3.2: Relative importance of specialisation vs. local capacity effects in explaining overall deviations in productivity performance from the national average in LEP areas (sorted by most to least productive LEP area)

LEP area	Productivity (relative to England average)	Specialisation-local capacity ratio
London	207%	1.04
Thames Valley Berkshire	123%	0.63
Enterprise M3	107%	0.88
Hertfordshire	99%	0.84
South East Midlands	98%	5.71
Coventry and Warwickshire	90%	1.13

Cheshire and Warrington	88%	0.64
Buckinghamshire Thames Valley	83%	0.46
Solent	81%	0.38
Dorset	81%	0.86
Tees Valley	80%	1.45
Coast to Capital	80%	0.37
Swindon and Wiltshire	79%	0.09
West of England	74%	0.06
Greater Birmingham and Solihull	73%	0.09
Sheffield City Region	72%	0.38
Greater Manchester	70%	0.04
Humber	68%	0.21
Greater Cambridge and Greater Peterborough	68%	0.25
New Anglia	68%	0.06
Leeds City Region	67%	0.15
Oxfordshire	66%	0.67
Leicester and Leicestershire	66%	0.13
Stoke-on-Trent and Staffordshire	66%	0.03
South East	66%	0.21
Gloucestershire	65%	0.54
Liverpool City Region	64%	0.47
Derby, Derbyshire, Nottingham and Nottinghamshire	63%	0.28
York, North Yorkshire and East Riding	62%	0.23
Worcestershire	61%	0.55
Black Country	59%	0.63
The Marches	58%	0.26
Lancashire	58%	0.30
North East	58%	0.38
Greater Lincolnshire	56%	0.23
Cumbria	54%	1.10
Heart of the South West	50%	0.35
Cornwall and Isles of Scilly	43%	0.54

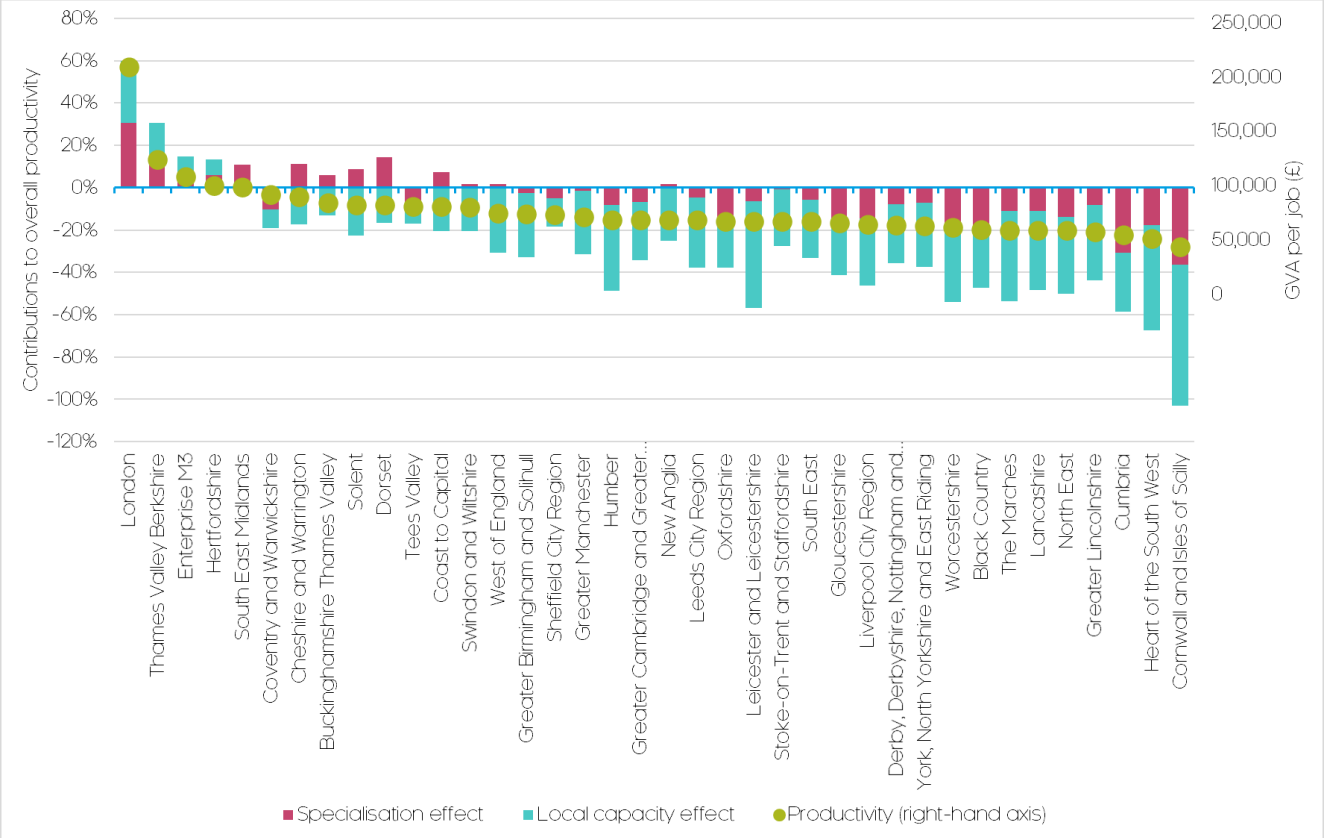
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: ratio calculated as the absolute difference between average specialisation effect and average place-based effects across 38 LEP areas. LEP area definitions exclude overlap.

This suggests that sectoral mix effects have stronger positive effects in places with higher productivity overall, whereas elsewhere local capacity effects tend to predominate. At the bottom of the table, results suggest that in these places either effect could be the most important explanation for negative deviations from the national average.

Interestingly, Figure 3.1 demonstrates that for these lower productivity places *both* effects can be relatively strong and negative even if one dominates slightly. In fact, these effects

combined tend to be stronger explanations for negative performance than for positive performance in the most productive places.

Figure 3.1: Composition of overall LEP area productivity disparities, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

Taken together, these findings show that the greatest policy effect may come from interventions to improve place-based assets such as skills, research, networks, and infrastructure. While there is still some question about how the data issues discussed previously affect results at the LEP area scale this data tells an interesting story and reinforces some of the key themes in the levelling up agenda.

4. Conclusions

In our attempt to better understand the role of sub-sectoral specialisation in inter-regional sectoral productivity disparities, the analysis presented in this report has identified the following:

- **Different contexts require different interventions**: A handful of sectors – agriculture, manufacture of food (etc), manufacture of wood (etc), manufacture of metals (etc), services to buildings, and arts and entertainment – clearly display high specialisation-local capacity effect ratios. This is a positive and definitive result that suggests that different policy interventions are required in these sectors.
- **Findings suggest a new dependent variable**: Future researchers should, when attempting to understand the quantitative relationship between some factor X and local sectoral productivity performance, make the dependent variable the local capacity effect as explored here, not local sectoral productivity.
- **Research is only as good as the data available**: We found that the more sub-sectors there were the more likely we were to find specialisation effects, but the number of sub-sectors varies widely (for instance, manufacturing, despite accounting for only 8% of employment accounts for 36% of sub-sector classifications). We recommend that all sectors be structured for more granular data to better understand these effects.

The puzzle of deep and widening spatial disparities in the UK threatens to slow growth, recovery, and resilience. Boosting productivity and securing more equitable outcomes across regions is at the heart of the levelling up agenda – an initiative that while loosely defined reflects a recognition that 'place matters' (Garling 2021, Tomaney and Pike 2020, 2021).

This project aimed to provide more detail to help diagnose the source of spatial disparities. It explores the relative power of two competing explanations for productivity differences – sectoral specialisation and local capacity.

Our analysis of sectors showed that almost all had mixes of higher and lower productivity activities at the sub-sector scale, which suggested that the spatial distribution of sub-sectors could hold important clues to inter-regional disparities. We found that sectors varied substantially in terms of which effects dominated explanations for deviations of LEP area performance from national averages with slightly more sectors experiencing local capacity effects than specialisation effects. We argue that the discovery that there are a handful sectors that with a high specialisation/local capacity ratio is a positive, definitive result, and these sectors require different policy interventions as a result.

Exploring this data at spatially, the findings from our decomposition analysis show that, in most places, both effects can influence productivity outcomes. However, overall, local capacity effects tend to have the greatest influence. While this holds generally, we found that the most productive places tended to benefit more from positive specialisation effects than local capacity effects. We suggest that future researchers attempting to understand the quantitative relationship between some factor X and local sectoral productivity performance, should set the local capacity effect as the dependent variable and not local sectoral productivity.

This analysis fills in some of the gaps in our knowledge of the sources and implications of spatial productivity differences but there is much more to learn. With this data, we can explore these same questions in more detail from a place-based perspective to better understand

which sub-sectors are driving productivity performance most significantly within each LEP area and which are underperforming relative to expectations.

This could help better target the place-based interventions to boost local capacity and highlight specific areas where sectoral mix appears to be hindering productivity. Subsequent research could also explore these effects at different geographies to get a better sense of how these results vary with spatial configurations (e.g., in denser urban areas and different urban geographies). We also strongly support a review of sector and sub-sector classifications and the development of more granular data collection capacity to add more detail to this type of analysis.

5. Appendix A: data collection and processing

This appendix provides additional detail on the steps taken and issues encountered during the preparation of the novel firm-level dataset used for this study.

5.1 Data collection and processing

Two extracts from the IDBR (dated Q4 2020) were provided for the study; one covering **business enterprises** and one covering **business local units** (definitions below). For the purpose of this study, to ensure completeness and alignment with official statistics, the two extracts were combined, with enterprises matched to their accompanying local units.

- **Enterprises** can be thought of as the overall business, made up of all the individual sites or workplaces. It is defined as the smallest combination of legal units (generally based on VAT and/or PAYE records) that has a certain degree of autonomy within an enterprise group.
- **Local units** are an individual site (for example a factory or shop) associated with an enterprise. It can also be referred to as workplace.

A number of issues were encountered during the matching and combination of the enterprise and local unit ('firm-level') data:

- Some 5,000 (1% of total) enterprises matched with local units had higher employment than the sum of the relative local units combined. To address this, an additional, enterprise-based local unit was created to attribute the residual employment (i.e. the difference between enterprise employment and sum of local units employment).
- Additionally, some 5,000 (1% of total) enterprises matched with local units had a higher number of registered local units than actually present in the local unit extract. This indicates some local units are missing from the data, given also the discrepancies in employment outlined above.
- In the case of some 6,000 enterprises it was not possible to identify the head office among local units due to multiple instances of the same registered address. However, this does not affect the results, given the firm-level data is aggregated.

Additionally, due to the fact output/turnover data is only available for enterprises, further adjustments were made to the data to interpolate local unit turnover. This was achieved by multiplying local unit employment (which is consistently available across all local units) by the productivity (turnover/employment) of their corresponding enterprise.

Performing these adjustments resulted in a combined enterprise and local unit dataset - with accompanying firm performance data i.e. employment and turnover - for more than 98% of the original extraction.

5.2 Spatial and sectoral aggregations

The following steps were taken to aggregate the processed firm-level data into a cross-region, cross-sector dataset.

For spatial aggregations:

- Utilizing ONS' *National Statistics Postcode Lookup*, the firm-level data was aggregated first to their accompanying Unitary Authority/Local Authority District (UALAD, April 2020 boundaries).
- This UALAD data has then be aggregated to accompanying Local Enterprise Partnership (LEP) region (note that the definition of LEP areas used for this study excludes overlapping boundaries. There are 38 LEP areas covering the entirety of England UALADs).
- In the case of some 8,000 enterprises and local units, no recognised postcode was provided. Therefore, these firms could not be matched to a UALAD/LEP area and have been excluded from the analysis.

For sectoral aggregations:

- The aim of the study is to explore the role of sub-sectoral specialisation in inter-region productivity differences. Therefore, firm-level data was sorted according to *5-digit Standard Industrial Classification* (SIC), the most detailed sector classification available. There are 728 5-digit SIC sectors (or 'sub-sectors') that a firm can be registered under.
- In the case of some 230,000 enterprises and local units, no recognised 5-digit SIC was provided. This was primarily the result of local units that could not be matched to enterprises. Therefore, these firms have been excluded from the analysis.
- The firm-level dataset showed no registered businesses or employment/turnover for 8 5-digit SIC sub-sectors. Therefore, these sub-sectors have been excluded from the analysis.

5.3 Turnover-GVA converters

Sectoral turnover-GVA converters were produced by estimating the ratio between a sectors total output at basic prices (effectively gross turnover) and GVA at basic prices. These converters were derived from ONS' October 2020 *Input–output supply and use tables* (consistent with UK National Accounts 2020 Blue Book, which includes data up to 2018).

The converters, presented in Table 5.1, were estimated for the 105 SIC-based sectors available in the Input–output supply and use tables (which is published at the UK-wide level only, with no sub-regional disaggregation's). These converters were then applied to their constituent 5-digit SIC sub-sector, across the 38 LEP areas, resulting in sectorally detailed, sub-regional estimates of GVA, from which productivity (GVA per job) could be calculated.

Table 5.1: Output-GVA converters, 2018

Sectors	Total output at basic prices (£m), 2018	Gross valued added at basic prices (£m), 2018	Total output-GVA converter
A01: Crop And Animal Production, Hunting And Related Service Activities	29214	11121	0.38
A02: Forestry And Logging	1550	541	0.35
A03: Fishing And Aquaculture	2006	523	0.26
B05: Mining Of Coal And Lignite	396	190	0.48

B06 & B07: Extraction Of Crude Petroleum And Natural Gas & Mining Of Metal Ores	29207	18083	0.62
B08: Other Mining And Quarrying	6107	1918	0.31
B09: Mining Support Service Activities	4956	1235	0.25
C101: Processing and preserving of meat and production of meat products	18721	4681	0.25
C102_3: Processing and preserving of fish, crustaceans, molluscs, fruit and vegetables	9586	2675	0.28
C104: Manufacture of vegetable and animal oils and fats	739	93	0.13
C105: Manufacture of dairy products	9706	2486	0.26
C106: Manufacture of grain mill products, starches and starch products	6419	1426	0.22
C107: Manufacture of bakery and farinaceous products	10004	4001	0.40
C108: Manufacture of other food products	19575	6957	0.36
C109: Manufacture of prepared animal feeds	6483	1005	0.16
C1101T1106 & C12: Manufacture of alcoholic beverages & Tobacco Products	12367	4762	0.39
C1107: Manufacture of soft drinks; production of mineral waters and other bottled waters	5285	1983	0.38
C13: Manufacture Of Textiles	7143	3835	0.54
C14: Manufacture Of Wearing Apparel	4381	2620	0.60
C15: Manufacture Of Leather And Related Products	1014	445	0.44
C16: Manufacture Of Wood & Products Of Wood & Cork, Except Furniture; Manuf. Of Articles Of Straw	8292	2927	0.35
C17: Manufacture Of Paper And Paper Products	12366	4250	0.34
C18: Printing And Reproduction Of Recorded Media	12020	5327	0.44
C19: Manufacture Of Coke And Refined Petroleum Products	31539	2897	0.09
C203: Manufacture of paints, varnishes and similar coatings, printing ink and mastics	3066	1040	0.34
C204: Manufacture of soap & detergents, cleaning & polishing, perfumes & toilet preparations	7803	3817	0.49
C205: Manufacture of other chemical products	5363	1858	0.35
C20A: Manufacture of industrial gases, inorganics and fertilisers (inorganic chemicals) - 20.11/13/15	4035	739	0.18
C20B: Manufacture of petrochemicals - 20.14/16/17/60	13562	2937	0.22
C20C: Manufacture of dyestuffs, agro-chemicals - 20.12/20	2191	965	0.44
C21: Manufacture Of Basic Pharmaceutical Products And Pharmaceutical Preparations	26426	12877	0.49
C22: Manufacture Of Rubber And Plastic Products	23949	7920	0.33
C235_6: Manufacture of cement, lime, plaster and articles of concrete, cement and plaster	8106	3223	0.40

C23OTHER: Manufacture of glass, refractory, clay, porcelain, ceramic, stone products - 23.1-4/7-9	7086	2489	0.35
C241T243: Manufacture of basic iron and steel	8385	2255	0.27
C244_5: Manufacture of other basic metals and casting	6535	1771	0.27
C254: Manufacture of weapons and ammunition	3974	1162	0.29
C25OTHER: Manufacture of fabricated metal products, excluding weapons & ammunition - 25.1-3/5-9	30709	14786	0.48
C26: Manufacture Of Computer, Electronic And Optical Products	23129	13564	0.59
C27: Manufacture Of Electrical Equipment	13037	4801	0.37
C28: Manufacture Of Machinery And Equipment N.E.C.	38074	16089	0.42
C29: Manufacture Of Motor Vehicles, Trailers And Semi-Trailers	64152	17039	0.27
C301: Building of ships and boats	4237	1897	0.45
C303: Manufacture of air and spacecraft and related machinery	28231	9482	0.34
C30OTHER: Manufacture of other transport equipment - 30.2/4/9	2468	870	0.35
C31: Manufacture Of Furniture	9055	4439	0.49
C32: Other Manufacturing	10776	5420	0.50
C3315: Repair and maintenance of ships and boats	1094	682	0.62
C3316: Repair and maintenance of aircraft and spacecraft	5107	1885	0.37
C33OTHER: Rest of repair; Installation - 33.11-14/17/19/20	12256	5773	0.47
D351: Electric power generation, transmission and distribution	92397	20852	0.23
D352_3: Manufacture of gas; distribution of gaseous fuels through mains; steam and aircon supply	28587	6237	0.22
E36: Water Collection, Treatment And Supply	11512	8227	0.71
E37: Sewerage	10103	8054	0.80
E38: Waste Collection, Treatment And Disposal Activities; Materials Recovery	22743	7666	0.34
E39: Remediation Activities And Other Waste Management Services	674	379	0.56
F41, F42 & F43: Construction	315630	123199	0.39
G45: Wholesale And Retail Trade And Repair Of Motor Vehicles And Motorcycles	56466	32065	0.57
G46: Wholesale Trade, Except Of Motor Vehicles And Motorcycles	139553	69924	0.50
G47: Retail Trade, Except Of Motor Vehicles And Motorcycles	156937	97546	0.62
H491_2: Rail transport	13659	4862	0.36
H493T495: Land transport services and transport services via pipelines, excluding rail transport	49413	24172	0.49

H50: Water Transport	14731	6949	0.47
H51: Air Transport	26331	5584	0.21
H52: Warehousing And Support Activities For Transportation	50261	23607	0.47
H53: Postal And Courier Activities	20483	12089	0.59
I55: Accommodation	29377	16560	0.56
I56: Food And Beverage Service Activities	73441	39690	0.54
J58: Publishing Activities	22310	12192	0.55
J59 & J60: Motion Picture, Video & TV Programme Production, Sound Recording & Music Publishing Activities & Programming And Broadcasting Activities	44258	20147	0.46
J61: Telecommunications	53943	34287	0.64
J62: Computer Programming, Consultancy And Related Activities	85879	50499	0.59
J63: Information Service Activities	15061	8393	0.56
K64: Financial Service Activities, Except Insurance And Pension Funding	157907	72398	0.46
K65.1-2 & K65.3: Insurance, reinsurance and pension funding services, except compulsory social security	86916	32074	0.37
K66: Activities Auxiliary To Financial Services And Insurance Activities	39033	24795	0.64
L68BXL683: Buying and selling, renting and operating of own or leased real estate, excluding imputed rent	104244	69272	0.66
L68A: Owner-Occupiers' Housing	0	0	N/A
L683: Real estate activities on a fee or contract basis	11480	7306	0.64
M691: Legal activities	37011	28445	0.77
M692: Accounting, bookkeeping and auditing activities; tax consultancy	28577	23127	0.81
M70: Activities Of Head Offices; Management Consultancy Activities	47575	23337	0.49
M71: Architectural And Engineering Activities; Technical Testing And Analysis	55147	25500	0.46
M72: Scientific Research And Development	30193	13260	0.44
M73: Advertising And Market Research	29578	19365	0.65
M74: Other Professional, Scientific And Technical Activities	21668	9627	0.44
M75: Veterinary Activities	5435	4144	0.76
N77: Rental And Leasing Activities	33046	22288	0.67
N78: Employment Activities	43102	29232	0.68
N79: Travel Agency, Tour Operator And Other Reservation Service And Related Activities	25215	10325	0.41
N80: Security And Investigation Activities	5701	3380	0.59
N81: Services To Buildings And Landscape Activities	23341	11427	0.49

N82: Office Administrative, Office Support And Other Business Support Activities	46358	24066	0.52
O84: Public Administration And Defence; Compulsory Social Security	164041	93848	0.57
P85: Education	154634	108495	0.70
Q86: Human Health Activities	162670	98399	0.60
Q87 & Q88: Residential Care & Social Work Activities	75333	45379	0.60
R90: Creative, Arts And Entertainment Activities	13886	7685	0.55
R91: Libraries, Archives, Museums And Other Cultural Activities	4049	2360	0.58
R92: Gambling And Betting Activities	13699	8328	0.61
R93: Sports Activities And Amusement And Recreation Activities	21277	12338	0.58
S94: Activities Of Membership Organisations	14915	8687	0.58
S95: Repair Of Computers And Personal And Household Goods	4711	3068	0.65
S96: Other Personal Service Activities	28671	22240	0.78
T97: Activities Of Households As Employers Of Domestic Personnel	5798	5798	1.00

Source: ONS (Blue Book), Cambridge Econometrics.

5.4 Dataset disclosure and quality control

Given the nature of the firm-level data used in the preparation of the cross-region, cross-sector dataset, extensive disclosure and quality control checks were undertaken. Firstly, a control was added where for any sub-sector in a LEP area employing less than 10 workers, their productivity value instead took that of the national sector average.

This would help to avoid the identification of any individual sites or activities, and also overcome problematic quality issues where very high turnover (and thus GVA) was - most likely incorrectly – being attributed to very small enterprises and units. Such controls where often only needed in the production and manufacturing sub-sectors.

With such controls in place, the aggregated estimates of sub-regional and sectoral employment, output and productivity from the IDBR-derived dataset were then compared to official statistics and datasets (notably, the ONS produced BRES and the Regional Accounts).

It should be emphasised there will never be a perfect reconciliation between the datasets, due to contrasting sources, methods of collection, timeframes, definitions etc. However, this process was important to ensure the quality and reliability of the study dataset.

As seen in Table 5.2, at the sub-regional level, the IDBR-derived dataset shows good alignment with official employment statistics. Only London shows a notable - albeit minor, less than 1 p.p. – deviation from its official baseline, possibly reflecting misreporting of activity by both larger, international/multi-region corporations, and very small businesses, of which the city accounts for a dipropionate share.

Indeed, it should be emphasised that given the two main sources of input for the IDBR are Value Added Tax (VAT) and Pay As You Earn (PAYE) records from HMRC, very small businesses operating below these tax thresholds will, in most cases, not be included, or will

have incomplete records. This will particularly impact regions and sectors where such businesses are more prevalent.

Table 5.2: Comparison of IDBR and official economic data (LEP areas)

LEP area	IDBR employment share, 2019-20	BRES employment share, 2019	*Employment share diff. +/-*	IDBR GVA share, 2019-20	Regional Accounts GVA share, 2018	*GVA share diff. +/-*
Black Country	1.7%	1.7%	*0.0%*	1.0%	1.3%	*-0.3%*
Buckinghamshire Thames Valley	0.9%	0.9%	*0.0%*	0.8%	0.9%	*-0.1%*
Cheshire and Warrington	1.8%	1.9%	*-0.1%*	1.6%	2.0%	*-0.4%*
Coast to Capital	2.7%	2.7%	*0.0%*	2.1%	2.6%	*-0.5%*
Cornwall and Isles of Scilly	0.8%	0.9%	*0.0%*	0.4%	0.6%	*-0.3%*
Coventry and Warwickshire	1.8%	1.8%	*0.0%*	1.6%	1.8%	*-0.2%*
Cumbria	0.9%	0.9%	*0.0%*	0.5%	0.7%	*-0.2%*
Derby, Derbyshire, Nottingham…	3.6%	3.6%	*0.1%*	2.3%	3.0%	*-0.7%*
Dorset	1.3%	1.3%	*0.0%*	1.0%	1.1%	*-0.1%*
Enterprise M3	3.1%	3.1%	*0.0%*	3.3%	3.6%	*-0.2%*
Gloucestershire	1.1%	1.1%	*0.0%*	0.7%	1.0%	*-0.3%*
Greater Birmingham and Solihull	2.5%	2.5%	*0.0%*	1.8%	2.5%	*-0.6%*
Greater Cambridge and Greater…	1.8%	1.7%	*0.0%*	1.2%	1.6%	*-0.4%*
Greater Lincolnshire	1.1%	1.1%	*-0.1%*	0.6%	0.9%	*-0.3%*
Greater Manchester	5.0%	5.1%	*-0.1%*	3.5%	4.4%	*-0.9%*
Heart of the South West	2.8%	2.8%	*-0.1%*	1.4%	2.2%	*-0.8%*
Hertfordshire	2.6%	2.4%	*0.2%*	2.6%	2.5%	*0.1%*
Humber	1.4%	1.5%	*-0.1%*	1.0%	1.2%	*-0.3%*
Lancashire	2.4%	2.5%	*-0.1%*	1.4%	2.1%	*-0.7%*
Leeds City Region	4.1%	4.0%	*0.1%*	2.8%	3.4%	*-0.7%*
Leicester and Leicestershire	1.9%	1.9%	*0.0%*	1.3%	1.6%	*-0.4%*
Liverpool City Region	2.4%	2.5%	*-0.1%*	1.5%	2.1%	*-0.6%*
London	20.3%	19.8%	*0.5%*	42.0%	27.6%	*14.4%*
New Anglia	2.6%	2.7%	*-0.1%*	1.8%	2.3%	*-0.5%*
North East	3.0%	3.1%	*0.0%*	1.7%	2.5%	*-0.8%*
Oxfordshire	1.4%	1.4%	*0.0%*	0.9%	1.3%	*-0.3%*
Solent	1.6%	1.7%	*-0.1%*	1.3%	1.6%	*-0.3%*
South East	6.0%	6.2%	*-0.2%*	4.0%	5.5%	*-1.5%*
Stoke-on-Trent and Staffordshire	1.8%	1.8%	*0.0%*	1.2%	1.4%	*-0.3%*
Swindon and Wiltshire	1.2%	1.2%	*0.0%*	1.0%	1.3%	*-0.3%*
Tees Valley	1.0%	1.0%	*0.0%*	0.8%	0.8%	*0.0%*
Thames Valley Berkshire	2.0%	2.0%	*0.0%*	2.5%	2.7%	*-0.3%*
The Marches	1.1%	1.2%	*0.0%*	0.7%	0.9%	*-0.2%*
West of England	2.3%	2.3%	*0.0%*	1.7%	2.2%	*-0.4%*

Worcestershire	1.0%	1.0%	*0.0%*	0.6%	0.8%	*-0.2%*
York, North Yorkshire and East…	1.5%	1.5%	*0.0%*	0.9%	1.2%	*-0.3%*
Sheffield City Region	2.1%	2.1%	*-0.1%*	1.5%	1.7%	*-0.2%*
South East Midlands	3.2%	3.1%	*0.1%*	3.1%	3.1%	*0.0%*

Source: ONS (BRES, Regional Accounts, IDBR), Cambridge Econometrics.

On the GVA side, there are some more notable differences, again driven by an overemphasis on activity within London (this time, a much larger 14 p.p. deviation). This is partly attributable to the inflation of finance and insurance related output in the IDBR, industries which are highly concentrated in London. This causes a shortfall in GVA attributed to other LEP areas, though this is somewhat spatially consistent (only in the South East is this shortfall more than -1 p.p.).

Given these observations, Table 5.3 considers the relative productivity rankings of LEP areas between datasets. The two datasets show a broad agreement on the best and worst performing LEP areas in particular. There are however some deviations; Sheffield City Region and Humber are particular beneficiaries, in contrast to the South East, Lancashire and Swindon and Wiltshire. Only 3 LEP areas show a deviation of more than 10 places.

Table 5.3: Comparison of IDBR and official productivity rankings (LEP areas)

LEP area	IDBR productivity rank, 2019-20	ONS Regional Accounts/BRES productivity rank, 2018	*Ranking diff. +/-*
London	1	1	*0*
Thames Valley Berkshire	2	2	*0*
Enterprise M3	3	3	*0*
Hertfordshire	4	6	*2*
South East Midlands	5	10	*5*
Coventry and Warwickshire	6	8	*2*
Cheshire and Warrington	7	5	*-2*
Buckinghamshire Thames Valley	8	9	*1*
Solent	9	13	*4*
Dorset	10	18	*8*
Tees Valley	11	20	*9*
Coast to Capital	12	7	*-5*
Swindon and Wiltshire	13	4	*-9*
West of England	14	12	*-2*
Greater Birmingham and Solihull	15	11	*-4*
Sheffield City Region	16	35	*19*
Greater Manchester	17	21	*4*
Humber	18	30	*12*
Greater Cambridge and Greater…	19	14	*-5*
New Anglia	20	22	*2*
Leeds City Region	21	27	*6*
Oxfordshire	22	16	*-6*

Leicester and Leicestershire	23	19	*-4*
Stoke-on-Trent and Staffordshire	24	32	*8*
South East	25	15	*-10*
Gloucestershire	26	17	*-9*
Liverpool City Region	27	23	*-4*
Derby, Derbyshire, Nottingham…	28	28	*0*
York, North Yorkshire and East…	29	25	*-4*
Worcestershire	30	26	*-4*
Black Country	31	38	*7*
The Marches	32	33	*1*
Lancashire	33	24	*-9*
North East	34	29	*-5*
Greater Lincolnshire	35	31	*-4*
Cumbria	36	36	*0*
Heart of the South West	37	34	*-3*
Cornwall and Isles of Scilly	38	37	*-1*

Source: ONS (BRES, Regional Accounts, IDBR), Cambridge Econometrics.

Table 5.4 and Table 5.5 repeats this analysis but for sectors (the IDBR dataset has been scaled up to the 32 sectors produced in official statistics). The IDBR-derived dataset again shows good alignment with official employment statistics. Only retail and education show any significant deviation; in both cases, employment is overestimated by the IDBR. Besides these examples, no other sector deviates from their official baseline by more than 1%.

Table 5.4: Comparison of IDBR and official economic data (sectors)

Sector	IDBR employment share, 2019-20	BRES employment share, 2019	*Employment share diff. +/-*	IDBR GVA share, 2019-20	Regional Accounts GVA share, 2018	*GVA share diff. +/-*
Agriculture, mining, electricity, gas, water…	2.4%	2.4%	*0.0%*	2.2%	3.6%	*-1.3%*
Manufacture of food, beverages, textiles…	1.7%	1.6%	*0.0%*	1.1%	1.8%	*-0.6%*
Manufacture of wood, petroleum, chemicals…	2.0%	1.9%	*0.1%*	1.9%	3.1%	*-1.2%*
Manufacture of metals, electrical products…	3.4%	3.2%	*0.1%*	3.0%	4.9%	*-1.8%*
Other manufacturing, repair and installation	0.8%	1.0%	*-0.1%*	0.5%	0.8%	*-0.3%*
Construction of buildings	1.5%	1.6%	*-0.1%*	2.0%	2.2%	*-0.2%*
Civil engineering	0.7%	0.6%	*0.1%*	0.7%	1.3%	*-0.6%*
Specialised construction activities	2.6%	2.7%	*-0.2%*	1.4%	3.3%	*-1.9%*
Motor trades	1.9%	1.9%	*0.0%*	4.0%	2.1%	*2.0%*
Wholesale trade	3.9%	3.9%	*0.0%*	14.5%	4.2%	*10.4%*
Retail trade	10.5%	9.2%	*1.2%*	9.5%	5.7%	*3.8%*

Land, water and air transport	2.2%	2.3%	*-0.1%*	1.5%	2.4%	*-1.0%*
Warehousing, transport support, postal and…	2.4%	2.7%	*-0.3%*	1.7%	2.3%	*-0.5%*
Accommodation and food service activities	7.8%	7.5%	*0.3%*	2.0%	3.1%	*-1.0%*
Information and communication	4.5%	4.4%	*0.1%*	5.7%	8.4%	*-2.7%*
Financial and insurance activities	3.1%	3.5%	*-0.4%*	24.6%	8.1%	*16.5%*
Real estate activities	1.9%	2.0%	*-0.1%*	1.7%	4.7%	*-3.0%*
Legal and accounting activities	2.3%	2.5%	*-0.1%*	2.0%	3.1%	*-1.1%*
Head offices and management…	1.9%	2.8%	*-0.8%*	1.9%	1.6%	*0.2%*
Architectural and engineering activities	1.6%	1.9%	*-0.3%*	1.0%	1.5%	*-0.5%*
Other professional, scientific and…	2.0%	2.1%	*-0.1%*	1.9%	2.9%	*-1.0%*
Rental and leasing activities	0.6%	0.5%	*0.0%*	1.0%	1.3%	*-0.4%*
Employment activities; tourism and security…	4.2%	4.2%	*0.1%*	2.3%	2.7%	*-0.4%*
Services to buildings and landscape activities	2.4%	2.3%	*0.0%*	0.5%	0.7%	*-0.1%*
Office administration and business support…	2.0%	1.8%	*0.2%*	1.7%	1.5%	*0.2%*
Public administration and defence	3.6%	3.9%	*-0.3%*	0.8%	4.9%	*-4.1%*
Education	9.7%	8.4%	*1.3%*	2.0%	6.4%	*-4.4%*
Human health and residential care…	9.7%	9.6%	*0.1%*	3.4%	6.5%	*-3.2%*
Social work activities	2.4%	2.8%	*-0.4%*	0.5%	1.5%	*-0.9%*
Arts, entertainment and recreation	2.4%	2.5%	*-0.1%*	2.0%	1.8%	*0.1%*
Membership organisations; repair…	0.9%	1.0%	*-0.1%*	0.4%	0.6%	*-0.2%*
Other personal service activities	1.1%	1.2%	*0.0%*	0.5%	1.2%	*-0.7%*

Source: ONS (BRES, Regional Accounts, IDBR), Cambridge Econometrics.

GVA once more shows much greater dispersion, with notable increases in financial and insurance, and wholesale and retail (including motor) trades shares, indicating IDBR data overestimates output in these sectors. As with the regional comparisons, this may reflect the misreporting of activity by both larger, international/multi-region corporations, and very small businesses, of which these sectors account for a dipropionate share.

Most other sectors show relatively minor (<1%) deviations, except for public sector reliant trades, notably public admin, education and human health, whose output appears to be underestimated by the IDBR. This is unsurprising given the non-market nature of these sectors, and extensive growth accounting required to accurately assess their economic output.

Table 5.5: Comparison of IDBR and official productivity rankings (sectors)

Sector	IDBR productivity rank, 2019-20	ONS Regional Accounts/BRES	*Ranking diff. +/-*

		productivity rank, 2018	
Financial and insurance activities	1	3	*2*
Wholesale trade	2	18	*16*
Motor trades	3	17	*14*
Rental and leasing activities	4	2	*-2*
Construction of buildings	5	7	*2*
Information and communication	6	4	*-2*
Civil engineering	7	5	*-2*
Head offices and management consultancy	8	29	*21*
Manufacture of wood, petroleum, chemicals and minerals	9	6	*-3*
Agriculture, mining, electricity, gas, water and waste	10	9	*-1*
Other professional, scientific and technical activities	11	8	*-3*
Retail trade	12	27	*15*
Real estate activities, excluding imputed rental	13	1	*-12*
Manufacture of metals, electrical products and machinery	14	10	*-4*
Legal and accounting activities	15	13	*-2*
Arts, entertainment and recreation	16	23	*7*
Office administration and business support activities	17	21	*4*
Warehousing, transport support, postal and courier activities	18	22	*4*
Manufacture of food, beverages, textiles and clothing	19	15	*-4*
Architectural and engineering activities	20	20	*0*
Land, water and air transport	21	16	*-5*
Other manufacturing, repair and installation	22	19	*-3*
Specialised construction activities	23	11	*-12*
Employment activities; tourism and security services	24	26	*2*
Membership organisations; repair of household goods	25	28	*3*
Other personal service activities	26	14	*-12*
Human health and residential care activities	27	25	*-2*
Accommodation and food service activities	28	31	*3*
Services to buildings and landscape activities	29	32	*3*
Social work activities	30	30	*0*
Public administration and defence	31	12	*-19*
Education	32	24	*-8*

Source: ONS (BRES, Regional Accounts, IDBR), Cambridge Econometrics.

As a result of the deviations in sectoral employment and GVA shares, there are some notable movements in the sectoral productivity rankings between the IDBR and official statistics. Wholesale and retail (including motor) trades sees a substantial increase in performance under the IDBR, as does head offices and management consultancy.

This is in contrast to real estate activities, specialised construction, personal services and public sector reliant trades, which all fall by more than 10 places in the IDBR rankings relative to official statistics. Besides these sectors though, only one other sector shows a deviation of more than 5 places, with reasonable alignment between the majority of sectors.

Given the focus of this study is on within sector performance rather than across sector comparisons, it is the not expected the aforementioned deviations will adversely impact on the analysis.

6. Appendix B: Sector decomposition summaries

This appendix contains two-page summaries for each of the 32 sectors studied in this report. Each summary provides key details about the sector and an overview of the results from the decomposition analysis. To facilitate this analysis, each summary features three visualisations.

The first summarises key sectoral information (and relative to the other 32 sectors), including the sectoral employment share, sectoral share of GVA, and the amount of variance we observe in productivity outcomes by sub-sectors (sub-sectoral productivity deviation) and between sectoral performance across LEP areas (spatial productivity deviation). Note the deviations are weighted by employment share, to prevent very small sub-sectors or LEP areas skewing the results for individual sectors.

Table 6.1 Example summary table

	Sector	*Rank (out of 32 sectors)*
Sector employment share	2.0%	*21*
Sector GVA share	1.9%	*15*
Sector productivity relative to average	97.0%	*9*
Sub-sectoral productivity deviation	113.4%	*5*
Spatial productivity deviation	54.9%	*5*

Figure 6.1 Sample spatial and sub-sectoral variation (top) and composition of productivity disparities (bottom) figures.

The next set of figures (see Figure 6.1) shows the sectoral and spatial results of the decomposition analysis by sub-sector (top) and by LEP area in that sector (bottom).

The box plot shows the highest and lowest LEP area productivity by sub-sector, so demonstrating the degree of spatial variation. The pink boxes indicate the 75th and 25th percentile LEP productivities in that sub-sector. The green bars along the bottom axis indicate the share of each sub-sector of the sector's total employment.

The bar chart indicates the relative explanatory power, and direction of influence, of specialisation effects (pink bars) and what we have termed local capacity effects (turquoise bars). The green dots, relating to the right-hand axis, present actual productivity values, with the blue horizontal axis representing the national average for that sector.

6.1 Agriculture, mining, electricity, gas, water and waste

The sector is defined by the ONS as comprising 2-digit SIC sectors 01-09 ('agriculture, mining') and 35-39 ('electricity, gas, water and waste'). Resultantly, the sector encompasses 73 constituent (5-digit SIC) sub-sectors.

Table 6.2: Sector overview, 2019-20

	Agriculture, mining, electricity etc.	*Rank (out of 32 sectors)*
Sector employment share	2.4%	*14*
Sector GVA share	2.2%	*9*
Sector productivity relative to average	93.7%	*10*
Sub-sectoral productivity deviation (weighted)	140.8%	*3*
Spatial productivity deviation (weighted)	58.5%	*4*

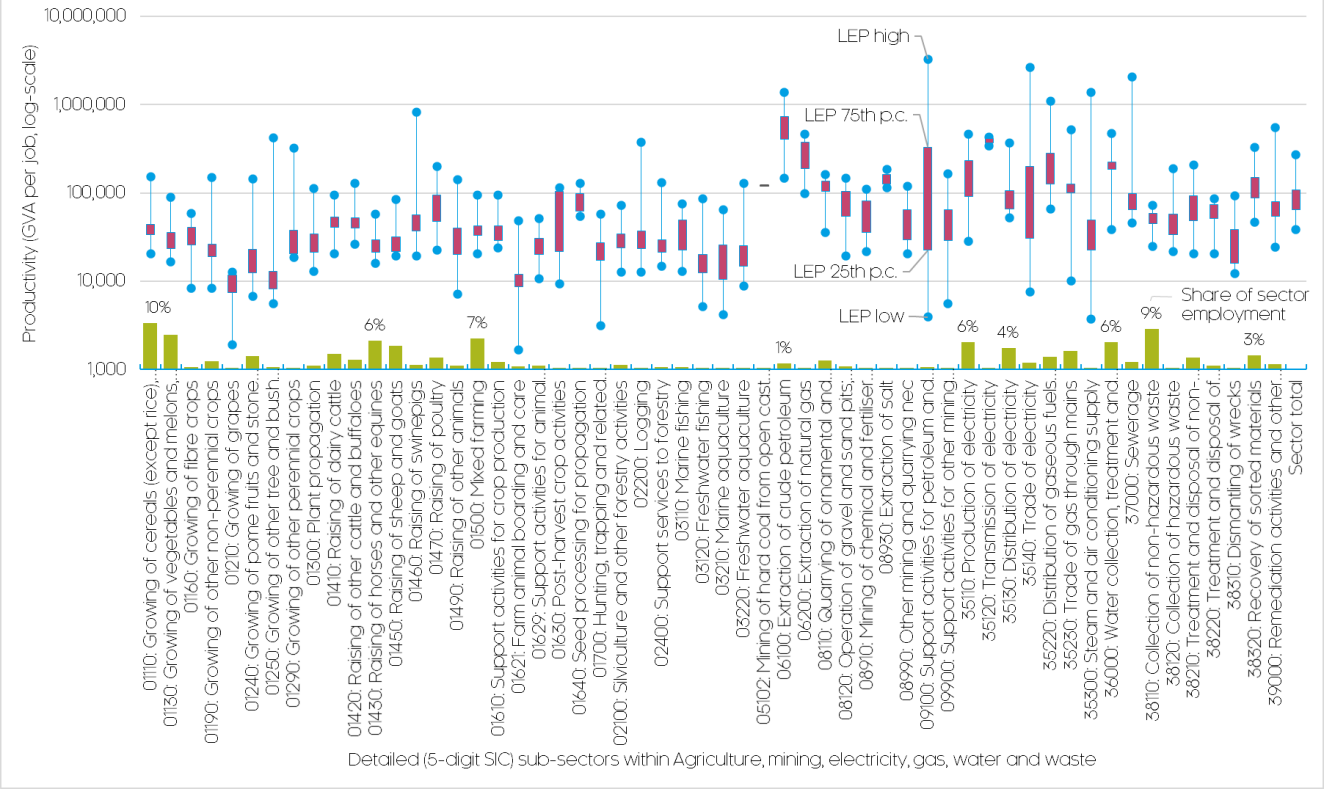
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.2 shows, the sectors share of total employment is slightly higher than that of GVA. Resultantly, productivity is below average, albeit marginally and the sector still ranks in the top 10 most productive sectors.

And within the sector there is substantial variance in productivity, with a 141% standard deviation in sub-sectoral productivity (i.e. across the 73 constituent sub-sectors), the third highest of all sectors. Spatial variance is also very high, with a 59% standard deviation in productivity across LEP areas, the fourth highest of all sectors.

Figure 6.2 looks at these sectoral and spatial disparities in more detail; pink bars highlight

Figure 6.2: Spatial and sub-sectoral productivity variance within the sector, 2019-20



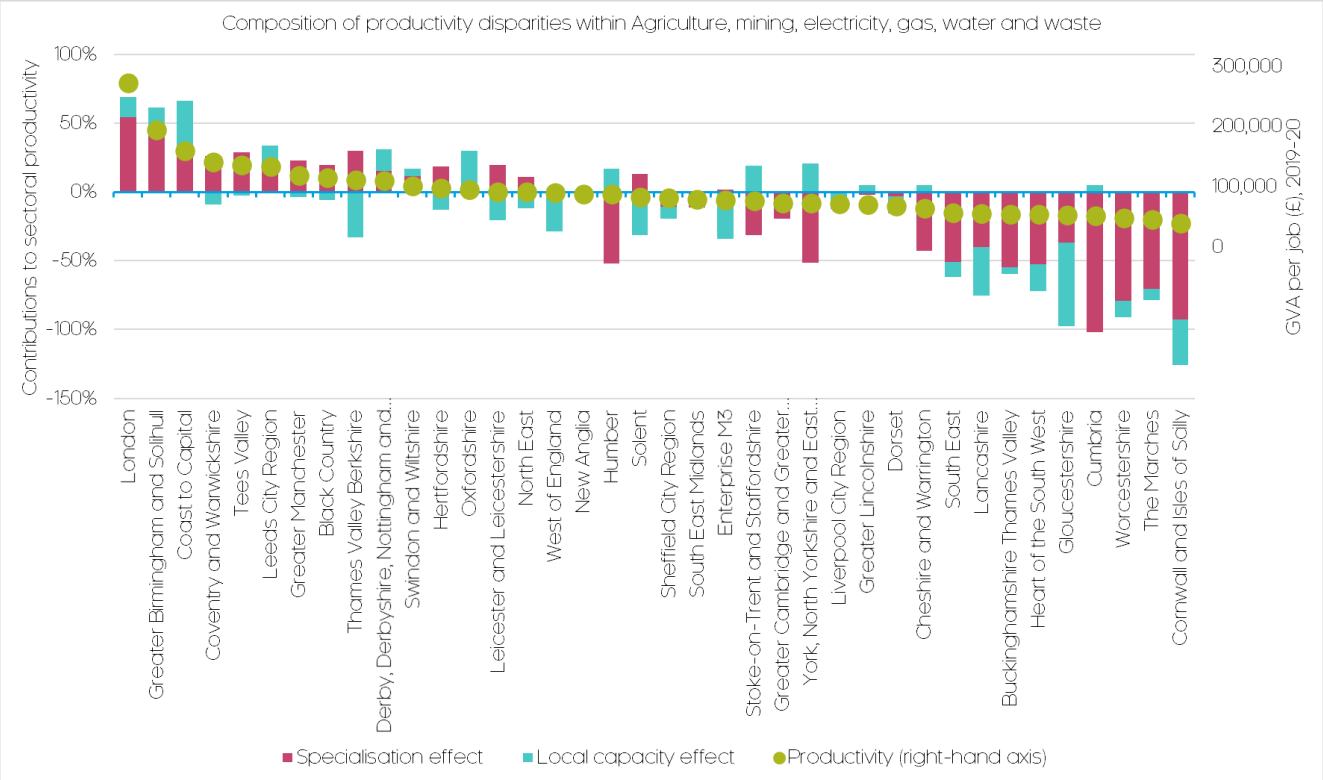
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst green bars show sub-sectoral employment shares.

Most notable is the sudden jump in productivity levels, and variance, within extraction and utility-based sub-sectors. More labour-intensive, agricultural sub-sectors typically show lower productivity levels, but still relatively high variance.

Figure 6.3 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (London), to the least productive (Cornwall and Isles of Scilly).

Figure 6.3: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

Disparities in regional productivity are predominantly being driven by sectoral specialisation; that is, a regions performance is generally determined by the structure and concentration of sub-sectors in that region.

Strong performers, such as London, Greater Birmingham and Solihull, and Coast to Capital, show specialisations in high productivity sub-sectors, typically extraction and utility-based activities. Poorer performers, meanwhile, such as Cornwall and Isles of Scilly, Cumbria, and Worcestershire, show a low specialisation in these high productivity sub-sectors, with a greater dependence on lower productivity sub-sectors, particularly those that are agriculture-related.

Also notable is that within these highest and lowest-ranking performers, there is a smaller, but still significant, local capacity effect; this is where a region retains an intrinsic productivity advantage/disadvantage, regardless of sectoral structure and specialisation.

For instance, Coast to Capital has both favourable sub-sectoral specialisations, and intrinsically stronger productivity across these and other sub-sectors. Meanwhile Cumbria's underperformance is entirely driven by sector specialisation (it actually has a positive local capacity effect).

6.2 Manufacture of food, beverages, textiles and clothing

The sector is defined by the ONS as comprising 2-digit SIC sectors 10-15. Resultantly, the sector encompasses 64 constituent (5-digit SIC) sub-sectors.

Table 6.3: Sector overview, 2019-20

	Manufacture of food, beverages, textiles, etc.	*Rank (out of 32 sectors)*
Sector employment share	1.7%	*25*
Sector GVA share	1.1%	*23*
Sector productivity relative to average	68.3%	*19*
Sub-sectoral productivity deviation	60.2%	*12*
Spatial productivity deviation	24.8%	*21*

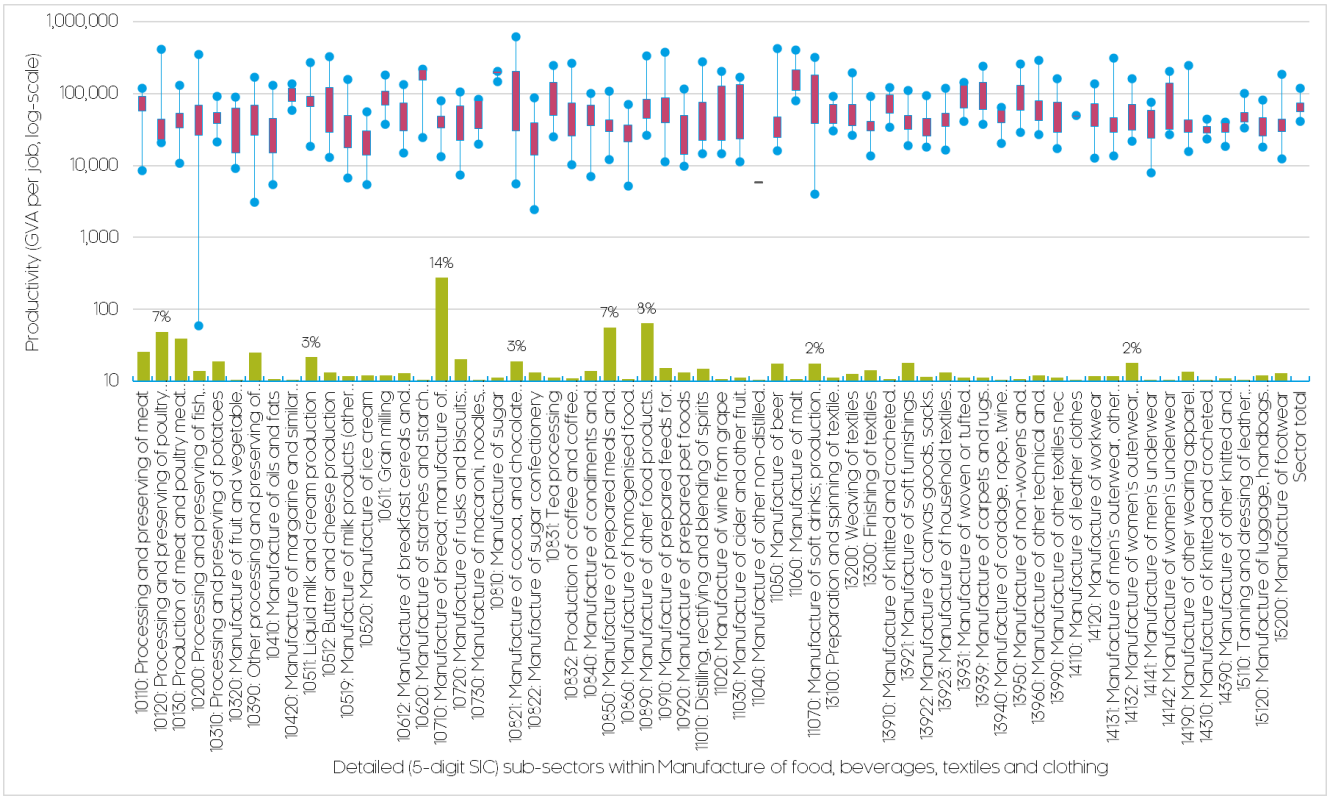
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.3 shows, the sector's share of total employment is higher than that of GVA. Consequently, productivity is some 32% below the national average, putting the sector lower-middle ranking for productivity.

Within the sector, there is notable variance in productivity though, with a 68% standard deviation in sub-sectoral productivity (i.e., across the 64 constituent sub-sectors), higher than the majority of sectors. Spatial variance is low however, with only a 25% standard deviation in productivity across LEP areas.

Figure 6.4 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst

Figure 6.4: Spatial and sub-sectoral productivity variance within the sector, 2019-20



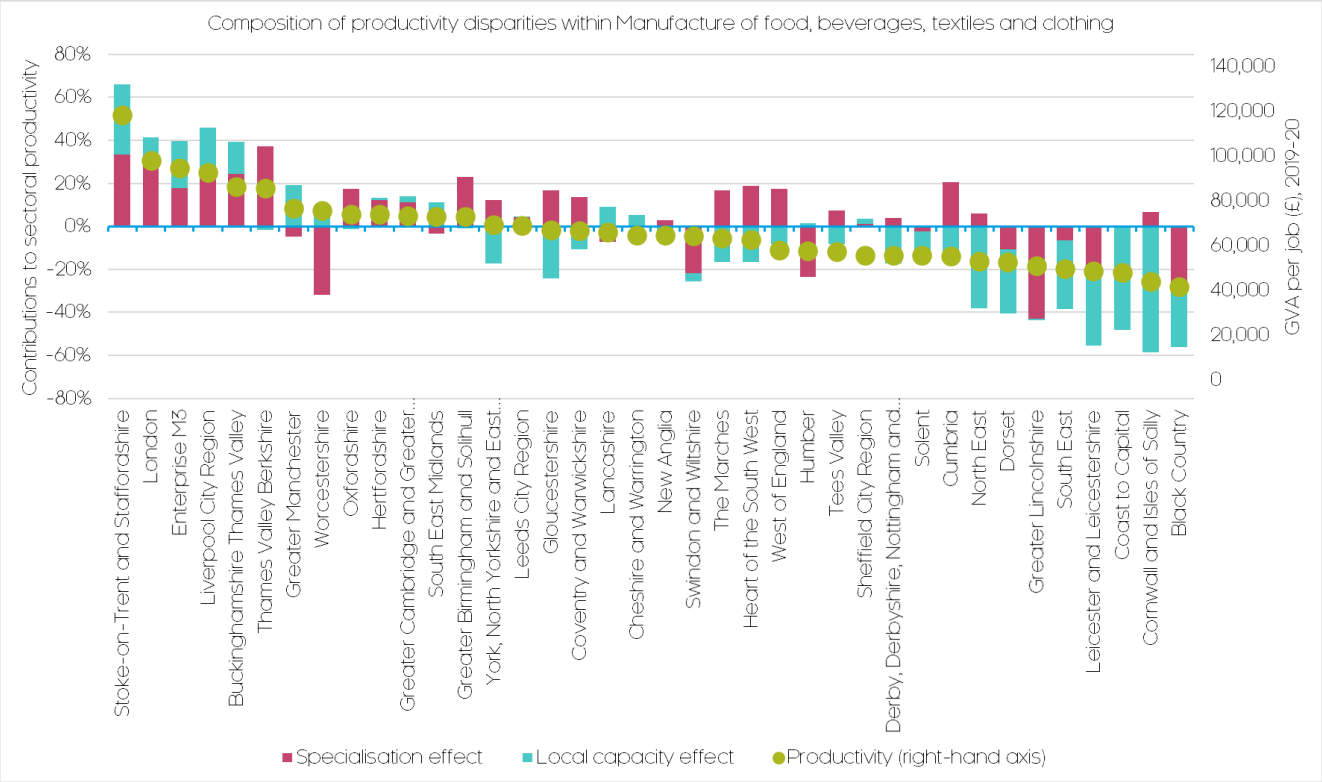
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

green bars show sub-sectoral employment shares.

Much greater spatial and sectoral variance is observed in sub-sectors relating to food and drink production, particularly beverage-related, which also have some of the highest employment shares. In contrast, textiles and clothing-based sub-sectors are more likely to be clustered around the sector mean.

Figure 6.5 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Stoke-on-Trent and Staffordshire), to the least productive (Black Country).

Figure 6.5: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

Across LEP areas there is an interesting split in the drivers of regional productivity disparities. The top performers, such as Stoke-on-Trent, Enterprise M3, and Liverpool City Region, are boosted predominantly by favourable sector specialisations (particularly in sub-sectors related to food and drink production), whilst many also experience positive local capacity effects, albeit to a lesser extent.

Poorer performers, meanwhile, such as Cornwall and Isle of Scilly and Coast to Capital, are typically held back by large negative local capacity effects, with less of an emphasis on sector specialisation (that is, they retain a neutral or even favourable sectoral structure, but exhibit lower productivity regardless).

There are some exceptions; Thames Valley Berkshire is driven solely by favourable sector specialisations. Greater Lincolnshire meanwhile, with a high reliance on lower-value food processing, is held back by sectoral specialisation, despite being relatively productive.

Middle-upper ranking regions generally exhibit positive specialisation effects, but are often limited by negative local capacity effects, Gloucestershire a strong example of this.

6.3 Manufacture of wood, petroleum, chemicals and minerals

The sector is defined by the ONS as comprising 2-digit SIC sectors 16-23. Resultantly, the sector encompasses 75 constituent (5-digit SIC) sub-sectors.

Table 6.4: Sector overview, 2019-20

	Manufacture of wood, petroleum, chemicals and minerals	*Rank (out of 32 sectors)*
Sector employment share	2.0%	*21*
Sector GVA share	1.9%	*15*
Sector productivity relative to average	97.0%	*9*
Sub-sectoral productivity deviation	113.4%	*5*
Spatial productivity deviation	54.9%	*5*

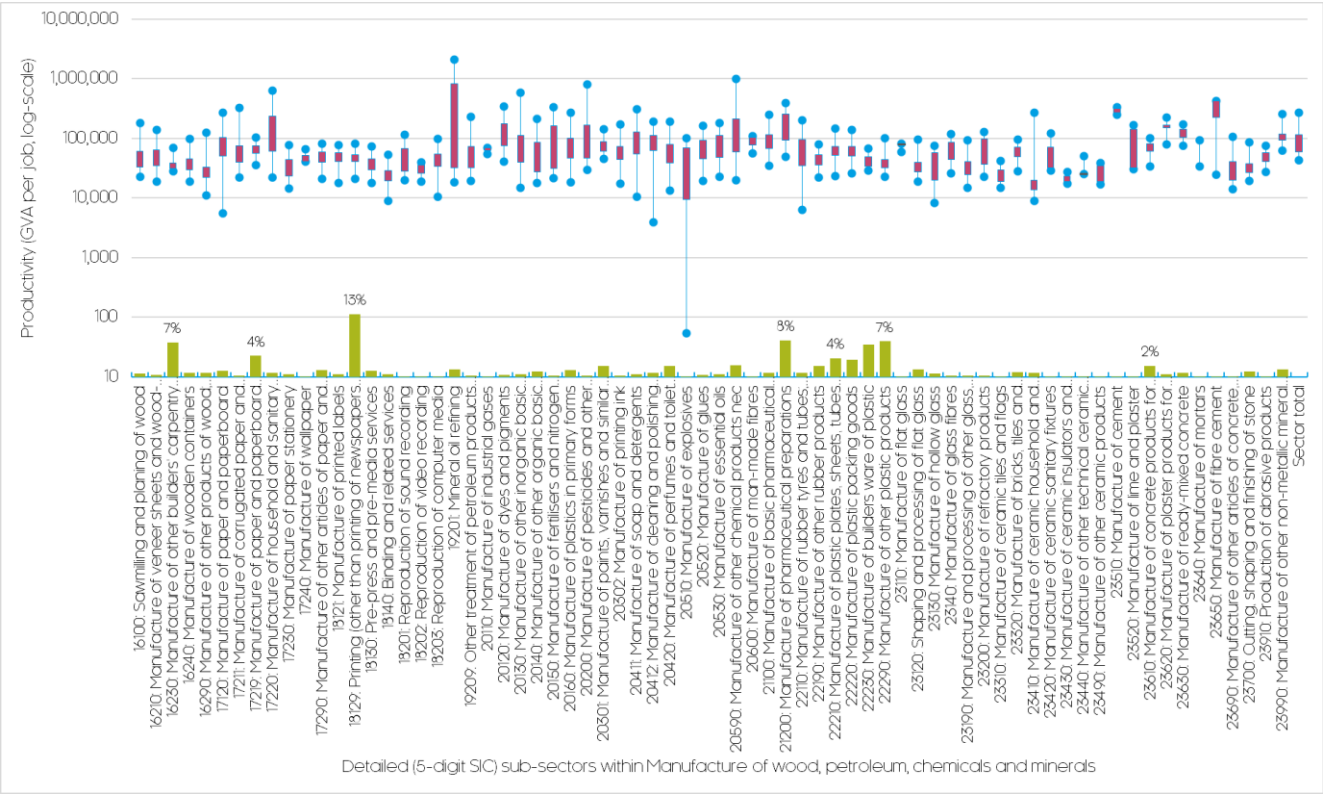
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.4 shows, with a near equal share of total employment and GVA, the sector is relatively productive, ranking in the top 10 of all sectors, and is the most productive manufacturing sector.

There is significant sectoral variance though with a 113% standard deviation in sub-sectoral productivity (i.e., across the 75 constituent sub-sectors), the fifth highest of all sectors, and the highest within manufacturing. Spatial variance is also very high, with a 55% standard deviation in productivity across LEP areas, again the fifth of all sectors.

Figure 6.6 looks at these sectoral and spatial disparities in more detail; pink bars highlight

Figure 6.6: Spatial and sub-sectoral productivity variance within the sector, 2019-20



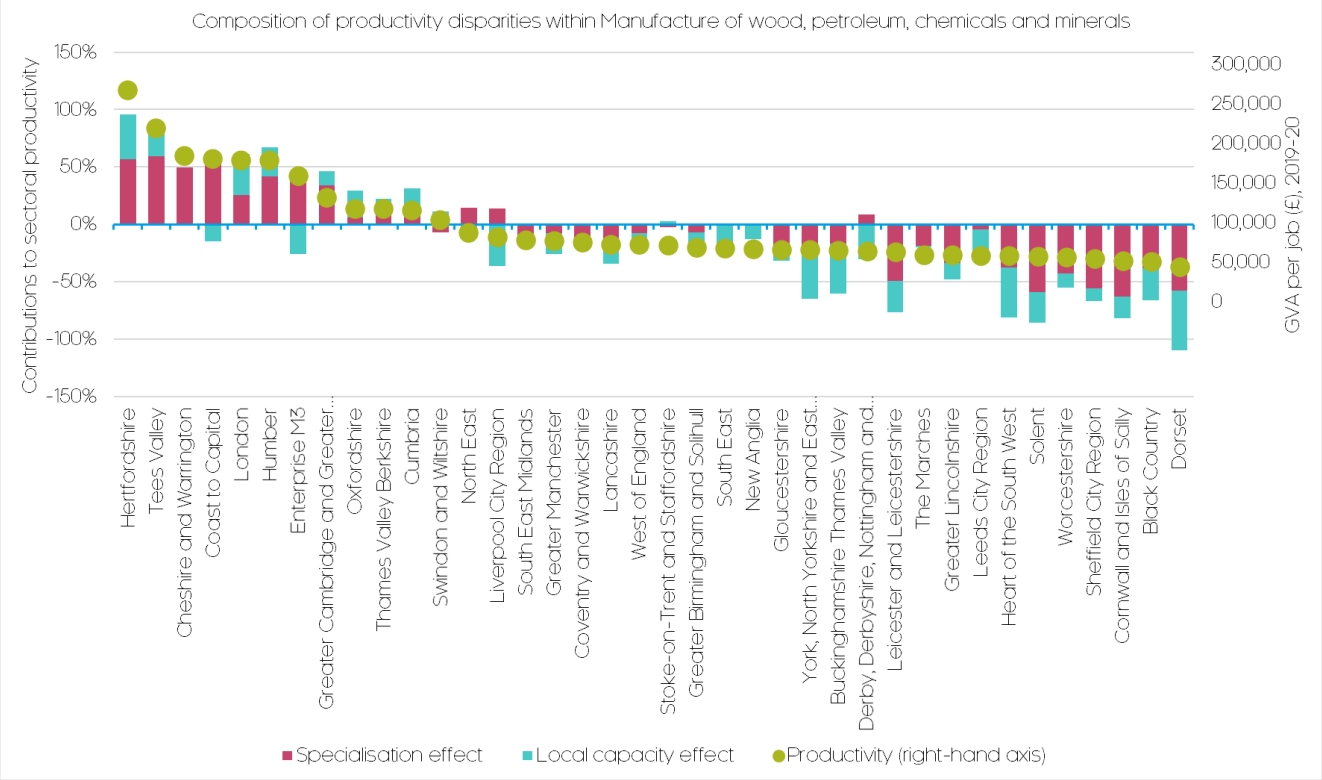
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst green bars show sub-sectoral employment shares.

The manufacture of wood and paper products sees relatively minor spatial and sectoral variance, with sub-sectors clustered around the sector average. In contrast, the manufacture of petroleum, chemicals and some minerals has much greater variance, with these activities also hosting very high productivity sub-sectors.

Figure 6.7 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Hertfordshire), to the least productive (Dorset).

Figure 6.7: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

The top performers, such as Hertfordshire, Tees Valley, and Coast to Capital, are boosted predominantly by favourable sector specialisations (particularly in sub-sectors relating to petroleum, chemicals, pharmaceuticals and some minerals) and some also experience positive local capacity effects, though to a lesser extent.

Poorer performers, meanwhile, such as Cornwall and Isles of Scilly, Sheffield City Region and Solent, show low specialisation in these high productivity sub-sectors, with greater dependence on lower productivity sub-sectors.

Also notable within poorer performers are slightly more significant and consistent local capacity effects; in this case, the poorest performers are being compounded by both unfavourable sectoral specialisation, and poor intrinsic productivity within sub-sectors.

6.4 Manufacture of metals, electrical products and machinery

The sector is defined by the ONS as comprising 2-digit SIC sectors 24-30. Resultantly, the sector encompasses 97 constituent (5-digit SIC) sub-sectors – the most of all sectors.

Table 6.5: Sector overview, 2019-20

	Manufacture of metals, electrical etc.	*Rank (out of 32 sectors)*
Sector employment share	3.4%	*9*
Sector GVA share	3.0%	*7*
Sector productivity relative to average	89.5%	*14*
Sub-sectoral productivity deviation	56.5%	*16*
Spatial productivity deviation	23.3%	*23*

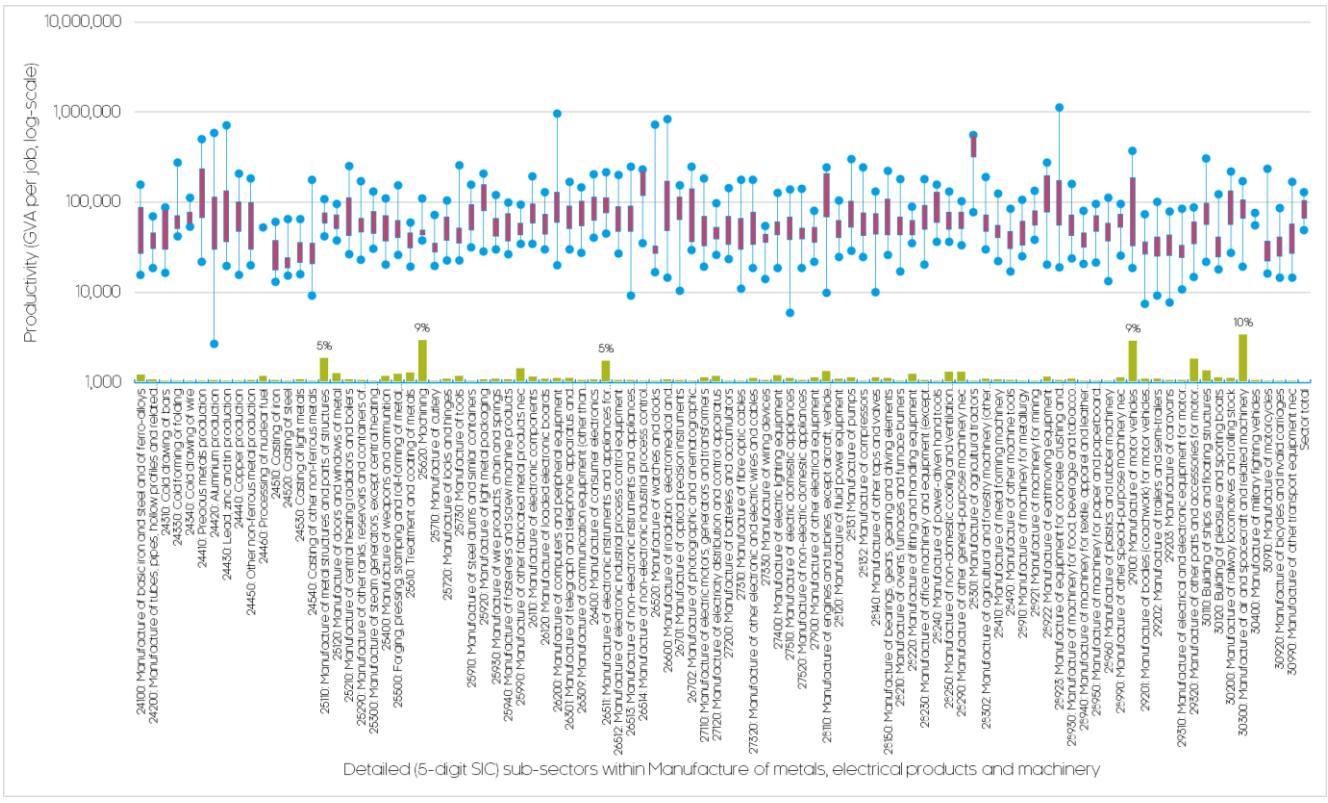
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.5 shows, the sector's share of total employment is higher than that of GVA. As a result, productivity is slightly below the national average, though the sector is still ranks comfortably in the top half of all sectors.

Despite the breadth of activities covered, sectoral variance is middle ranking compared to other sectors, with a 57% standard deviation in sub-sectoral productivity (i.e., across the 97 constituent sub-sectors). Spatial variance is also low, with only a 23% standard deviation in productivity across LEP areas.

Figure 6.8 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst

Figure 6.8: Spatial and sub-sectoral productivity variance within the sector, 2019-20



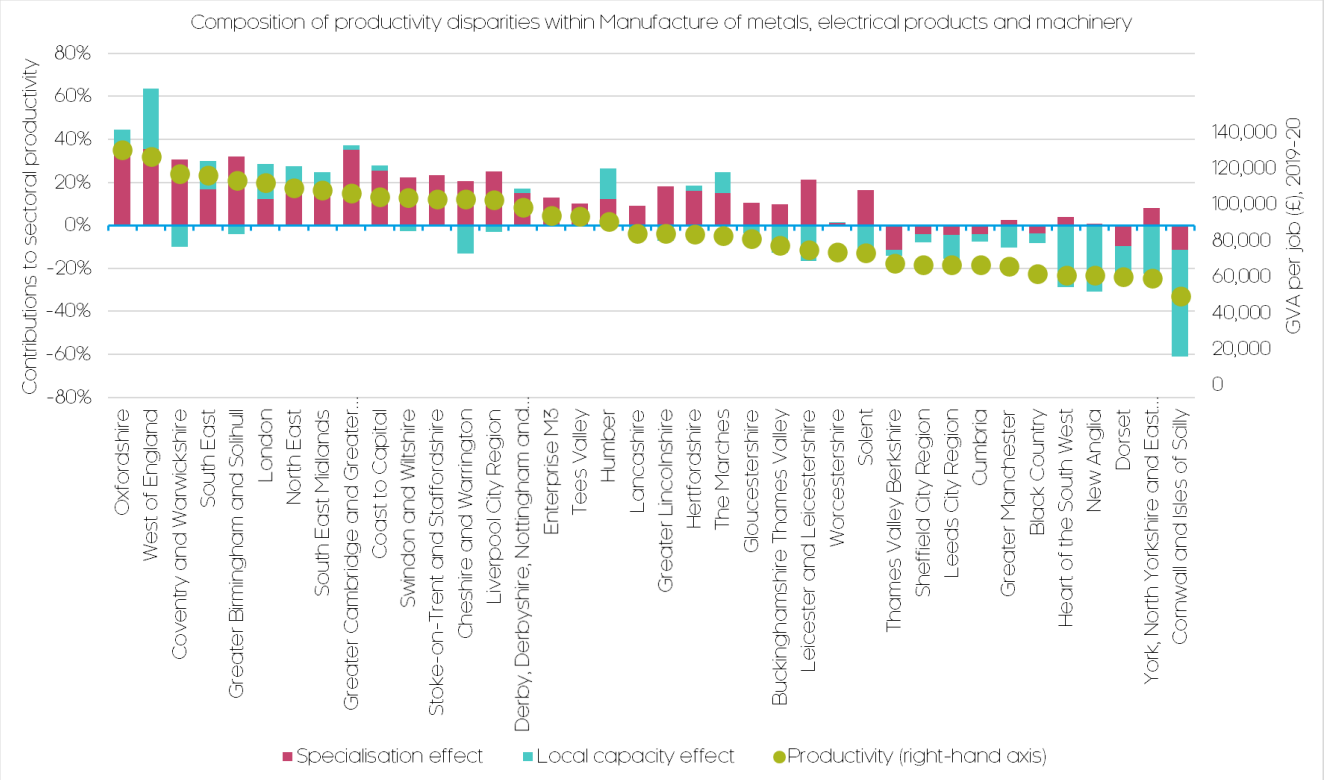
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

green bars show sub-sectoral employment shares.

Despite the broad range of activities covered, spatial variance is relatively consistent within the sector, though metals and machinery show some volatility despite having some of the highest employment shares. Sectoral productivity variance is less consistent, and most notable within machinery and transport equipment, which host some of the most productive sub-sectors.

Figure 6.9 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Oxfordshire), to the least productive (Cornwall and Isles of Scilly).

Figure 6.9: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

Across LEP areas there is an interesting split in the drivers of regional productivity disparities. The top performers, such as Oxfordshire, Coventry and Warwickshire, and Greater Birmingham and Solihull are boosted by favourable sector specialisations (particularly in automotive and transport-related sub-sectors), alongside a smaller positive local capacity effect.

This trend persists throughout the majority of LEP areas, until poorer performers, such as Cornwall and Isle of Scilly, Heart of the South West, and New Anglia. In contrast to others, these LEP areas are typically held back by large negative local capacity effects, with less of an emphasis on sector specialisation (that is, they retain a neutral or even favourable sectoral structure, but exhibit lower productivity regardless).

6.5 Other manufacturing, repair and installation

The sector is defined by the ONS as comprising 2-digit SIC sectors 31-33. Resultantly, the sector encompasses 23 constituent (5-digit SIC) sub-sectors.

Table 6.6: Sector overview, 2019-20

	Other manufacturing etc.	*Rank (out of 32 sectors)*
Sector employment share	0.8%	*30*
Sector GVA share	0.5%	*29*
Sector productivity relative to average	63.6%	*22*
Sub-sectoral productivity deviation	25.5%	*26*
Spatial productivity deviation	18.1%	*27*

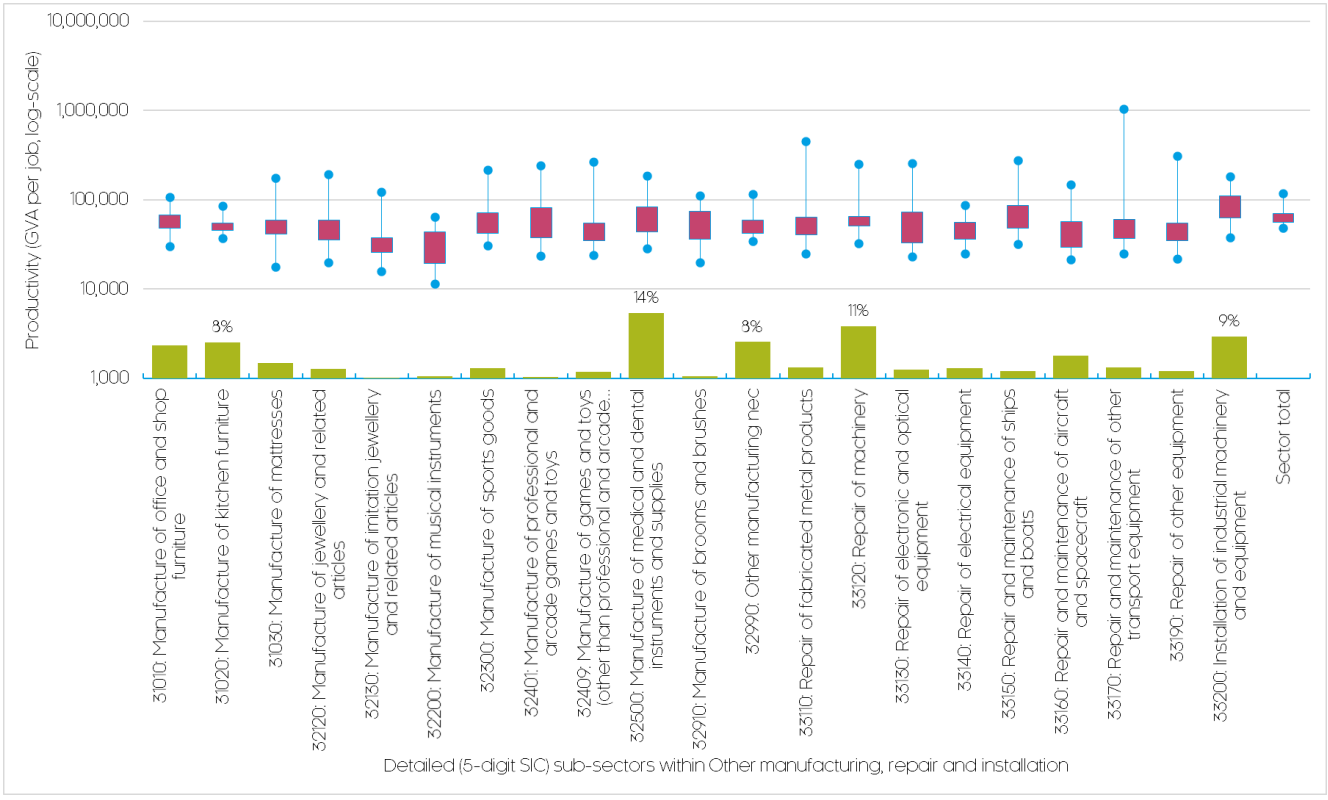
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.6 shows, the sector's share of total employment is higher than that of GVA. Resultantly, productivity is slightly below the national average, in the bottom half of all sectors, and the lowest within manufacturing.

In addition, there is limited sectoral variance, with only a 26% standard deviation in sub-sectoral productivity (i.e., across the 23 constituent sub-sectors), the seventh lowest of all sectors. Spatial variance is also low, with a 18% standard deviation in productivity across LEP areas, the sixth lowest of all sectors.

Figure 6.10 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst

Figure 6.10: Spatial and sub-sectoral productivity variance within the sector, 2019-20



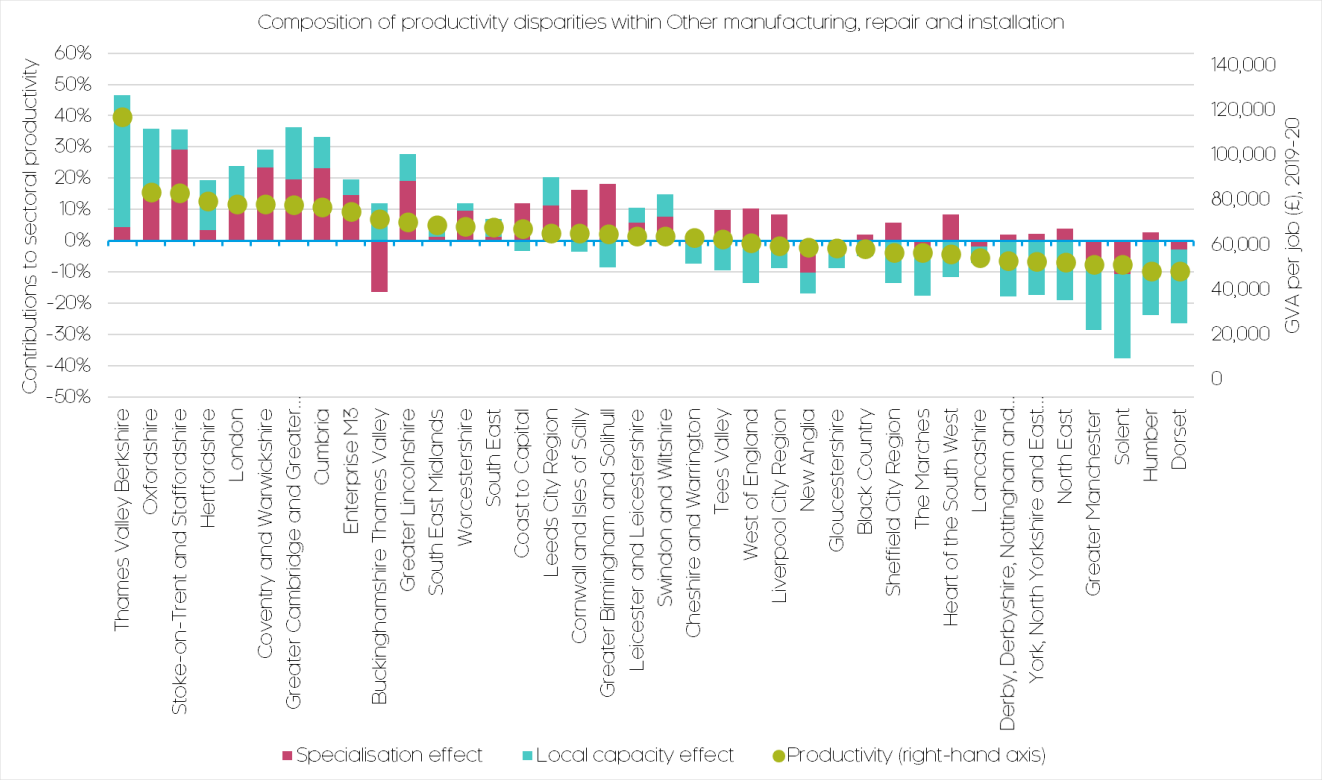
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

green bars show sub-sectoral employment shares.

Variance is greatest in the “other manufacturing” sub-sectors, which covers a diverse range of activities from the production of musical instruments to medical goods. Interestingly, variance is also high across repair and installation sub-sectors, despite it encompassing typically non-tradeable, local service activities. These sub-sectors also amongst the highest productivity sub-sectors.

Figure 6.11 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Thames Valley Berkshire), to the least productive (Dorset).

Figure 6.11: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

Again, there is an interesting split in the drivers of regional productivity disparities across LEP areas. The top performers, such as Oxfordshire, Coventry and Warwickshire, and Stoke-on-Trent and Staffordshire are boosted by favourable sector specialisations alongside strong, albeit smaller, positive local capacity effects.

This trend persists throughout the majority of LEP areas, until the bottom half of the rank, which includes Dorset, Humber, and Solent. In contrast to others, these LEP areas are typically held back by large negative local capacity effects, with less of an emphasis on sector specialisation (that is, they retain a neutral or even favourable sectoral structure, but exhibit lower productivity regardless).

There are some exceptions; Thames Valley Berkshire, the top performing LEP area, is driven almost exclusively by positive local capacity effects. Neighbouring Buckinghamshire Thames Valley follows a similar pattern, and actually exhibits negative sectoral specialisation effects.

6.6 Construction of buildings

The sector is defined by the ONS as comprising 2-digit SIC sector 41. Resultantly, the sector encompasses only 3 constituent (5-digit SIC) sub-sectors, the joint-lowest of any sector.

Table 6.7: Sector overview, 2019-20

	Construction of buildings	*Rank (out of 32 sectors)*
Sector employment share	1.5%	*27*
Sector GVA share	2.0%	*11*
Sector productivity relative to average	132.5%	*5*
Sub-sectoral productivity deviation	13.2%	*31*
Spatial productivity deviation	16.8%	*28*

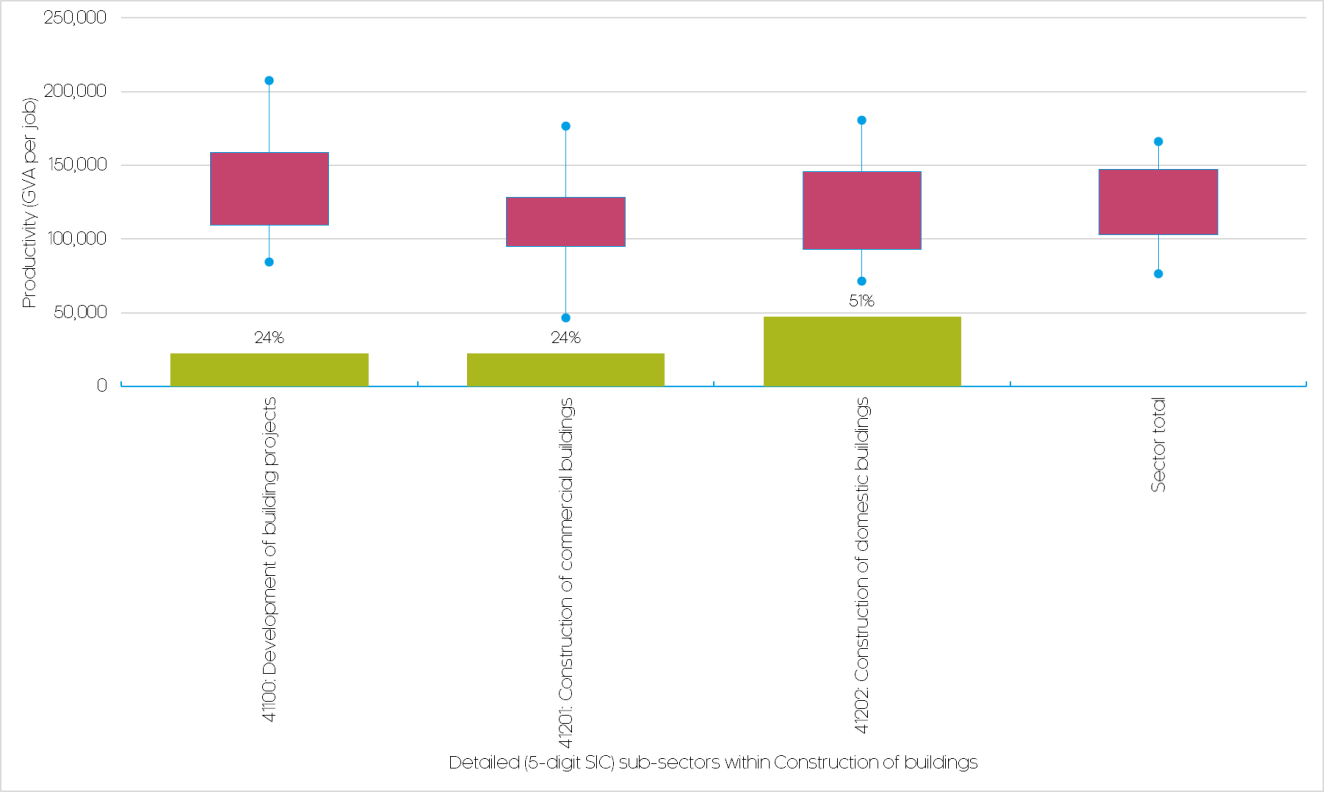
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.7 shows, with the sectors share of total GVA higher than that of employment, productivity is very high, some 33% above the national average, and in the top five most productive sectors.

The sector displays very low sectoral variance, with only a 13% standard deviation in sub-sectoral productivity (i.e., across the 3 constituent sub-sectors), the second lowest of all sectors. Spatial variance is marginally higher, but still low, with only a 17% standard deviation in productivity across LEP areas, the fifth lowest of all sectors.

Figure 6.12 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst

Figure 6.12: Spatial and sub-sectoral productivity variance within the sector, 2019-20



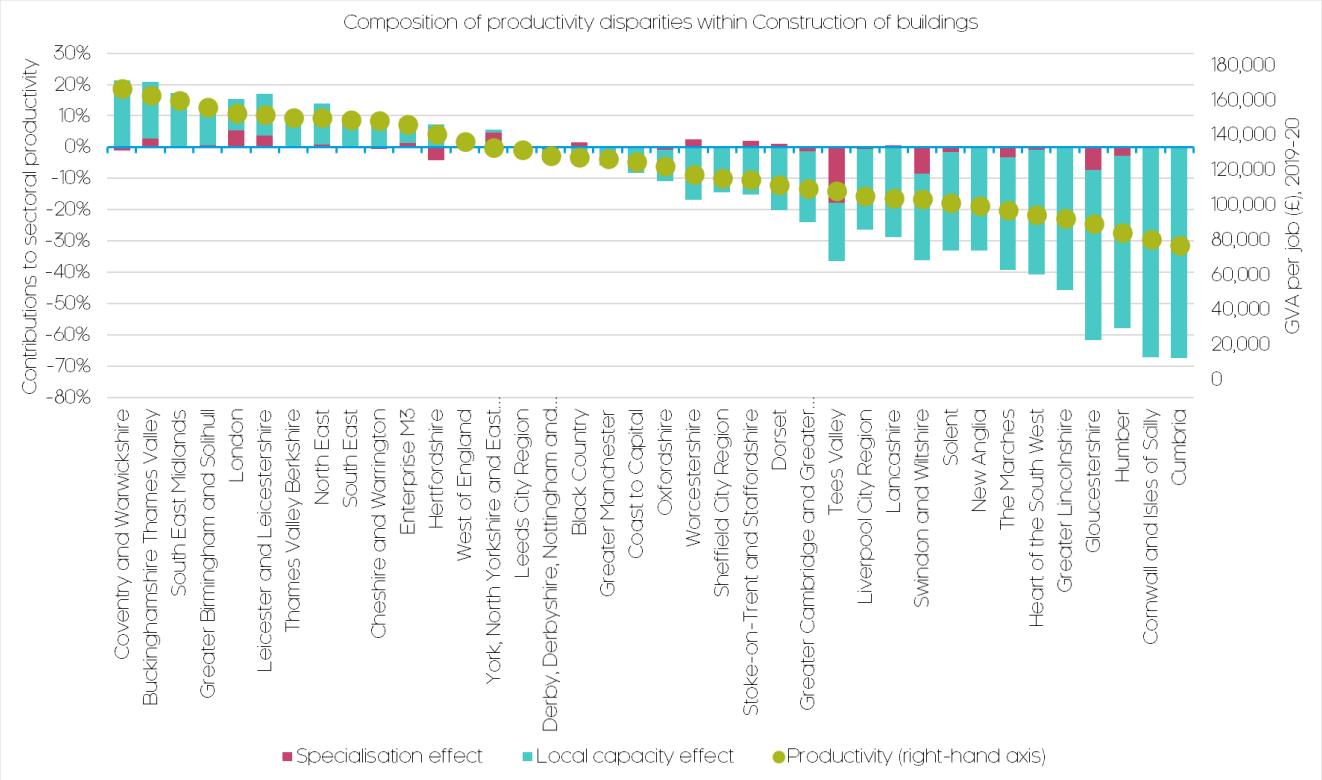
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Sectors employing less than 100 people are excluded from the figure.

green bars show sub-sectoral employment shares.

Spatial variance is lowest within the construction of commercial buildings. In contrast, the construction of domestic buildings – the largest sub-sector, encompassing a wide range of housebuilding related activities - shows greater variance, as does the development of building projects, which is also the most productive sub-sector.

Figure 6.13 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Coventry and Warwickshire), to the least productive (Cumbria).

Figure 6.13: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

Regional productivity disparities in the sector are overwhelmingly explained by local capacity effects; that is, the best/worst performing regions retain an intrinsic productivity advantage/disadvantage, regardless of sectoral structure and specialisation.

Of course, some of this reflects the relatively limited number of sub-sectors (only 3) to capture specialisation, and the relative uniformity of performance across the existing sub-sectors. But a limited number of LEP areas do show specialisation effects, notably Tees Valley, which has a lower specialisation in the highly productive development of building projects sub-sector.

Regardless, the influence of local capacity rather than specialisation effects is a trend observed in other construction-related activity.

6.7 Civil engineering

The sector is defined by the ONS as comprising 2-digit SIC sector 42. Resultantly, the sector encompasses 7 constituent (5-digit SIC) sub-sectors.

Table 6.8: Sector overview, 2019-20

	Civil engineering	*Rank (out of 32 sectors)*
Sector employment share	0.7%	*31*
Sector GVA share	0.7%	*27*
Sector productivity relative to average	98.8%	*7*
Sub-sectoral productivity deviation	10.1%	*32*
Spatial productivity deviation	40.3%	*12*

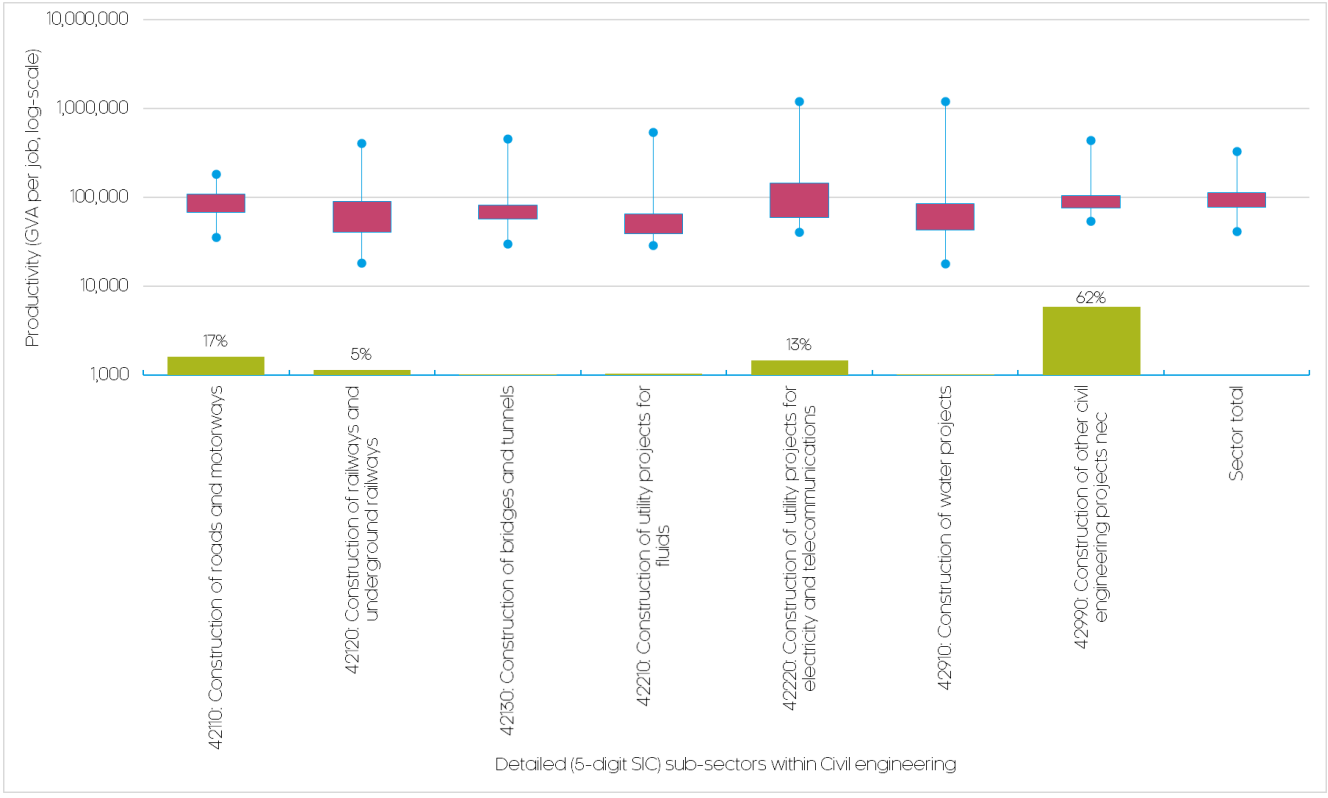
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.8 shows, with an equal share of GVA and employment, the sector is small but highly productive, featuring in the top ten most productive sectors, and the most productive construction-related activity.

The sector displays very low sectoral variance, with only a 10% standard deviation in sub-sectoral productivity (i.e., across the 7 constituent sub-sectors), the lowest of any sector. Spatial variance is much higher though, with a 40% standard deviation in productivity across LEP areas.

Figure 6.14 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst green bars show sub-sectoral employment shares.

Figure 6.14: Spatial and sub-sectoral productivity variance within the sector, 2019-20

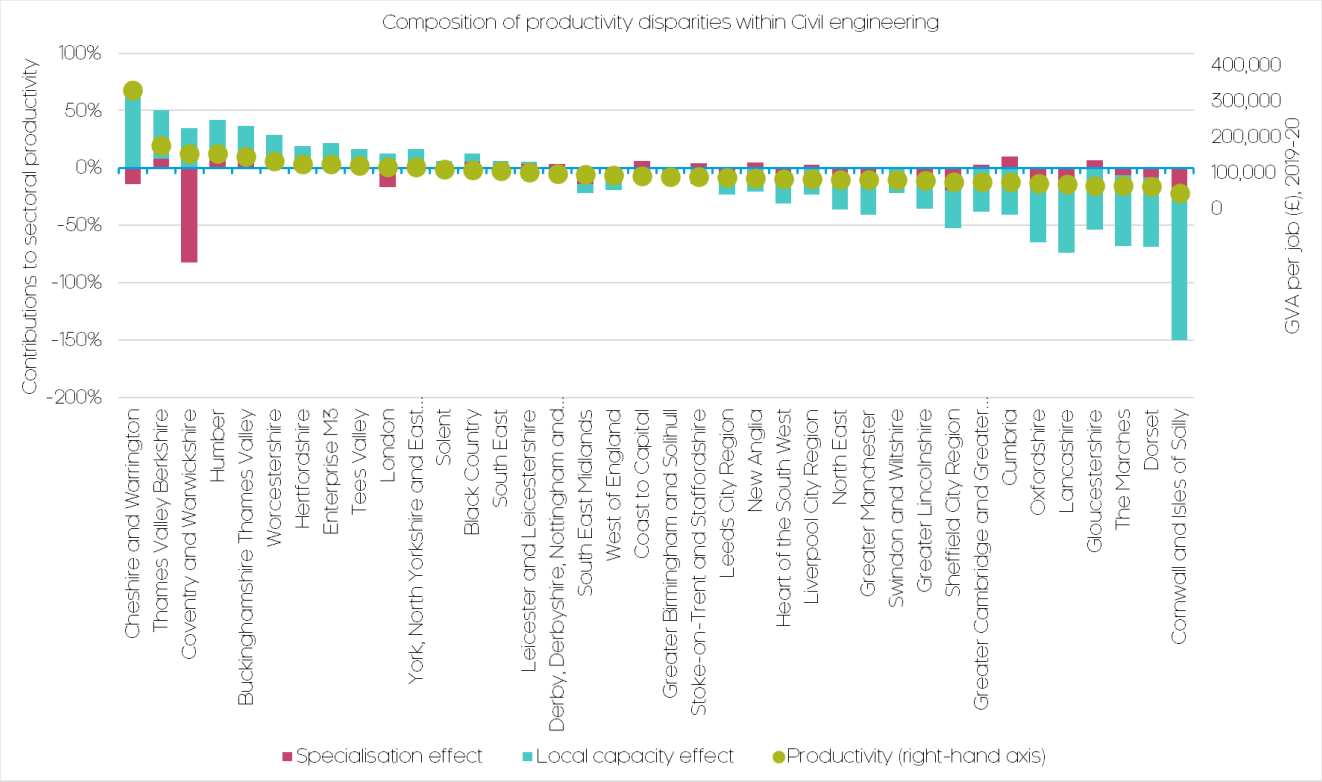


Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

Most notable is the low variance in sub-sectoral productivity, particularly across transport-related infrastructure and engineering (road, rail, bridges/tunnels). Utility and water-related infrastructure and engineering show higher spatial and sectoral variance and are also the most productive sub-sectors. Activity in the sector is underpinned by other (i.e., non transport or utility) civil engineering activities, which accounts for two-thirds of employment in the sector.

Figure 6.15 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Cheshire and Warrington), to the least productive (Cornwall and Isles of Scilly).

Figure 6.15: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

As with other construction activities, regional productivity disparities in the sector are largely explained by local capacity effects; that is, the best/worst performing regions retain an intrinsic productivity advantage/disadvantage, regardless of sectoral structure and specialisation; in Cheshire and Warrington case, performance is being driven solely by local capacity effects.

However, there are still some notable, albeit smaller specialisation effects, despite the relatively limited number of sectors to capture this. Many of poorer performers in particular, such as Cornwall and Isles of Scilly and Lancashire, exhibit negative specialisation effects, further compounding already substantial negative local capacity effects.

Coventry and Warwickshire IS an interesting outlier, with high productivity (third highest) driven solely by local capacity effects, with substantial negative specialisation effects, attributable to the sectors low specialisation in the highly productive utility-related infrastructure and engineering.

6.8 Specialised construction activities

The sector is defined by the ONS as comprising 2-digit SIC sector 43. Resultantly, the sector encompasses 15 constituent (5-digit SIC) sub-sectors.

Table 6.9: Sector overview, 2019-20

	Specialised construction activities	*Rank (out of 32 sectors)*
Sector employment share	2.6%	*11*
Sector GVA share	1.4%	*22*
Sector productivity relative to average	55.3%	*23*
Sub-sectoral productivity deviation	17.1%	*29*
Spatial productivity deviation	19.8%	*25*

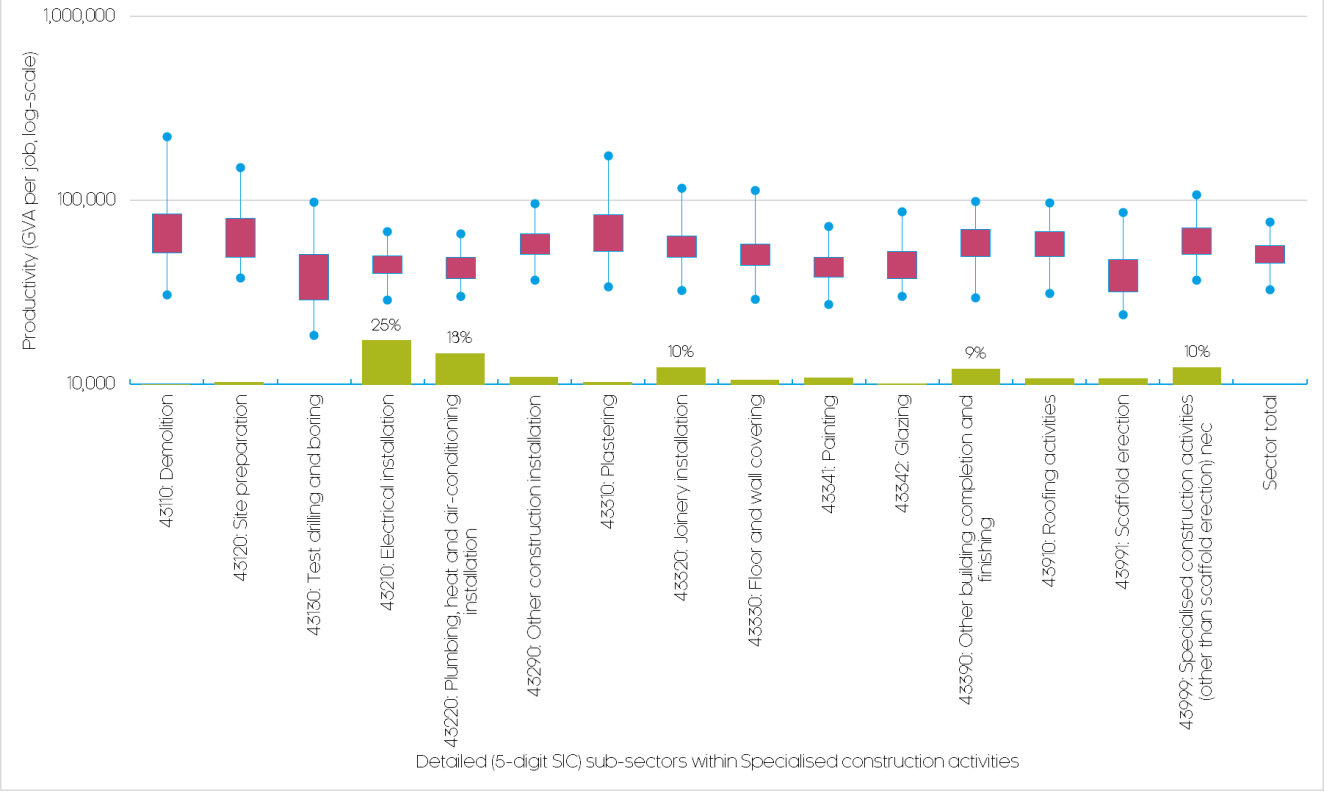
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.8 shows, the sectors share of total employment is almost double that of GVA. Resultantly, productivity in the sector is some 45% below the national average, and in the bottom-third of all sectors.

As with other construction-related activity, the sector displays very low sectoral variance, with only a 17% standard deviation in sub-sectoral productivity (i.e., across the 15 constituent sub-sectors), the fourth lowest of all sectors. Spatial variance is also low, with only an 20% standard deviation in productivity across LEP areas.

Figure 6.16 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst

Figure 6.16: Spatial and sub-sectoral productivity variance within the sector, 2019-20



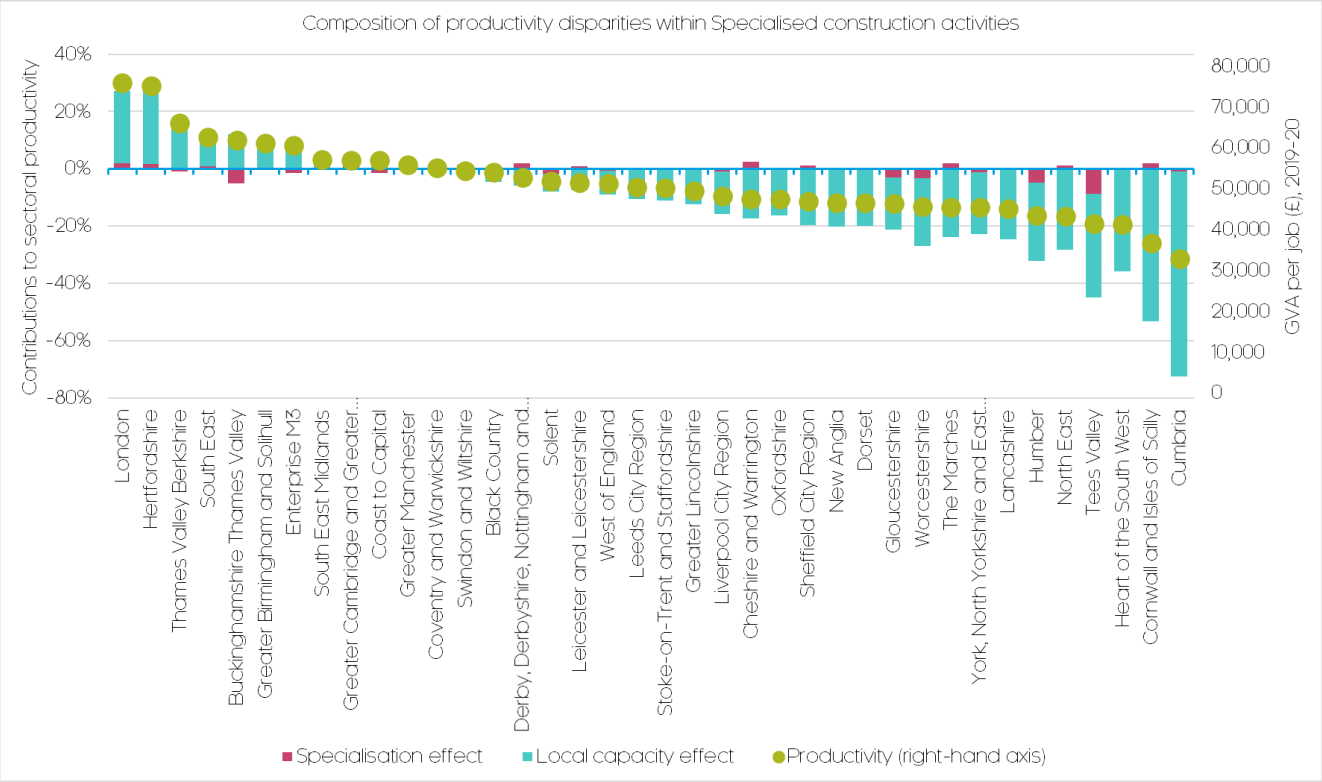
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

green bars show sub-sectoral employment shares.

Variance is particularly low and relatively consistent across the more labour-intensive (and typically lower productivity) skilled trades, such as plumbing, painting, and roofing. Smaller, more specialised sub-sectors such as demolition, site preparation and drilling, show greater variance, whilst also being the most productive sub-sectors, though retain low employment shares.

Figure 6.17 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (London), to the least productive (Cumbria).

Figure 6.17: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

As with the wider construction sector, regional productivity disparities in the sector are almost exclusively explained by local capacity effects; that is, the best/worst performing regions retain an intrinsic productivity advantage/disadvantage, regardless of sectoral structure and specialisation.

These effects are particularly significant for poorer performers, such as Cumbria, Cornwall and Isles of Scilly, and Heart of the South West.

Some small specialisation effects are also observable, though they are mostly insignificant given the scale of the local capacity effects. These specialisation effects are typically negative for the least productive regions and positive those middle-upper ranking.

6.9 Motor trades

The sector is defined by the ONS as comprising 2-digit SIC sector 45. Resultantly, the sector encompasses 7 constituent (5-digit SIC) sub-sectors.

Table 6.10: Sector overview, 2019-20

	Motor trades	*Rank (out of 32 sectors)*
Sector employment share	1.9%	*23*
Sector GVA share	4.0%	*5*
Sector productivity relative to average	217.4%	*3*
Sub-sectoral productivity deviation	71.9%	*7*
Spatial productivity deviation	53.9%	*6*

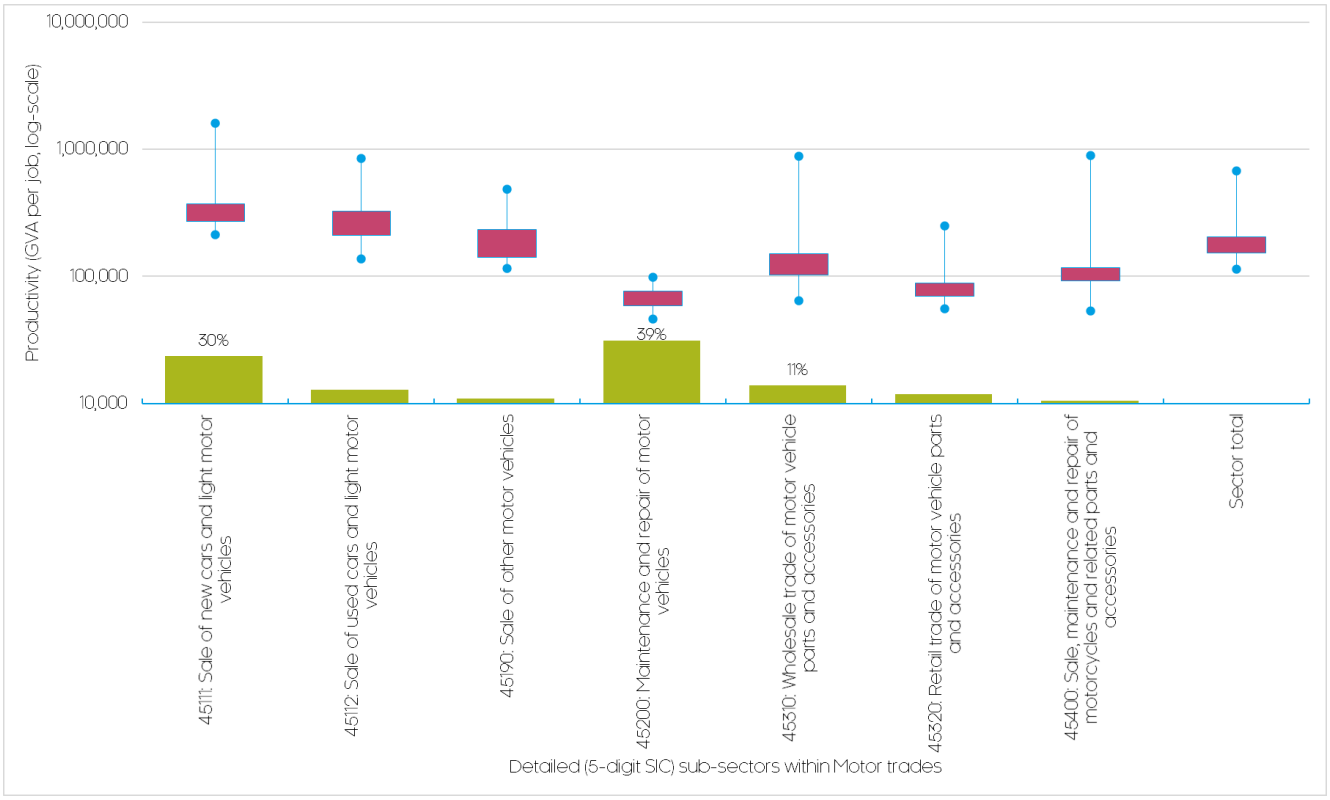
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.10 shows, the sectors share of total GVA is substantially higher than that of employment. As a result, productivity in the sector is very high, more than twice the national average and in the top three most productive sectors. However, sector output is likely being overestimated given reporting issues in the IDBR (see *Appendix A: data collection and processing*).

The sector displays significant sectoral and spatial variance, with a 72% standard deviation in sub-sectoral productivity (i.e., across the 7 constituent sub-sectors), the seventh highest of all sectors, and a 54% standard deviation in productivity across LEP areas, the sixth highest of all sectors.

Figure 6.18 looks at these sectoral and spatial disparities in more detail; pink bars highlight

Figure 6.18: Spatial and sub-sectoral productivity variance within the sector, 2019-20



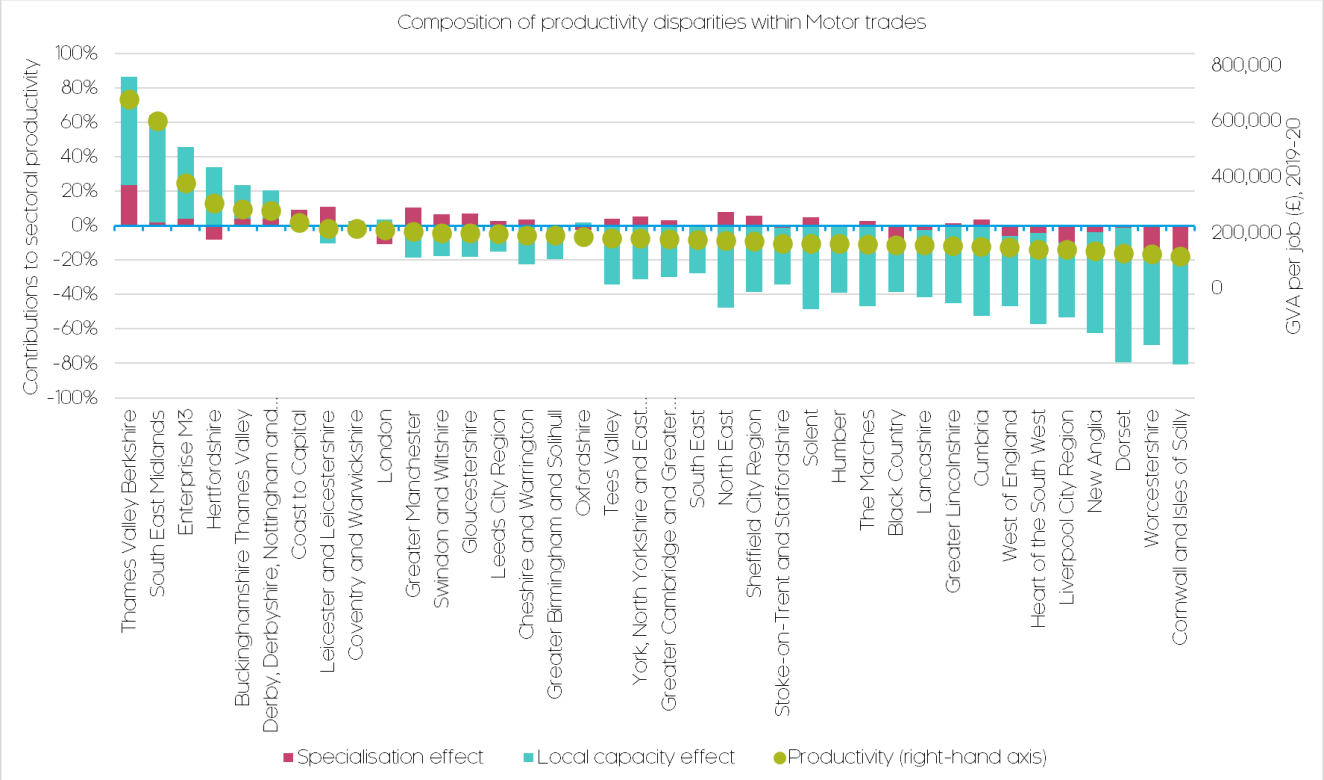
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst green bars show sub-sectoral employment shares.

Within the sector, variance is typically greatest in the higher productivity sales-based sub-sectors, which appear to be driving much of the spatial deviation in the sector. Maintenance, repairs, and parts-related sales show both lower levels of productivity and lower variance. Note that this particular sector excludes automotive related manufacture and production.

Figure 6.19 shows the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Thames Valley Berkshire), to the least productive (Cornwall and Isles of Scilly).

Figure 6.19: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

Regional productivity disparities in the sector are almost exclusively explained by local capacity effects; that is, the best/worst performing regions retain an intrinsic productivity advantage/disadvantage, regardless of sectoral structure and specialisation. These effects are particularly significant, and often negative, for many lower-middle ranking regions.

Some small specialisation effects are also observable, though they are mostly insignificant given the scale of the local capacity effects. These specialisation effects are typically negative for the least productive regions (e.g., Cornwall and Isles of Scilly, Worcestershire) and positive for middle-upper ranking regions (e.g., Thames Valley Berkshire).

6.10 *Wholesale trade*

The sector is defined by the ONS as comprising 2-digit SIC sector 46. Resultantly, the sector encompasses 52 constituent (5-digit SIC) sub-sectors.

Table 6.11: Sector overview, 2019-20

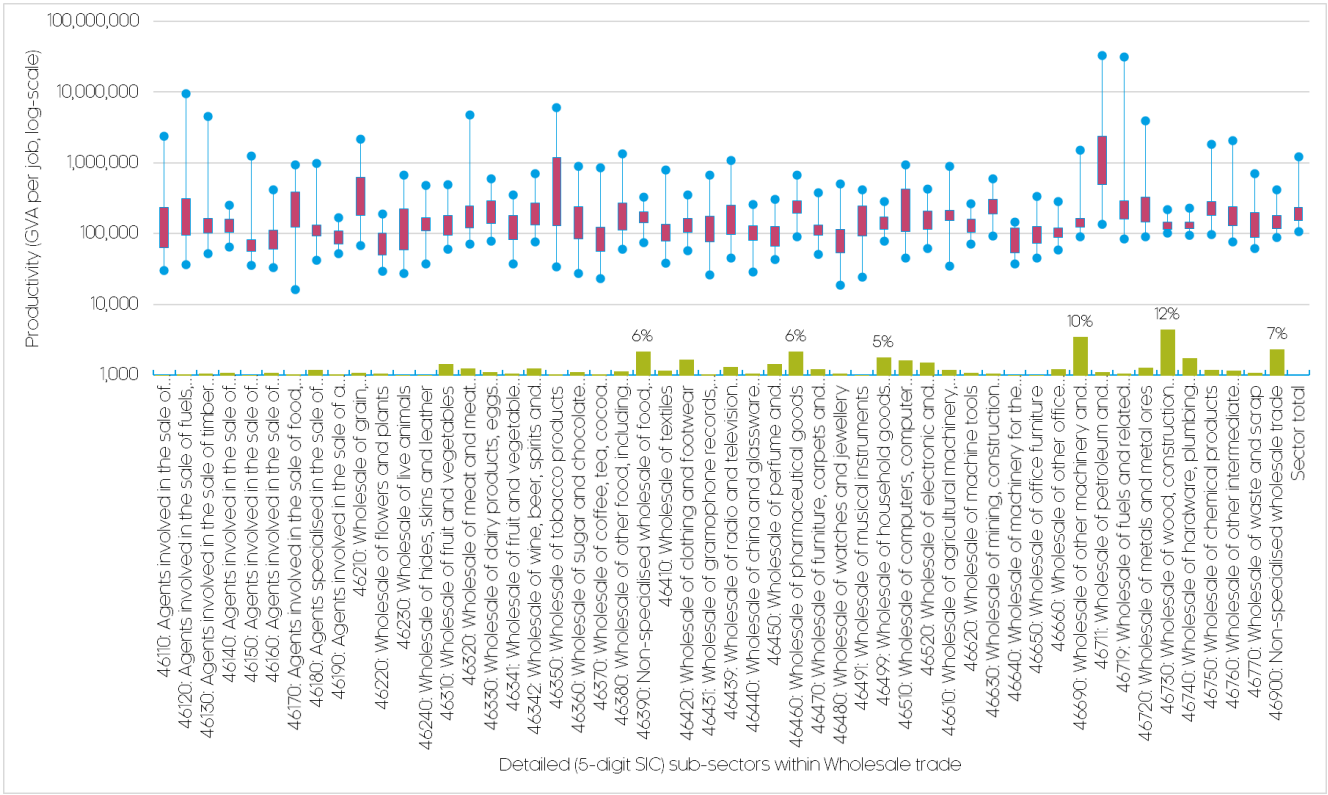
	Wholesale trade	*Rank (out of 32 sectors)*
Sector employment share	3.9%	*7*
Sector GVA share	14.5%	*2*
Sector productivity relative to average	371.4%	*2*
Sub-sectoral productivity deviation	366.5%	*1*
Spatial productivity deviation	100.0%	*1*

Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.11 shows, a large and productive sector, its share of total GVA is substantially higher than that of employment. Resultantly, sector productivity is very high, almost four times the national average, making it the second most productive sector. However, sector output is likely being overestimated given reporting issues in the IDBR (see *Appendix A: data collection and processing*).

The sector displays very high sectoral variance, with a 321% standard deviation in sub-sectoral productivity (i.e., across the 52 constituent sub-sectors), the highest of any sector. Spatial variance is also very high, with an 80% standard deviation in productivity across LEP areas, also the highest of any sector.

Figure 6.20: Spatial and sub-sectoral productivity variance within the sector, 2019-20



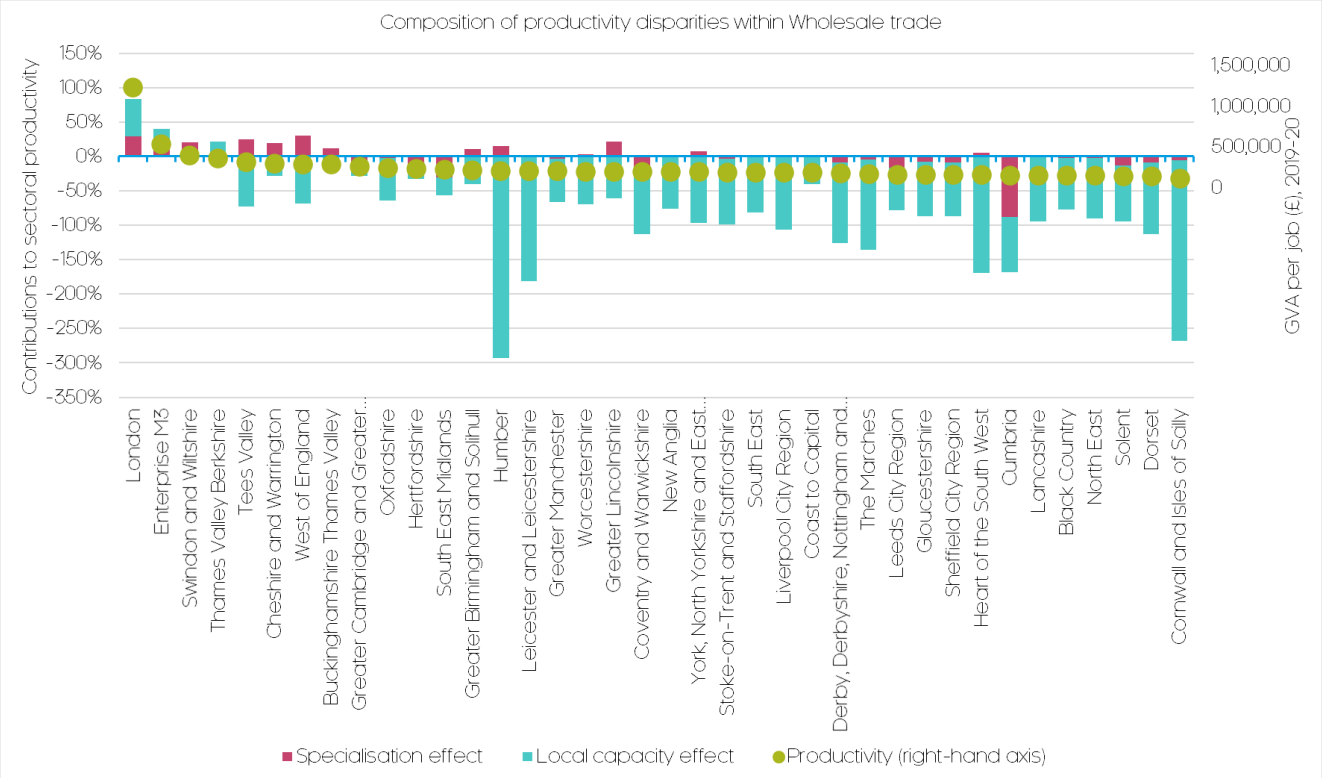
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

Figure 6.20 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst green bars show sub-sectoral employment shares.

There is significant spatial and sectoral variance within the sector. This is most notable in sub-sectors relating to the wholesale of raw materials and related goods (e.g., fuels, commodities, intermediate goods/materials etc.), which also include the most productive sub-sectors. Lower variance, and productivity is seen in sub-sectors relating to the wholesale of consumer-oriented goods (e.g., some food and drink, clothing, household goods).

Figure 6.21 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (London), to the least productive (Cornwall and Isles of Scilly).

Figure 6.21: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

The spatial variance within the sector is particularly notable, with only a handful of LEP areas showing significant positive effects. For many lower-middle ranking regions, productivity disparities are being explained by significant and negative local capacity effects.

For the top performers, specialisation effects are more notable, such as in London, West of England and Swindon and Wiltshire, who have higher specialisation in typically higher productivity sub-sectors (particularly those relating to raw materials and electronics.).

The sector displays some interesting outliers though. Humber, and Leicester and Leicestershire for instance show substantial negative local capacity effects, despite favourable sector specialisations (for Humber, raw materials and for Leicester and Leicestershire, manufactured goods).

Cumbria meanwhile is one of a handful of regions compounded by negative local capacity effects and already substantial negative specialisation effects.

6.11 *Retail trade*

The sector is defined by the ONS as comprising 2-digit SIC sector 47. Resultantly, the sector encompasses 44 constituent (5-digit SIC) sub-sectors.

Table 6.12: Sector overview, 2019-20

	Retail trade	*Rank (out of 32 sectors)*
Sector employment share	10.5%	*1*
Sector GVA share	9.5%	*3*
Sector productivity relative to average	90.5%	*12*
Sub-sectoral productivity deviation	50.6%	*17*
Spatial productivity deviation	13.9%	*30*

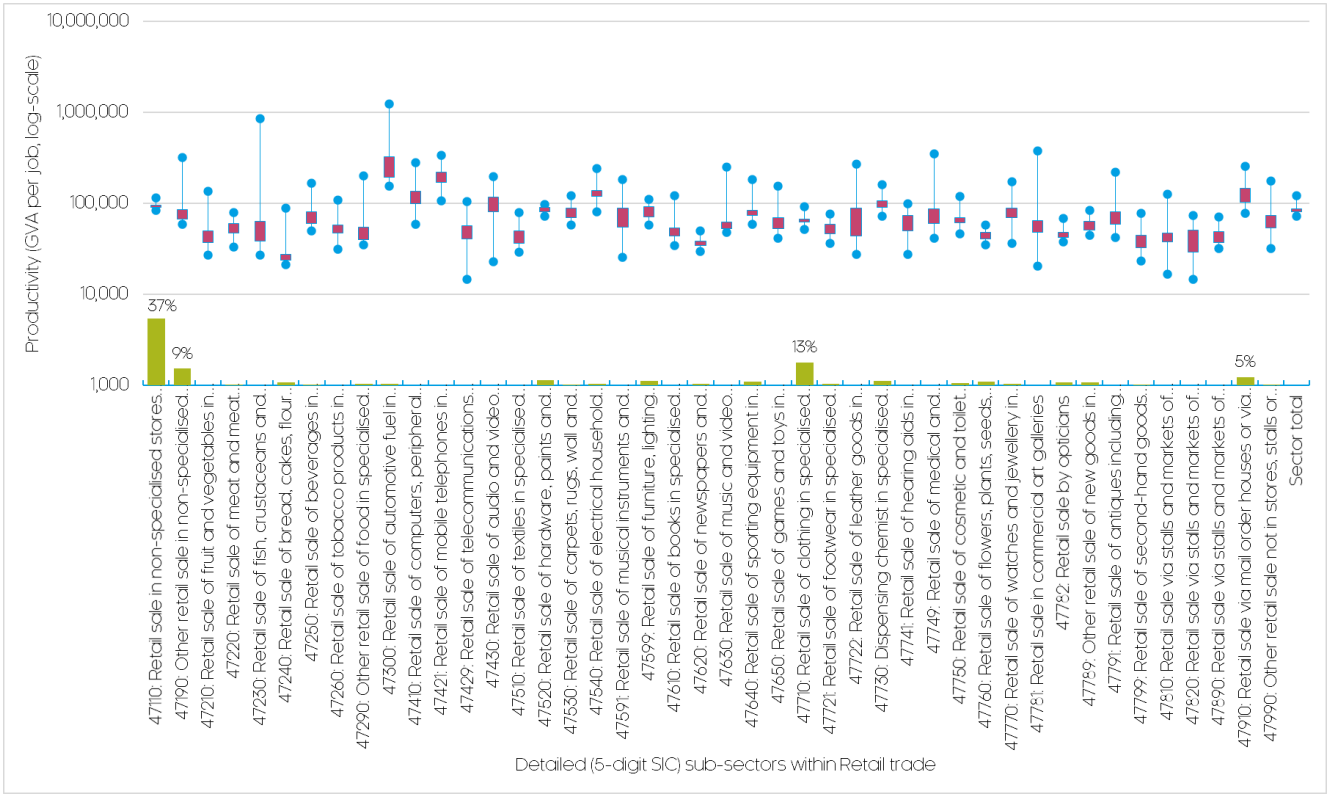
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.12 shows, a large sector and significant employer, its share of total employment is marginally higher than that of GVA. As a result, productivity in the sector is below the national average, albeit marginally, with the sector still middle-upper ranking for productivity.

The sector displays relatively low sectoral variance, with a 51% standard deviation in sub-sectoral productivity (i.e., across the 44 constituent sub-sectors), ranking in the lower half of all sectors. Spatial variance is significantly lower, with only a 14% standard deviation in productivity across LEP areas, the third lowest of all sectors.

Figure 6.22 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst green bars show sub-sectoral employment shares.

Figure 6.22: Spatial and sub-sectoral productivity variance within the sector, 2019-20

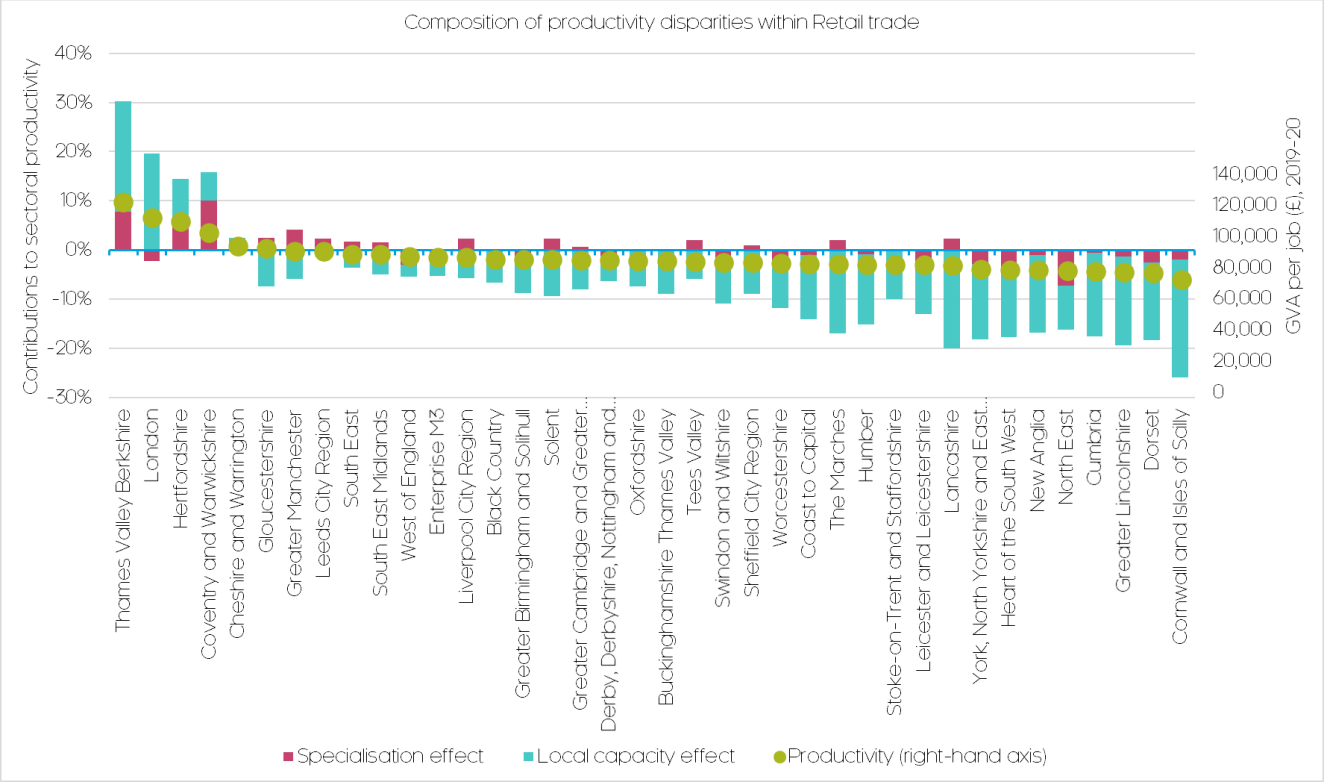


Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

Across sub-sectors, spatial variance is low and relatively consistent with few extremes. As with wholesale trades, higher variance is more notable in the retail of manufactured and raw material-derived goods (e.g., fuels, specialised food and drink, electronics, and software etc.), which also include the most productive sub-sectors. Lower variance, and productivity, is observed in non-specialised retail (e.g., supermarkets) and other consumer goods.

Figure 6.23 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Thames Valley Berkshire), to the least productive (Cornwall and Isles of Scilly).

Figure 6.23: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

A similar pattern is observed to that of wholesale trades. For many lower-middle and even some top-ranking regions, productivity disparities are being explained by large local capacity effects, which are almost always negative.

For the top performers, specialisation effects are more notable, such as in Thames Valley Berkshire, Coventry and Warwickshire, and Hertfordshire, though these are often also boosted by more significant local capacity effects. These specialisation effects persist throughout other middle-upper ranking regions, though often on a smaller scale.

A number of lower ranking regions, with large negative local capacity effects, are also compounded by negative specialisation effects, such as in the North East, Heart of the South West, and Leicester and Leicestershire.

6.12 *Land, water and air transport*

The sector is defined by the ONS as comprising 2-digit SIC sectors 49-51. Resultantly, the sector encompasses 17 constituent (5-digit SIC) sub-sectors.

Table 6.13: Sector overview, 2019-20

	Land, water and air transport	*Rank (out of 32 sectors)*
Sector employment share	2.2%	*18*
Sector GVA share	1.5%	*21*
Sector productivity relative to average	64.9%	*21*
Sub-sectoral productivity deviation	90.7%	*6*
Spatial productivity deviation	34.3%	*15*

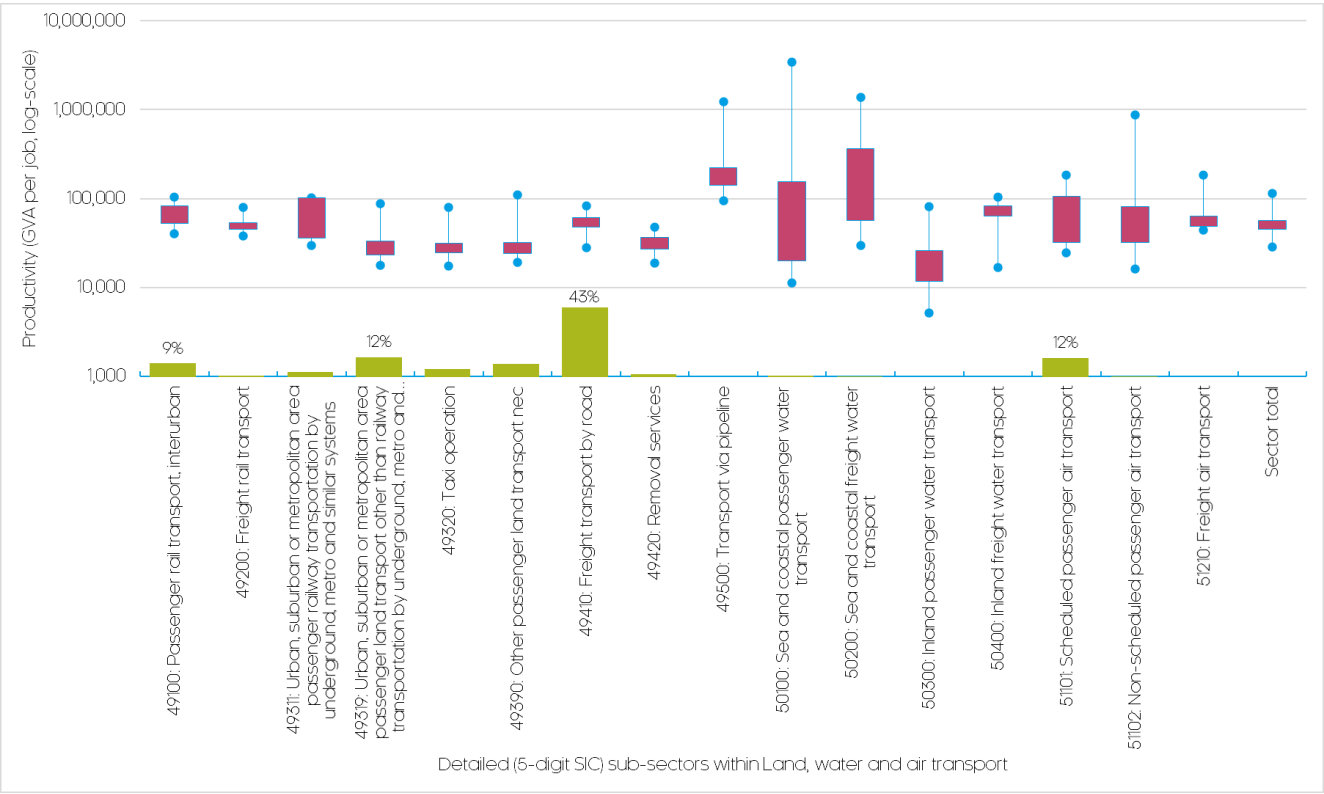
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.13 shows, the sectors share of total employment is higher than that of GVA. Consequently, productivity is below the national average, in the bottom half of all sectors, and the least productive transport-related activity.

Despite this, the sector displays very high sectoral variance, with a 91% standard deviation in sub-sectoral productivity (i.e., across the 17 constituent sub-sectors), the sixth highest of all sectors. Spatial variance is significantly lower, with a 34% standard deviation in productivity across LEP areas.

Figure 6.24 looks at these sectoral and spatial disparities in more detail; pink bars highlight

Figure 6.24: Spatial and sub-sectoral productivity variance within the sector, 2019-20



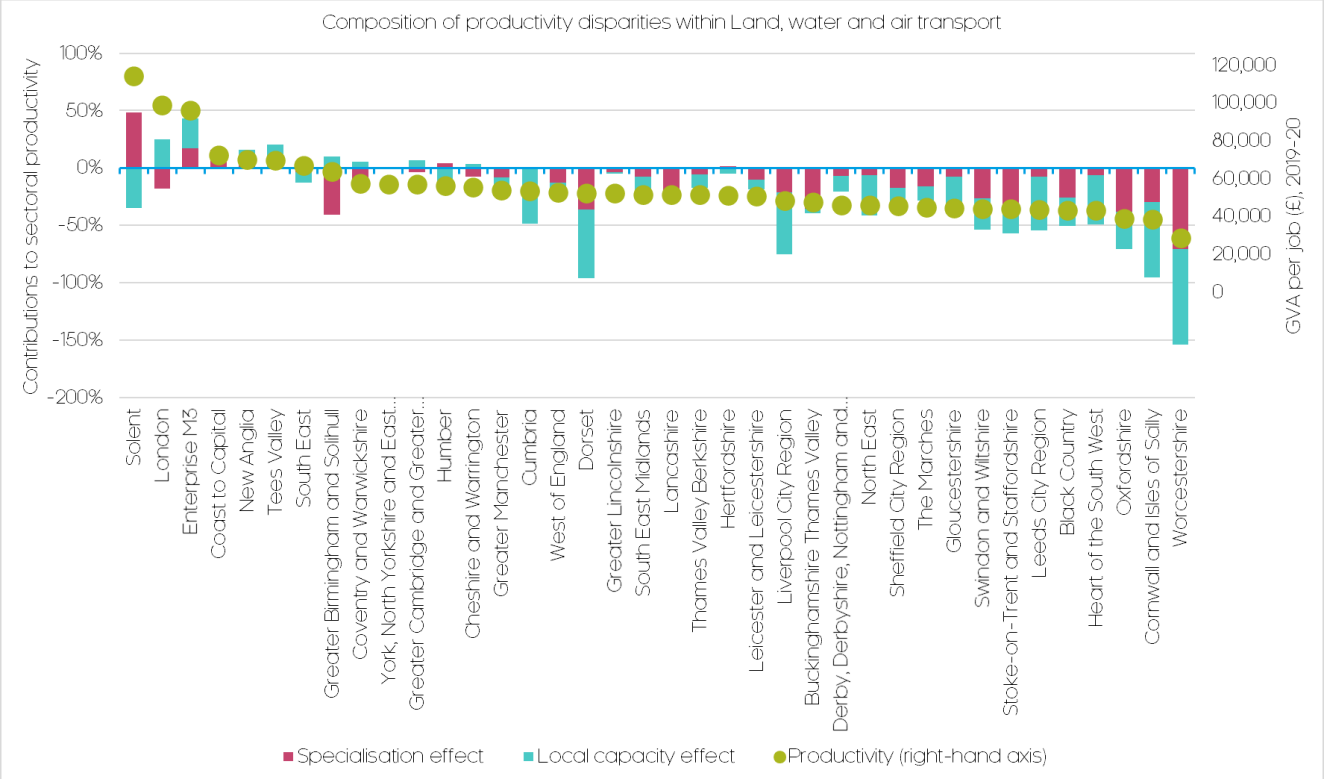
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst green bars show sub-sectoral employment shares.

The sector displays low and relatively consistent variance across the labour-intensive land-based transport sub-sectors, with associated sub-sectoral productivity clustered around the sector average. Air and water-based transport sub-sectors show significantly higher variance, whilst also including some of the most productive sub-sectors, though they retain low employment shares.

Figure 6.25 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Solent), to the least productive (Worcestershire).

Figure 6.25: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

Interestingly, the sector shows an increased emphasis on sector specialisation effects; that is, a regions performance is generally determined by the structure and concentration of sub-sectors in that region.

Strong performers, such as Solent, Coast to Capital, Enterprise M3 and New Anglia show specialisations in high productivity sub-sectors, particularly air and water-based transport activities (notably, these LEP areas all host significant ports and/or airports).

Meanwhile, poorer performers, such as Worcestershire, Oxfordshire, and Black Country, show low specialisation in these high productivity sub-sectors, with greater dependence on lower productivity sub-sectors (particularly land-transport based activities).

There are still some significant local capacity effects, particularly for middle-lower ranking LEP areas – typically, these large negative local capacity effects compound already poor sectoral specialisation. Interestingly, the highest productivity LEP area, Solent, shows negative local capacity effects, with its overperformance driven entirely by sector specialisation.

6.13 *Warehousing, transport support, postal and courier activities*

The sector is defined by the ONS as comprising 2-digit SIC sectors 52-53. As such, the sector encompasses 16 constituent (5-digit SIC) sub-sectors.

Table 6.14: Sector overview, 2019-20

	Warehousing, transport support, postal etc.	*Rank (out of 32 sectors)*
Sector employment share	2.4%	*13*
Sector GVA share	1.7%	*18*
Sector productivity relative to average	72.2%	*18*
Sub-sectoral productivity deviation	48.3%	*19*
Spatial productivity deviation	23.6%	*22*

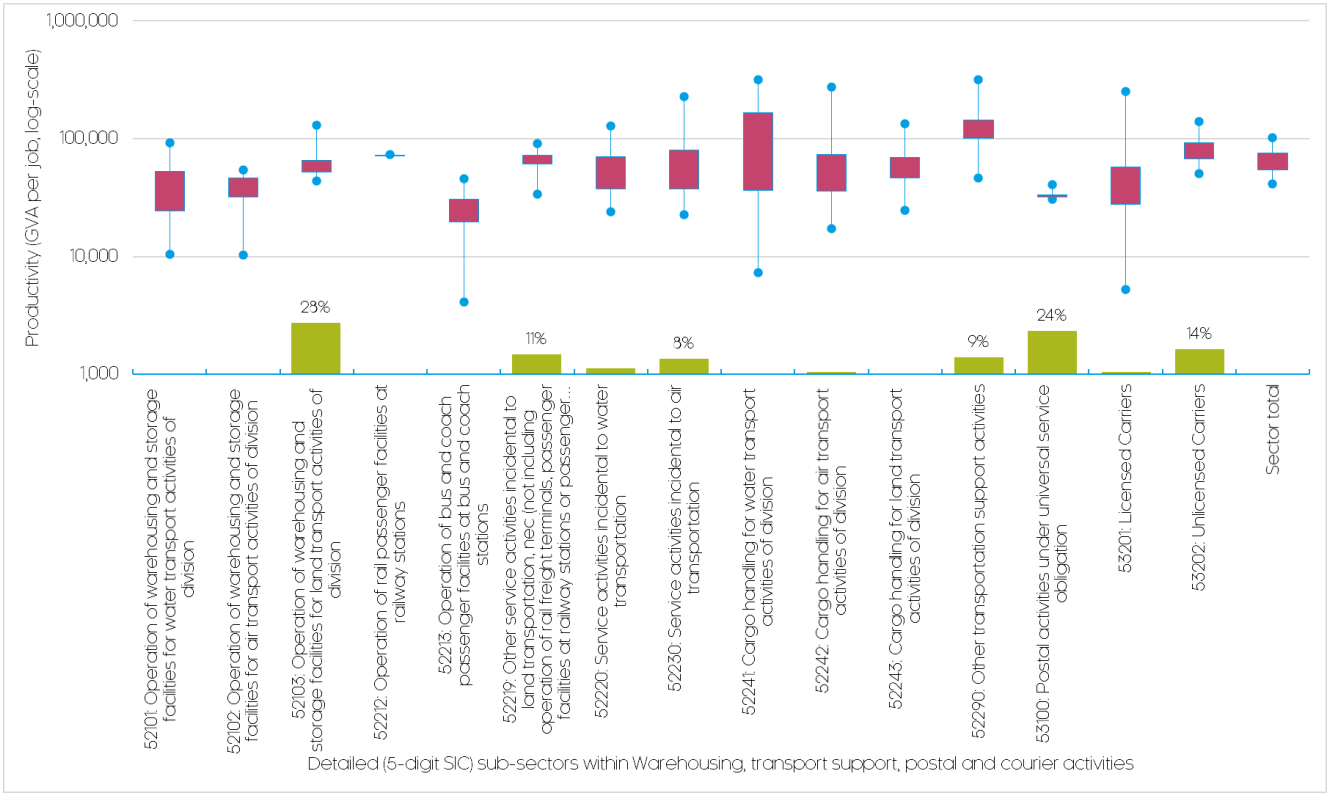
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.14 shows, the sector's share of total employment is higher than that of GVA. As a result, productivity is some 38% below the national average, putting the sector lower-middle ranking for productivity.

Sectoral variance is relatively low in the sector, with only a 48% standard deviation in sub-sectoral productivity (i.e., across the 16 constituent sub-sectors). Spatial variance is also low, with only a 24% standard deviation in productivity across LEP areas.

Figure 6.26 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst green bars show sub-sectoral employment shares.

Figure 6.26: Spatial and sub-sectoral productivity variance within the sector, 2019-20

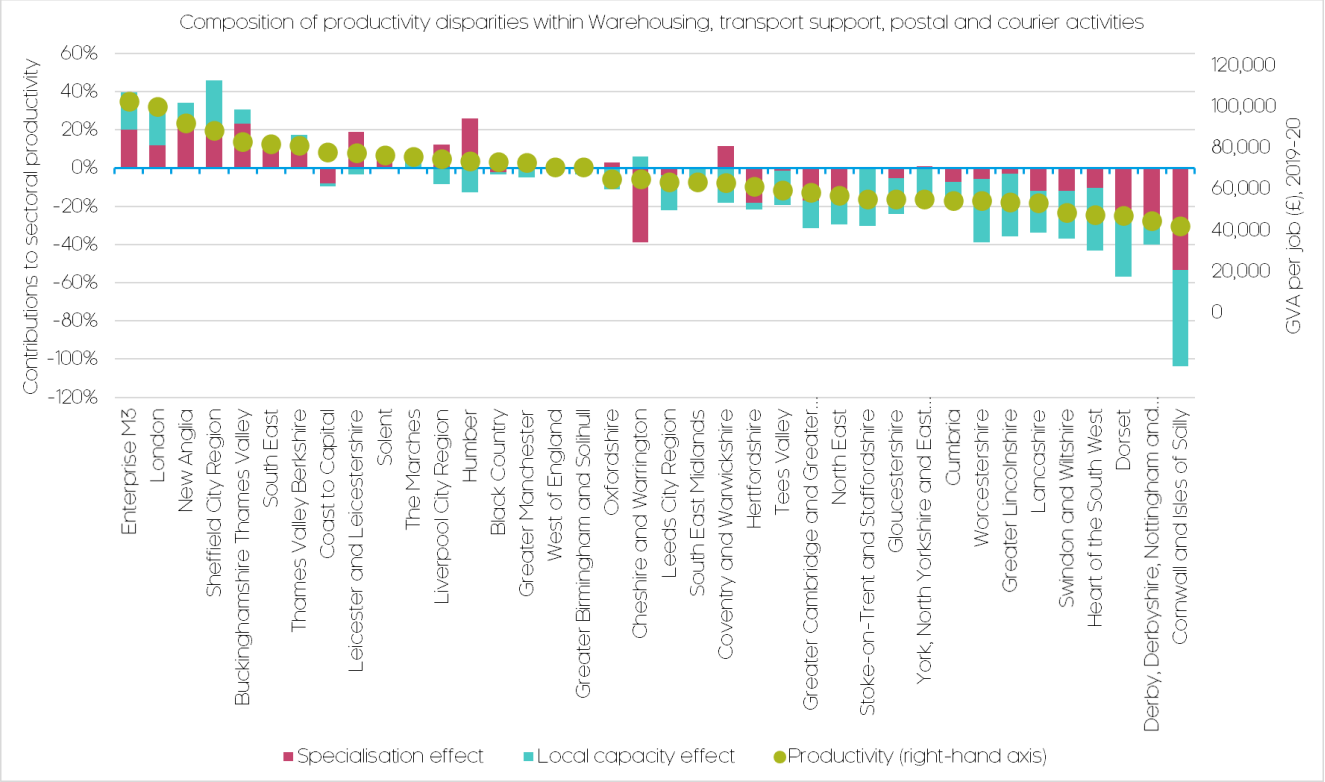


Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

Most notable is the very low sectoral variance, with sub-sectoral productivity largely clustered around the sector average. There is greater spatial variance, largely confined to freight and cargo-related sub-sectors (particularly those relating to air and water transport), which are also some of the most productive sub-sectors.

Figure 6.27 shows the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Enterprise M3), to the least productive (Cornwall and Isles of Scilly).

Figure 6.27: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

As with other transport-related activity, the sector exhibits greater sector specialisation effects; that is, a regions performance is generally determined by the structure and concentration of sub-sectors in that region.

Strong performers, such as Enterprise M3, New Anglia and Liverpool City Region show specialisations in high productivity sub-sectors, particularly air and water-based freight and cargo activities (notably, these LEP areas all host significant ports and/or airports).

Poorer performers, meanwhile, such as Cornwall and Isles of Scilly, Oxfordshire, and Black Country, show low specialisation in these high productivity sub-sectors, with greater dependence on lower productivity sub-sectors (particularly land-transport related).

There are still some significant local capacity effects, particularly for lower ranking LEP areas – typically, these negative local capacity effects compound already poor sectoral specialisation. Many of the top performing LEP areas are also boosted by smaller local capacity effects.

6.14 *Accommodation and food service activities*

The sector is defined by the ONS as comprising 2-digit SIC sectors 55-56. As a result, the sector encompasses 13 constituent (5-digit SIC) sub-sectors.

Table 6.15: Sector overview, 2019-20

	Accommodation and food service activities	*Rank (out of 32 sectors)*
Sector employment share	7.8%	*4*
Sector GVA share	2.0%	*10*
Sector productivity relative to average	26.1%	*28*
Sub-sectoral productivity deviation	23.4%	*27*
Spatial productivity deviation	15.2%	*29*

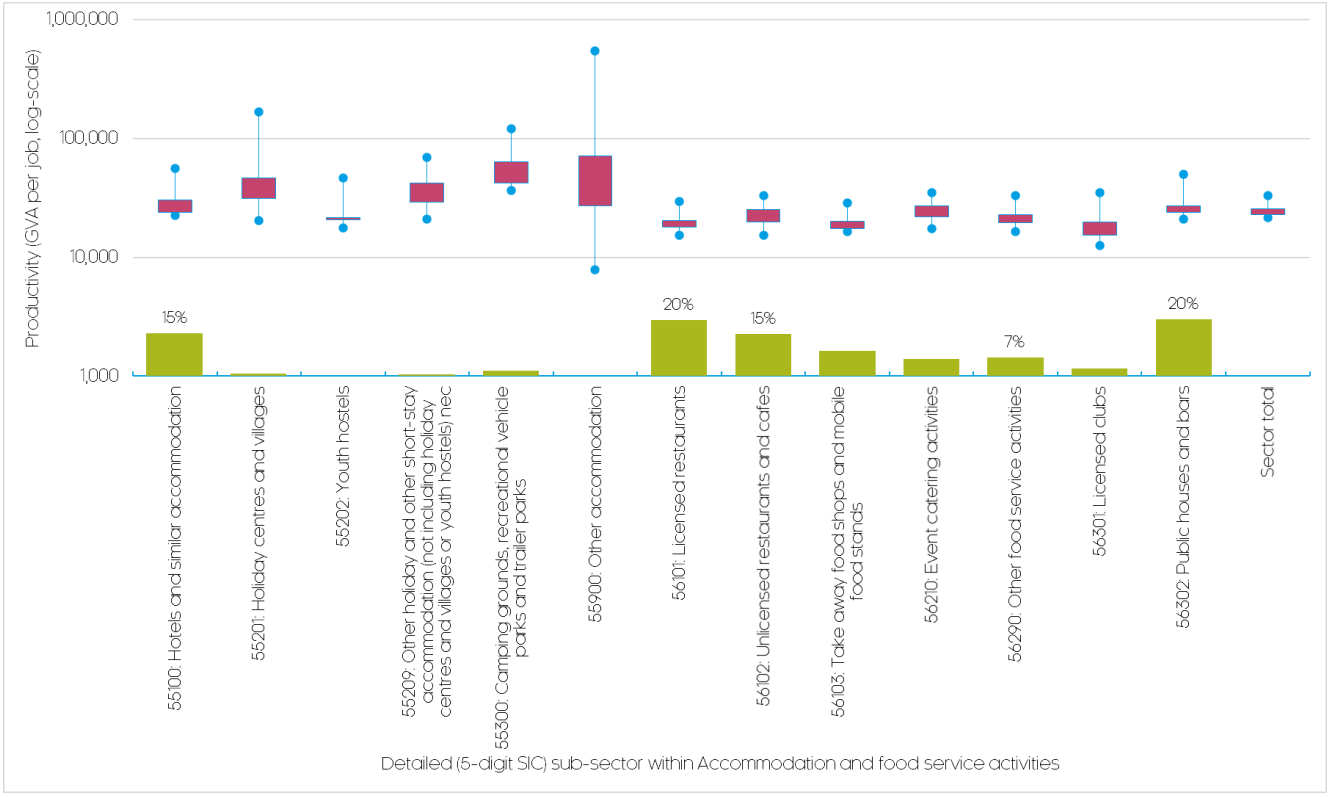
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.14 shows, this is a large sector and significant employer, and its share of total employment is much higher than that of GVA. Consequently, productivity in the sector is low, approximately a quarter of the national average, with the sector having the fifth lowest productivity of all sectors.

There is relatively low sectoral variance in the sector, with a 23% standard deviation in sub-sectoral productivity (i.e., across the 13 constituent sub-sectors), the sixth lowest of all sectors. Spatial variance is even lower, with only a 15% standard deviation in productivity across LEP areas, the fourth lowest of all sectors.

Figure 6.28 looks at these sectoral and spatial disparities in more detail; pink bars highlight

Figure 6.28: Spatial and sub-sectoral productivity variance within the sector, 2019-20



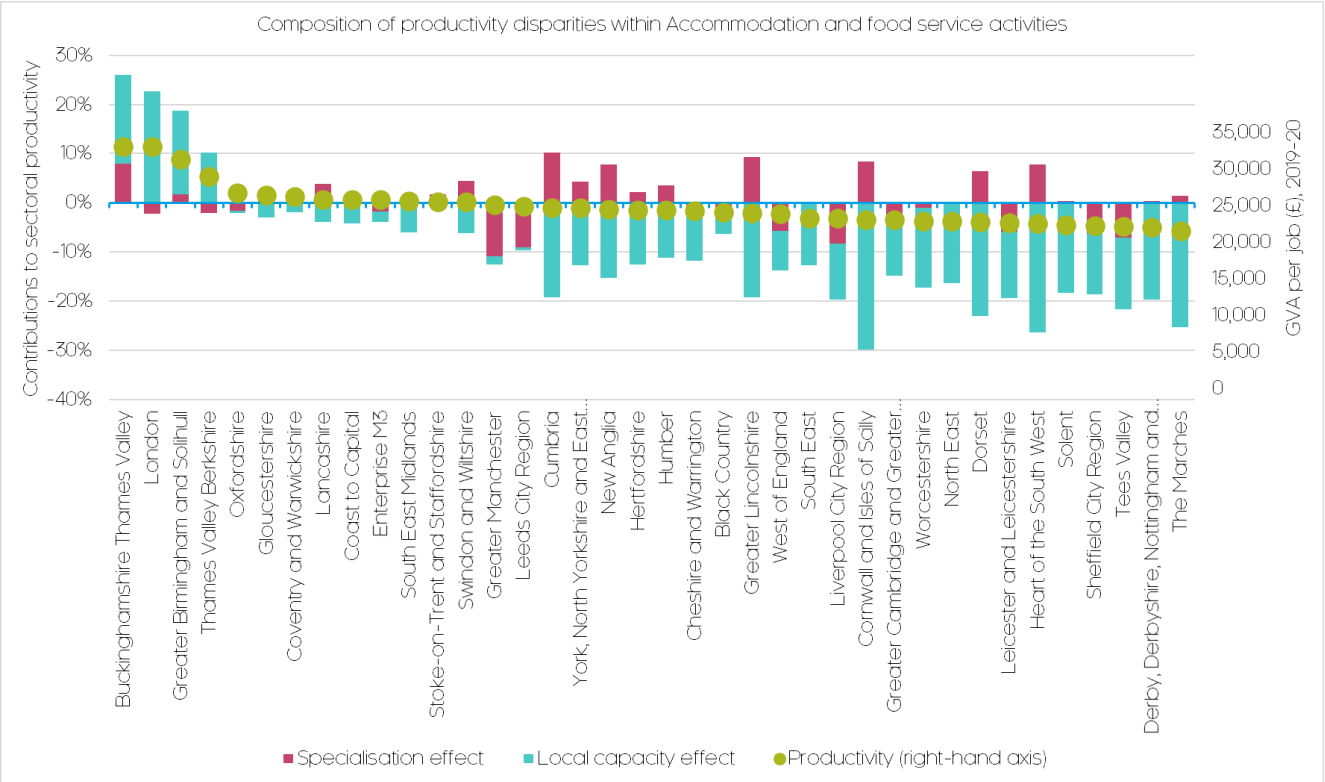
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst green bars show sub-sectoral employment shares.

Sectoral and spatial variance is notably lower within the labour-intensive food and beverage service sub-sectors, with accompanying sub-sectoral productivity consistent and largely clustered around the sector average. There is greater variance within accommodation sub-sectors, particularly relating to non-hotel accommodation.

Figure 6.29 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Buckinghamshire Thames Valley), to the least productive (The Marches).

Figure 6.29: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

Regional productivity disparities in the sector are largely explained by local capacity effects; that is, the best/worst performing regions retain an intrinsic productivity advantage/disadvantage, regardless of sectoral structure and specialisation.

However, there are still some notable and interesting specialisation effects, particularly for a number of middle-lower ranking regions. Though often positive, these specialisation effects are rarely significant enough to counteract the large, negative local capacity effects.

Interestingly, it is areas with significant and established visitor economies (e.g., Heart of the South West, Cornwall and Isles of Scilly, Cumbria, New Anglia) that often display favourable sectoral specialisations (particularly within visitor accommodation sub-sectors).

In contrast, some of the best performing regions (London, Greater Birmingham and Solihull, Thames Valley Berkshire) show negligible specialisation effects, but are boosted by large and advantageous local capacity effects.

6.15 *Information and communication*

The sector is defined by the ONS as comprising 2-digit SIC sectors 58-63. As a result, the sector encompasses 32 constituent (5-digit SIC) sub-sectors.

Table 6.16: Sector overview, 2019-20

	Information and communication	*Rank (out of 32 sectors)*
Sector employment share	4.5%	*5*
Sector GVA share	5.7%	*4*
Sector productivity relative to average	127.7%	*6*
Sub-sectoral productivity deviation	58.5%	*13*
Spatial productivity deviation	29.6%	*20*

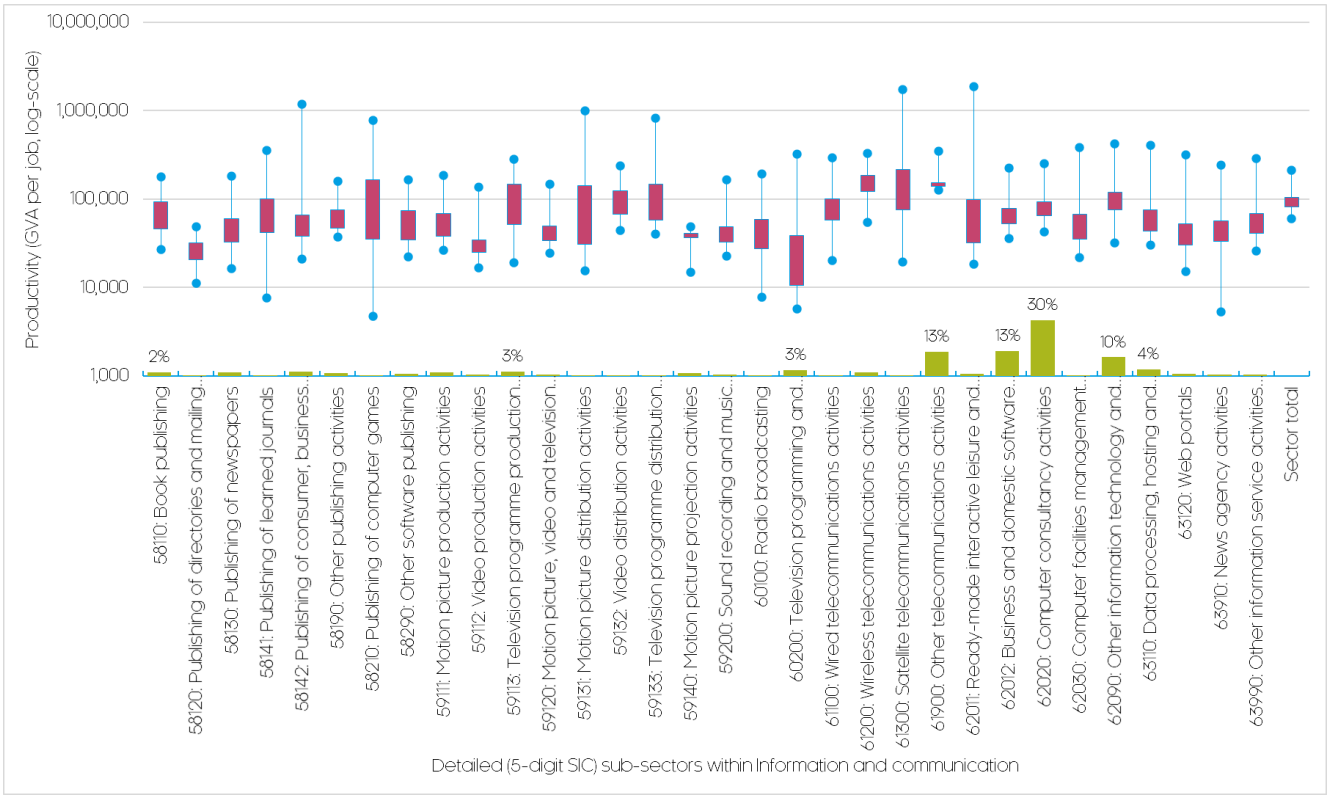
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.16 shows, this is a large and productive sector, its share of total GVA is higher than that of employment. Resultantly, productivity in the sector is some 28% higher the national average, and the sixth highest of all sectors.

The sector displays a reasonable amount of sectoral variance, with a 59% standard deviation in sub-sectoral productivity (i.e., across the 32 constituent sub-sectors). Spatial variance is lower however, with only a 30% standard deviation in productivity across LEP areas.

Figure 6.30 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst green bars show sub-sectoral employment shares.

Figure 6.30: Spatial and sub-sectoral productivity variance within the sector, 2019-20

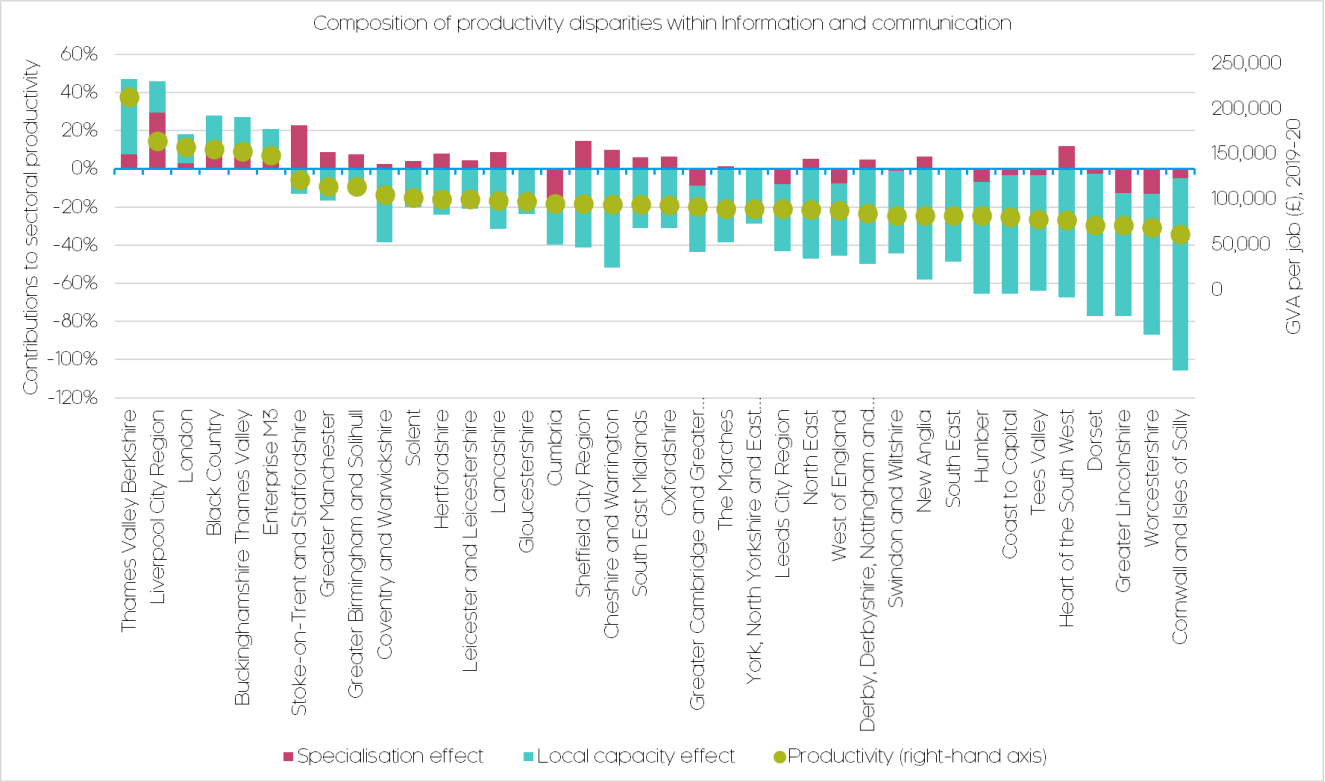


Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

Across the diverse range of activities captured by the sector, there is notable variance in sub-sectoral productivity levels. Spatial variance is also consistently high, particularly within motion picture and broadcasting sub-sectors. Sub-sectors relating to computer programming and software development and publishing show more limited, whilst retaining sizeable employment shares.

Figure 6.31 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Thames Valley Berkshire), to the least productive (Cornwall and Isles of Scilly).

Figure 6.31: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

As with other service-based sectors, regional productivity disparities in the sector are largely explained by local capacity effects; that is, the best/worst performing regions retain an intrinsic productivity advantage/disadvantage, regardless of sectoral structure and specialisation.

These effects explain the large underperformance of many lower-middle ranking LEP areas relative to the national average. There are still some notable and interesting specialisation effects though, particularly for the top performing areas, where they are typically positive and significant.

For instance, Thames Valley Berkshire, Liverpool City Region, and Buckinghamshire Thames Valley all display favourable specialisation effects, reflecting specialisations in high productivity sub-sectors, often broadcasting and programming/software related.

Some middle-lower ranking areas also display positive specialisations effects, though these are rarely significant enough to counteract the large, negative local capacity effects.

6.16 *Financial and insurance activities*

The sector is defined by the ONS as comprising 2-digit SIC sectors 64-66. Resultantly, the sector encompasses 34 constituent (5-digit SIC) sub-sectors.

Table 6.17: Sector overview, 2019-20

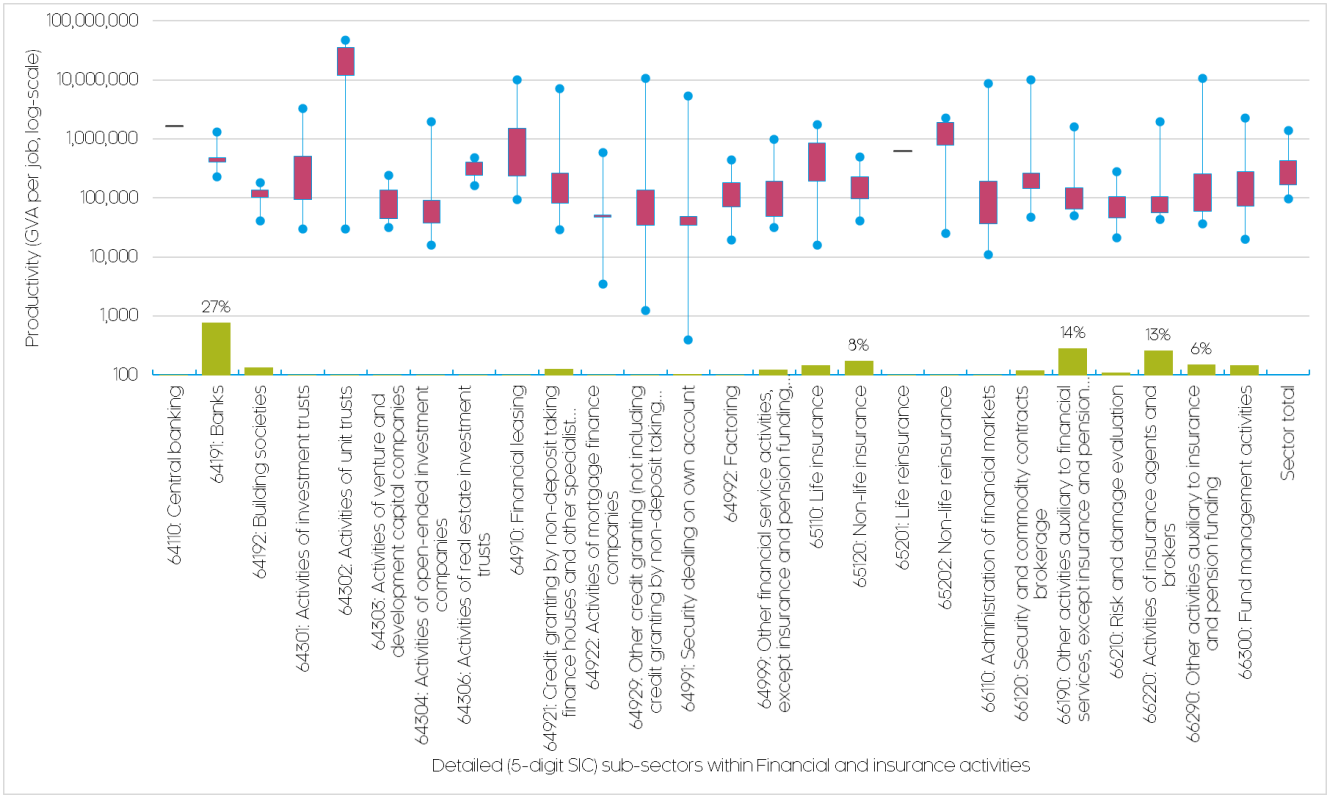
	Financial and insurance activities	*Rank (out of 32 sectors)*
Sector employment share	3.1%	*10*
Sector GVA share	24.6%	*1*
Sector productivity relative to average	802.1%	*1*
Sub-sectoral productivity deviation	167.1%	*2*
Spatial productivity deviation	67.8%	*2*

Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.17 shows, a large and productive sector, its share of total GVA is substantially higher than that of employment. Resultantly, productivity in the sector is very high, some 8 times the national average, making it the most productive sector. However, sector output is likely being overestimated given reporting issues in the IDBR (see *Appendix A: data collection and processing*).

The sector displays very high sectoral variance, with a 167% standard deviation in sub-sectoral productivity (i.e., across the 34 constituent sub-sectors), the second highest of all sectors. Spatial variance is also very high, with an 84% standard deviation in productivity across LEP areas, again the second highest of all sectors.

Figure 6.32: Spatial and sub-sectoral productivity variance within the sector, 2019-20



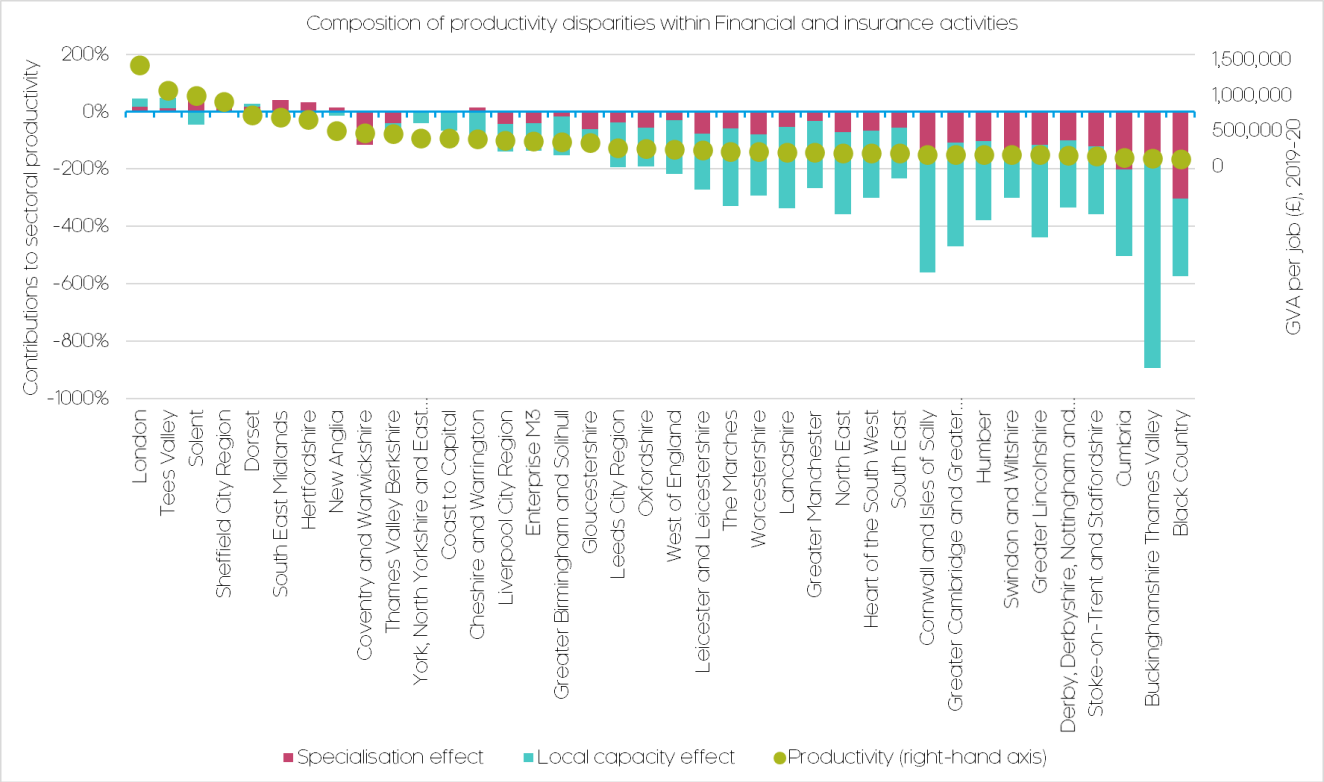
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

Figure 6.32 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst green bars show sub-sectoral employment shares.

There is a substantial amount of spatial and sectoral variance within the sector, driven largely by volatile productivity in specialised financial and insurance sub-sectors (e.g., trust and fund related activity, financial leasing and mortgage financing etc.). Yet some of the larger sub-sectors, such as banks and building societies, show very low spatial variance.

Figure 6.33 shows the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (London), to the least productive (Black Country).

Figure 6.33: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

The spatial variance within the sector is particularly notable, with only a handful of LEP areas showing positive local capacity effects. For the majority of lower-middle ranking regions, productivity disparities are being explained by significant and negative local capacity effects.

Many of these poorer performing regions are further compounded by negative specialisation effects; Black Country, Cumbria, and Swindon and Wiltshire all have large, negative specialisation effects, reflecting limited specialisations in higher productivity sub-sectors.

These specialisation effects also explain the improved performance of more productive regions such as Solent, Dorset, South East Midlands and Hertfordshire, who all retain unique specialisations in typically high productivity sub-sectors.

The top-performing region, London, also benefits from specialisation effects, but this is not the extent of its local capacity effects, with the highly productive performance in the city driven largely by its intrinsic productivity advantage.

6.17 Real estate activities

The sector is defined by the ONS as comprising 2-digit SIC sector 68. Resultantly, the sector encompasses 6 constituent (5-digit SIC) sub-sectors. Note that, to align with official productivity statistics, the following analysis of the sector excludes imputed rental income.

Table 6.18: Sector overview, 2019-20

	Real estate activities	*Rank (out of 32 sectors)*
Sector employment share	1.9%	*24*
Sector GVA share	1.7%	*19*
Sector productivity relative to average	90.4%	*13*
Sub-sectoral productivity deviation	28.9%	*22*
Spatial productivity deviation	33.0%	*17*

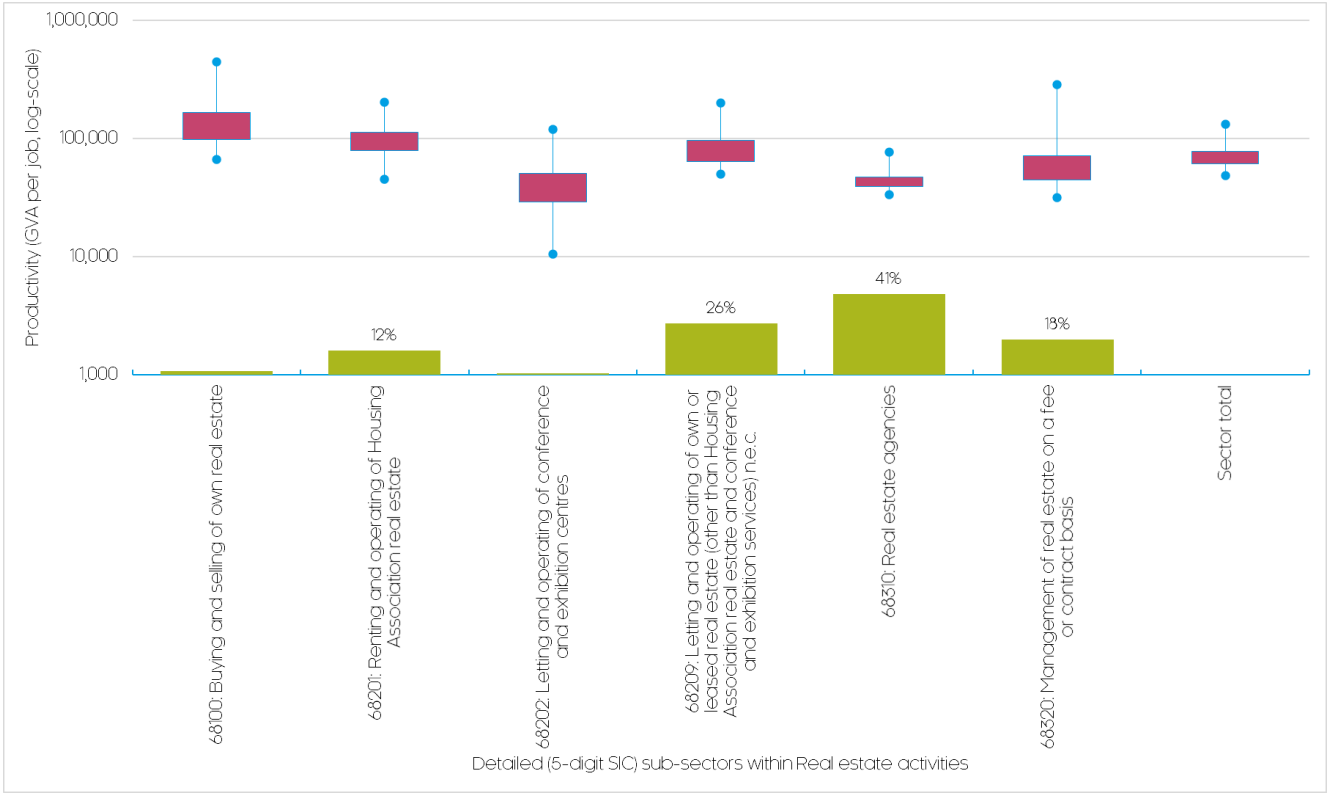
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.18 shows, the sectors share of total employment is slightly higher than that of GVA. As such, productivity is below average, albeit marginally and the sector still ranks in the top half of all sectors.

Both sectoral and spatial variance is middle ranking compared to other sectors, with a 29% standard deviation in sub-sectoral productivity (i.e., across the 6 constituent sub-sectors), and a 33% standard deviation in productivity across LEP areas.

Figure 6.34 explores these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub- sectoral productivity, whilst green bars show sub-sectoral employment shares.

Figure 6.34: Spatial and sub-sectoral productivity variance within the sector, 2019-20

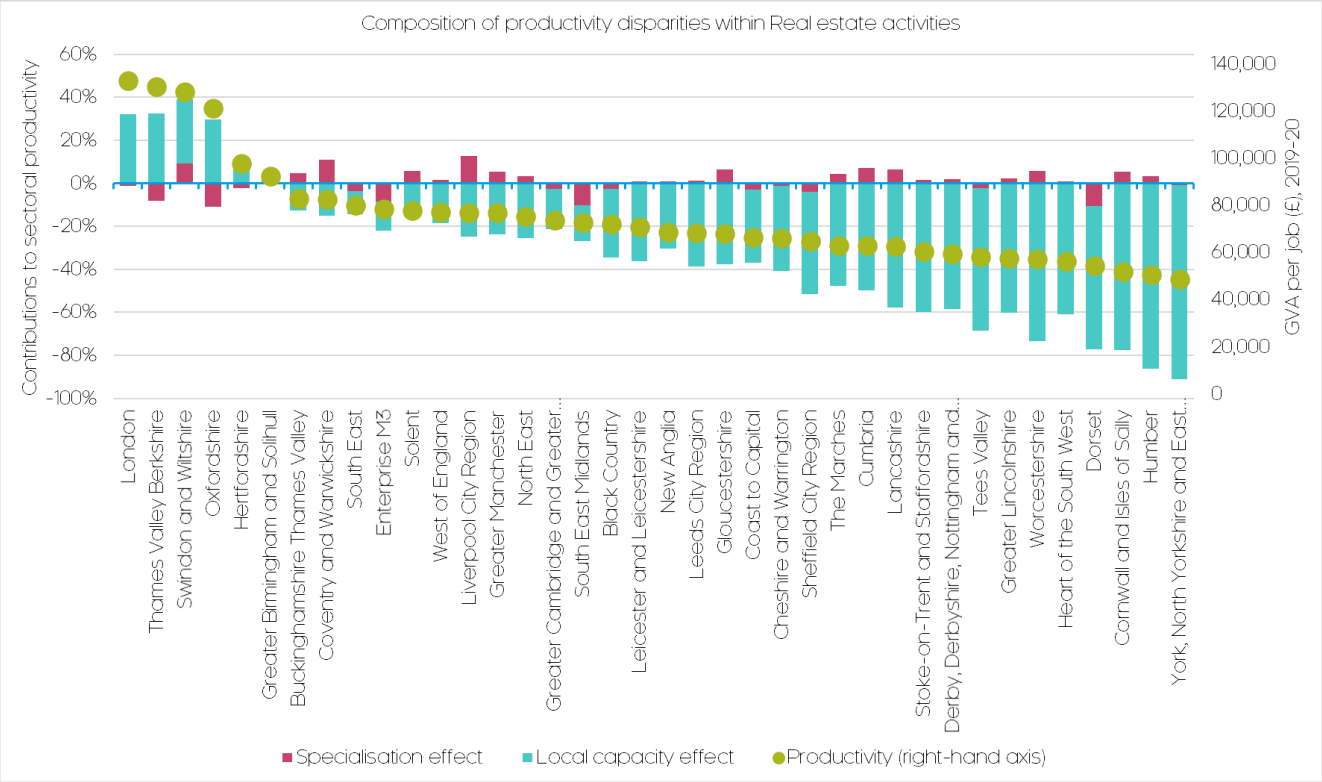


Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

Across sub-sectors, spatial variance and productivity is relatively consistent. The exception to this is real estate agencies, which is not only the largest sub-sector by employment, but also the one with the lowest spatial variance and productivity. Buying and leasing-related sub-sectors are the amongst most productive.

Figure 6.35 shows the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (London), to the least productive (York, North Yorkshire and East Riding).

Figure 6.35: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

As with other service-based sectors, regional productivity disparities in the sector are largely explained by local capacity effects; that is, the best/worst performing regions retain an intrinsic productivity advantage/disadvantage, regardless of sectoral structure and specialisation.

These effects are significant for almost all regions, and particularly explain the large underperformance of many lower-middle ranking LEP areas relative to the national average. There are still some notable specialisation effects, though the scale and significance of these is small compared to the local capacity effects.

Interestingly, for some of the best performing regions, such as London, Thames Valley Berkshire and Hertfordshire, these specialisation effects are negative, with performance driven solely by local capacity effects.

And for some middle-lower ranking regions, such as Liverpool City Region, Gloucestershire, and Cornwall and Isles of Scilly, these specialisation effects are positive, but are unable to offset large shortfalls in local capacity effects.

6.18 Legal and accounting activities

The sector is defined by the ONS as comprising 2-digit SIC sector 69. Resultantly, the sector encompasses 6 constituent (5-digit SIC) sub-sectors.

Table 6.19: Sector overview, 2019-20

	Legal and accounting activities	*Rank (out of 32 sectors)*
Sector employment share	2.3%	*17*
Sector GVA share	2.0%	*12*
Sector productivity relative to average	84.5%	*15*
Sub-sectoral productivity deviation	27.7%	*24*
Spatial productivity deviation	34.9%	*14*

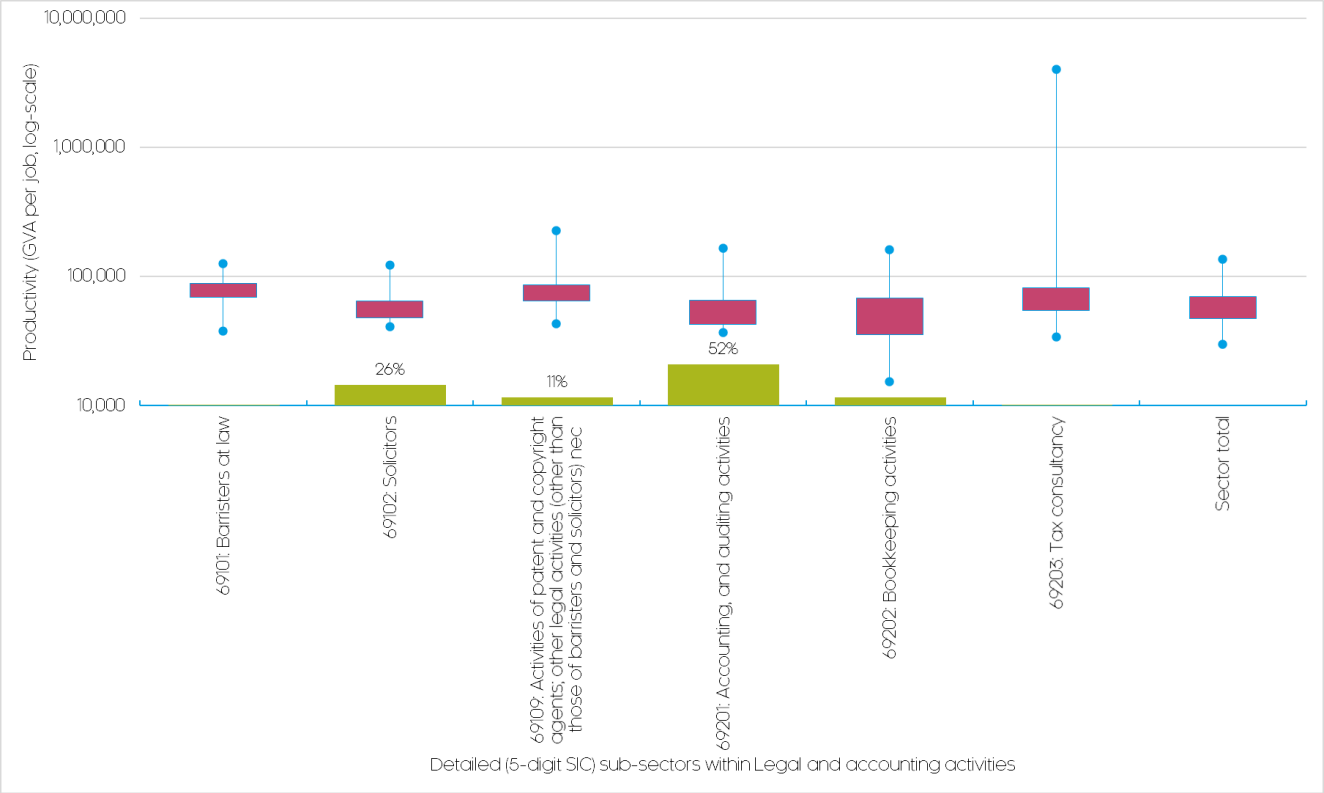
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.18 shows, the sector's share of total employment is slightly higher than that of GVA. Resultantly, productivity is below the national average, though the sector still ranks in the top half of all sectors.

Within the sector, there is relatively limited variance in productivity, with only a 28% standard deviation in sub-sectoral productivity (i.e., across the 6 constituent sub-sectors), the ninth lowest of all sectors. Spatial variance is marginally higher but still low, with a 35% standard deviation in productivity across LEP areas.

Figure 6.36 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst

Figure 6.36: Spatial and sub-sectoral productivity variance within the sector, 2019-20



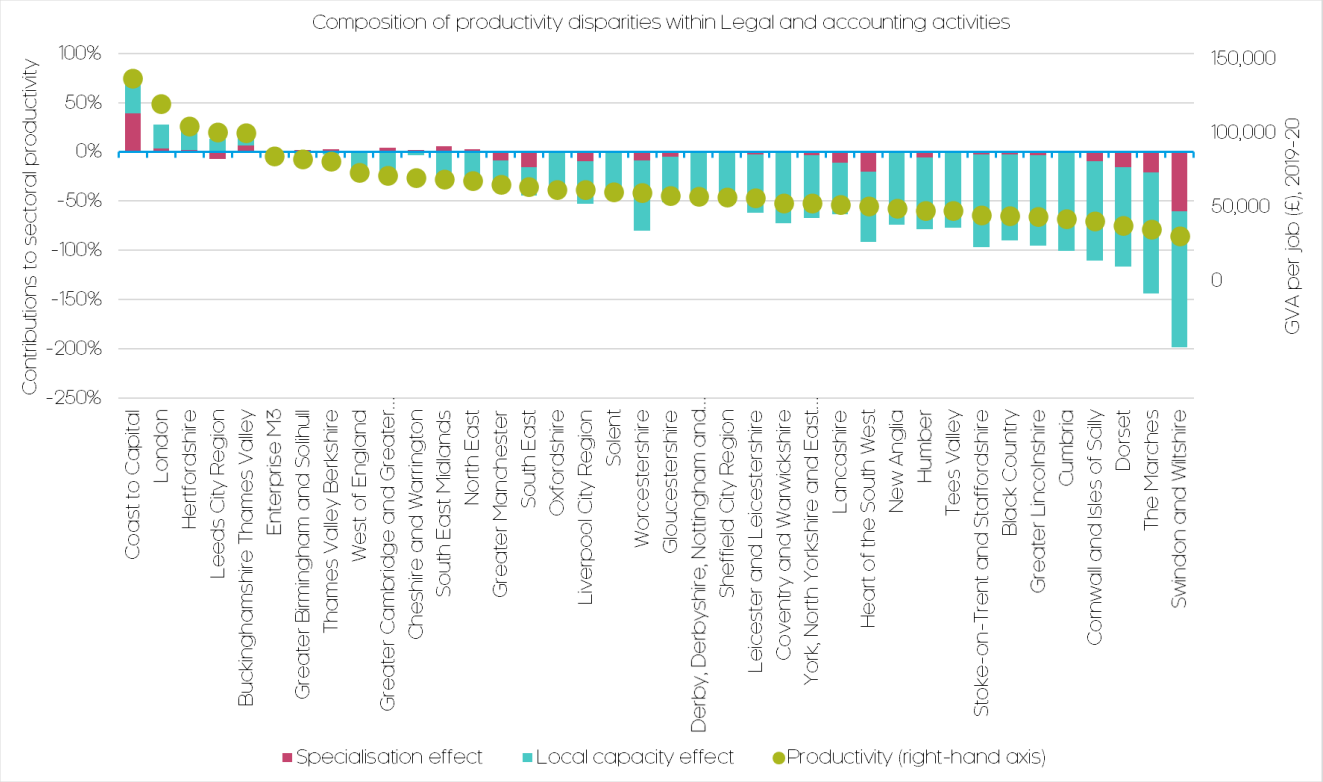
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

green bars show sub-sectoral employment shares.

Within the sector, legal service sub-sectors show relatively consistent spatial variance and productivity levels. Greater variance is observed in accounting and tax activities, which also include the most productive sub-sectors. The accounting and auditing sub-sector represents just over half of all activity in the sector.

Figure 6.37 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Coast to Capital), to the least productive (Swindon and Wiltshire).

Figure 6.37: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

Regional productivity disparities in the sector are overwhelmingly explained by local capacity effects; that is, the best/worst performing regions retain an intrinsic productivity advantage/disadvantage, regardless of sectoral structure and specialisation.

These effects are significant for almost all regions, and particularly explain the large underperformance of many lower ranking LEP areas relative to the national average, such as Swindon and Wiltshire, Dorset, and Cumbria.

There are some limited specialisation effects, though the scale and significance of these is small compared to the local capacity effects. Interestingly, for the top and bottom ranking regions (Coast to Capital and Swindon and Wiltshire), these specialisation effects are highly significant.

Generally, for the high productivity LEP areas, these specialisation effects are typically positive, and for the middle-lower ranking LEP areas, negative.

6.19 Head offices and management consultancy

The sector is defined by the ONS as comprising 2-digit SIC sector 70. As such, the sector encompasses 4 constituent (5-digit SIC) sub-sectors.

Table 6.20: Sector overview, 2019-20

	Head offices and management consult.	*Rank (out of 32 sectors)*
Sector employment share	1.9%	*22*
Sector GVA share	1.9%	*16*
Sector productivity relative to average	97.9%	*8*
Sub-sectoral productivity deviation	33.4%	*20*
Spatial productivity deviation	42.4%	*11*

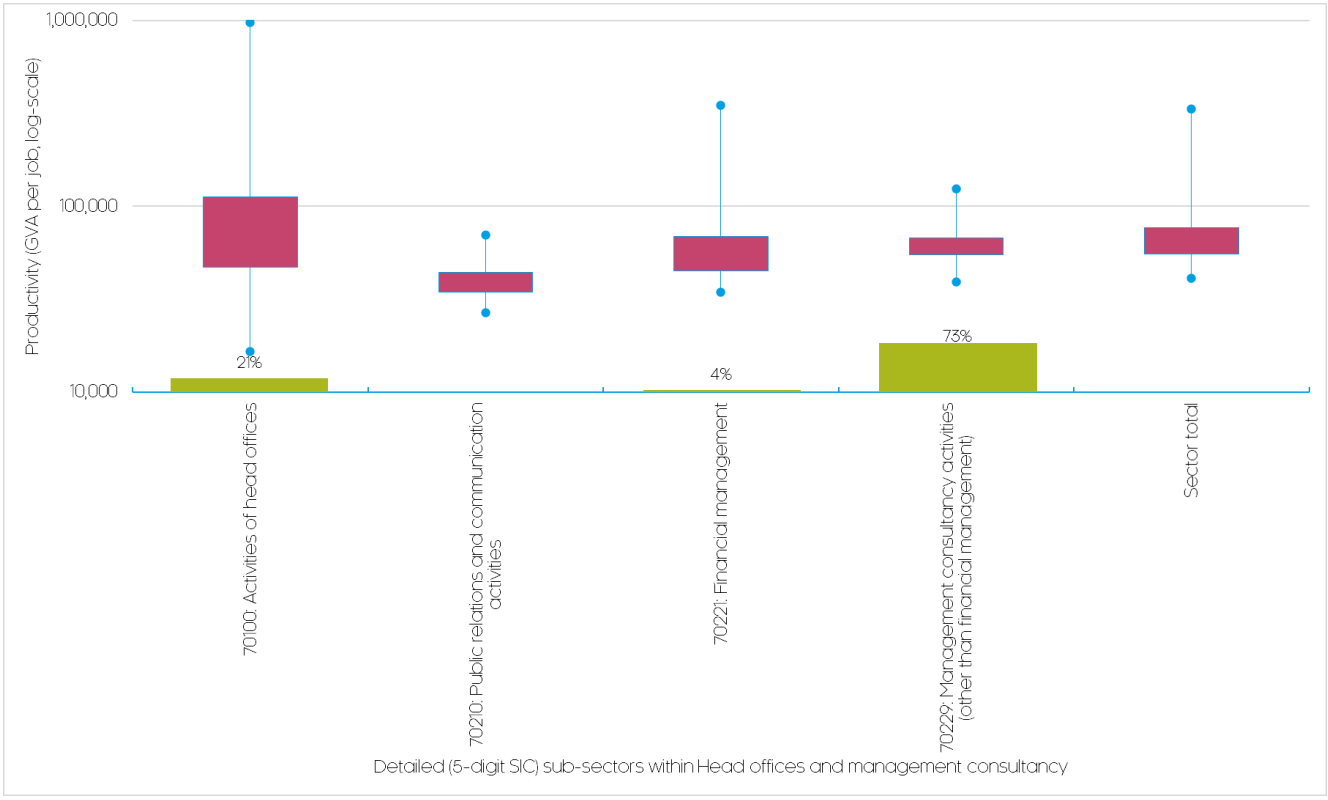
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.20 shows, the sector's share of total employment is roughly equal to that of GVA. As a result, productivity in the sector is in line with national average, whilst it ranks as the eight most productive sector, and the most productive in professional services.

Within the sector, there is relatively limited variance in productivity, with only a 33% standard deviation in sub-sectoral productivity (i.e., across the 4 constituent sub-sectors). Yet spatial variance is much higher, with a 42% standard deviation in productivity across LEP areas, in the top third of all sectors.

Figure 6.38 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub-

Figure 6.38: Spatial and sub-sectoral productivity variance within the sector, 2019-20



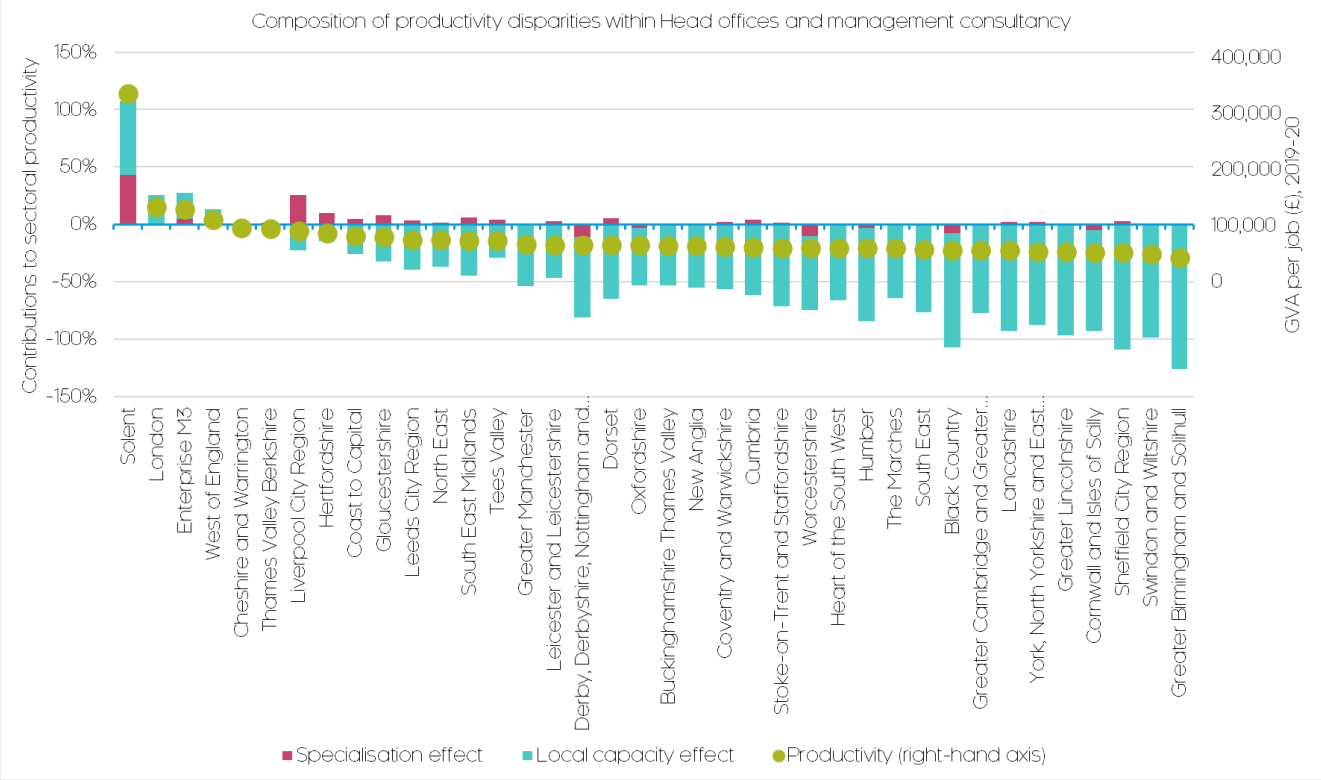
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

sectoral productivity, whilst green bars show sub-sectoral employment shares.

The activities of head offices sub-sector is the main driver of variance in the wider sector, with above average productivity and very high spatial variance, despite retaining a sizeable employment share. Activity in the sector is underpinned by the management consultancy sub-sector, which accounts for almost three-quarters of employment in the sector.

Figure 6.39 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Coast to Capital), to the least productive (Swindon and Wiltshire).

Figure 6.39: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

As with other professional services, regional productivity disparities in the sector are overwhelmingly explained by local capacity effects; that is, the best/worst performing regions retain an intrinsic productivity advantage/disadvantage, regardless of sectoral structure and specialisation.

These effects are significant for almost all regions, and particularly explain the large underperformance of many lower-middle ranking LEP areas relative to the national average, such as Greater Birmingham and Solihull, Swindon and Wiltshire, and Sheffield City Region.

Specialisation effects are limited and are mostly small and insignificant when compared to local capacity effects. These specialisation effects are typically more pronounced (and positive) for the more productive LEP areas.

Interestingly, the top performing LEP area, Solent, alongside a large local capacity effect, also shows a significant and positive specialisation effect, driven by the local concentration of highly productive head office activities.

6.20 *Architectural and engineering activities*

The sector is defined by the ONS as comprising 2-digit SIC sector 71. As such, the sector encompasses 6 constituent (5-digit SIC) sub-sectors.

Table 6.21: Sector overview, 2019-20

	Architectural and engineering activities	*Rank (out of 32 sectors)*
Sector employment share	1.6%	*26*
Sector GVA share	1.0%	*24*
Sector productivity relative to average	65.1%	*20*
Sub-sectoral productivity deviation	28.9%	*23*
Spatial productivity deviation	32.5%	*18*

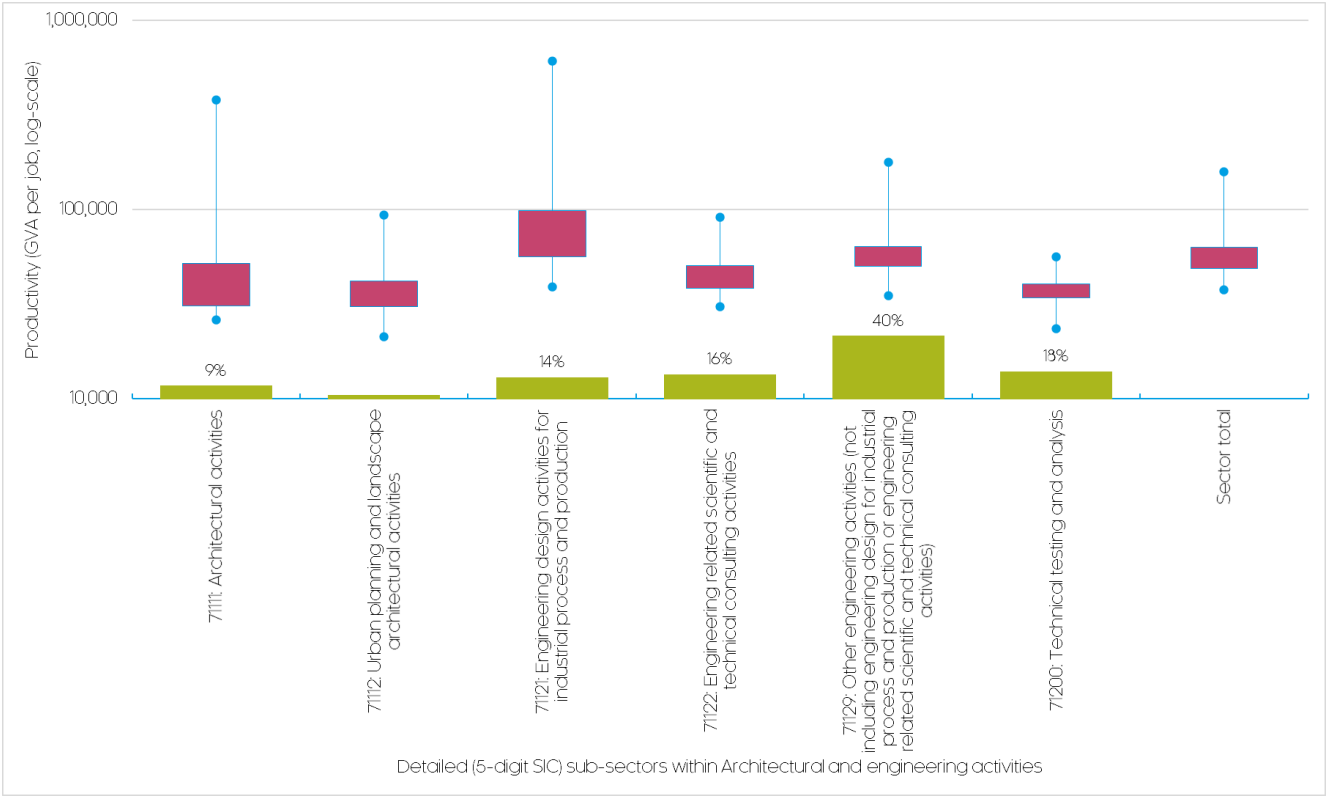
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.21 shows, the sector's share of total employment is higher than that of GVA. Resultantly, productivity is below the national average, whilst the sector is the least productive within professional services.

There is relatively limited variance in productivity within the sector, with only a 29% standard deviation in sub-sectoral productivity (i.e., across the 6 constituent sub-sectors), the tenth lowest of all sectors. Spatial variance is more notable, with a 33% standard deviation in productivity across LEP areas.

Figure 6.40 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub- sectoral productivity, whilst

Figure 6.40: Spatial and sub-sectoral productivity variance within the sector, 2019-20



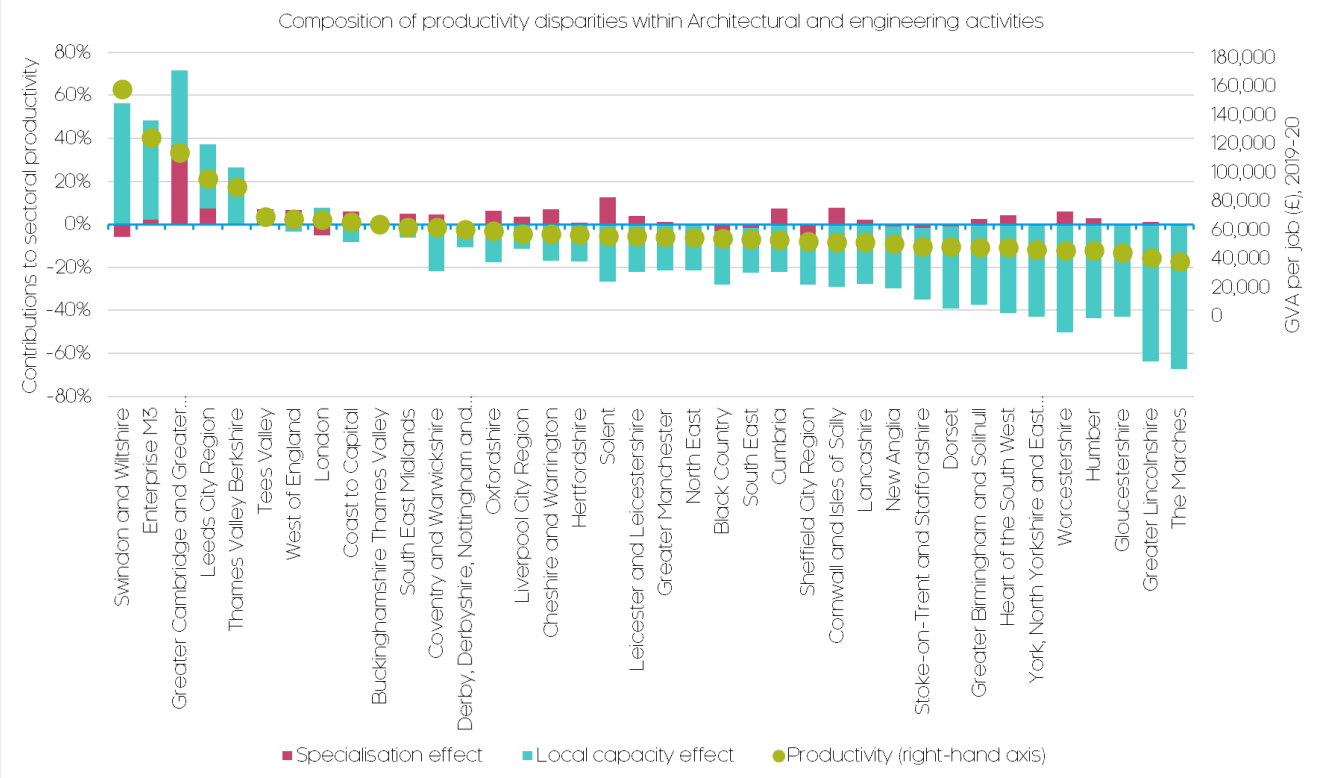
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

green bars show sub-sectoral employment shares.

Generally, sectoral variance is relatively low and consistent, with sub-sectoral productivity largely clustered around the sector average. Engineering design activities are somewhat of an exception, with high spatial variance in the sub-sector accompanying above-average productivity. Spatial variance is also notable in the architectural activities sub-sector.

Figure 6.41 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Swindon and Wiltshire), to the least productive (The Marches).

Figure 6.41: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

As with other professional services, regional productivity disparities in the sector are overwhelmingly explained by local capacity effects; that is, the best/worst performing regions retain an intrinsic productivity advantage/disadvantage, regardless of sectoral structure and specialisation.

These effects are significant for the majority regions, and particularly explain the large underperformance of many lower ranking LEP areas relative to the national average, such as The Marches, Greater Lincolnshire and Humber.

There are some specialisation effects, though the scale and significance of these is small compared to the local capacity effects. Interestingly, these specialisation effects are positive for the majority of regions, even those middle-lower ranking.

One of the top performing regions, Greater Cambridge and Greater Peterborough, shows a significant positive specialisation effect, driven by the local concentration of high productivity engineering design activities.

6.21 *Other professional, scientific and technical activities*

The sector is defined by the ONS as comprising 2-digit SIC sectors 72-75. Resultantly, the sector encompasses 16 constituent (5-digit SIC) sub-sectors.

Table 6.22: Sector overview, 2019-20

	Other professional, scientific etc.	*Rank (out of 32 sectors)*
Sector employment share	2.0%	*20*
Sector GVA share	1.9%	*17*
Sector productivity relative to average	92.5%	*11*
Sub-sectoral productivity deviation	68.0%	*8*
Spatial productivity deviation	51.9%	*8*

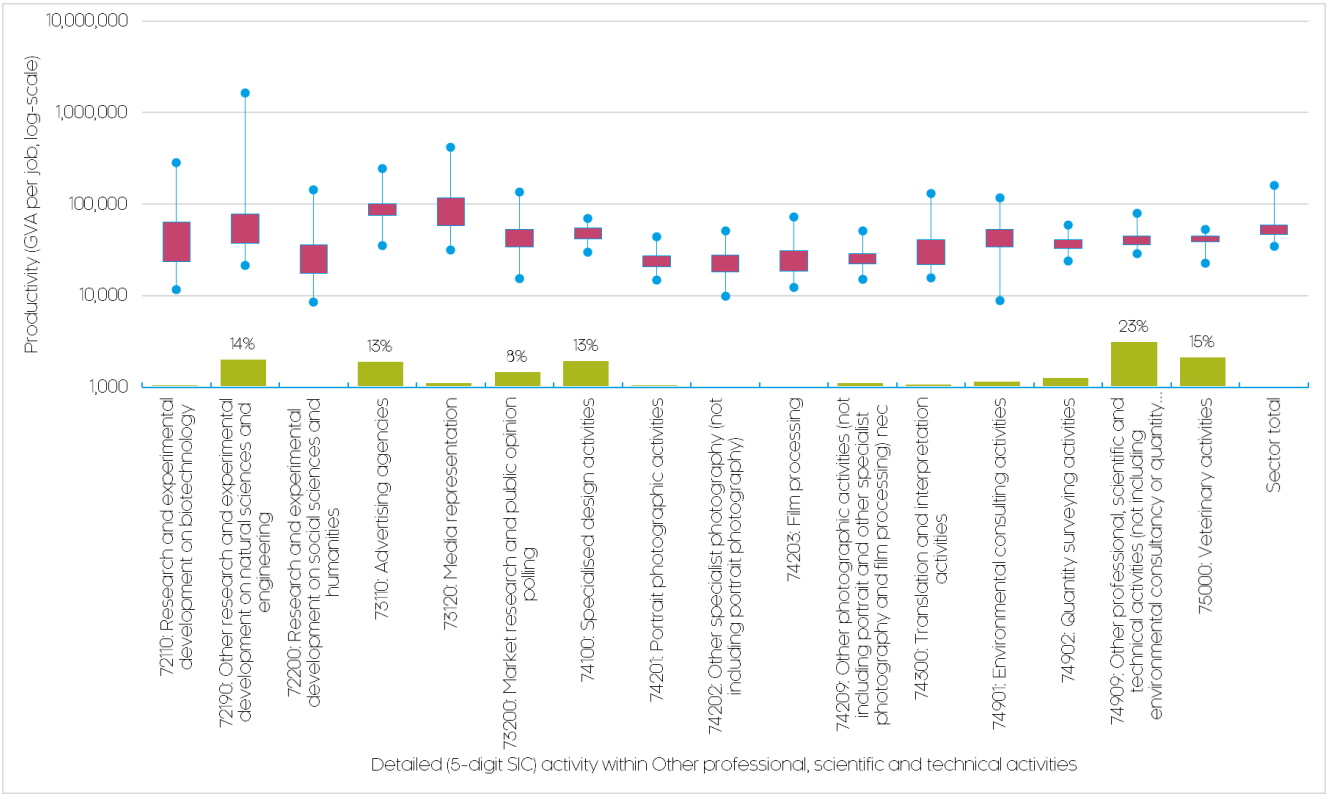
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.22 shows, the sector's share of total employment is slightly higher than that of GVA. Consequently, productivity is below average, albeit marginally and the sector still ranks in the top-third of most productive sectors.

Productivity variance within the sector is high, with a 68% standard deviation in sub-sectoral productivity (i.e., across the 16 constituent sub-sectors), the eight highest of all sectors. Spatial variance is lower but still notable, with a 52% standard deviation in productivity across LEP areas, again the eight highest of all sectors.

Figure 6.42 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub- sectoral productivity, whilst

Figure 6.42: Spatial and sub-sectoral productivity variance within the sector, 2019-20



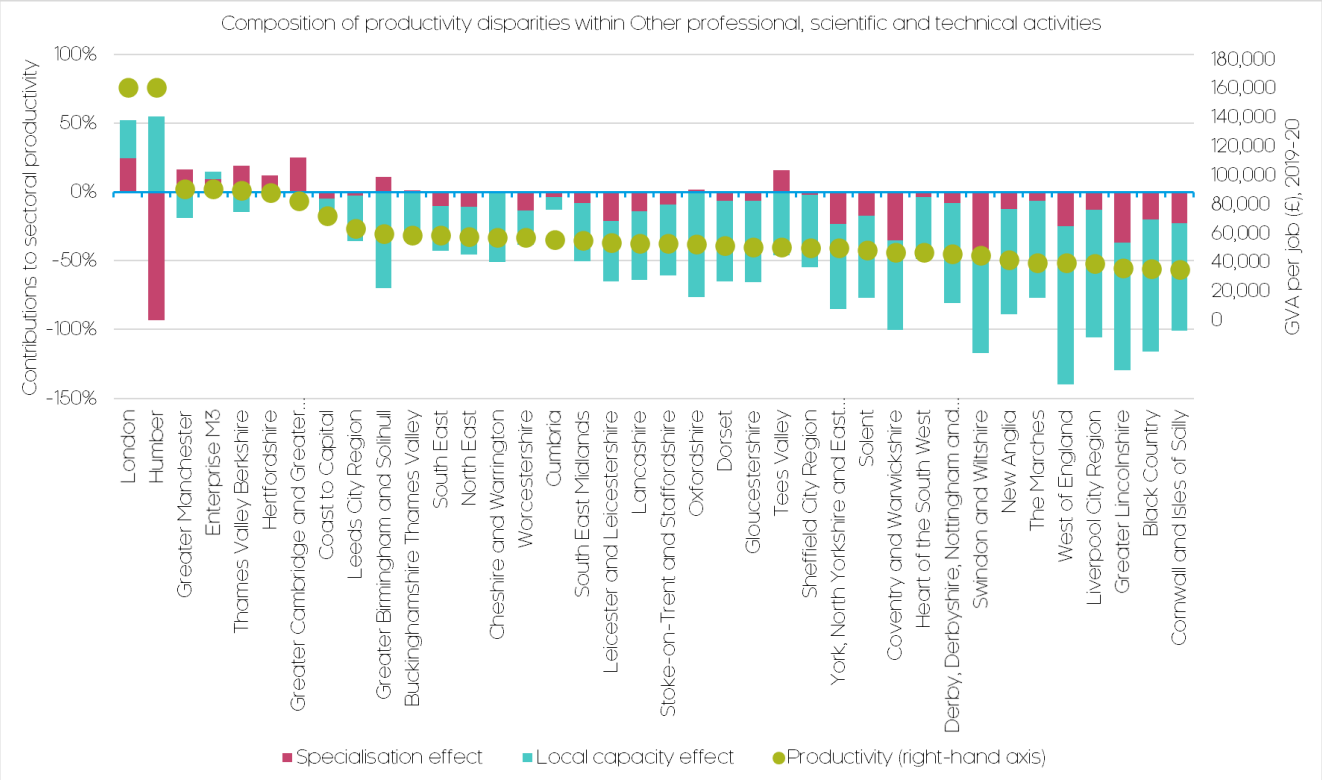
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

green bars show sub-sectoral employment shares.

Across the diverse range of activities represented by the sector, there is a notable variance in sub-sectoral productivity levels. The highly productive research and development, and media sub-sectors demonstrate the highest spatial variance. Sub-sectors relating to creative and other professional services are typically less productive and display lower spatial variance.

Figure 6.43 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (London), to the least productive (Cornwall and Isles of Scilly).

Figure 6.43: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

As with other professional services, regional productivity disparities in the sector are largely explained by local capacity effects; that is, the best/worst performing regions retain an intrinsic productivity advantage/disadvantage, regardless of sectoral structure and specialisation.

These effects are significant for the majority regions, and particularly explain the large underperformance of many lower ranking LEP areas relative to the national average. However, the sector does also display some notable specialisation effects, which are significant for some LEP areas.

For instance, many lower-ranking LEP areas are further compounded by large, negative specialisation effects. For the top performing regions, such as London, Greater Manchester, and Enterprise M3, these specialisation effects are even more significant, and often positive.

Humber, the second most productive LEP area, is an interesting outlier; significant and negative specialisation effects - attributable to limited activity in high productivity research and development and media sub-sectors - is counterbalanced by substantial and positive local capacity effects.

6.22 *Rental and leasing activities*

The sector is defined by the ONS as comprising 2-digit SIC sector 77. Resultantly, the sector encompasses 15 constituent (5-digit SIC) sub-sectors.

Table 6.23: Sector overview, 2019-20

	Rental and leasing activities	*Rank (out of 32 sectors)*
Sector employment share	0.6%	*32*
Sector GVA share	1.0%	*25*
Sector productivity relative to average	173.4%	*4*
Sub-sectoral productivity deviation	66.0%	*9*
Spatial productivity deviation	59.3%	*3*

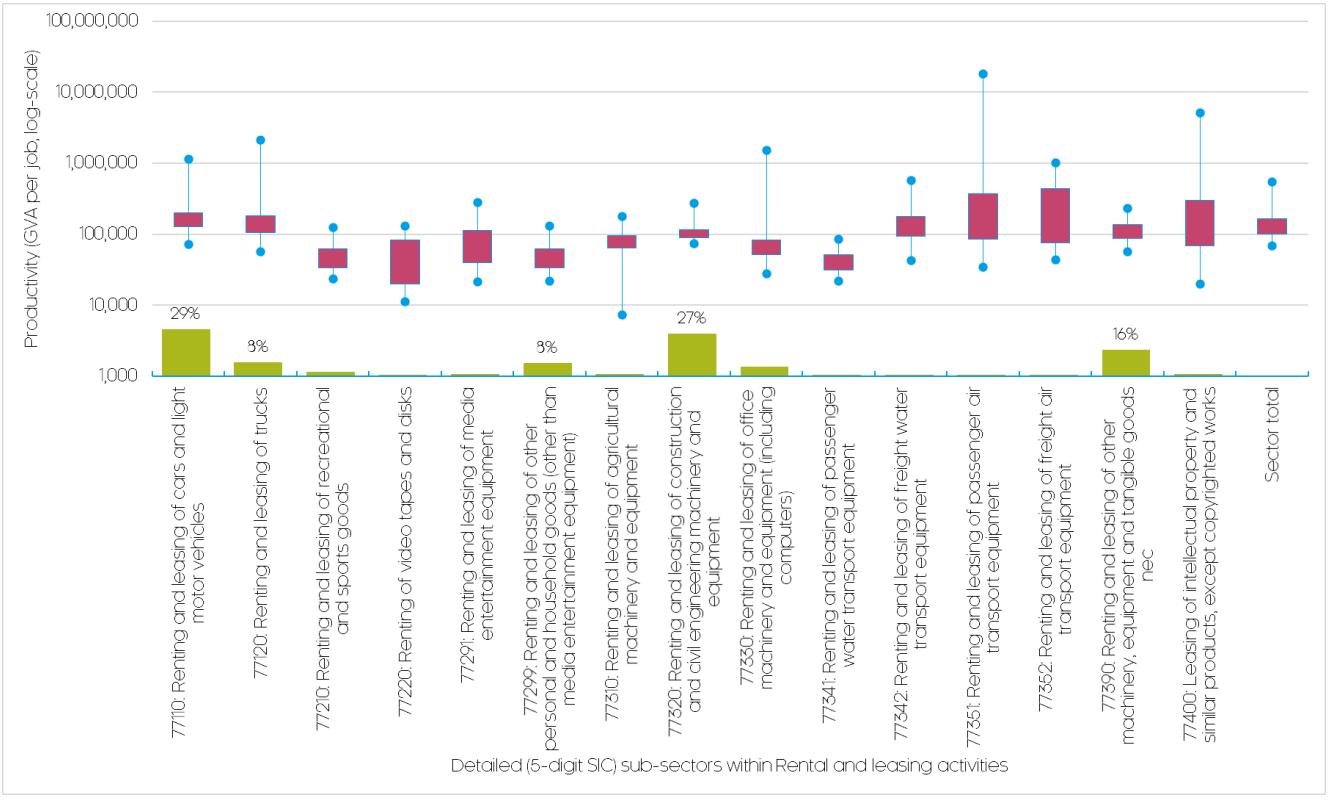
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.23 shows, a small but highly productive sector, its share of total GVA is higher than that of employment. Resultantly, productivity in the sector is some 73% higher the national average, and the fourth highest of all sectors.

The sector also displays very high sectoral variance, with a 109% standard deviation in sub-sectoral productivity (i.e., across the 15 constituent sub-sectors), the ninth highest of all sectors. Spatial variance is very high, with a 59% standard deviation in productivity across LEP areas, the third highest of all sectors.

Figure 6.44 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub- sectoral productivity, whilst

Figure 6.44: Spatial and sub-sectoral productivity variance within the sector, 2019-20



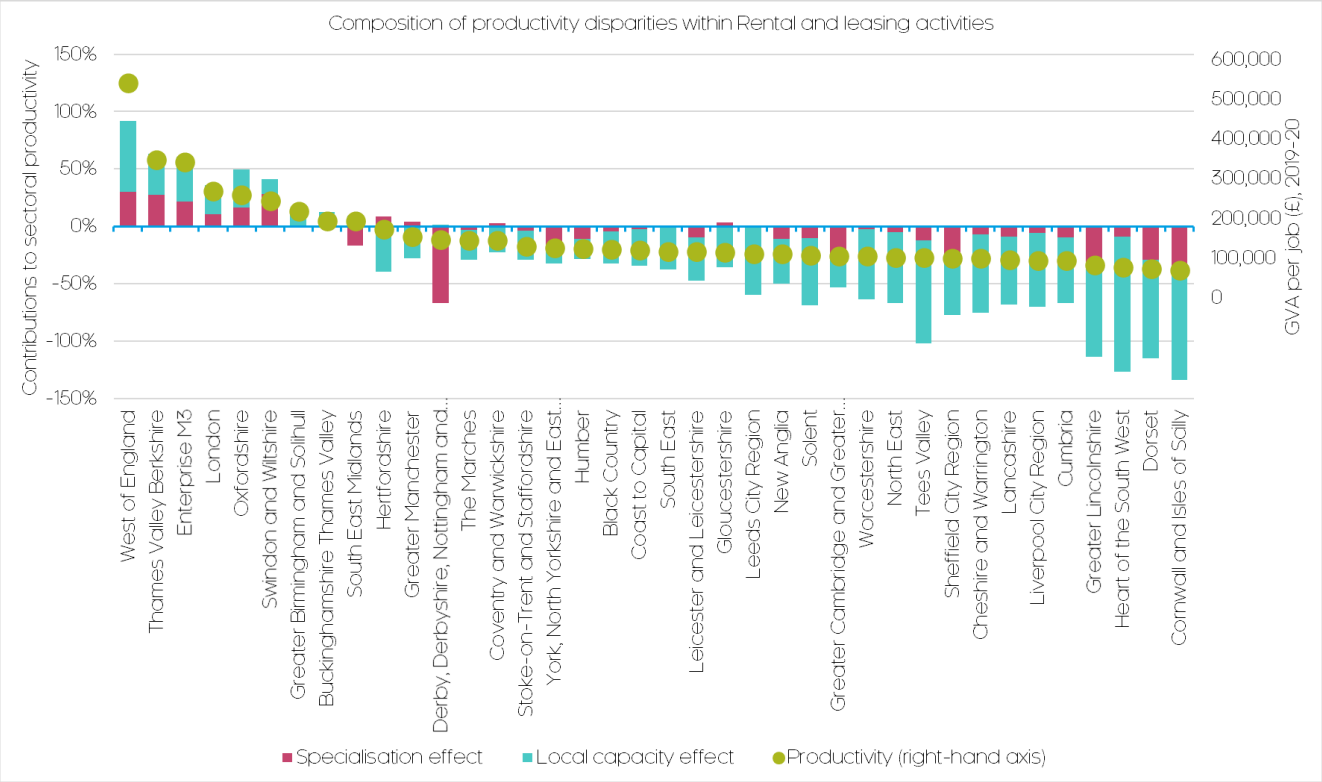
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

green bars show sub-sectoral employment shares.

Across the diverse range of rental and leasing activities, there is a notable variance in sub-sectoral productivity levels. Transport and machinery rental are amongst the most productive sub-sectors and show the highest spatial variance. Additionally, sub-sectors relating to consumer and electronic goods, though less productive, still display high spatial variance.

Figure 6.45 shows the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (West of England), to the least productive (Cornwall and Isles of Scilly).

Figure 6.45: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

Regional productivity disparities in the sector are largely explained by local capacity effects; that is, the best/worst performing regions retain an intrinsic productivity advantage/disadvantage, regardless of sectoral structure and specialisation.

These effects are significant for the majority regions, and particularly explain the large underperformance of many lower ranking LEP areas relative to the national average. However, the sector does also display some notable specialisation effects.

For instance, many lower-ranking LEP areas are further compounded by large, negative specialisation effects. For the top performing regions, such as West of England, Swindon and Wiltshire, and Enterprise M3, these specialisation effects are significant and exclusively positive.

Derby, Derbyshire, Nottingham and Nottignhamshire is a notable outlier, with significant and negative specialisation effects holding back the regions productive potential.

6.23 Employment activities; tourism and security services

The sector is defined by the ONS as comprising 2-digit SIC sectors 78-80. Resultantly, the sector encompasses 11 constituent (5-digit SIC) sub-sectors.

Table 6.24: Sector overview, 2019-20

	Employment activities; tourism and security etc.	*Rank (out of 32 sectors)*
Sector employment share	4.2%	*6*
Sector GVA share	2.3%	*8*
Sector productivity relative to average	54.1%	*24*
Sub-sectoral productivity deviation	61.5%	*10*
Spatial productivity deviation	34.2%	*16*

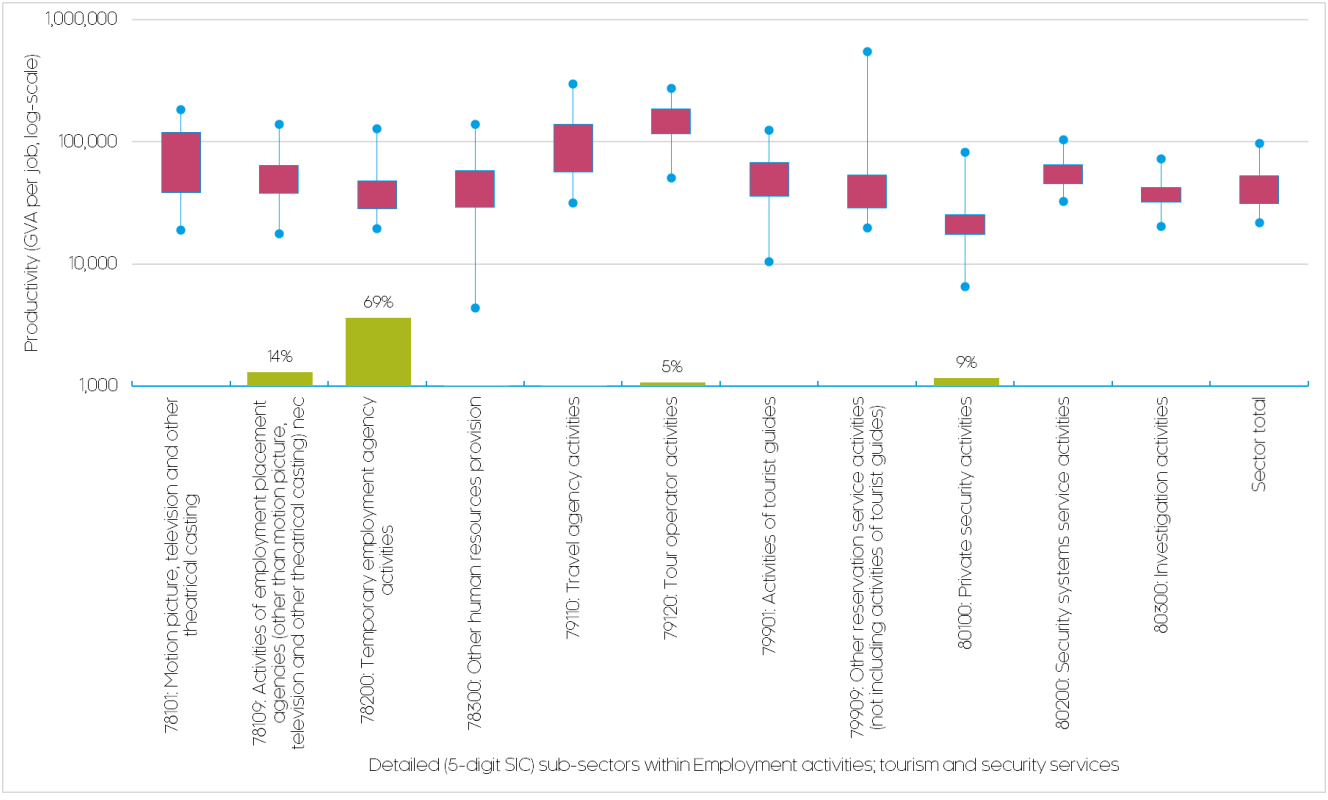
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.24 shows, a labour-intensive sector, its share of total employment is almost twice that of GVA. Resultantly, productivity in the sector is low, approximately half the national average, with the sector having the ninth lowest productivity of all sectors.

Productivity variance within the sector is relatively high, with 62% standard deviation in sub-sectoral productivity (i.e., across the 11 constituent sub-sectors), the tenth highest of all sectors. Spatial variance is lower, with a 34% standard deviation in productivity across LEP areas.

Figure 6.46 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub- sectoral productivity, whilst

Figure 6.46: Spatial and sub-sectoral productivity variance within the sector, 2019-20



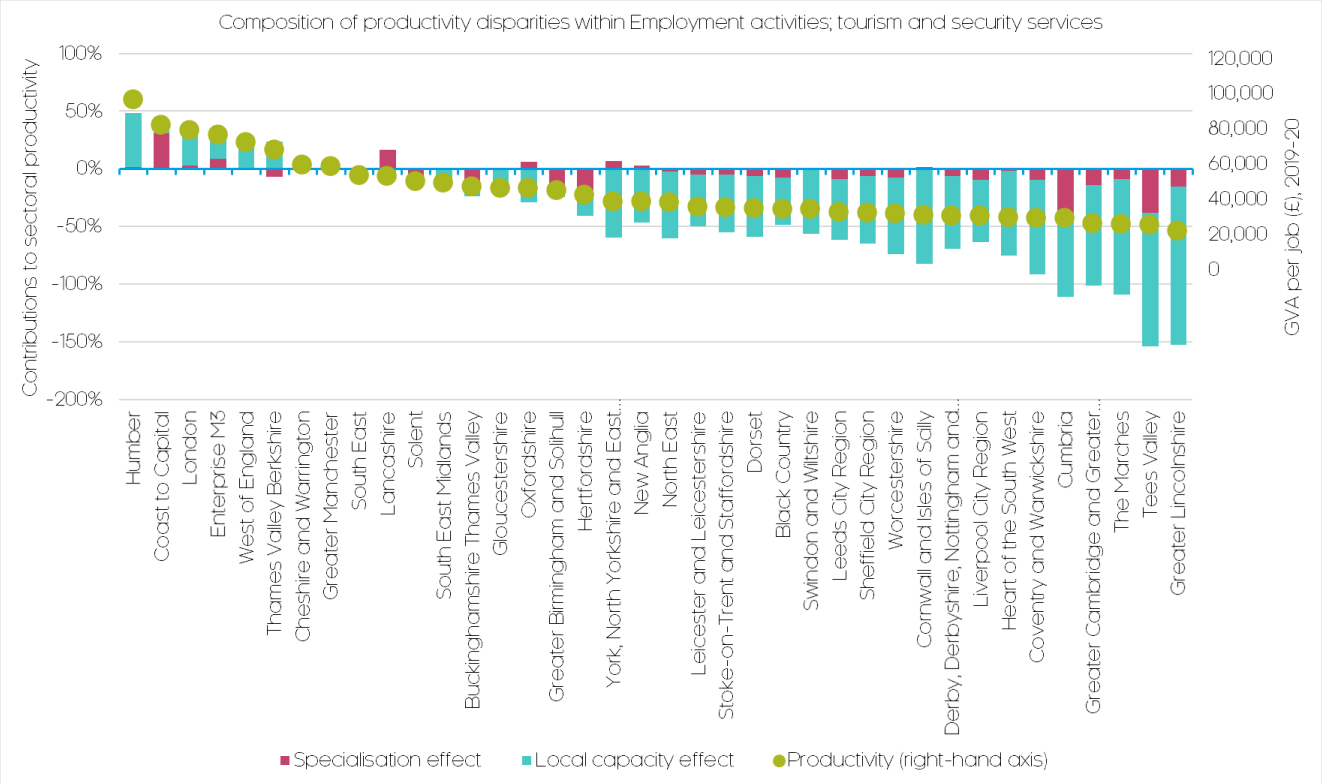
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

green bars show sub-sectoral employment shares.

Representing a diverse range of activities, activity in the sector is underpinned by the human resources sub-sectors, which account for more than three-quarters of employment in the sector. Tourism and travel services include the most productive sub-sectors, and also demonstrate higher spatial variance. Lower productivity and variance are observed in security and investigation sub-sectors.

Figure 6.47 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Humber), to the least productive (Greater Lincolnshire).

Figure 6.47: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

Again, regional productivity disparities in the sector are largely explained by local capacity effects; that is, the best/worst performing regions retain an intrinsic productivity advantage/disadvantage, regardless of sectoral structure and specialisation.

These effects are significant for the majority regions, and particularly explain the large underperformance of many lower ranking LEP areas relative to the national average.

Specialisation effects are relatively limited, and typically small and insignificant compared to local capacity effects. These a larger and negative for lower-ranking LEP areas, such as Cumbria and Tees Valley, further compounding poor local capacity effects.

Specialisation effects are limited for the higher-ranking LEP areas, though Coast to Capital shows a significant positive specialisation effect, driven by the local concentration of higher productivity tourism and travel services.

6.24 *Services to buildings and landscape activities*

The sector is defined by the ONS as comprising 2-digit SIC sector 81. As such, the sector encompasses 9 constituent (5-digit SIC) sub-sectors.

Table 6.25: Sector overview, 2019-20

	Services to buildings and landscape activities	*Rank (out of 32 sectors)*
Sector employment share	2.4%	*15*
Sector GVA share	0.5%	*28*
Sector productivity relative to average	23.0%	*29*
Sub-sectoral productivity deviation	61.1%	*11*
Spatial productivity deviation	29.9%	*19*

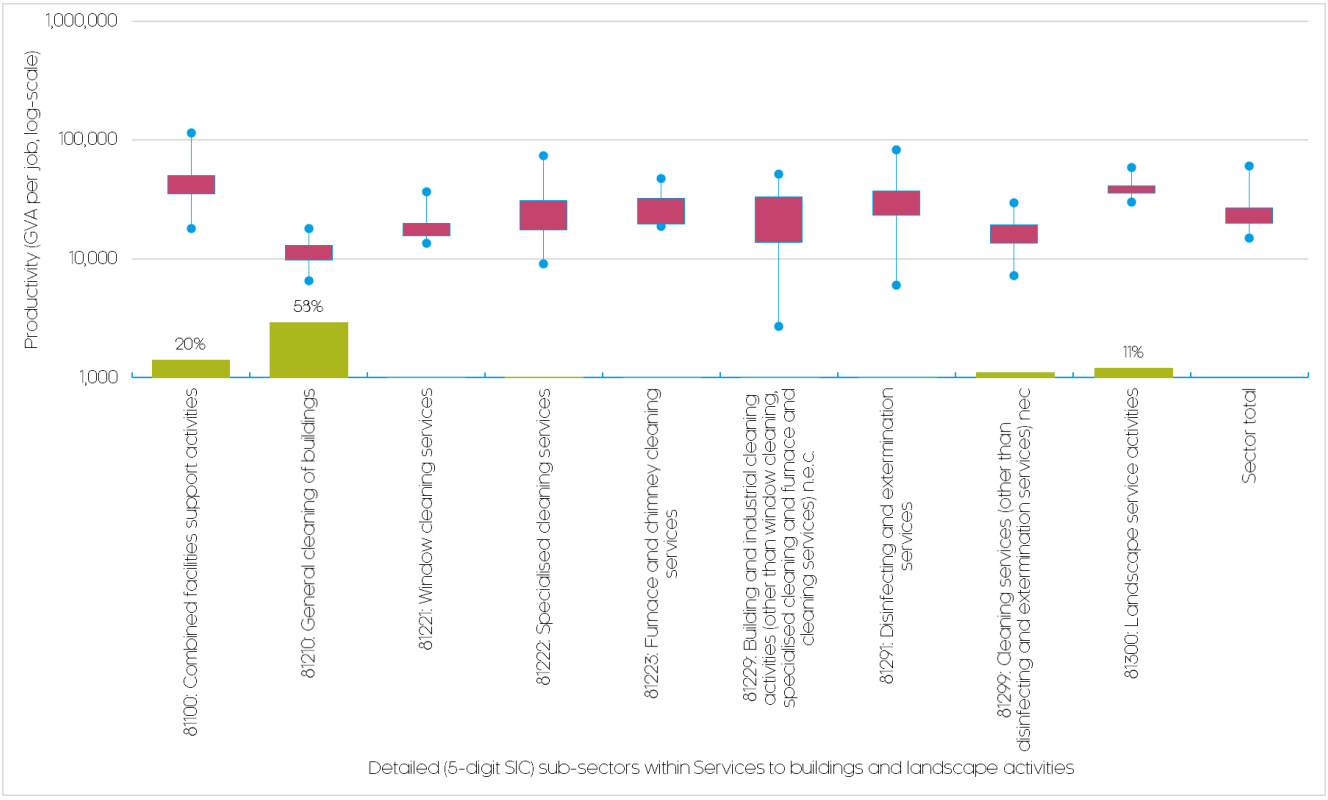
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.25 shows, a labour-intensive sector, its share of total employment is significantly higher than that of GVA. Resultantly, productivity in the sector is very low, approximately a quarter of the national average, with the sector having the fourth lowest productivity of all sectors.

Productivity variance within the sector is relatively high, with 61% standard deviation in sub-sectoral productivity (i.e., across the 9 constituent sub-sectors), in the top third of all sectors. Spatial variance is lower, with a 30% standard deviation in productivity across LEP areas.

Figure 6.48 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub- sectoral productivity, whilst

Figure 6.48: Spatial and sub-sectoral productivity variance within the sector, 2019-20



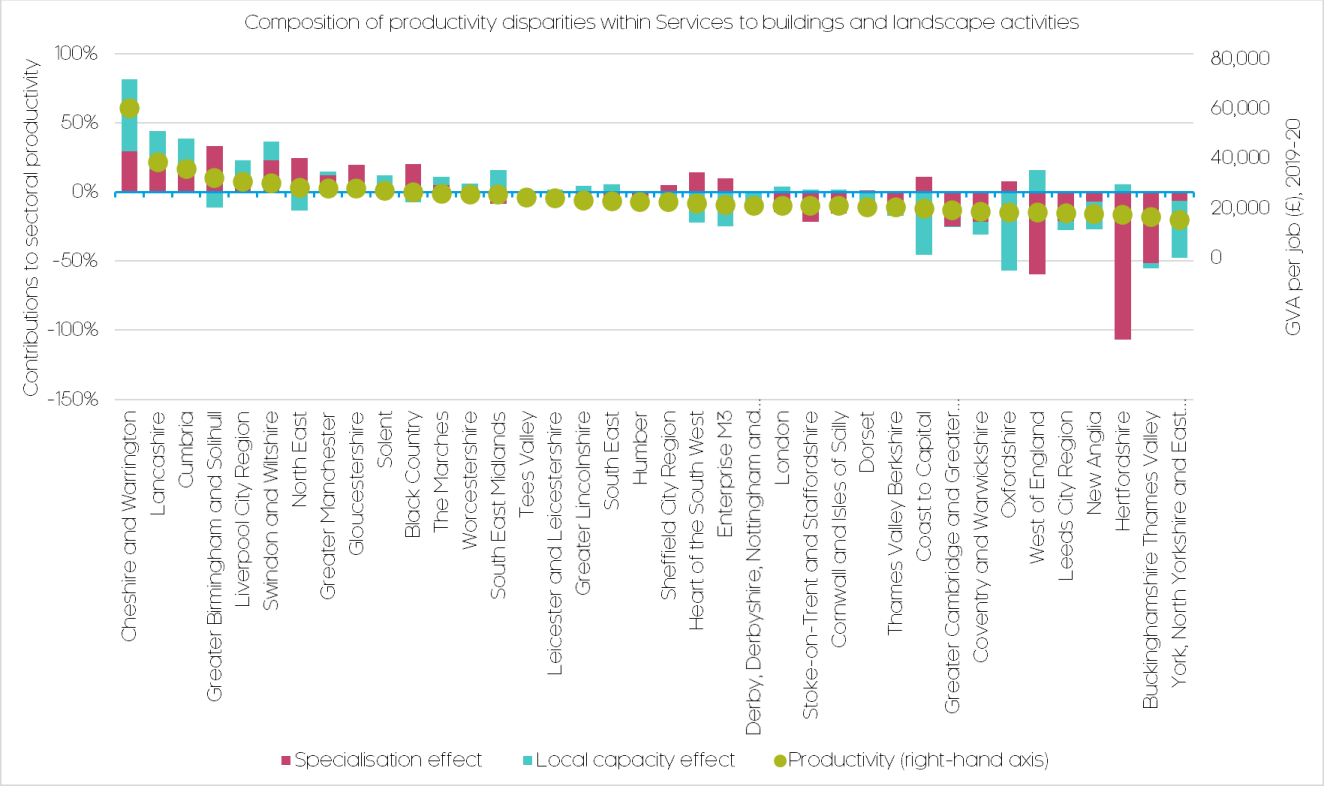
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

green bars show sub-sectoral employment shares.

Within the sector, spatial variance is most notable within the specialised cleaning services sub-sectors. Facilities support and landscaping are amongst the most productive sub-sectors, and also display the lowest spatial variance. The general cleaning sub-sector represents almost two-thirds of all activity in the sector and is also the least productive.

Figure 6.49 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Cheshire and Warrington), to the least productive (York, North Yorkshire and East Riding).

Figure 6.49: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

In contrast to other business service activities, the sector shows a higher influence of sector specialisation effects; that is, a regions performance is generally determined by the structure and concentration of sub-sectors in that region.

Strong performers, such as Cheshire and Warrington, Greater Birmingham and Solihull, and Swindon and Wiltshire show specialisations in high productivity sub-sectors, particularly facilities support and landscaping.

Poorer performers, meanwhile, such as Hertfordshire, West of England, and Buckinghamshire Thames Valley show low specialisation in these high productivity sub-sectors, with greater dependence on lower productivity sub-sectors (particularly human resources related).

There are still some significant local capacity effects, particularly for higher ranking LEP areas – typically, these positive local capacity effects complement already favourable sectoral specialisations.

6.25 *Office administration and business support activities*

The sector is defined by the ONS as comprising 2-digit SIC sector 82. Resultantly, the sector encompasses 9 constituent (5-digit SIC) sub-sectors.

Table 6.26: Sector overview, 2019-20

	Office administration and business support activities	*Rank (out of 32 sectors)*
Sector employment share	2.0%	*19*
Sector GVA share	1.7%	*20*
Sector productivity relative to average	81.5%	*17*
Sub-sectoral productivity deviation	25.8%	*25*
Spatial productivity deviation	49.3%	*9*

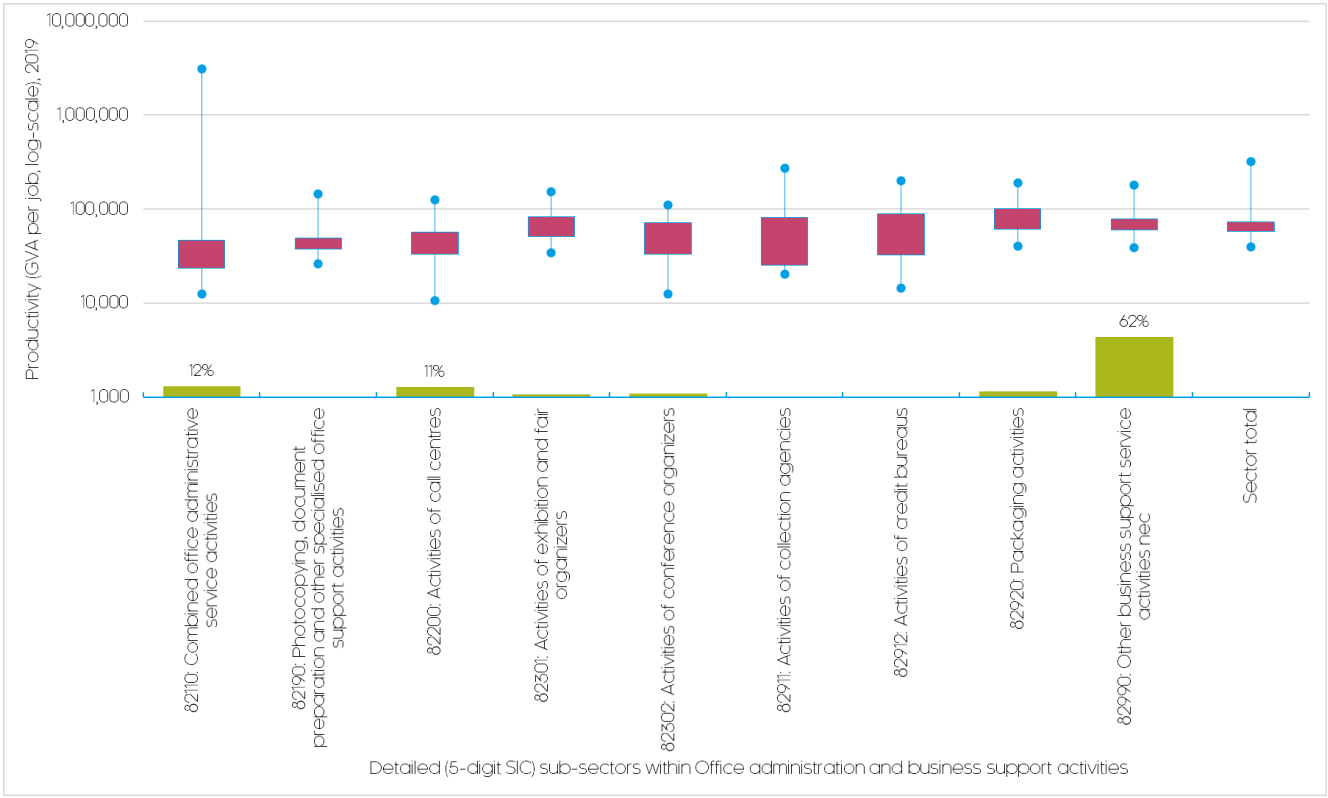
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.26 shows, the sectors share of total employment is higher than that of GVA. Resultantly, productivity is below the national average, and middle ranking compared to other sectors.

There is relatively limited variance in productivity within the sector, with only a 26% standard deviation in sub-sectoral productivity (i.e., across the 9 constituent sub-sectors). Spatial variance is much higher, with a 49% standard deviation in productivity across LEP areas, the ninth highest of all sectors.

Figure 6.50 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub- sectoral productivity, whilst

Figure 6.50: Spatial and sub-sectoral productivity variance within the sector, 2019-20



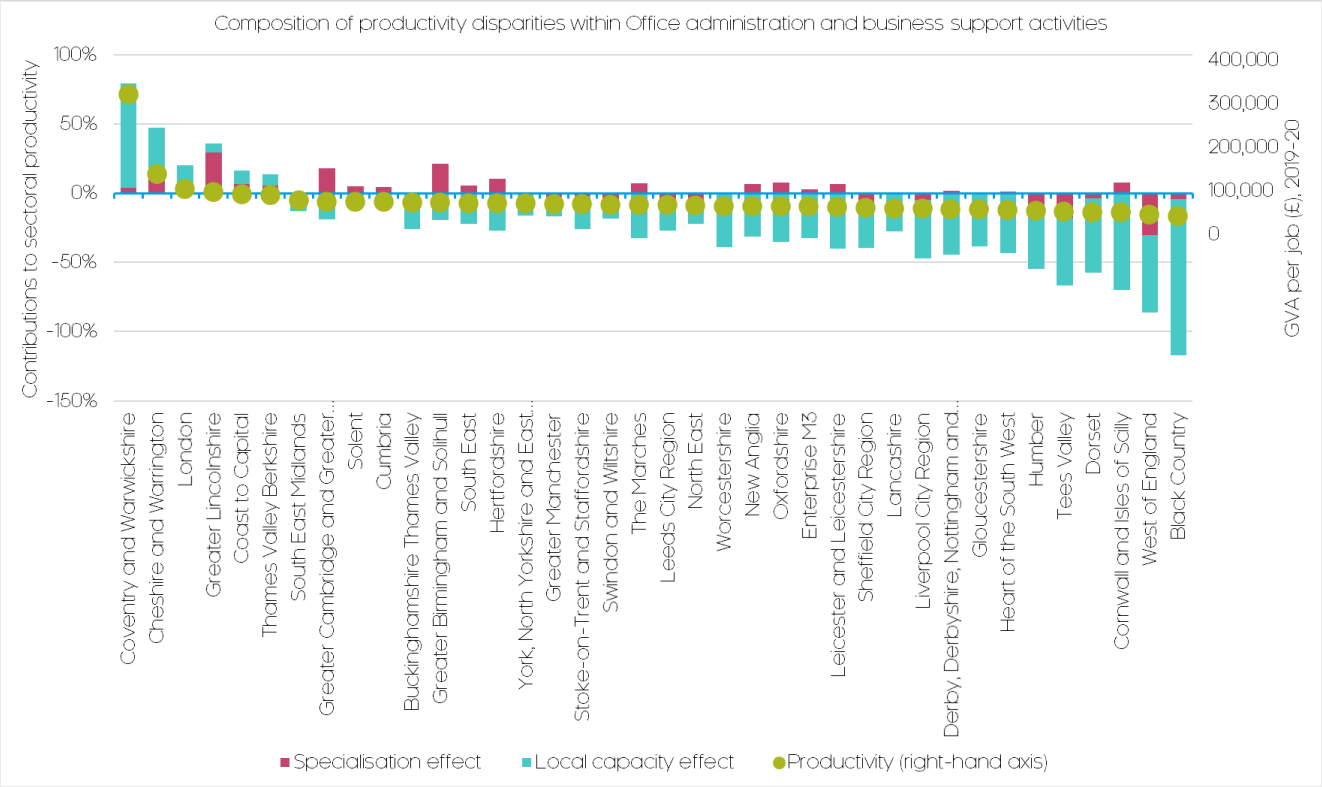
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

green bars show sub-sectoral employment shares.

Generally, variance is relatively low and consistent, with sub-sectoral productivity largely clustered around the sector average. Activity in the sector is underpinned by the other business support sub-sector, which accounts for more than two-thirds of employment in the sector. Spatial variance is greatest within specialised business support service sub-sectors.

Figure 6.51 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Cheshire and Warrington), to the least productive (Black Country).

Figure 6.51: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

Regional productivity disparities in the sector are largely explained by local capacity effects; that is, the best/worst performing regions retain an intrinsic productivity advantage/disadvantage, regardless of sectoral structure and specialisation.

These effects are significant for the majority regions, and particularly explain the large underperformance of many lower ranking LEP areas relative to the national average, such as Black Country, Dorset, and Cornwall and Isles of Scilly.

There are some limited specialisation effects; for the majority of higher-ranking regions, these specialisation effects are significant and exclusively positive. For poorer performers, they are typically negative, though the scale and significance of these is small compared to local capacity effects

One of the most productive LEP areas, Greater Lincolnshire, is unique in being driven predominantly by specialisation effects, attributable to a local overrepresentation of higher productivity specialised business support service sub-sectors.

6.26 Public administration and defence

The sector is defined by the ONS as comprising 2-digit SIC sector 84. Resultantly, the sector encompasses 9 constituent (5-digit SIC) sub-sectors.

Table 6.27: Sector overview, 2019-20

	Public administration and defence	*Rank (out of 32 sectors)*
Sector employment share	3.6%	*8*
Sector GVA share	0.8%	*26*
Sector productivity relative to average	21.3%	*31*
Sub-sectoral productivity deviation	31.3%	*21*
Spatial productivity deviation	43.4%	*10*

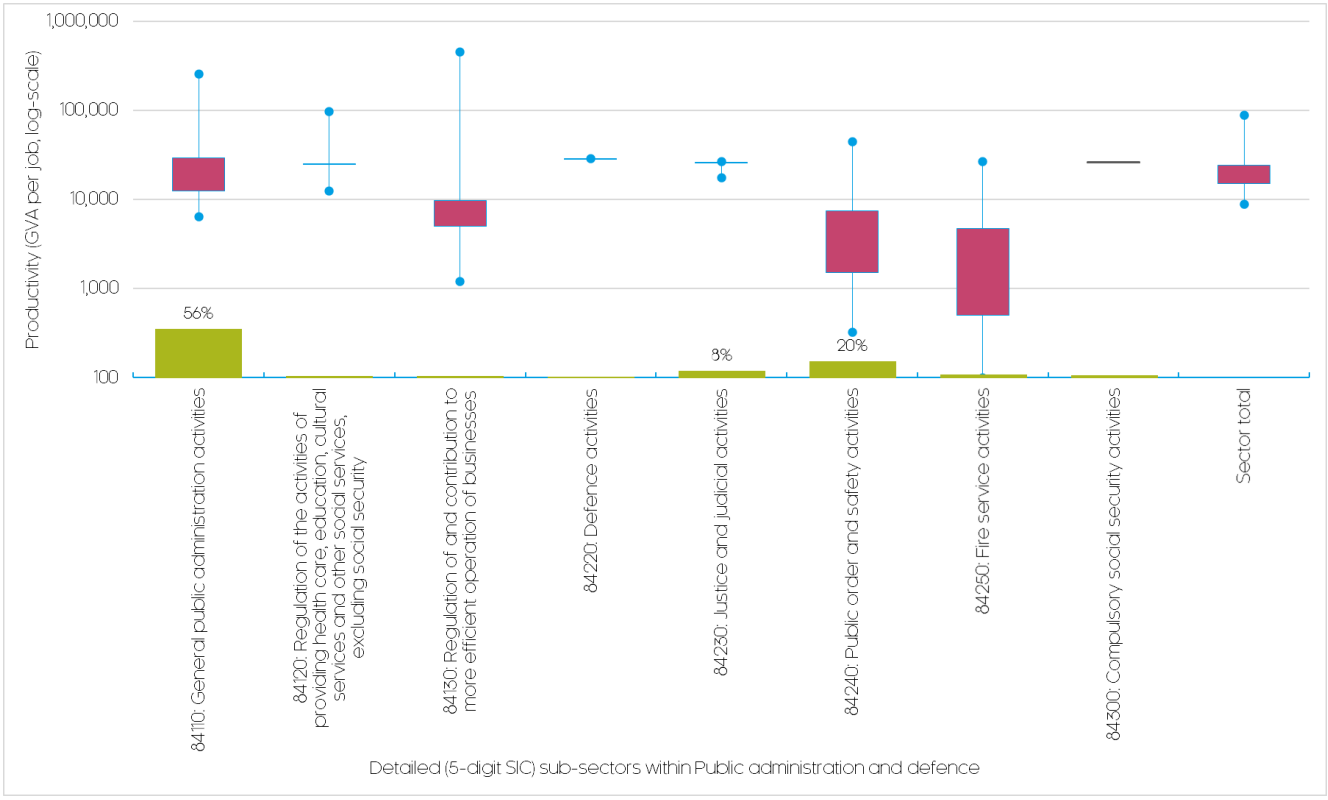
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.27 shows, the sector's share of total employment is substantially higher than that of GVA. Resultantly, productivity in the sector is low, a fifth of the national average, making it the second least productive sector. However, sector output is likely being underestimated given reporting issues in the IDBR (see *Appendix A: data collection and processing*).

There is relatively limited variance in productivity within the sector, with only a 31% standard deviation in sub-sectoral productivity (i.e., across the 9 constituent sub-sectors). Interestingly, spatial variance is significantly higher, with a 43% standard deviation in productivity across LEP areas, the tenth highest of all sectors.

Figure 6.52 looks at these sectoral and spatial disparities in more detail; pink bars highlight

Figure 6.52: Spatial and sub-sectoral productivity variance within the sector, 2019-20



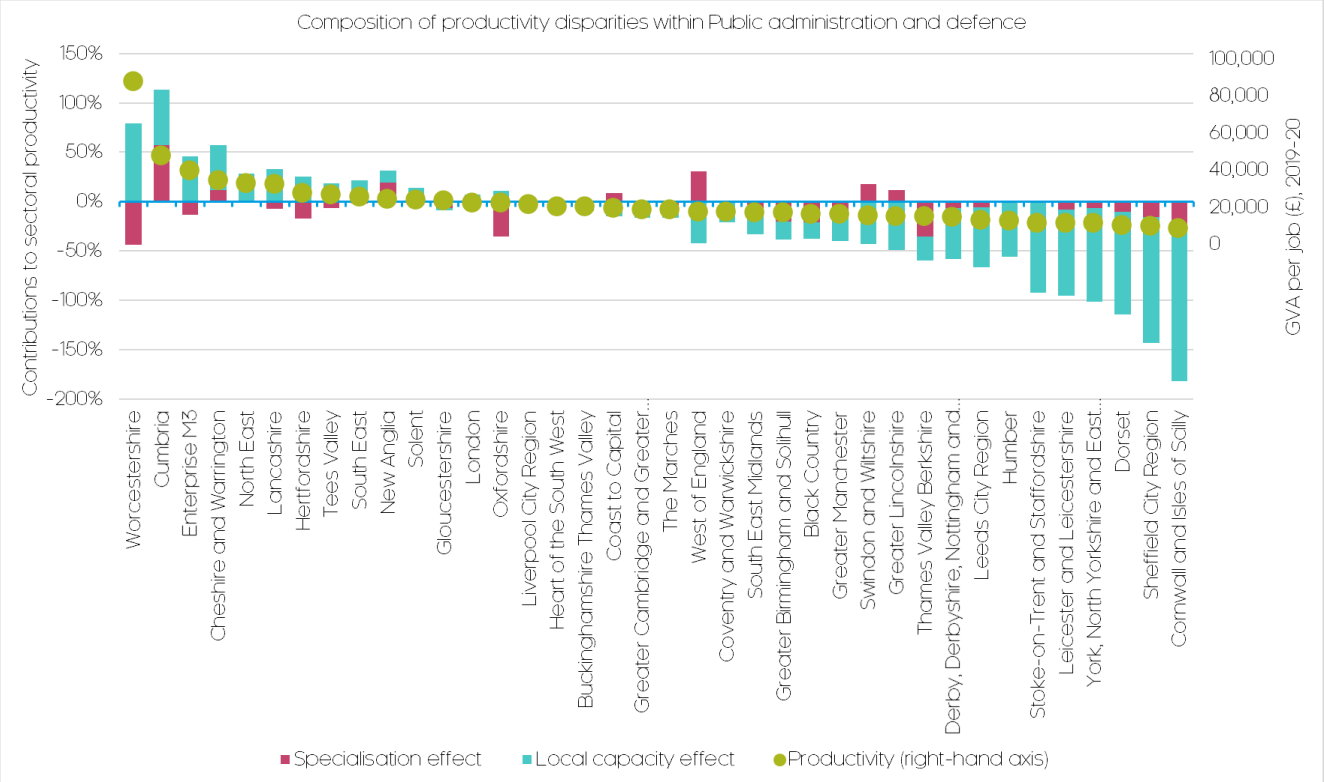
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst green bars show sub-sectoral employment shares.

High spatial variance is notable in some sub-sectors, particularly public order and fire-related, despite being the least productive sub-sectors. Activity in the sector is underpinned by the general public administration sub-sector, which accounts for more than half of employment in the sector. Spatial variance is very low across some sub-sectors, reflecting the centralised nature of these activities (e.g., defence activities).

Figure 6.53 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Worcestershire), to the least productive (Cornwall and Isles of Scilly).

Figure 6.53: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

Regional productivity disparities in the sector are largely explained by local capacity effects; that is, the best/worst performing regions retain an intrinsic productivity advantage/disadvantage, regardless of sectoral structure and specialisation. These effects are particularly significant for many lower ranking LEP areas, such as Sheffield City Region, Dorset, and Cornwall and Isles of Scilly, and explain their large underperformance relative to the national average.

There are some specialisation effects, though the scale and significance of these is small compared to local capacity effects. Interestingly, the two most productive LEP areas (Worcestershire and Cumbria), despite sharing large, positive local capacity effects, show divergent specialisation effects.

Cumbria's positive specialisation is due to a local overrepresentation of specialised public administration and regulation sub-sectors, whilst these sub-sectors are underrepresented in Worcestershire.

6.27 Education

The sector is defined by the ONS as comprising 2-digit SIC sector 85. Resultantly, the sector encompasses 12 constituent (5-digit SIC) sub-sectors.

Table 6.28: Sector overview, 2019-20

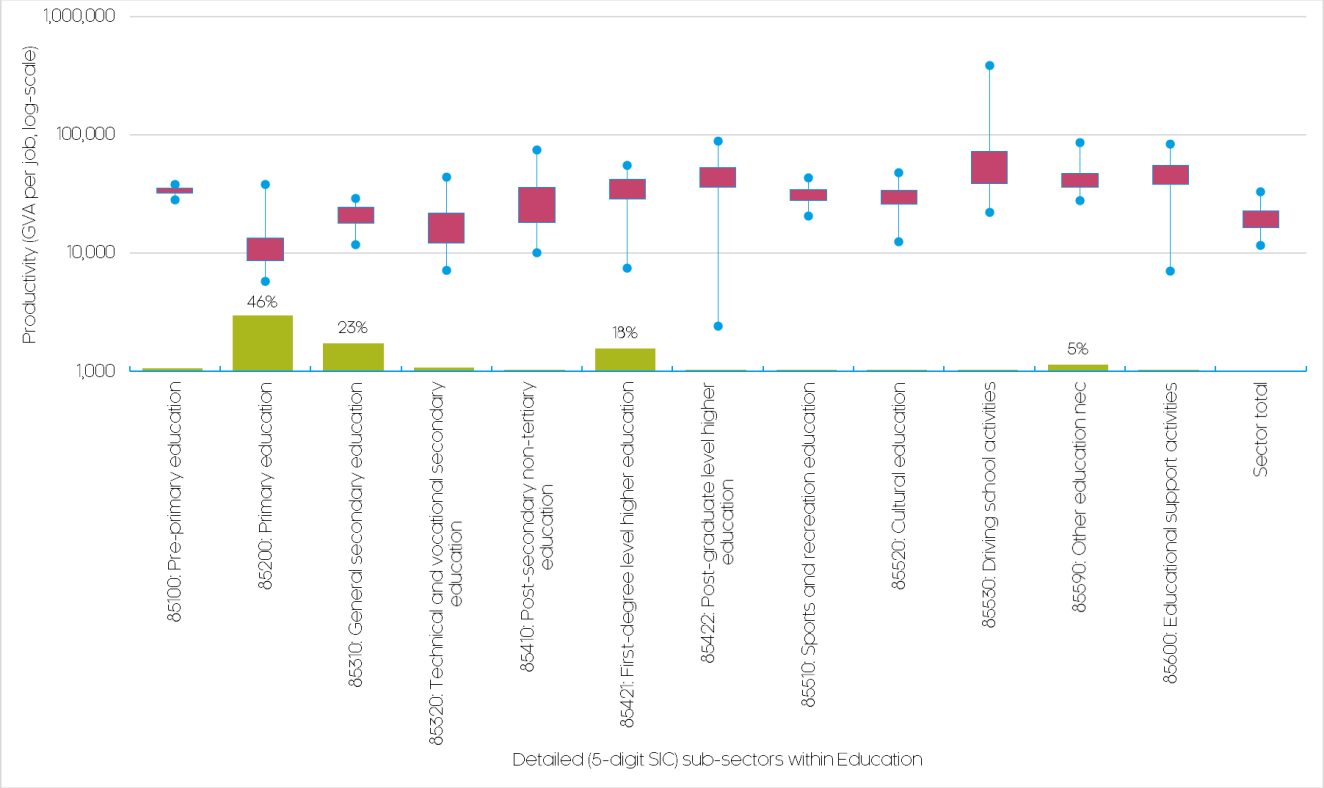
	Education	*Rank (out of 32 sectors)*
Sector employment share	9.7%	*3*
Sector GVA share	2.0%	*14*
Sector productivity relative to average	20.4%	*32*
Sub-sectoral productivity deviation	50.0%	*18*
Spatial productivity deviation	22.6%	*24*

Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.28 shows, a significant employer, the sectors share of total employment is substantially higher than that of GVA. Resultantly, productivity in the sector is low, a fifth of the national average, making it the least productive sector. However, sector output is likely being underestimated given reporting issues in the IDBR (see *Appendix A: data collection and processing*).

There is a reasonable degree of variance in productivity within the sector, with a 50% standard deviation in sub-sectoral productivity (i.e., across the 12 constituent sub-sectors). Spatial variance is lower, with only a 23% standard deviation in productivity across LEP areas, the ninth lowest of all sectors.

Figure 6.54: Spatial and sub-sectoral productivity variance within the sector, 2019-20



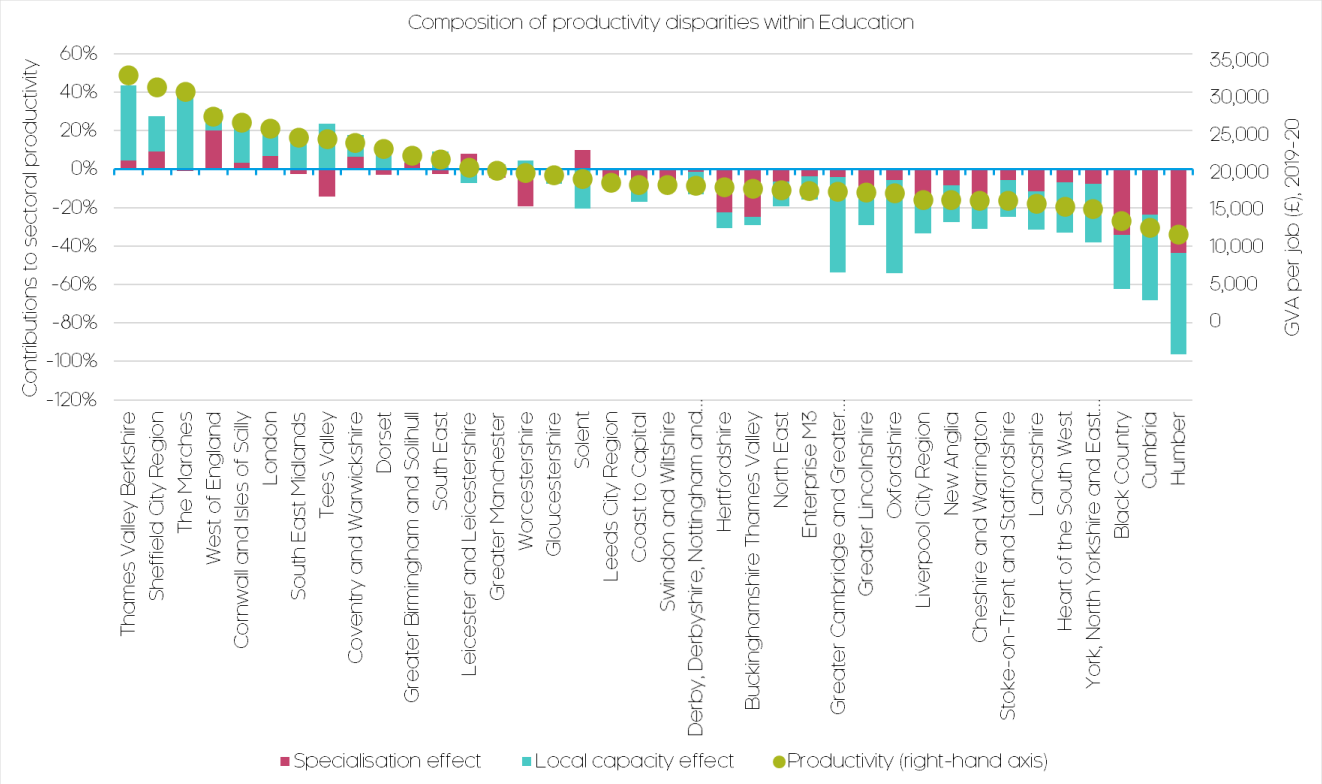
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

Figure 6.54 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst green bars show sub-sectoral employment shares.

High spatial variance is notable in some sub-sectors, particularly in further and higher education activities, which also include the most productive sub-sectors. Activity in the sector is underpinned by the primary and secondary education sub-sectors, which account for more than half of employment in the sector.

Figure 6.55 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Thames Valley Berkshire), to the least productive (Humber).

Figure 6.55: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

In contrast to other public services, the sector shows an increased emphasis on sector specialisation effects; that is, a regions performance is generally determined by the structure and concentration of sub-sectors in that region.

There is an interesting split in these effects across LEP areas though. For poorer performers, such as Humber, Cumbria and Black Country, specialisation effects are significant and negative, and compound already unfavourable local capacity effects.

For the top performers, such as West of England, London, and Sheffield City Region, these specialisation effects, though positive (largely driven by the local concentration of further and higher education-related sub-sectors) are often insignificant given the size of the local capacity effect.

Solent, and Leicester and Leicestershire are interesting outliers, with favourable specialisation effects (again, attributable to further and higher education-related sub-sectors) unable to correct negative local capacity effects.

6.28 Human health and residential care activities

The sector is defined by the ONS as comprising 2-digit SIC sectors 86-87. Resultantly, the sector encompasses 10 constituent (5-digit SIC) sub-sectors.

Table 6.29: Sector overview, 2019-20

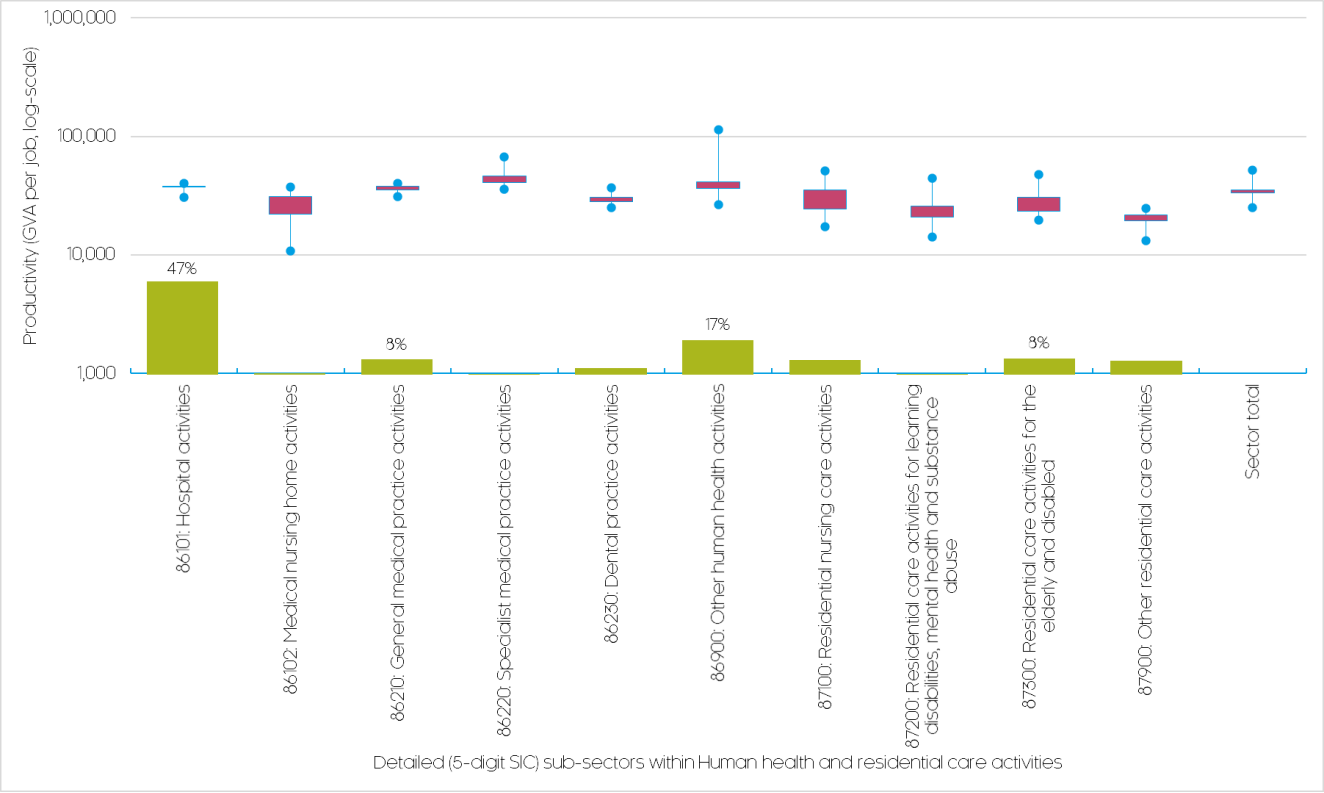
	Human health and residential care activities	*Rank (out of 32 sectors)*
Sector employment share	9.7%	*2*
Sector GVA share	3.4%	*6*
Sector productivity relative to average	34.8%	*27*
Sub-sectoral productivity deviation	17.7%	*28*
Spatial productivity deviation	9.5%	*32*

Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.29 shows, a significant employer, the sectors share of employment is notably higher than that of GVA. As such, productivity in the sector is low, approximately a third of the national average, making it the sixth least productive sector. However, sector output is likely being underestimated given reporting issues in the IDBR (see *Appendix A: data collection and processing*).

There is very limited variance in productivity within the sector, with only an 18% standard deviation in sub-sectoral productivity (i.e., across the 10 constituent sub-sectors), the fifth lowest of all sectors. Spatial variance is even lower, with only a 10% standard deviation in productivity across LEP areas, the lowest of any sector.

Figure 6.56: Spatial and sub-sectoral productivity variance within the sector, 2019-20



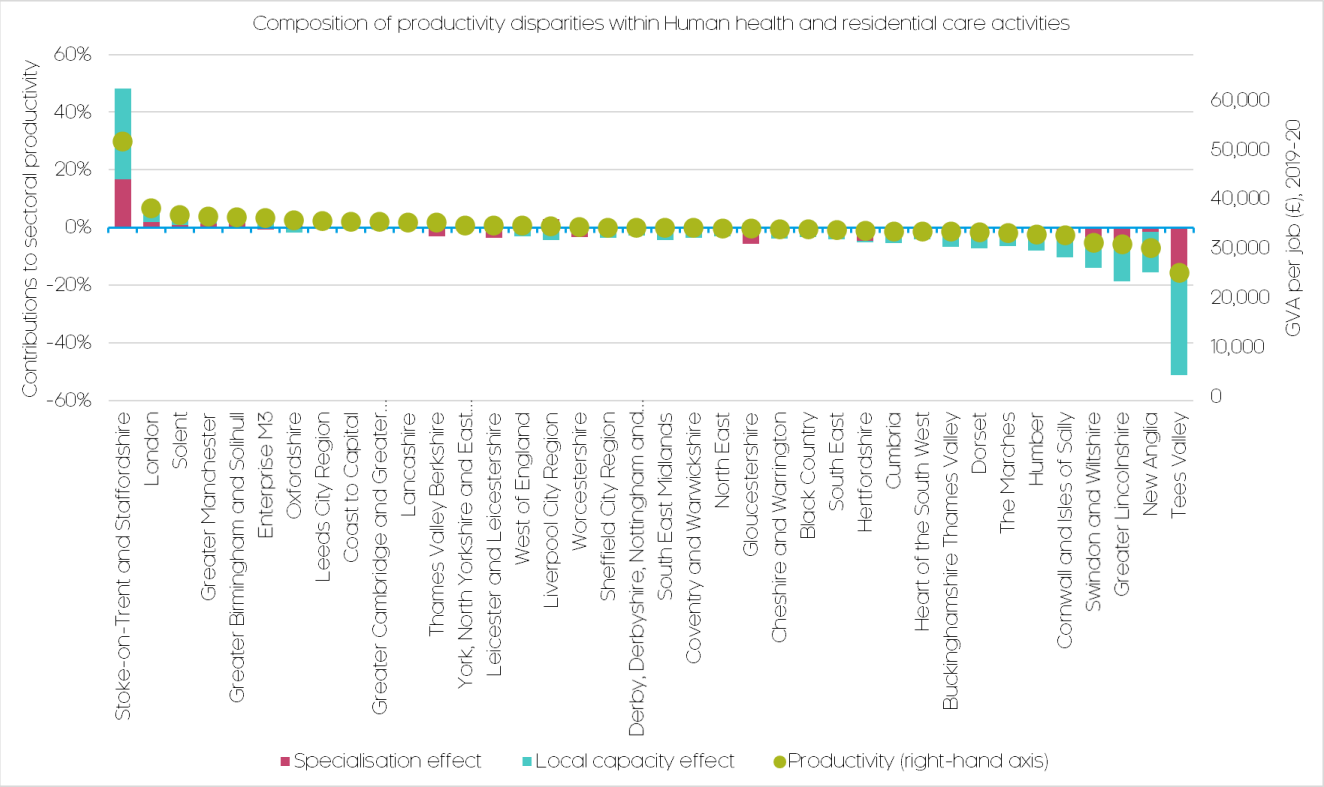
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

Figure 6.56 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst green bars show sub-sectoral employment shares.

Across sub-sectors, variance is relatively low and consistent, with sub-sectoral productivity largely clustered around the sector average. Activity in the sector is underpinned by the hospital activities sub-sector, which accounts for almost half of employment in the sector and exhibits very low spatial variance. Greater, but still low spatial variance is observed in nursing and care home sub-sectors. Other human health is the most productive sub-sector.

Figure 6.57 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Stoke-on-Trent and Staffordshire), to the least productive (Tees Valley).

Figure 6.57: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

Most notable is the very low variance in sectoral productivity across LEP areas, with few areas deviating by more than 10% from the national sector average. These deviations, though small, are largely explained by local capacity effects.

There are some specialisation effects, though the scale and significance of these is small compared to local capacity effects. They are typically positive for the higher-ranking regions, and negative for those lower ranking.

The most and least productive LEP areas (Stoke-on-Trent and Staffordshire and Tees Valley respectively) are relative outliers compared to peers, given the scale and composition of their deviations.

Interestingly, both show more significant, but contradictory specialisation effects (largely driven by local over/underrepresentation of the higher productivity other human health sub-sector).

6.29 Social work activities

The sector is defined by the ONS as comprising 2-digit SIC sectors 86-87. Resultantly, the sector encompasses 3 constituent (5-digit SIC) sub-sectors, the joint-lowest of any sector.

Table 6.30: Sector overview, 2019-20

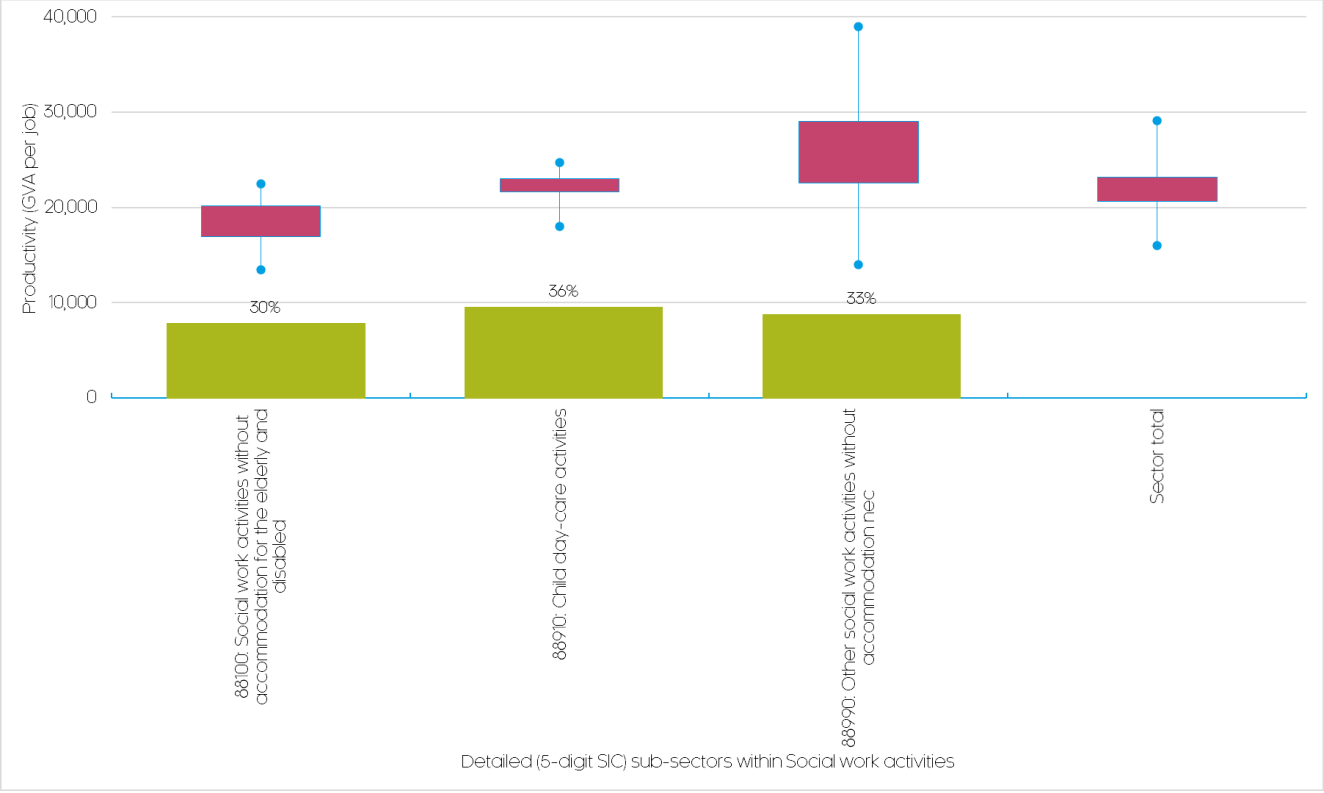
	Social work activities	*Rank (out of 32 sectors)*
Sector employment share	2.4%	*12*
Sector GVA share	0.5%	*30*
Sector productivity relative to average	21.9%	*30*
Sub-sectoral productivity deviation	15.2%	*30*
Spatial productivity deviation	10.7%	*31*

Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.30 shows, the sectors share of total employment is significantly higher than that of GVA. Resultantly, productivity in the sector is low, approximately a fifth of the national average, making it the third least productive sector. However, sector output is likely being underestimated given reporting issues in the IDBR (see *Appendix A: data collection and processing*).

There is very low variance in productivity within the sector, with only a 15% standard deviation in sub-sectoral productivity (i.e., across the 3 constituent sub-sectors), the third lowest of all sectors. Spatial variance is even lower, with only a 11% standard deviation in productivity across LEP areas, the second lowest of any sector.

Figure 6.58: Spatial and sub-sectoral productivity variance within the sector, 2019-20



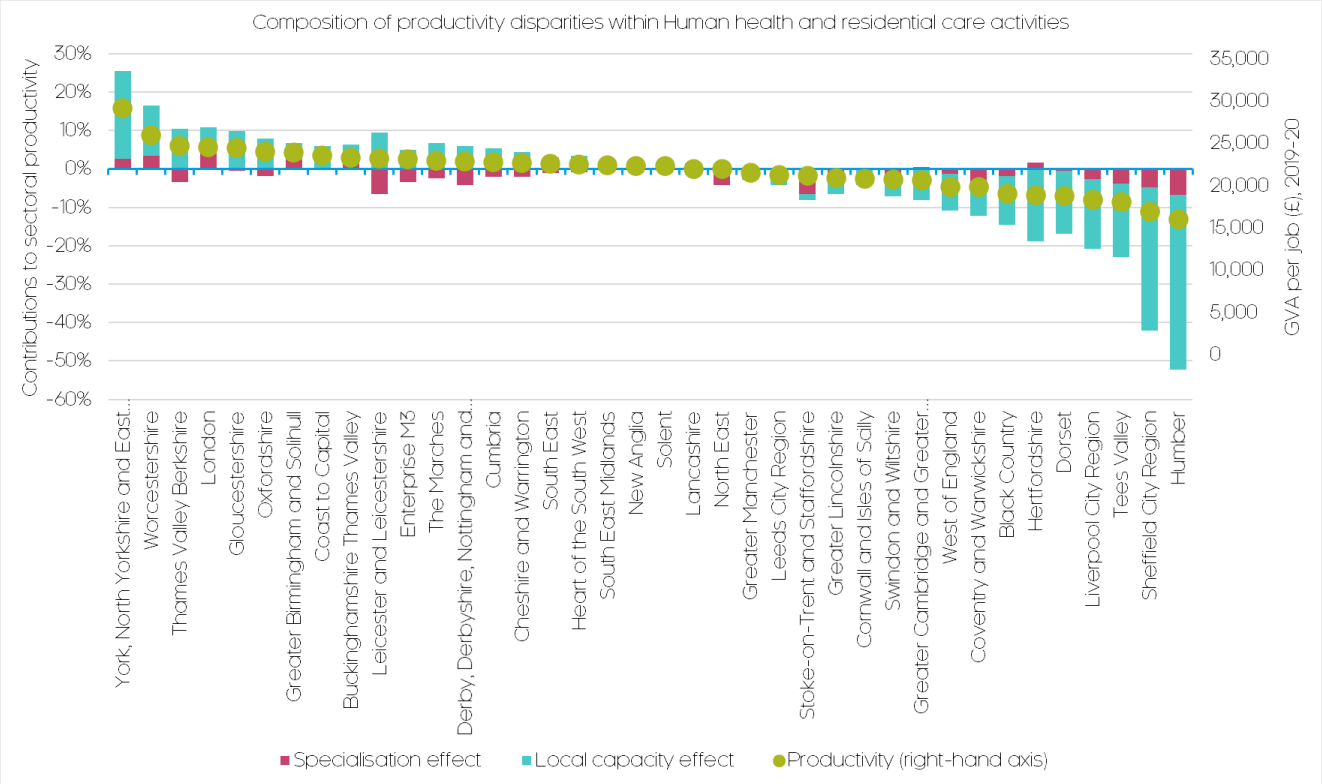
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Sectors employing less than 100 people are excluded from the figure.

Figure 6.58 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst green bars show sub-sectoral employment shares.

Activity in the sector is relatively evenly distributed across sub-sectors. Productivity is highest in the other social work sub-sector, which also shows the greatest (albeit still low) spatial variance. The child day-care sub-sector shows very low spatial variance.

Figure 6.59 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (York, North Yorkshire, and East Riding), to the least productive (Humber).

Figure 6.59: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

Regional productivity disparities in the sector are largely explained by local capacity effects; that is, the best/worst performing regions retain an intrinsic productivity advantage/disadvantage, regardless of sectoral structure and specialisation.

Of course, some of this reflects the relatively limited number of sub-sectors (only 3) to capture specialisation, and the relative uniformity of performance across the existing sub-sectors.

Despite this, the majority of LEP areas do show small, albeit insignificant specialisation effects. These are typically positive for the higher-ranking regions, and negative for those middle-lower ranking.

6.30 *Arts, entertainment and recreation*

The sector is defined by the ONS as comprising 2-digit SIC sectors 90-93. Resultantly, the sector encompasses 17 constituent (5-digit SIC) sub-sectors.

Table 6.31: Sector overview, 2019-20

	Arts, entertainment and recreation	*Rank (out of 32 sectors)*
Sector employment share	2.4%	*16*
Sector GVA share	2.0%	*13*
Sector productivity relative to average	83.1%	*16*
Sub-sectoral productivity deviation	125.9%	*4*
Spatial productivity deviation	52.1%	*7*

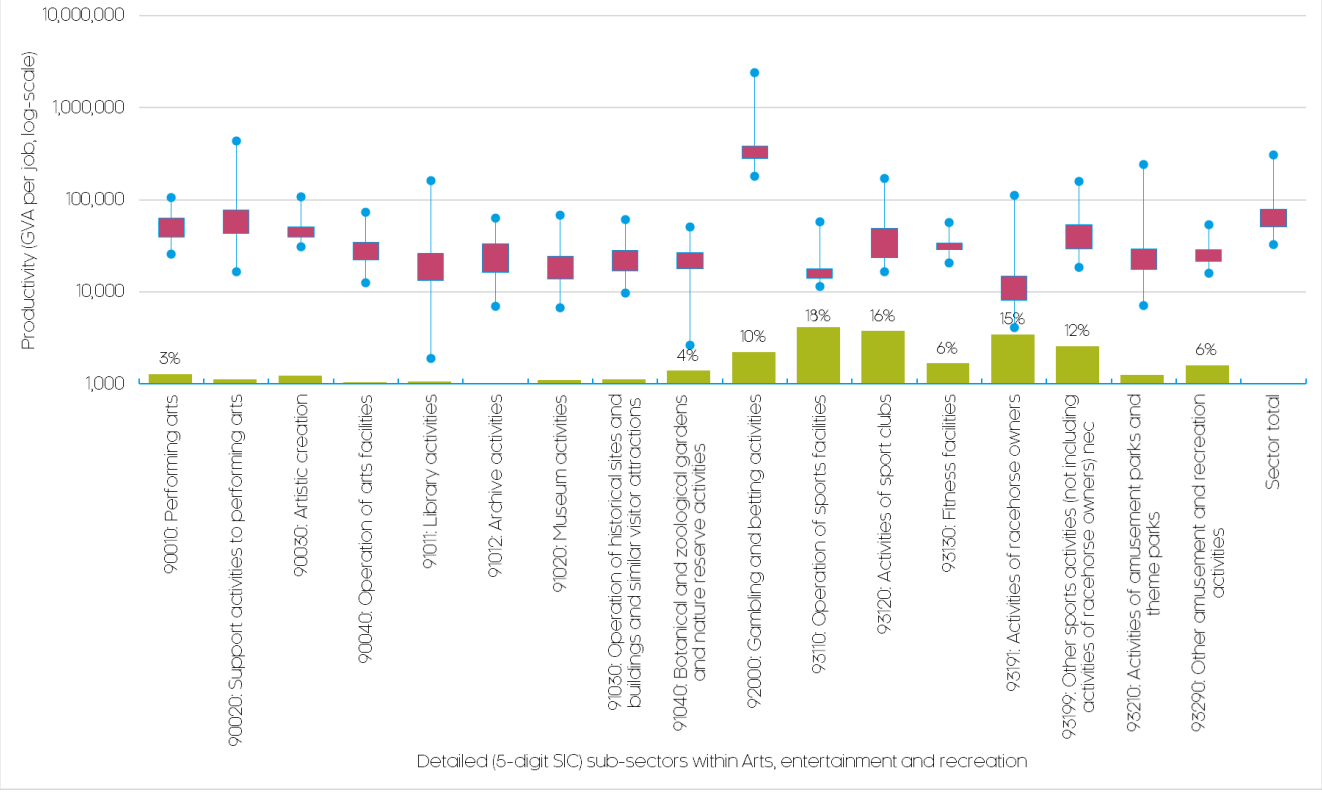
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.31 shows, the sector's share of total employment is higher than that of GVA. Resultantly, productivity is below the national average, and middle ranking compared to other sectors.

There is very high variance in productivity within the sector though, with a 126% standard deviation in sub-sectoral productivity (i.e., across the 17 constituent sub-sectors), the fourth highest of all sectors. Spatial variance is also high, with a 52% standard deviation in productivity across LEP areas, the seventh highest of all sectors.

Figure 6.60 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst

Figure 6.60: Spatial and sub-sectoral productivity variance within the sector, 2019-20



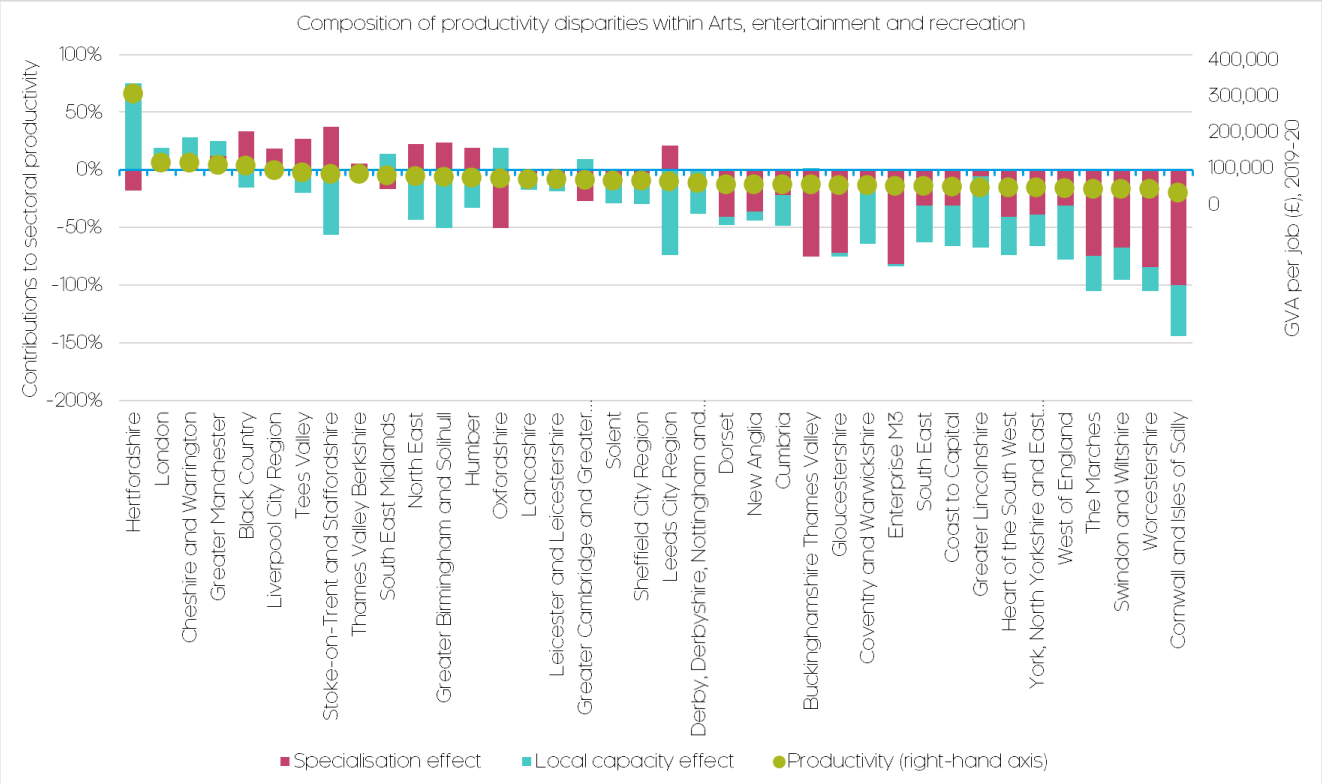
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

green bars show sub-sectoral employment shares.

Across the diverse activities represented by the sector, there is a notable variance in sub-sectoral productivity levels. Sub-sectors relating to gambling and betting, the arts, and some sporting activities, which also include the most productive sub-sectors, and retain large employment shares. Spatial variance is greatest in tourism-oriented library, museums and cultural sub-sectors.

Figure 6.61 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Hertfordshire), to the least productive (Cornwall and Isles of Scilly).

Figure 6.61: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

In contrast to other consumer services, the sector shows an increased emphasis on sector specialisation effects; that is, a regions performance is generally determined by the structure and concentration of sub-sectors in that region.

These effects are particularly significant, and exclusively negative, for many lower-ranking regions, such as Cornwall and Isles of Scilly, Worcestershire, and The Marches, who show a greater dependence on lower productivity sub-sectors (particularly tourism-oriented cultural activities).

For many of the stronger performers, such as London, Greater Manchester, and Liverpool City Region, these specialisation effects are positive, albeit less significant.

In fact, for the three most productive LEP areas, it is significant local capacity effects driving performance. And or many lower-ranking LEP areas, negative local capacity effects are compounding already poor sectoral specialisation, acting as a further drag on performance.

6.31 *Membership organisations; repair of household goods*

The sector is defined by the ONS as comprising 2-digit SIC sectors 94-95. Resultantly, the sector encompasses 14 constituent (5-digit SIC) sub-sectors.

Table 6.32: Sector overview, 2019-20

	Membership organisations; repair etc.	*Rank (out of 32 sectors)*
Sector employment share	0.9%	*29*
Sector GVA share	0.4%	*32*
Sector productivity relative to average	47.5%	*25*
Sub-sectoral productivity deviation	57.7%	*14*
Spatial productivity deviation	35.8%	*13*

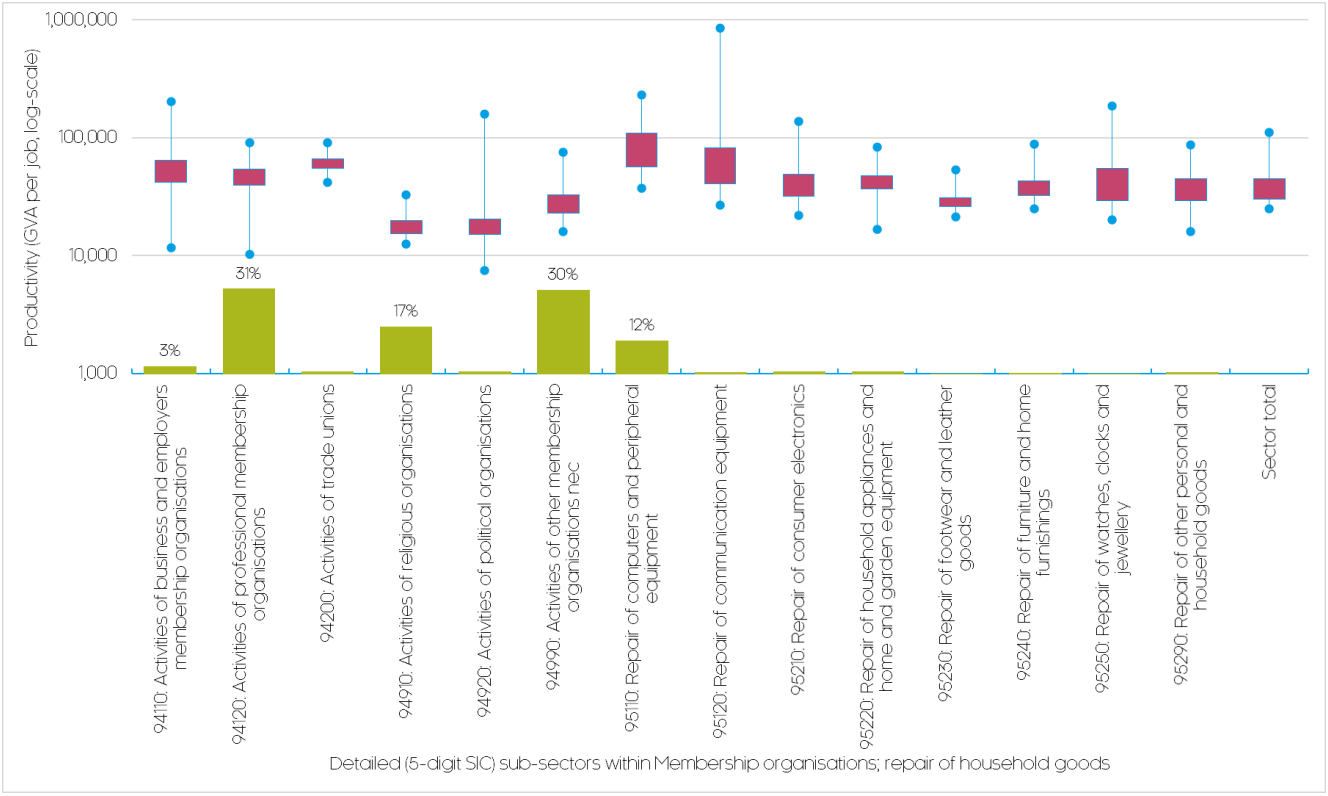
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.32 shows, the sector's share of total employment is higher than that of GVA. Resultantly, productivity in the sector is low, approximately half the national average, with the sector having the eight lowest productivity of all sectors.

Both sectoral and spatial variance is middle ranking compared to other sectors, with a 58% standard deviation in sub-sectoral productivity (i.e. across the 14 constituent sub-sectors), and a 36% standard deviation in productivity across LEP areas.

Figure 6.62 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst green bars show sub-sectoral employment shares.

Figure 6.62: Spatial and sub-sectoral productivity variance within the sector, 2019-20

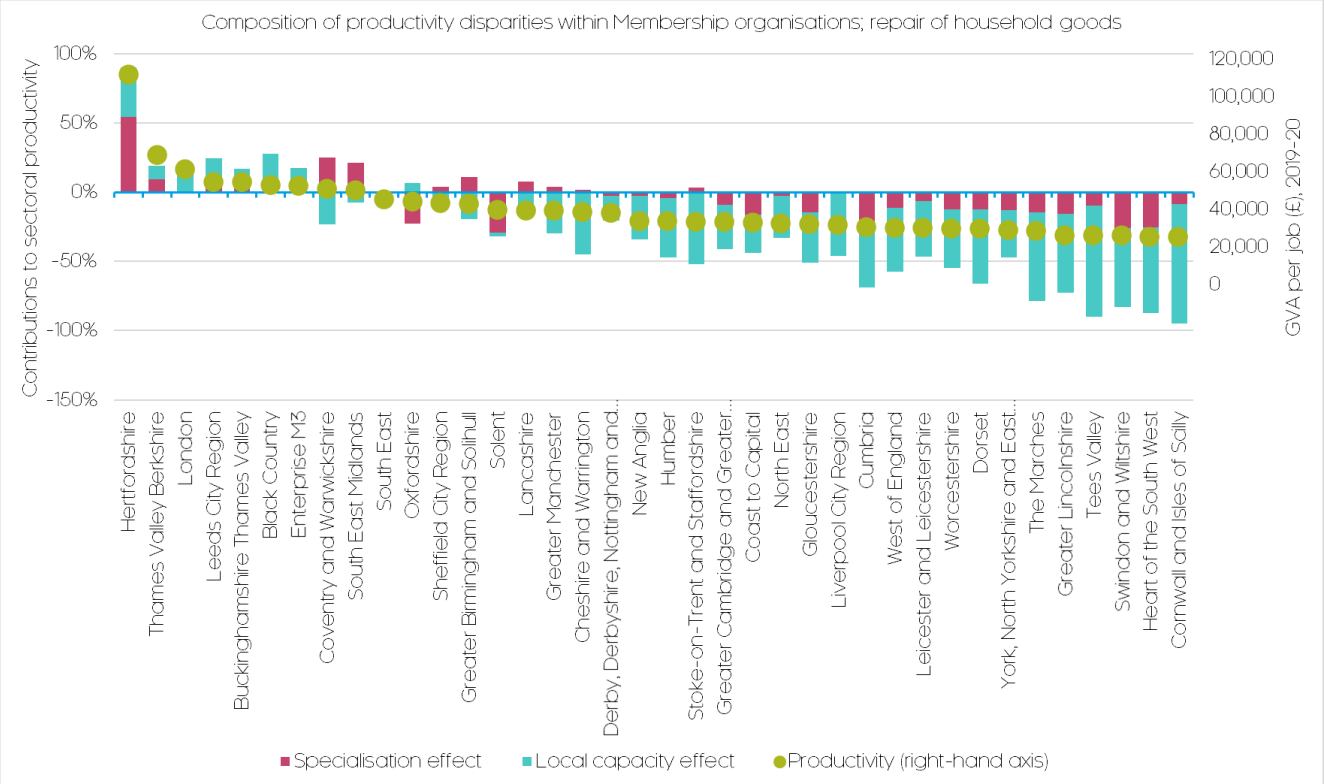


Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

There is a more notable variance in sub-sectoral productivity levels in membership activities, although spatial variance is low and relatively consistent. These sub-sectors also account for the vast majority (more than 80%) of the sectors employment. Spatial variance is greatest in repair activities, which also include the most productive sub-sectors.

Figure 6.63 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Hertfordshire), to the least productive (Cornwall and Isles of Scilly).

Figure 6.63: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

Regional productivity disparities in the sector are largely explained by local capacity effects; that is, the best/worst performing regions retain an intrinsic productivity advantage/disadvantage, regardless of sectoral structure and specialisation.

These effects are significant for the majority regions, and particularly explain the large underperformance of many lower ranking LEP areas relative to the national average, such as Cornwall and Isles of Scilly, Heart of the South West, and Swindon and Wiltshire.

There are some limited specialisation effects; for the majority of higher-ranking regions, these specialisation effects are significant and exclusively positive. For poorer performers, they are typically negative, though the scale and significance of these is small compared to local capacity effects

The most productive LEP area, Hertfordshire, is unique in being driven predominantly by specialisation effects, attributable to a local overrepresentation of highly productivity electronics repair sub-sectors.

6.32 Other personal service activities

The sector is defined by the ONS as comprising 2-digit SIC sector 96. Resultantly, the sector encompasses 5 constituent (5-digit SIC) sub-sectors.

Table 6.33: Sector overview, 2019-20

	Other personal service activities	*Rank (out of 32 sectors)*
Sector employment share	1.1%	*28*
Sector GVA share	0.5%	*31*
Sector productivity relative to average	43.6%	*26*
Sub-sectoral productivity deviation	56.9%	*15*
Spatial productivity deviation	18.5%	*26*

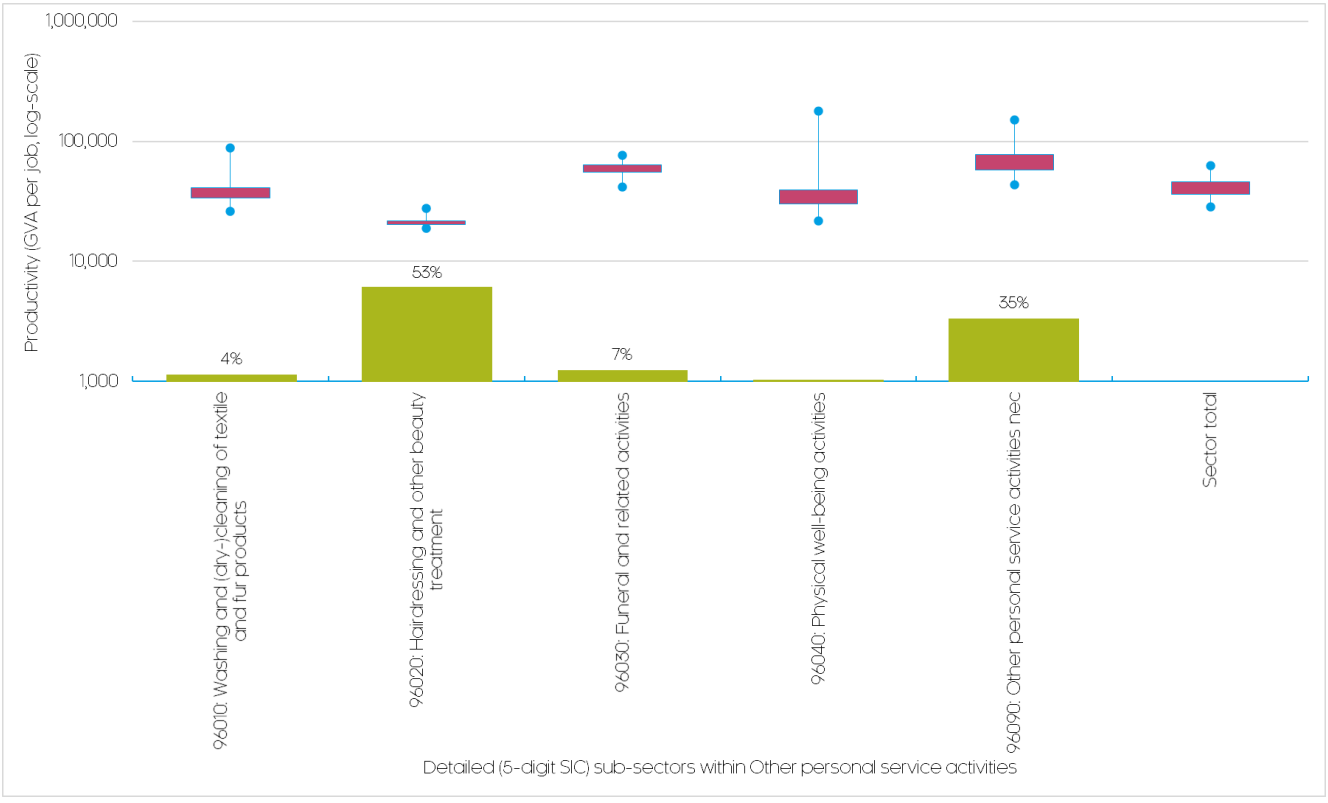
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: standard deviations weighted by employment share.

As Table 6.33 shows, the sector's share of total employment is higher than that of GVA. Resultantly, productivity in the sector is low, approximately half the national average, with the sector having the seventh lowest productivity of all sectors.

Sectoral variance is middle ranking compared to other sectors, with a 57% standard deviation in sub-sectoral productivity (i.e. across the 5 constituent sub-sectors). Spatial variance is very low, with only a 19% standard deviation in productivity across LEP areas, the seventh lowest of all sectors.

Figure 6.64 looks at these sectoral and spatial disparities in more detail; pink bars highlight spatial variance (25th-75th percentiles, LEP highs-lows) in sub-sectoral productivity, whilst

Figure 6.64: Spatial and sub-sectoral productivity variance within the sector, 2019-20



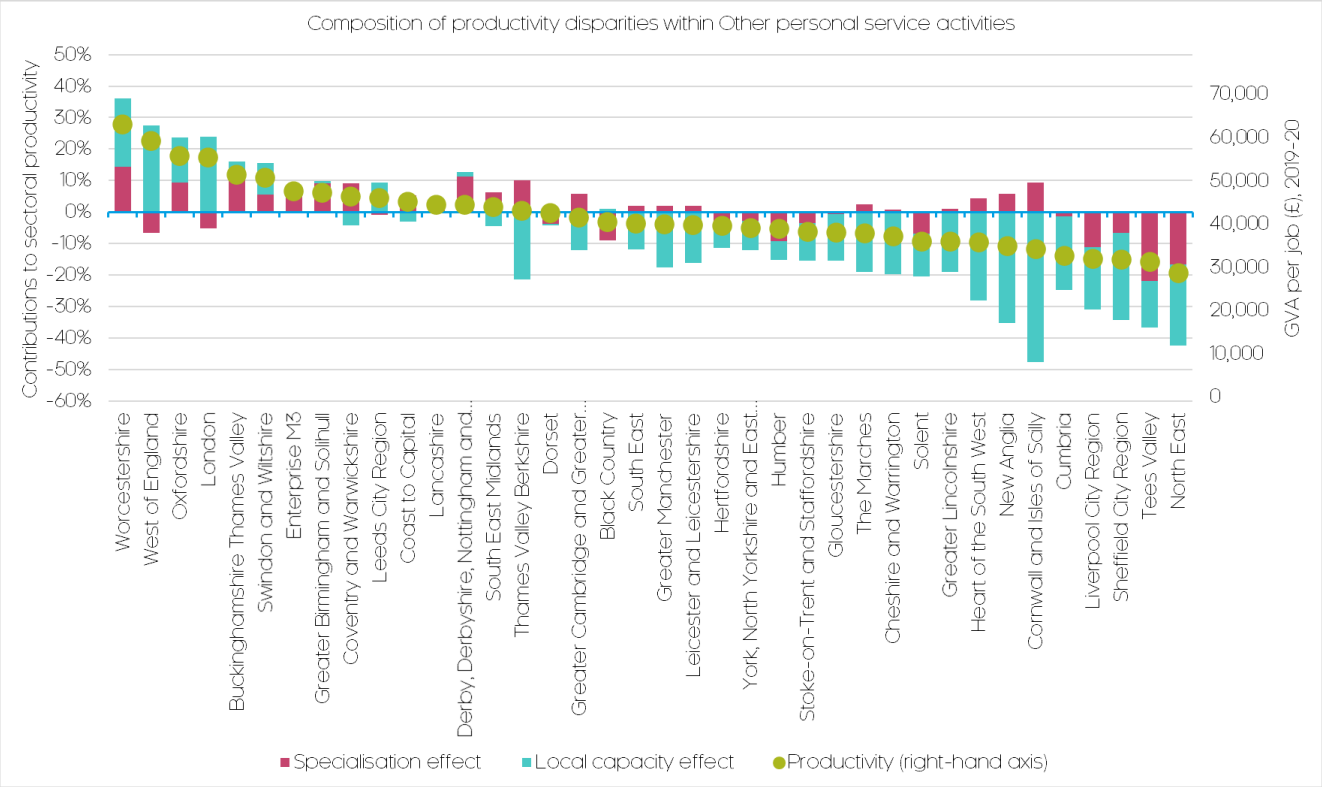
Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: Logarithmic scale. Sectors employing less than 100 people are excluded from the figure.

green bars show sub-sectoral employment shares.

Across sub-sectors, variance is relatively low and consistent, with sub-sectoral productivity largely clustered around the sector average. Spatial variance is very low, particularly in the largest sub-sector, hairdressing and beauty treatment. Greater, but still low spatial variance is observed in other personal services.

Figure 6.65 explores the composition of regional productivity disparities in the sector, sorted by the most productive LEP area (Worcestershire), to the least productive (North East).

Figure 6.65: Composition of sector productivity disparities across LEP areas, 2019-20



Source: Office for National Statistics (IDBR), Cambridge Econometrics. Note: blue horizontal axis represents national average.

As with other consumer services, regional productivity disparities in the sector are largely explained by local capacity effects; that is, the best/worst performing regions retain an intrinsic productivity advantage/disadvantage, regardless of sectoral structure and specialisation.

These effects are significant for the majority regions, and particularly explain the large underperformance of many lower ranking LEP areas relative to the national average, such as Cornwall and Isles of Scilly, Sheffield City Region, and New Anglia.

There are some still some notable specialisation effects though. These are significant and positive for the majority of middle-higher ranking regions, reflecting local concentrations in higher productivity sub-sectors, particularly relating to other services.

For poorer performers, specialisation effects are typically negative, and occasionally significant, often compounding already unfavourable local capacity effects. Cornwall and Isles of Scilly and New Anglia are a handful of lower ranking LEP areas who actually retain favourable sectoral specialisations.

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