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The Changing Spatial Distribution of Employment in Creative Industry Clusters in England, 1991-2018

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Executive summary

The geography of employment in contemporary creative industries is marked by two apparently contradictory trends. The first is the tendency to cluster; a large number of studies have shown that the creative industries tend to agglomerate strongly in large cities. At the same time, the growth of the creative industries is producing a spread and dispersion of employment in these industries across a wider range of locations.

To date, data limitations have meant there have been no long-term studies of how these two tendencies are interacting to shape the changing spatial patterns of creative industries and the evolution of creative clusters. Most work emphasises the strength of clustering, but we know little about how this varies over time and space.

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Prior work on the geography of the UK's creative industries has found that the concentration of employment in London has been growing strongly in recent years, but that there has also been considerable growth in other locations. It describes a layered pattern in which clustering interacts with broader regional effects, and finds that different creative sub-sectors show different patterns. Furthermore, there may be co-location effects between them that support their growth. However, most of this work is based on what has happened since the recession of 2008.

In this report, we aim to provide a longer term analysis of creative sub-sectors and to provide a more historical and rigorous study of locational patterns and tendencies across these industries since the early 1990s. Our aim is to place the period since 2008 in a historical context in order to examine how the concentration of employment, particularly in London has changed, and how creative sub-sectors in other types of location have fared over this period. We show how tendencies towards spatial concentration and dispersal have interacted, and how far this has changed the geography of creative industry employment at regional and local scales. We also outline some of the important implications of these patterns.

For reasons of data availability, our analysis primarily relates to England. We use the number of jobs, including both employees and the self-employed, as the main measure of creative industries activity, sub-divided by the nine creative industries sub-sectors as defined by Department for Digital, Culture, Media and Sport (DCMS) (see Table 1). The number of jobs is the most straightforward indicator, as it is unaffected by inflation, and less susceptible to revision; it is also available for a longer period of time than other indicators such as turnover or the number of firms. Using combinations and different vintages of the Business Register and Employment Survey (BRES) and the Labour Force Survey (LFS) from the Office of National Statistics (ONS), it is possible to construct a local enterprise partnership (LEP)-level dataset for the period 1991-2018 for the nine creative sub-sectors.

The creative industries have grown very rapidly since 1991 but there have been significant variations between sub-sectors. While employment in the fastest growing sub-sectors (for example, IT, software and computer services and Design and designer fashion) has grown four-fold, in other sub-sectors it has remained broadly stable (for example, Museums, galleries and libraries, and Publishing).

Table 1: Creative sub-sectors

Creative industry sub-sectors
1. Advertising and marketing
2. Architecture
3. Crafts
4. Design and designer fashion
5. Film, TV, video, radio and photography
6. IT, software and computer services
7. Publishing
8. Museums, galleries and libraries
9. Music, performing and visual arts

Source: DCMS.

The geography of creative industry employment shows growth in many parts of the country, but at the same time an increasing share of total employment has become concentrated in London. A disproportionate volume of employment was already found in London in 1991, but this has been reinforced by exceptionally rapid growth in the capital since 2008 in particular. Furthermore, London shows strength in most sub-sectors while most other regions have experienced strong growth in some sub-sectors but not others.

Our analysis also shows that, **prior to the start of the 2008 recession, the degree of geographical concentration in many of the sub-sectors was fairly stable across the English LEPs. But that since the recession, London's growth has proved particularly resilient, and creative industries employment has become more strongly concentrated in the capital**. The implication is that the possibilities for a more geographically dispersed pattern of growth in the creative sub-sectors should not be judged on the basis of the experience of the post-recession period alone. Increasing concentration in London may not be inevitable.

The report also confirms that, notwithstanding this increasing concentration, most sub-sectors show areas of agglomeration outside the capital. Many of these agglomerations are found in the Home Counties and 'motorway corridors' from London to the South and West, and also in the East, and North West including, for example, Film, broadcasting and photography in the West of England, Architecture in Cheshire and Warrington, and IT, software and computer services in Greater Cambridge and Peterborough.

Employment trends in locations with established specialisation outside London have however been uneven and unstable over time, with some established locations experiencing slow relative growth. The profile of most locations in terms of their shares of the various creative sub-sectors has become more similar to the national average, which is partly due to the widening spread of the creative industries in general, but also suggests that many places outside London have not built specialised creative clusters in one or more industry sub-sectors.

Indeed, outside of London, creative industry growth has not exhibited significant and sustained co-agglomerations of two or more sub-sectors, as each sub-sector has seen a different pattern of change, and employment has been typically been dispersed across a wide range of locations (albeit involving overlaps between different sub-sectors in some places). Aside from the aforementioned 'motorway corridors' to South West and West of London, employment growth been relatively fast in a relatively small number of regional cities such as Leicester, Bristol and Bath in the West of England, Greater Manchester, and the Leeds City Region. These more successful secondary cities account for a similar amount of creative industries employment as the LEPs in the South East region, including the Enterprise M3 and Thames Valley Berkshire LEPs. Their relative success outside of London suggests that there are policy lessons to be drawn about the importance of connectivity and a larger nodal city for the growth of creative industries and creative industries employment. However, we also see other regional cities – including Birmingham, Liverpool, Newcastle and Hull - have been less successful in growing creative industries employment, and agglomerations in some of these cities have shown disappointing growth.

Selected regional cities and the motorway corridors aside, other areas of fast growth in creative industries employment have been in rural areas. Some have achieved rates of growth faster than those in London, although the absolute scale of this growth has, of course, been much lower. The degree of growth in rural areas varies strongly across the sub-sectors, and it has been strongest in Design and designer fashion, IT, software and computer services, Music, performing and visual arts, and Crafts. Fast growth in rural areas has occurred in some predominantly rural LEPs in a variety of places, including York, North Yorkshire and East Riding, and Cornwall and the Isles of Scilly.

While there are important variations between creative sub-sectors (as defined by DCMS), in general the lowest rates of employment growth have been in some Northern LEPs (Cumbria, the Black Country, Tees Valley, Lancashire, Stoke on Trent, and Humber) and in some areas where other (non-creative) industry sectors dominate (such as Coventry and Warwickshire, and Cheshire and Warrington). It is worth stating that the areas used in the study are LEPs, which may contain smaller clusters of sectors that are either averaged out by using a larger geography, or based around parts of the creative economy not identified here, for example Coventry and its digital creative sectors, as identified in Roper et al (2017). It is likely that legacies and inherited effects in manufacturing and particularly heavy industry (such as skills, hard infrastructure, market potential and place-image) make it harder for creative industries to grow in these areas.

Overall, our historical perspective allows us to see that while London has strengthened over time, particularly since the 2008 crisis, the patterns of creative sub-sector employment growth in other locations, particularly in secondary creative industry centres, has been more unpredictable and unstable. For example, excepting London, there is little relationship between initial size of employment in a location and its subsequent growth. While some secondary centres have done well and built on their presence in a particular sub-sector, others have seen little employment growth and a decline in their degree of specialisation in the creative industries. The uneven outcomes seen in these mid-sized and specialised creative industry locations suggest that they have faced challenges in sustaining their expansion, consolidation and renewal. Regional effects, the strength of market demand, the ability to attract skilled labour and connectivity may be especially important in meeting these challenges, and there is a strong need for further understanding of why secondary creative industry locations show contrasting fortunes, including why some do not manage to sustain and build on an established presence in a creative sub-sector.

A key goal for place-based creative industry policy should be to support creative industries in these mid-sized and secondary locations, not least because their further development is essential to a more geographically balanced pattern of employment growth in the creative industries. The complex mosaic of creative industry employment means that simple generalisations on the causes of change are often misleading, and underlines the need for more detailed research into the evolution of creative sub-sectors and clusters in particular locations.

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1

Why space and time matter for analysing creative clusters

1.1 The localising nature of creative cluster activity

It is well known that creative industries show a striking tendency to agglomeration and concentration in big cities (Scott, 2000; Lorenzen, 2018). Moreover, many studies have argued that this tendency has intensified in recent decades, and that creative clusters have become more concentrated in the largest metropolitan areas and global cities. Place has become ever more important to the production of creative and cultural goods (Cooke and Lazzeretti, 2008). Larger creative clusters are typically growing in size, and they are often diversifying into new sub-sectors. Most analyses of creative cluster evolution have focused on processes of growth and described the cumulative and reinforcing effects of agglomeration economies that enhance firm learning and local knowledge exchange leading to more innovative and productive firms (e.g. Sunley et al, 2008; Vinodrai, 2015). Typically, studies highlight the importance of localisation economies, in which firms benefit from co-location with similar firms, clients and skilled labour (Branzanti, 2015), and/or the importance of urbanisation economies in which creative firms benefit from proximity to urban amenities, facilities and a diverse range of industries (see Florida, 2014; Drake, 2003; Lorenzen and Frederiksen, 2008).

1.2 Recognising the importance of cluster evolution and adaptability

There are some questions surrounding this emphasis on agglomeration and rising concentration in the creative industries. There has, for example, been little analysis of how agglomeration economies relate to the stage of development of particular clusters and whether these economies are, at some point, over-ridden by congestion costs and saturation effects.

Heterogeneity across sectors and sub-sectors

Recent research has highlighted that there may be important differences between different industries and sub-sectors, including those between technology-intensive creative sub-sectors, such as ICT and advertising, and more traditional creative sub-sectors, such as publishing, music and arts. Some have found that more traditional industries prefer smaller, secondary cities (Lazzeretti et al, 2008; Cruz and Teixeira, 2015), although these findings may well be specific to particular countries (Boix et al, 2014; Kemeny et al, 2019). The growth of outsourcing, organisational links and personal networks produces new types of smaller and more specialised creative clusters that are dependent on their connectivity to the largest clusters. The implementation of digital technologies allows the decentralisation and dispersion of some forms of work, while intensifying the clustering of other forms of production (Pratt, 2013). Creative workers in smaller cities appear able to compensate for the lack of strong local external economies, so that this may lead to more dispersal of parts of the creative industries (Brydges and Hracs, 2019; Gibson, 2012). However, the balance of evidence to date shows that creative industries continue to agglomerate and cluster strongly (Lorenzen, 2018; Gong and Hassink, 2017).

Spin-off processes

As yet, such questions have not been properly addressed in the literature as there has been a shortage of systematic and comparative work on the evolution of creative clusters. Nevertheless, case studies and research on other industries have highlighted key processes in cluster evolution (Gong and Hassink, 2017). Several studies highlight the importance of a localised process of spin-offs and creation of new firms around parent firms, or 'anchor' public institutions (e.g. Wenting, 2008; De Vaan et al, 2013). The strength of this process is key to understanding a cluster's adaptability and development through stages such as birth, expansion and maturity. Without a strong spin-off process clusters may become stuck in particular stages, and fail to grow and develop (Martin and Sunley, 2011). Most studies emphasise that this process depends on local institutional support and networks, of both a formal and informal kind (Cooke and Lazzaretti, 2008; Vinodrai, 2015; Lorenzen, 2019).

Co-location as a growth driver

There has also been a growing focus on how creative cluster evolution is shaped by the co-location of related sub-sectors. According to the concept of related variety (see Frenken et al, 2010), the co-location of a variety of industries that also have a certain degree of cognitive similarity, leads to growth. This is because knowledge exchange increases innovation and leads to higher rates of firm spin-off and allows diversification into new and hybrid specialisms (Chapain et al, 2010; Lazzeretti, et al, 2017). Creative clusters may therefore decline if their knowledge variety and heterogeneity are eroded and narrowed; mixing knowledge and developing synergies across industries may possibly prevent this risk and aid adaptability (Lorenzen and Frederiksen, 2008; Sinozic and Tödtling, 2014). A key question, then, is whether the co-location of related sub-sectors is driving the growth of creative clusters (Lee, 2020).

1.3 Recent research findings

During the last decade or so, research led by Nesta and others has provided a highly detailed picture of creative industries in the UK and their spatial distribution (Bernick et al, 2017; Mateos-Garcia and Bakhshi (2016), Mateos-Garcia (2009); Mateos-Garcia et al (2018). This research has shown that creative industries have a layered spatial pattern in which strong local clustering interacts with broader agglomerations and regional differences. Key findings have been that:

- **The concentration of creative industries in London and the South East is very strong**. This is due to a combination of both agglomeration, global city and centripetal institutional factors (De Propris et al, 2009; Bakhshi et al, 2015; Tether, 2019).
- **The degree of spatial concentration since 2010 is increasing and the largest creative TTWAs are increasing their shares of employment and activity** (Mateos-Garcia and Bakhshi, 2016; Mateos-Garcia et al, 2018). Changes to concentration vary across sub-sectors and have not been measured thoroughly, however (Tether, 2019).
- **There are also many other important and growing creative clusters in other cities and locations**. The creative industries represent an increasing share of business in most TTWAs (Mateos-Garcia and Bakhshi, 2016).
- **Certain industries (radio, TV, music and arts; and advertising, design and software) show a trend towards co-location suggesting synergies** (De Propris et al, 2009; Mateos-Garcia, and Bakhshi, 2016).
- **Clusters outside London and the South East are more specialised by type of industry** (De Propris et al, 2009) and appear to have a greater dependence on large firms (Mateos-Garcia and Bakhshi, 2016). There is a negative relationship between average firm size and importance of self-employment across clusters (Ibid).
- **Growth in a local area tends to have positive impact on creative industries growth in neighbouring areas suggesting that positive spillovers and demand linkages are operating with a distance decay effect** (Mateos-Garcia et al, 2018).

The need to analyse longer-term cluster development

While this work has primarily provided a detailed picture of current geographies, it also contains some clues as to the evolution of creative clusters in the UK, and it suggests that the UK's creative clusters vary in their rate of growth, stage of development and by degree of specialisation. Mateos-Garcia et al (2018), for example, propose a five-fold taxonomy of clusters, based on their structure and growth from 2011. This work confirms the significance and rise of agglomeration but indicates that different sub-sectors show different patterns of clustering, that regional economic contexts strongly influence cluster evolution, and that industry synergies may be important to growth in some parts of the creative industries. It has been primarily based on change over the last decade, however; that is the period during and following the global financial crisis. We need a longer-term and systematic analysis of the spatial distribution of the UK's creative industries and how their clusters have evolved, in order to assess how far key propositions about cluster evolution explain the key processes of change.

2

Methods and data sources[1]

2.1 Indicators and data sources

Employment as the main measure of activity

Activity can be measured in many ways, e.g. output (turnover or value added), number of firms or employment. In this study, we use employment (i.e. the number of jobs, including self-employment) as the metric for creative sector activity. The reasons are that it is mostly readily available over longer periods of time and is a volume measure, so little additional manipulation is required to interpret changes in it (unlike, say, turnover which may change over time because of changes in general prices). As such, it is also less susceptible to revision and uncertainty.

Sector and sub-sector definitions

Table 2.1: Creative sub-sectors

Creative industry sub-sectors
1. Advertising and marketing
2. Architecture
3. Crafts
4. Design and designer fashion
5. Film, TV, video, radio and photography
6. IT, software and computer services
7. Publishing
8. Museums, galleries and libraries
9. Music, performing and visual arts

Source: DCMS.

The creative sub-sectors identified in the study (industries and aggregate sub-sectors) follow the DCMS classification,[2] as shown in Table 2.1. A full split between sub-sectors and industries is provided in Appendix A.

1. Further details on the data methods, and construction of indicators for analysing spatial concentration and specialisation can be found in Appendices A and B, respectively.
2. See https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/499683/CIEE_Methodology.pdf

Separating employees and self-employment

When analysing the number of jobs, it is important to split total employment into employees and self-employment. This is because of the high prevalence of self-employment across the creative industries (Mateos-Garcia and Bakhshi, 2016, Tether, 2019)). Self-employment in these sub-sectors is much higher than in the economy as a whole; self-employment represented 15.1 per cent of total employment is in 2016 (ONS, 2018). Table 2.2 shows how varied the importance of self-employment is across the different sub-sectors and, of course, the figures mask variance across individual industries within the sub-sectors.

Table 2.2: Self-employment proportion of total employment in UK creative sub-sectors

Sub-sector	2011	2012	2013	2014	2015	2016	2017	2018
1. Advertising and marketing	20.3	24.3	22.6	24.0	25.8	26.8	22.1	21.5
2. Architecture	26.6	28.1	30.9	27.7	30.0	25.5	35.6	27.9
3. Crafts	-	-	-	-	-	-	-	-
4. Design and designer fashion	53.9	56.4	58.1	58.1	60.6	61.3	60.6	55.2
5. Film, TV, video, radio and photography	39.3	38.8	39.2	42.1	38.1	38.2	40.6	39.6
6. IT, software and computer services	19.7	19.5	20.6	19.1	18.9	19.3	19.1	18.0
7. Publishing	24.2	27.4	28.8	34.7	34.0	31.6	28.6	33.2
8. Museums, galleries and libraries	-	-	-	-	-	-	-	-
9. Music, performing and visual arts	72.8	72.2	71.7	68.7	68.2	69.8	72.4	72.0
Creative Industries	**32.3**	**33.2**	**34.2**	**34.8**	**34.1**	**34.5**	**34.5**	**33.3**

Note: '-' means the figure has been suppressed due to disclosure issues. Source: ONS (Annual Population Survey).

Data sources used

Various data sources have been combined together (using official correspondence tables) to create a consistent database over the period 1991-2018. These are discussed in detail in Appendix A, with a summary below.

Employees

Employee data has been sourced from the Office for National Statistics' Business Register Employment Survey (BRES), the Annual Business Inquiry (ABI), and Annual Employment Survey (AES), which together cover different periods and sector classifications over the period 1991-2018. The employee data has been typically available at local area level (380 areas) and by detailed (4-digit) industry across the whole of the UK.

Self-employment

The self-employment data came from the Labour Force Survey (LFS). Consistent data can be achieved over the period 1994-2018 , although only at NUTS1 (12 region) level and limited to the 9 sub-sectors, again across the whole of the UK.

3. Self-employment data for the period 1991-1993 was interpolated based on historical trends, as were selected region – sub-sector combinations where the LFS data were deemed not robust enough. See Appendix A for more details.

2.2 Measuring creative clusters and their location

The paper maps and measures geographical concentration and patterns of creative industries employment over time by using standard locational measurements (see Appendix B for more details).

Industry specialisation

The level of specialisation in sub-sectors in specific local areas is captured by the Location Quotient (LQ), which measures whether, in a particular area, the share of employment in a specific sub-sector is disproportionate relative to that area's share in total national employment. Industries with a high location quotient in a region are considered to be geographically concentrated.

We also report the Krugman Specialisation Index (KSI), sometimes known as the Coefficient of Regional Specialisation (CRS), which is an index of regional structural dissimilarity. The higher the index the more a region differs from the national industry structure. In this paper we use this to examine how the mix of creative industries in each Local Enterprise Partnership (LEP) differs from the national mix of creative sub-sectors.

Industry area concentration and co-location

The strength of geographical concentration is measured in each sub-sector by using the Herfindahl-Hirschman Index (HHI), which is an absolute measure that compares the distribution of employment in a particular sector with that of a uniform distribution. The value of the index increases with the degree of concentration reaching 1 when all employment is concentrated in one region. In this analysis, we use this measure to examine how the levels of geographical concentration vary across the creative sub-sectors.

Making up the complement, the Ellison-Glaeser (EG) statistic is used to measure agglomeration as geographical concentration compared with a completely random distribution of firm locations, thereby measuring the excess concentration beyond what would be expected from a random spread. Existing work shows that co-agglomeration tends to be lower in service industries than in manufacturing, as most services tend to be geographically dispersed (Kolko, 2010).

Growth of clusters

Finally, the project examines the growth of creative clusters and concentrations using simple rates of growth over time, and by using cumulative change in employment relative to the national trend in each sub-sector. These cumulative growth trajectories are useful in revealing whether employment in particular places is growing, or declining, faster or slower than the national average.

The table below summarises the statistical indicators mentioned above, explains in more detail what is being measured, and how the results can be interpreted.

Table 2.3: Indicators, measurement and meaning

Statistic used	What it measures	What it is used to show
Location Quotients	Whether, in a particular area, the share of employment in a specific industry is disproportionate, relative to that area's share in total national employment	Areas (LEPs) have become more or less specialised in different creative sub-sectors
Krugman Specialisation Index	The degree to which the industrial structure (mix of industries) in an area differs from the national industrial structure (mix or profile of industries)	The mix of creative sub-sector employment in an area (LEP) has become more or less similar to the national mix of employment across the creative sub-sectors
Herfindahl-Hirschmann Index	How the geographical distribution of employment in a particular industry compares with a uniform distribution	Creative sub-sectors have become more or less geographically concentrated
Ellison- Glaeser Statistic	Geographical concentration of an industry compared with a completely random distribution of firms, showing excess concentration beyond a random spread	Each creative sub-sector has tended to concentrate in the same areas as other creative sub-sectors, thereby showing co-location
Cumulative Growth Trajectories	Cumulative rates of growth in particular industries, relative to the national average rate of growth in that industry	Employment growth in particular creative sub-sectors/ areas has grown faster or slower than the national average rate of growth in that sub-sector

3

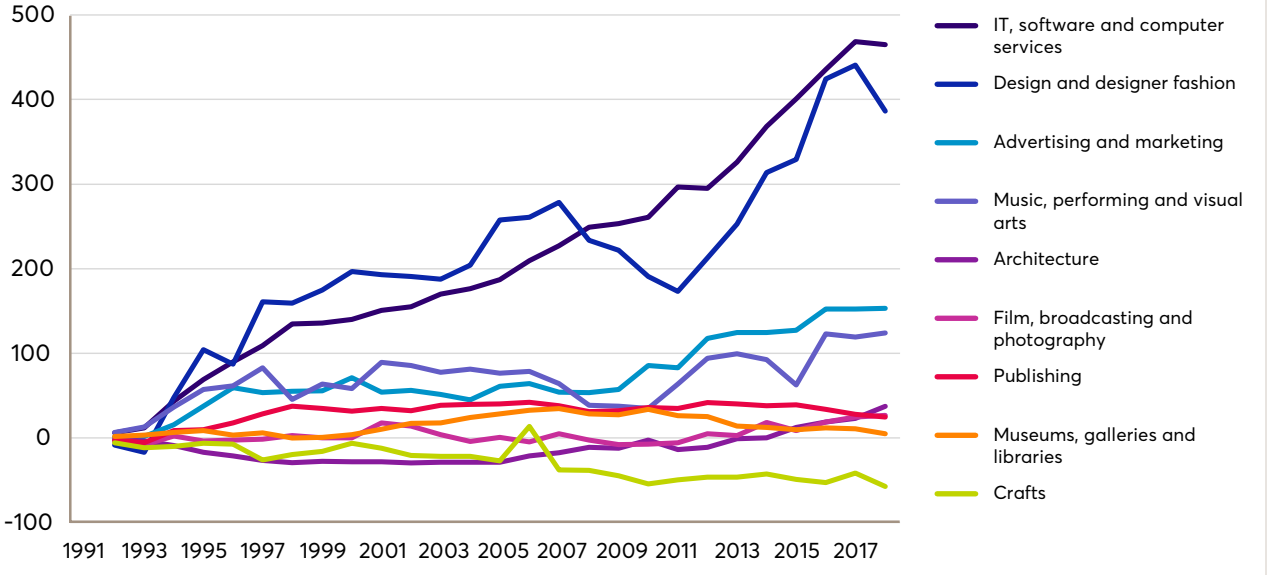
The evolution of creative clusters across the regions of the Great Britain and English LEPs

3.1 Introduction

As we have noted, previous work has shown that the concentration of the creative industries in London is very strong and has been growing since 2010, the aftermath of the global financial crisis. At the same time, the growth of these industries has involved their spread to many other places (Mateos-Garcia and Bakhshi, 2016; Mateos-Garcia et al, 2018; Nathan, 2020). There are also many other important and growing creative clusters in other cities and places (Mateos Garcia and Bakhshi, 2016). Locations outside London and the South East are more specialised by type of industry (De Propris et al, 2009) and appear to have a greater dependence on large firms (Mateos-Garcia and Bakhshi, 2016). This paper examines whether the same trends are evident in our longer time series, from 1991 to 2018.

By way of introduction, we should note that over this longer time period, employment (including self-employment) change in the creative industries has varied strongly across the sub-sectors. Figure 3.1 shows that the fastest growing sub-sectors over the period as a whole have been Design and designer fashion and IT, software and computer services. Most sub-sectors have grown. However, in accord with the findings of other studies (DCMS, 2018; Tether, 2019), Museums, galleries and libraries and Publishing have declined since 2010 and, according to the available data, Crafts employment and self-employment has fluctuated around a stable level.

Figure 3.1: Cumulative employment growth by creative sub-sector, 1991-2018



3.2 The regional growth of sub-sectors

This employment growth has important regional dimensions. Table 3.1 shows the annual rates of growth by region and sub-sector and shows that regional patterns have tended to vary significantly by sub-sector. In most sub-sectors London has experienced strong growth, but outcomes have varied in other regions. In some cases, several other regions have grown at a faster rate than the capital. An intriguing observation is that regions in the North and Midlands together with the devolved nations tend to show a more uneven set of outcomes with some sub-sectors matching or exceeding London's growth rate, but other sub-sectors growing marginally or even declining.

Table 3.1: Mean Annual Growth in Employment in Creative Sub-sectors, 1991-2018

Sub-sector	NE	NW	YH	EM	WM	EE	LO	SE	SW	WA	SC	GB
Advertising and marketing	1.2	4.5	12.1	3.1	1.0	5.1	4.7	4.2	4.6	5.8	3.0	**3.8**
Architecture	1.1	1.1	1.4	0.9	0.5	1.9	5.4	0.9	2.7	2.7	0.5	**1.4**
Crafts	33.6	3.7	1.7	2.6	1.8	12.0	0.1	0.8	2.3	0.7	0.8	**1.6**
Design and designer fashion	9.6	5.8	11.2	13.0	6.9	8.8	8.0	13.3	8.1	6.9	5.9	**7.5**
Film, TV, video, radio and photography	2.3	2.1	1.0	0.6	1.2	0.7	2.7	1.6	1.3	0.1	0.5	**1.1**
IT, software and computer services	10.4	7.8	8.7	9.8	5.9	6.2	7.4	6.2	7.0	11.5	7.0	**6.8**
Publishing	0.4	0.3	1.4	2.3	1.6	1.6	1.7	2.2	1.9	1.3	0.1	**0.9**
Museums, galleries and libraries	0.0	0.2	0.2	1.0	0.5	0.9	1.2	0.9	0.7	0.9	1.6	**0.3**
Music, performing and visual arts	4.3	4.3	5.5	17.2	6.3	4.1	3.9	3.9	3.8	5.0	3.9	**3.8**
Creative sector total	**1.6**	**3.0**	**3.0**	**4.5**	**1.7**	**2.9**	**3.9**	**3.6**	**3.1**	**1.4**	**2.0**	**3.2**

In the expanding sub-sectors, London's divergence from other regions increased in the period since 2005, when employment growth in creative industries in the capital accelerated. For example, Figures 3.2 and 3.3 show absolute employment growth and illustrate this divergence in Advertising and marketing, and in IT, software and computer services.

Figure 3.2: Employment by Region 1991-2018: Advertising and Marketing

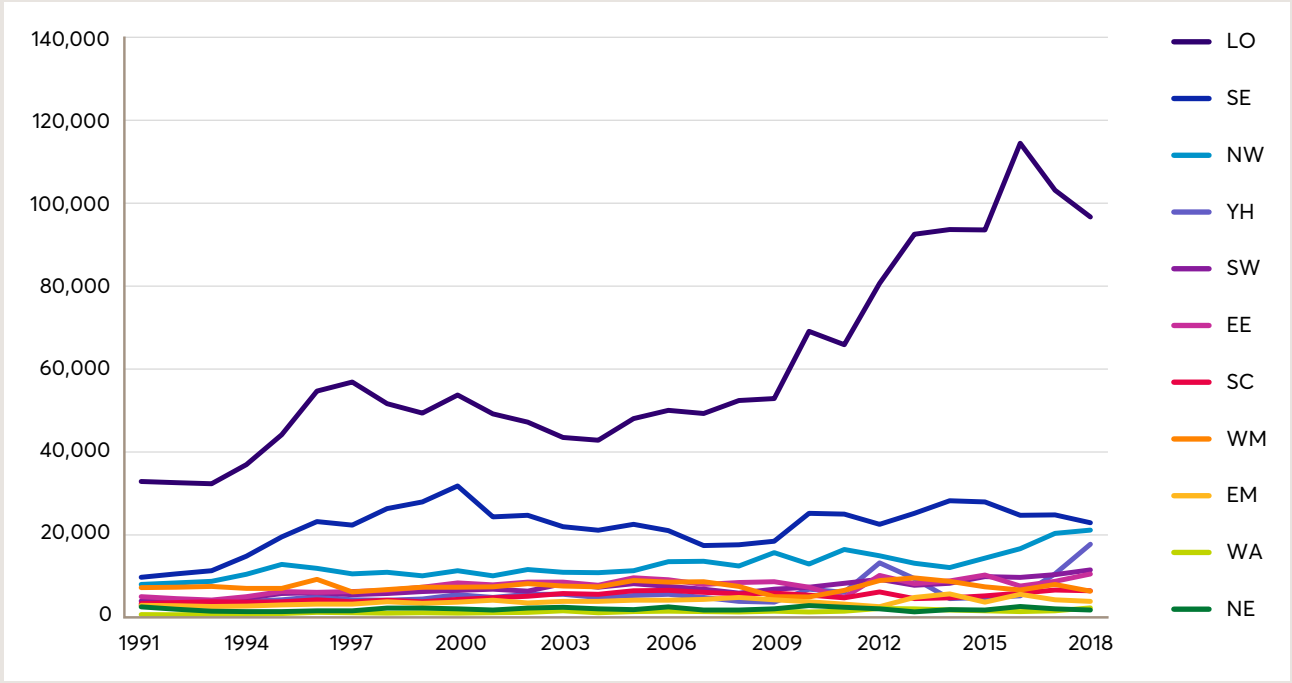
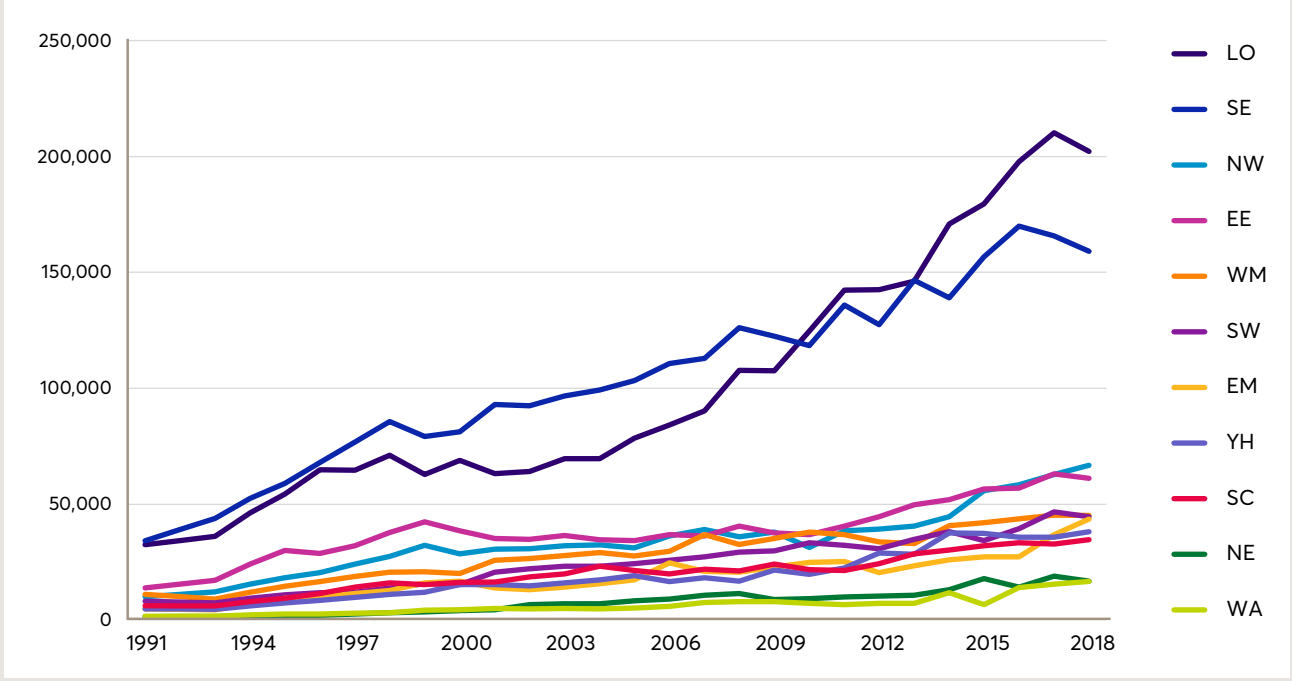


Figure 3.3: Employment by Region 1991-2018: IT and Computer Services



The scale of London's divergence in employment is apparent. While some of the other regions have seen strong rates of growth the small initial size of their sub-sectors (with the exception of the South East in IT and computing services) has meant that they have not significantly closed the gap with London.

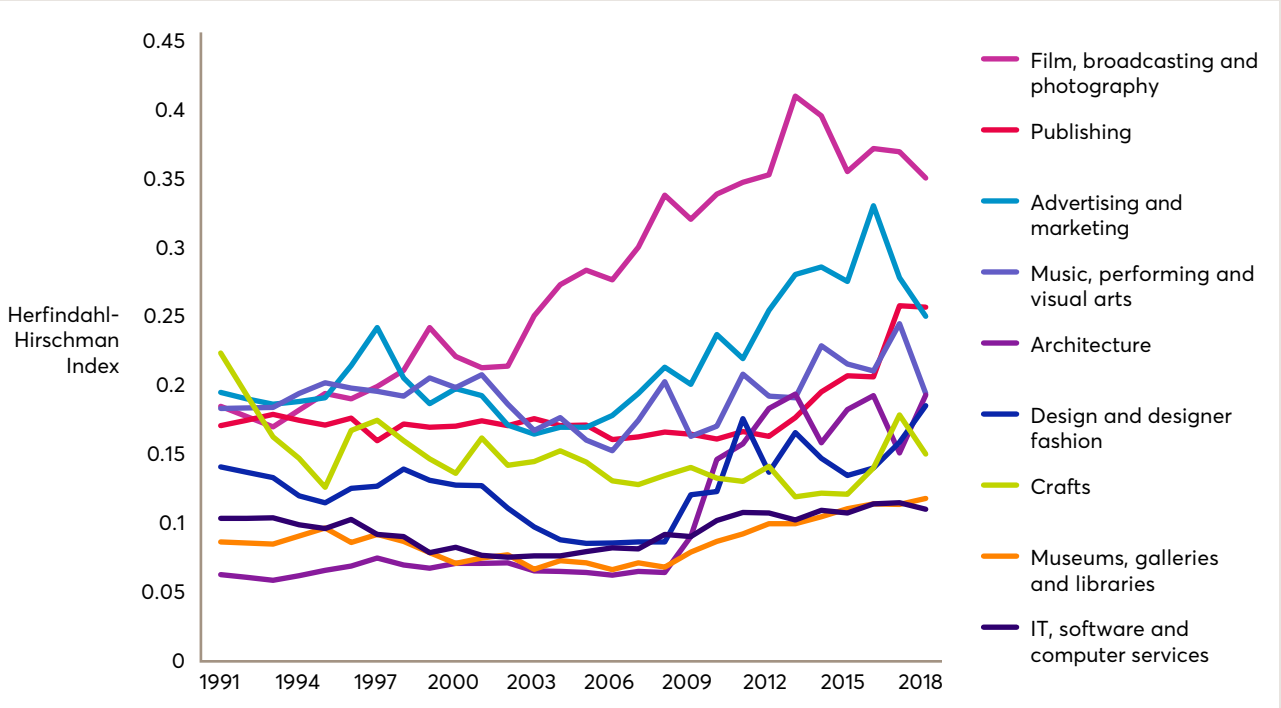
3.3 Geographical concentration

We can understand this uneven growth in more detail by examining geographical concentration across the LEPs. The degree of geographical concentration has increased in most sub-sectors over the period, confirming the findings of earlier research (Figure 3.4). However, a slight trend to less concentration is evident in many sub-sectors (with the exception of Film, broadcasting and photography) between 1991 and 2007. In most sub-sectors, there has been a switch towards greater concentration, coincident with the global financial crisis in 2008. Figure 3.4 suggests that this continued until around 2016, at which time locational trends have again become more varied and concentration has fallen in the majority of the sub-sectors. Of course, it is too early to tell if this is a long-term change or volatility.

These differences in time suggest that the tendency for growing concentration in most creative sub-sectors, apparent since 2008 and documented in previous studies, may not be inevitable.

The data suggests over the three decades as a whole the increase in geographical concentration has been smaller in IT, software and computer services, whereas it has increased most strongly in Film, broadcasting and photography, in Publishing, and in Advertising and marketing.

Figure 3.4: Herfindahl-Hirschman Indices of Concentration by sub-sector, 1991-2018



As earlier work has shown, the main driver for this pattern is London, which has particular relative strengths in these latter fast-growing sub-sectors. Table 3.2 shows that by the end of our sample period London grew its share of total (GB) employment in all of the sub-sectors that constitute the creative industries, with the exception of Music, performing and visual arts.

Table 3.2: London's share of creative sub-sector employment (%)

Sub-sector	1991	2018
Advertising and marketing	41.3	48.0
Architecture	17.5	41.1
Crafts	25.0	32.3
Design and designer fashion	35.7	42.6
Film, TV, video, radio and photography	36.5	54.9
IT, software and computer services	25.2	27.7
Publishing	38.3	49.1
Museums, galleries and libraries	24.6	26.9
Music, performing and visual arts	40.1	39.0

3.4 Growth across LEPs

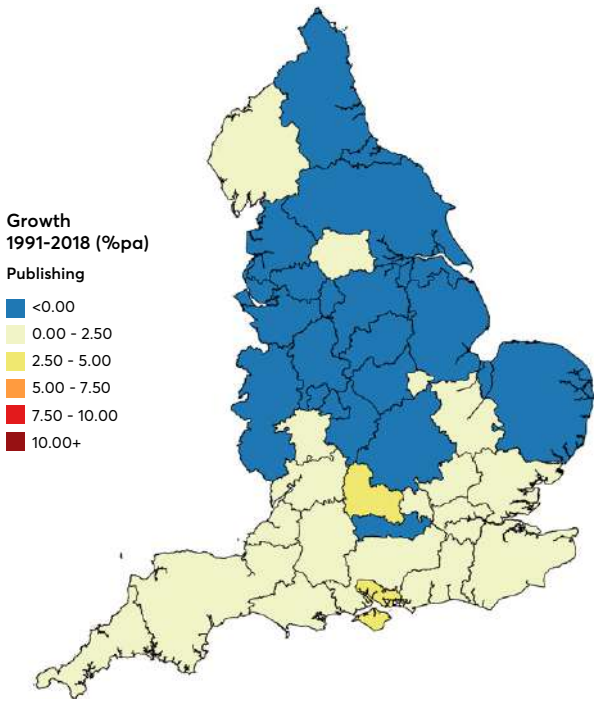
When we map growth rates across the Local Enterprise Partnership areas (LEPs) across England, it is clear that there are different patterns in the sub-sectors.

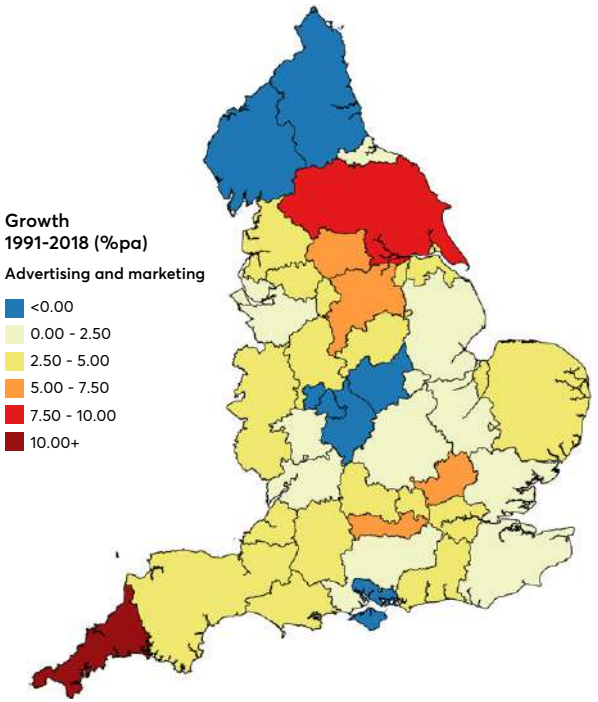
For example, Figure 3.5a shows maps of selected sub-sector average growth rates across LEPs, while Figure 3.5b shows the equivalent regional (NUTS1) maps. Here, Publishing shows a 'North-South divide' in growth but is quite unusual in this regard. More typical is the pattern visible in Advertising and marketing where there has been strong growth in a mixture of Southern, Northern, and rural LEPs. Strong growth in London has been exceeded by very fast growth in some rural, South Eastern and Northern LEPs (see also Design and designer fashion). Comparing the LEP and regional maps shows how the growth in particular LEPs shapes the regional averages, and also that the regional scale hides important intra-regional variations.

When we examine which LEPs have grown fastest relative to the national growth rate, there are a number which appear in two or more of the top quartiles in different creative sub-sectors (see Appendix C). These include: Cornwall and the Isles of Scilly; York, North Yorkshire and East Riding; Cheshire and Warrington; Coast to Capital; Greater Cambridge and Greater Peterborough; Buckinghamshire Thames Valley; Oxfordshire; Enterprise M3; Gloucestershire; West of England and Heart of the South West. In other words, in such LEPs, several creative sub-sectors have grown especially rapidly, although some have started from a small initial base.

While all of these LEPs have strong growth in a number of creative sub-sectors, they include some that have substantial employment levels, but others with small levels of employment. More generally, we should emphasise there are very large differences in the absolute scale of employment totals across LEPs.

Figure 3.5a: Annual mean growth rates in selected sub-sectors at English LEP level





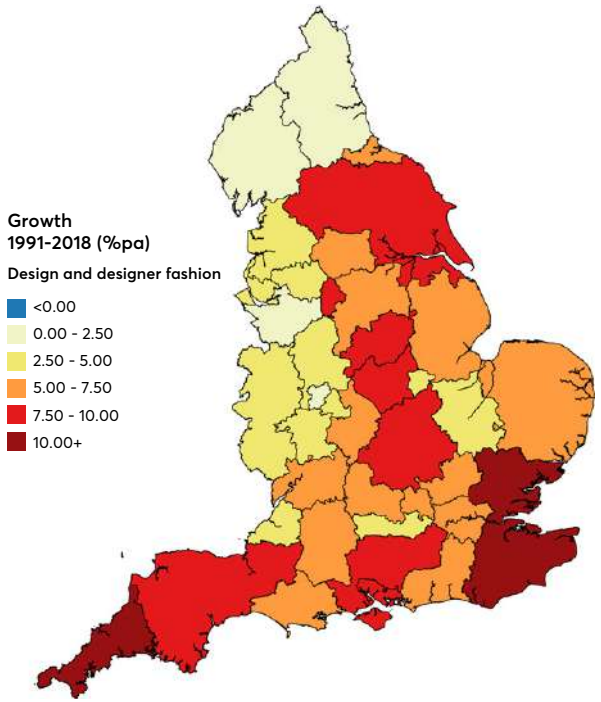


Figure 3.5b: Annual mean growth rates in selected sub-sectors at NUTS1 region level

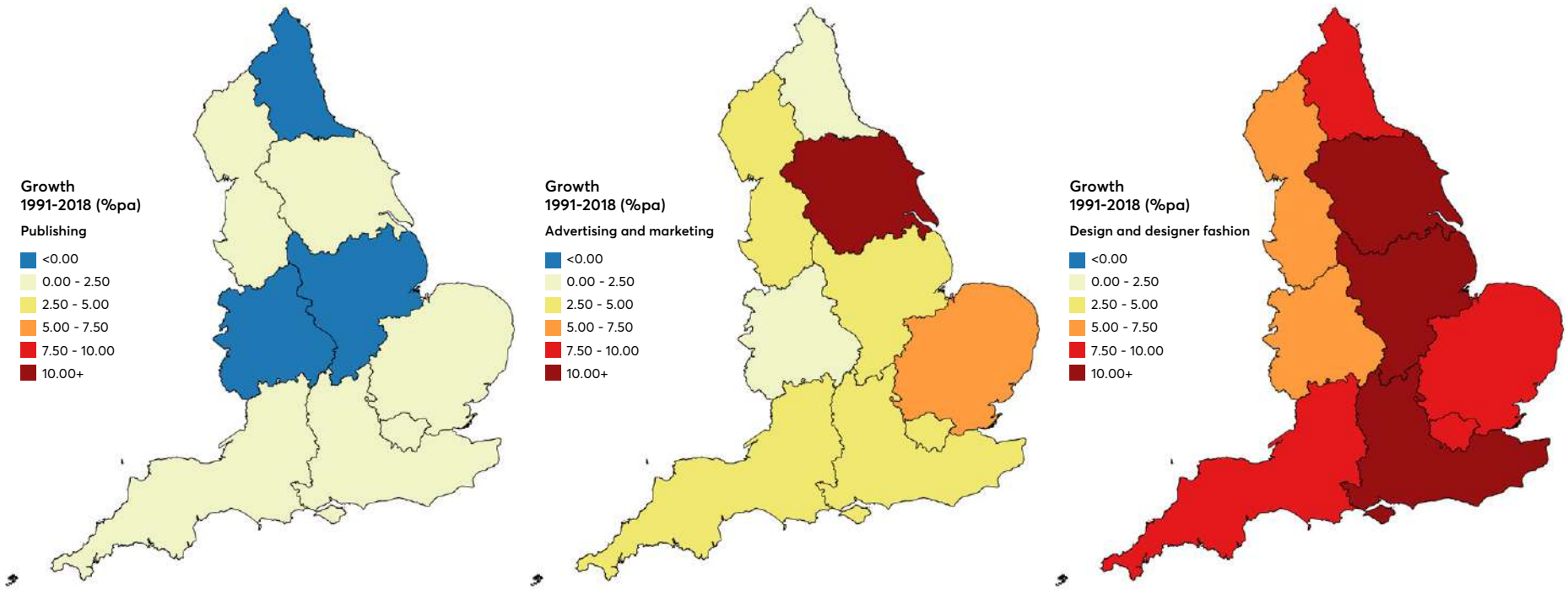
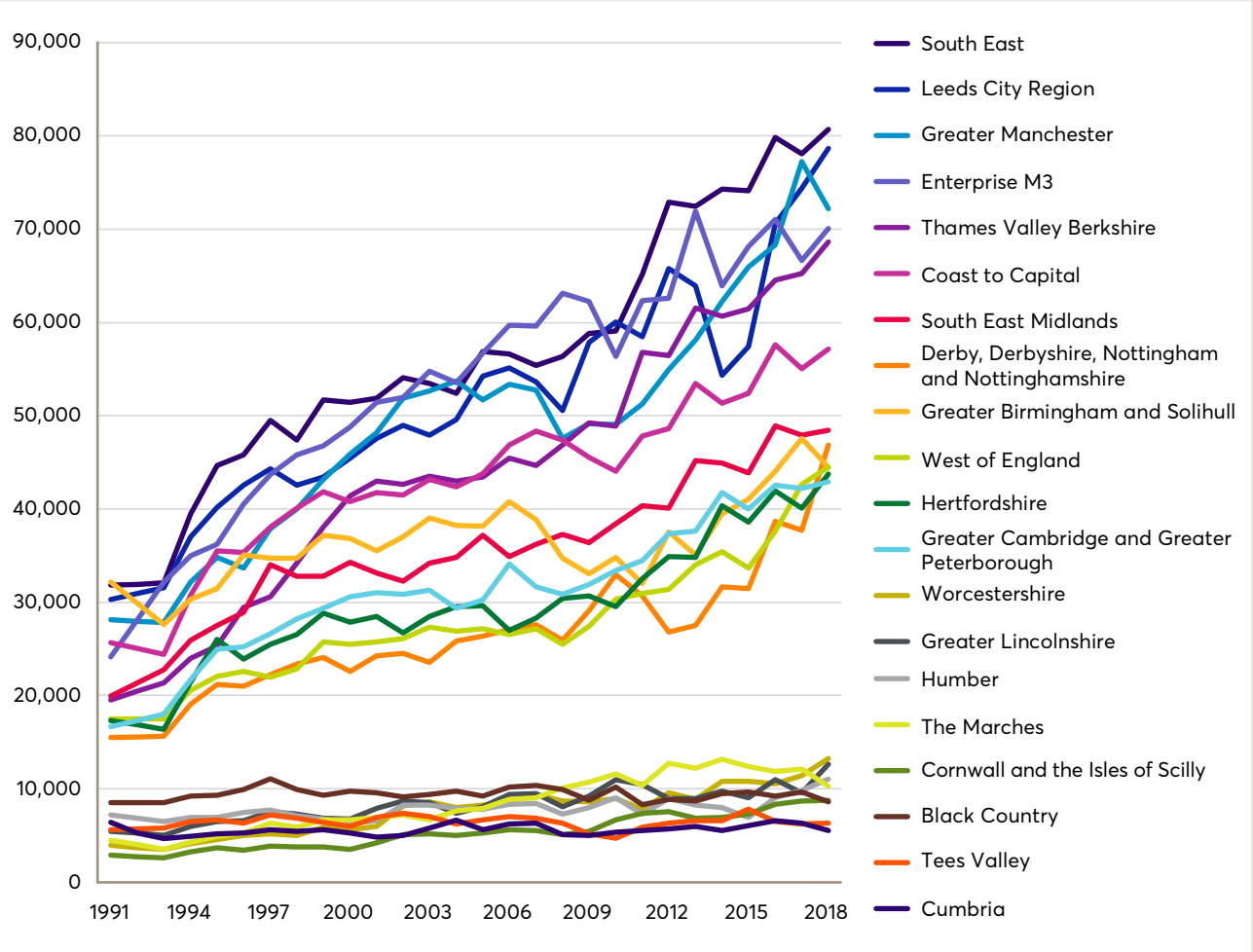


Figure 3.6 shows the absolute growth in the creative industries as a whole across selected LEPs outside of London. It includes the ten largest and the ten smallest LEPs in terms of their total creative industries employment in 2018. It shows that the scale of employment in Leeds and Manchester and key Midlands cities is equivalent to that in some of the fast growth Southern LEPs but also reveals the substantial and widening range in size of the creative industries across the different LEPs.

Figure 3.6: Total employment in the creative industries (1991-2018) for largest ten and smallest ten LEPs (by employment in 2018) (excluding London)



Those LEPs with the lowest rates of growth in total creative industry employment are mainly former industrial cities and Northern LEPs, including: Cumbria, Tees Valley, the Black Country, Humber, Stoke on Trent and Staffordshire, Lancashire, Liverpool City region and the North East. Growth has also been slow in LEPs with other economic strengths such as Coventry and Warwickshire, Cheshire and Warrington, Greater Birmingham and Solihull, and Buckinghamshire Thames Valley.

3.5 Share of employment and growth

We now want to probe these patterns to understand if there are obvious causes. We first look at relationships between initial share of employment in a sub-sector in a LEP and its subsequent growth, in order to test if the bigger centres are growing faster than the smaller centres. Then we turn to growth in different types of areas – metropolitan, urban, rural – to examine how growth has varied over these types. Have cities grown faster than semi-urban and rural areas?

Given the complex patterns reported in this paper, it is not surprising that – London aside – there is no evidence that the initial size of sub-sector employment in LEPs is positively associated with subsequent growth over the period. In particular, there is a very wide range of performance among the initially small locations with some growing much faster than London and others declining. For example, Figures 3.7 and 3.8 show the share of sub-sector employment in 1991 against growth (measured as cumulative deviation from the national growth) for Advertising and Marketing, and Design and Designer Fashion.

Figure 3.7: Devation from the national growth of employment (1991-2018) against share of employment (1991), Advertising and marketing

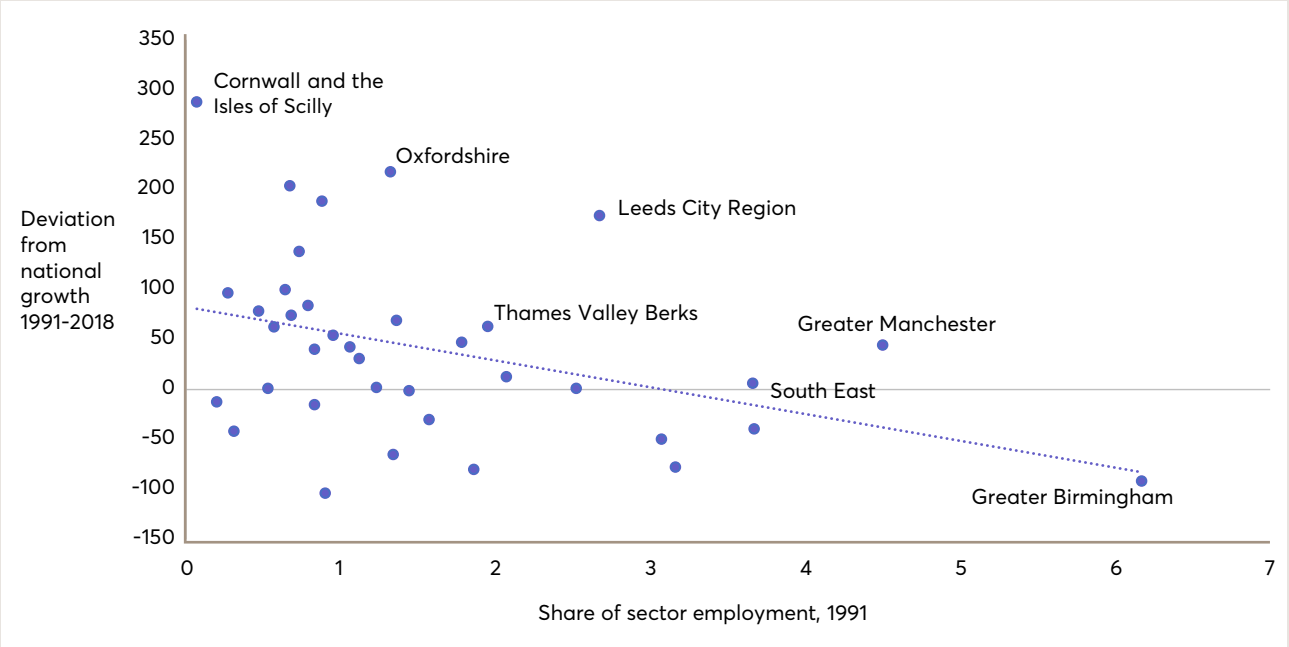
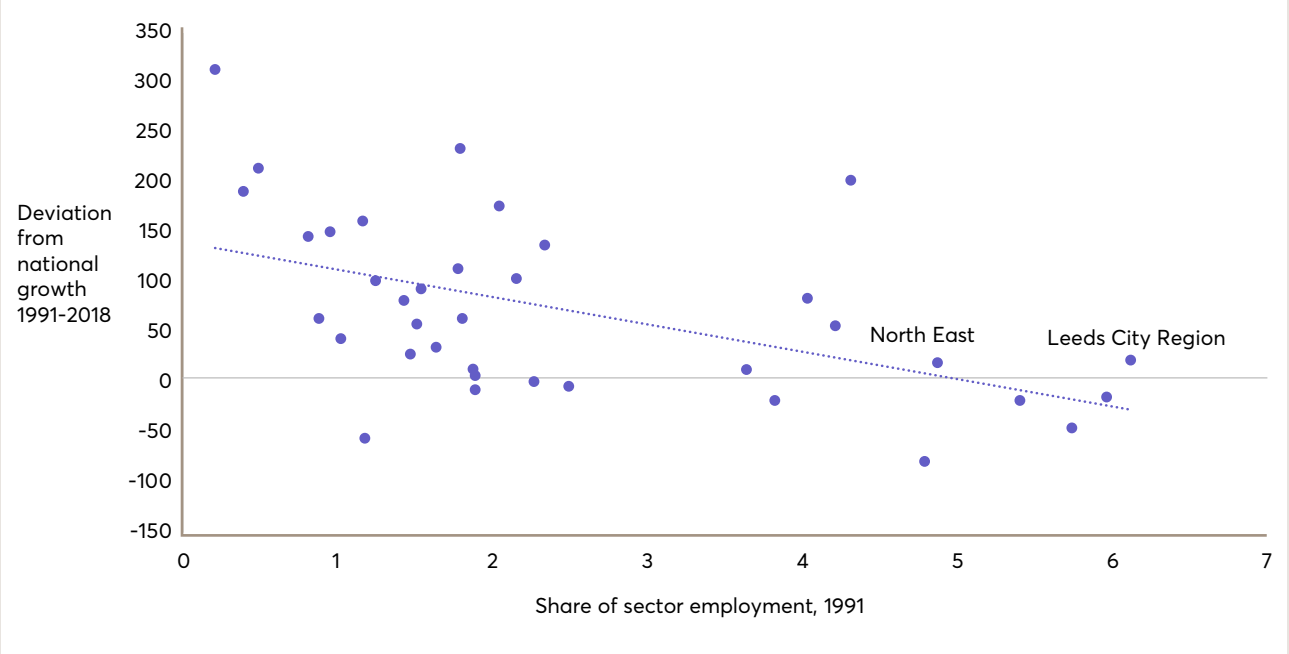


Figure 3.8: Deviation from the national growth of employment (1991-2018) against share of employment (1991), Design and designer fashion



These plots show that, if we exclude London, (as its share is so much larger than others), then in many sub-sectors there tends to be a negative relationship between size and growth, with some of the smaller centres showing particularly high rates of growth, whereas many of the locations with significant shares of employment have grown close to the national average (see Appendix C for the similar pattern in most other sectors). It is hard to draw generalisations on the characteristics of fast and growing small centres, however. There are no simple locational patterns as both types appear to include commuter and rural areas, and cities in various regions. The nature of these factors and their relationships to policy interventions require further investigation.

This concomitant of this discussion is that in some sub-sectors there are locations which had significant initial shares but weak subsequent growth performance. Cheshire and Warrington in Design and designer fashion, North East in Advertising and marketing, and South East Midlands in Publishing are cases in point. Uncovering the underlying reasons for why some large clusters have grown while others have declined is a priority for further research.

3.6 Population density and growth

Is an urban-rural difference more strongly associated with growth than initial size of employment? Table 3.3. shows average annual growth rates in each sub-sector for three sub-periods and over the whole period for London and LEPs categorized by their relative population densities in 1991 (see Appendix C). It shows that patterns of urban-rural growth have varied markedly across the sub-sectors. In Publishing, and Film, broadcasting and photography, growth has been concentrated in London. Architecture shows a similar pattern but with weak growth in rural LEPs. However, Crafts show the converse pattern in which only very rural areas have seen growth over the whole period. IT, software and computer services shows strong in all the categories of LEPs, and slightly faster growth outside London. In contrast, in Museums, galleries and libraries, employment has grown slowly in London, semi-urban areas and very rural areas, although LEPs outside London have declined in the years since 2009. Advertising and marketing, and Design and designer fashion share a pattern in which growth has been stronger in London and in rural areas, and weaker in metropolitan and urban LEPs. Music, performing and visual arts shows a similar tendency for very rural areas to show faster growth, but with strong growth also in London. The table also shows that phases of growth have changed over the sub-periods. In many sub-sectors (except Architecture, Film and Music and Arts) it is evident that while growth in London has increased or remained resilient, growth rates in metropolitan and urban LEPs have tended to decline so that they have not kept pace with London's growth.

Table 3.2: Employment growth in sub-sectors by type of LEP (classified by relative population density)

Advertising and marketing				
	1991-2000	2000-2009	2009-2018	1991-2018
London	5.61	0.15	6.62	**4.09**
Metropolitan	4.41	0.03	-0.00	**1.44**
Urban	6.30	-0.64	3.92	**3.12**
Semi-urban	4.55	-0.40	2.61	**2.15**
Rural	6.28	-0.90	4.28	**2.95**
Very rural	3.66	3.95	4.10	**3.71**

Architecture				
	1991-2000	2000-2009	2009-2018	1991-2018
London	-2.46	5.65	11.33	**4.69**
Metropolitan	-3.60	0.68	1.60	**-0.55**
Urban	-6.03	2.87	1.39	**-0.70**
Semi-urban	-3.32	1.30	0.32	**-0.61**
Rural	-2.54	3.46	1.51	**0.72**
Very rural	-3.86	6.62	1.97	**1.39**

Note: Negative rates are shown in pink.

Design and designer fashion				
	1991-2000	2000-2009	2009-2018	1991-2018
London	11.34	1.27	8.61	**6.99**
Metropolitan	9.22	3.97	1.05	**4.59**
Urban	12.47	2.28	2.91	**5.76**
Semi-urban	11.38	1.29	5.07	**5.75**
Rural	16.30	1.63	2.32	**6.41**
Very rural	10.52	3.69	4.05	**5.95**

Film, TV, video, radio and photography				
	1991-2000	2000-2009	2009-2018	1991-2018
London	0.75	3.02	4.04	**2.59**
Metropolitan	-0.92	-4.70	3.34	**-0.84**
Urban	-3.25	-0.26	2.03	**-0.55**
Semi-urban	-1.20	-1.03	1.29	**-0.34**
Rural	-1.20	-1.20	2.89	**0.10**
Very rural	-4.04	-0.16	4.18	**-0.10**

IT, software and computer services				
	1991-2000	2000-2009	2009-2018	1991-2018
London	8.71	5.12	7.21	**7.00**
Metropolitan	16.38	1.97	4.65	**7.44**
Urban	14.74	2.29	5.47	**7.36**
Semi-urban	12.68	6.57	4.02	**7.60**
Rural	9.28	6.46	4.23	**6.57**
Very rural	14.77	7.32	5.48	**8.99**

Publishing				
	1991-2000	2000-2009	2009-2018	1991-2018
London	2.91	-0.12	2.01	**1.59**
Metropolitan	1.62	-0.39	-3.76	**-0.90**
Urban	1.55	-2.84	-3.57	**-1.71**
Semi-urban	3.28	0.17	-7.77	**-1.62**
Rural	3.07	-1.96	-1.02	**-0.04**
Very rural	3.49	3.71	-7.79	**-0.64**

Museums, galleries and libraries				
	1991-2000	2000-2009	2009-2018	1991-2018
London	-1.75	3.51	1.01	**0.90**
Metropolitan	-0.36	3.99	-5.09	**-0.60**
Urban	3.73	0.85	-6.20	**-0.71**
Semi-Urban	2.28	2.40	-1.91	**0.85**
Rural	-1.03	1.63	-2.14	**-0.54**
Very Rural	1.06	3.24	-2.45	**0.56**

Music, performing and visual arts				
	1991-2000	2000-2009	2009-2018	1991-2018
London	6.05	-2.29	7.74	**3.74**
Metropolitan	3.44	-1.02	5.58	**2.59**
Urban	4.11	-0.64	6.06	**3.03**
Semi-Urban	5.90	-2.64	8.83	**3.86**
Rural	4.29	0.75	3.80	**2.90**
Very Rural	9.33	1.67	2.29	**4.34**

Crafts				
	1991-2000	2000-2009	2009-2018	1991-2018
London	0.13	-4.20	1.83	**-0.78**
Metropolitan	0.22	-5.79	-6.38	**-3.00**
Urban	2.75	-4.77	0.71	**-0.67**
Semi-Urban	5.94	-6.57	1.15	**-0.12**
Rural	-0.35	-1.55	-6.02	**-2.71**
Very Rural	18.12	-12.63	9.84	**4.00**

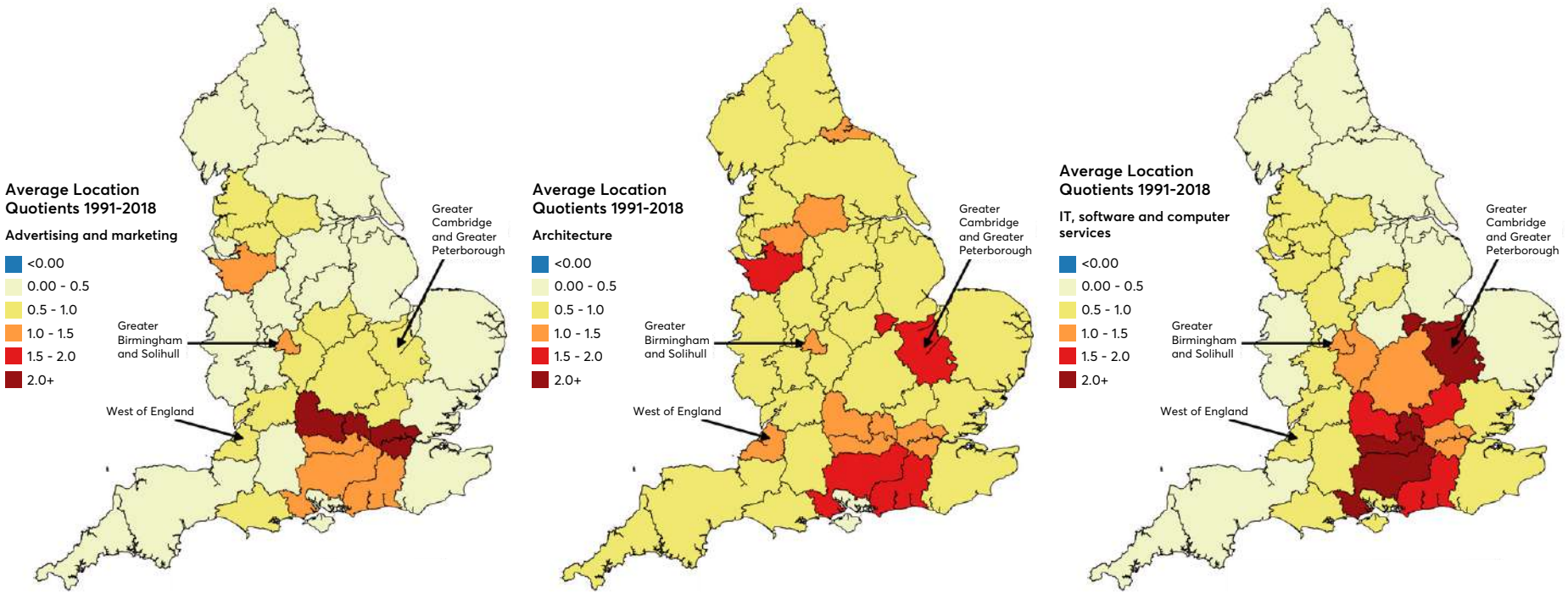
3.7 Geographical specialisation among English LEPs

What are the consequences of these varied patterns over time for the specialisation profile of areas and their particular strengths and weaknesses? Unsurprisingly, they are not simple. We have used Location Quotients (LQs) to show the specialisation of LEPs in sub-sectors as these are widely used as an indicator of the competitive advantage of an industry in a location.

Over the period 1991-2018 and in most sub-sectors, the LEPs with the strongest presence on this measure have been in London and adjacent areas to the West and South of the capital (see Figure 3.9). The strength of Greater Cambridge and Greater Peterborough is also evident in several sub-sectors, including IT, software and computer services, Design and designer fashion, Architecture, and Publishing. Areas of specialisation seem to be particularly associated with the motorway corridors (M4, M3, M23 and M11) radiating from London. There have also been strong specialisations in cities in the North West and in Birmingham and Bristol, in Architecture and to a lesser extent in Design and designer fashion and Advertising and marketing.

Figures 3.10, 3.11 and 3.12 show location quotients for LEPs in three sub-sectors in 1991, 2009 and 2018, chosen to illustrate sub-sectors with different rates of job growth. Recall that IT, software and Computer Services has shown fast growth, while Advertising and marketing has shown moderate growth, and Architecture has been slower growing. They tend to show that, while the relative strength of the sub-sectors in London has remained broadly unchanged or increased over the period, many other creative concentrations outside of London have declined in relative terms while others have increased (see Appendix C). For example, LQs have declined in Greater Birmingham in Advertising and marketing, Cheshire and Warrington and Coast to Capital in Advertising and marketing, and Oxfordshire and Buckinghamshire in IT, software and computer services. By contrast, in Architecture the West of England has seen an increase in its LQ, as have Leicester, the South East, Midlands and Enterprise M3 in Design and designer fashion, Buckinghamshire and Thames Valley and Greater Manchester in Film, broadcasting and photography, Oxfordshire in Publishing, and Thames Valley Berkshire in IT, software and computer services.

Figure 3.9: Average LQs by LEP (1991-2018) in selected sub-sectors



Note: A map with all LEP names listed is located at www.lepnetwork.net/about-leps/location-map

Figure 3.10: LQs by LEP in Advertising and marketing, 1991, 2009 and 2019

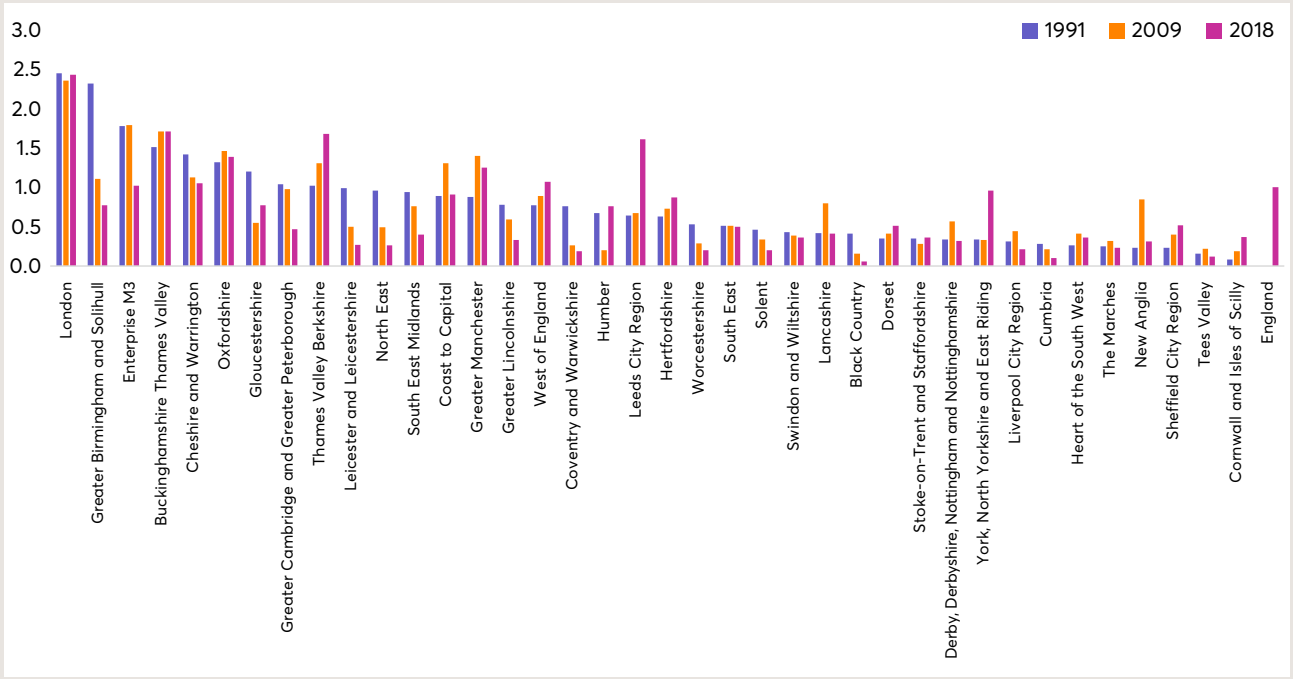


Figure 3.11: LQs by LEP in Architecture, 1991, 2009 and 2019

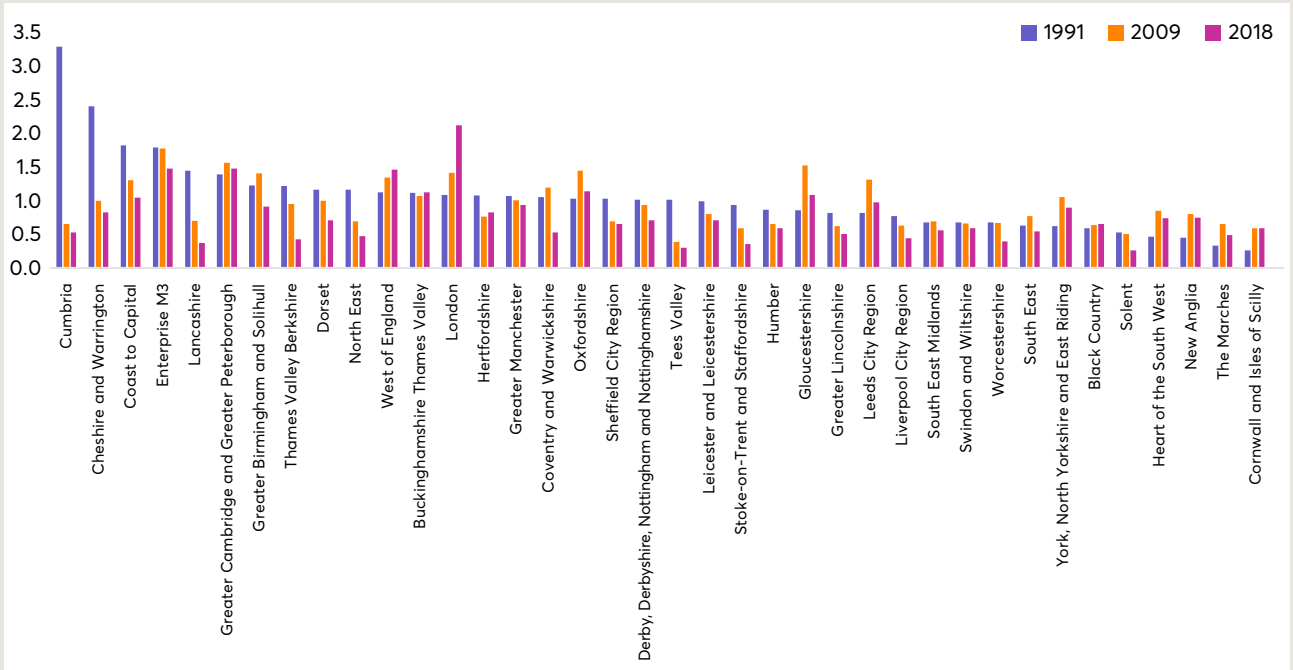
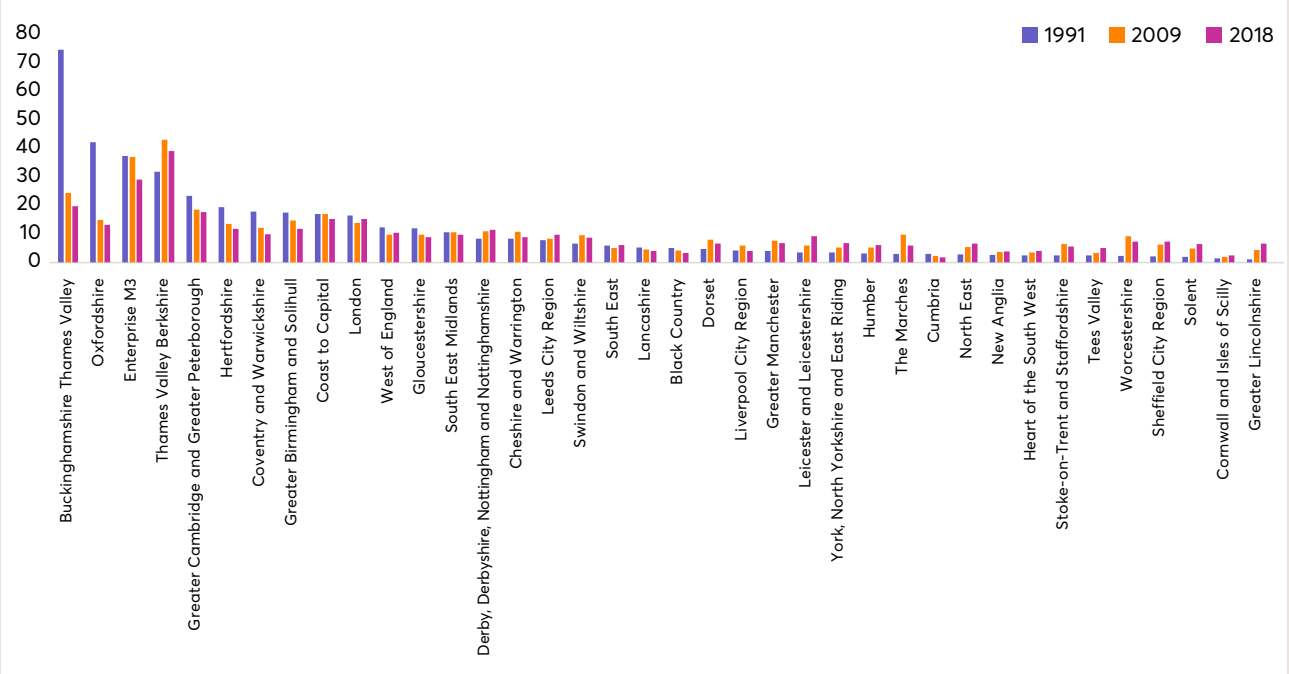


Figure 3.12: LQs by LEP in IT, software and computer services, 1991, 2009 and 2019



3.8 Diversity and co-agglomeration

Having examined these broad patterns of concentration, growth and specialisation, we now look into two dimensions of the geography of the creative sub-sectors across the LEPs. First whether the mix or profile on creative sub-sectors in a particular LEP has become more or less similar to the national mix of creative sub-sectors. Here we use the Krugman index and dissimilarity. We then use the Ellison Glaeser index to examine whether creative sub-sectors at a LEP scale have shown a strong tendency to locate together or co-agglomerate. Both measures provide us with a basis for understanding the key characteristics of creative industry locations.

Figure 3.13 shows the degree of similarity in the creative sub-sector profiles of LEPs in 1991, 2009 and in 2018. It reveals that in around two-thirds of LEPs their profile (or specialisation in different creative sub-sectors) has become more similar to the national average (in terms of the profile of creative industry employment across the sub-sectors). The majority of LEPs have seen small changes in their levels of similarity. However, a minority have seen strong increases or decreases, such as increases in Thames Valley Berkshire, and in Cheshire and Warrington, and large falls in West of England, Cumbria and Buckinghamshire Thames Valley. Figure 3.13 implies that the tendency has been for many LEPs to move towards a less distinctive and more diversified profile of creative sub-sectors and their profiles have become more similar over time. This is true of many (but not all) of the LEPs with stronger employment growth.

Comparing the results for 2009 and 2018, it appears that in most cases the established trend has sustained since the 2008 global financial crisis. Exceptions however include the Leeds City Region and York, North Yorkshire and East Riding, where a trend towards greater specialisation before 2009, has been reversed, and replaced by a trend to a less distinctive creative profile since that date.

Figure 3.13: Krugman Indices of Dissimilarity for creative sub-sectors by LEP, 1991, 2009, and 2018

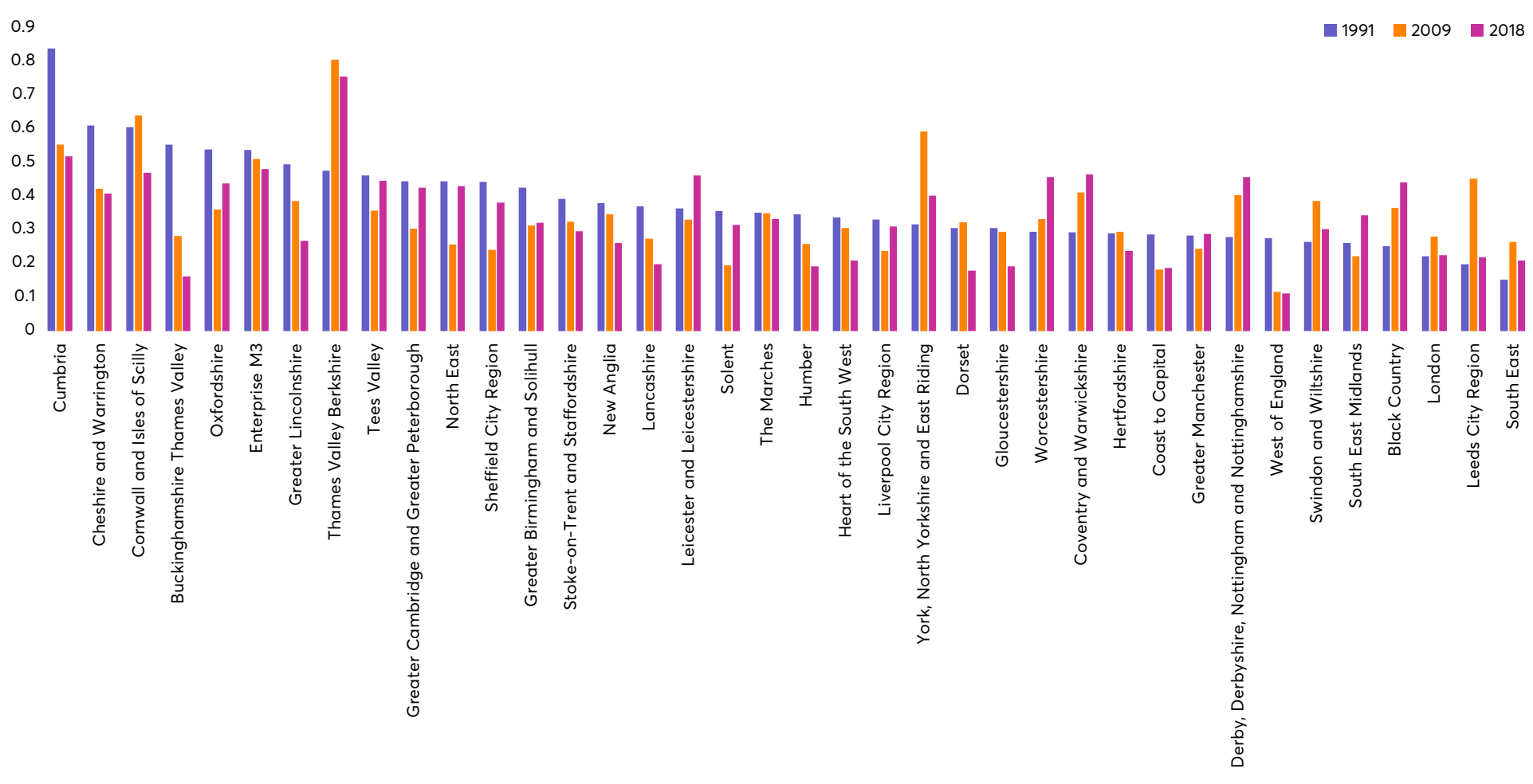


Figure 3.14 shows the simplified Ellison-Glaeser analysis of co-agglomeration of the sub-sectors for the most recent (post-recession) period, 2009-2018, in order to throw light on the current degree of overlaps between agglomerations in different sub-sectors. Given the low tendency for agglomeration in most service industries (Kolko, 2010), here we take values over 0.01 as a sign of moderate co-agglomeration. The figure shows that while some sub-sectors show moderate tendencies towards co-agglomeration, there are few sub-sectors where this is significant.

Figure 3.14: Ellison-Glaeser Index of Co-Agglomeration by LEP, 2009-2018 average

	1. Advertising and marketing	2. Architecture	3. Crafts	4. Design and designer fashion	5. Film, TV, video, radio and photography	6. IT, software and computer services	7. Publishing	8. Museums, Galleries and Libraries	9. Music, performing and visual arts
1. Advertising and marketing		0.00267	-0.01359	-0.00061	0.01928	-0.01234	0.00896	-0.00939	0.00184
2. Architecture			-0.00197	0.00034	0.00546	-0.00408	0.00273	-0.00114	0.00094
3. Crafts				0.00133	-0.02545	0.01461	-0.01333	0.01352	-0.00095
4. Design and designer fashion					0.0005	-0.00143	0.00162	0.00105	0.00071
5. Film, TV, video, radio and photography						-0.02689	0.0201	-0.02107	0.00472
6. IT, software and computer services							-0.01393	0.01117	-0.00396
7. Publishing								-0.0085	0.00199
8. Museums, galleries and libraries									-0.00087

Note: Pink shades indicates co-location, blue indicates a tendency not to locate together (below what would be expected on average). The numbers shown do not imply significance.

Co-agglomeration is strongest between Publishing and Film, TV, video, radio and photography, and between Advertising and Film, TV, video, radio and photography. This appears to reflect the strong concentration seen in Publishing and Film, broadcasting and photography in a very limited number of LEPs (especially London). Rather more surprisingly there appears to be some co-agglomeration between crafts and IT, software and computer services, though this does not necessarily imply connections between the sub-sectors.

However, in general at the LEP scale, this analysis suggests that levels of co-agglomeration are not particularly strong between the sub-sectors. This is not surprising given that many sub-sectors have grown rapidly and have spread across a wide range of regions and LEPs, and would suggest that a lower spatial scale (such as local authority districts) might be better for exploring this aspect of clustering.[4]

3.9 Conclusions

In summary, this paper has shown that total creative industry employment has grown substantially and spread across the regions and LEPs since 1991. We have seen that the rapid growth of London during this period, and especially since 2008 has produced increasing relative concentration of most creative industry sub-sectors in London, confirming the findings of existing research. Hence there is little evidence of convergence processes involving a shift of firms and labour away from the (higher cost) capital. During the 1991-2001 period, the degree of geographical concentration was stable suggesting that employment growth was less disproportionately concentrated in London in these years, which shows that we should not base our assessment of possibilities for a geographically more balanced pattern growth on the period since 2008 alone. Since the mid-to-late 2000s, London's divergence from other regions in creative industry employment has accelerated as creative industry growth proved more resilient to the 2008 recession than in many other regions.

Outside of London, creative industry growth has been strong in two types of area. The first is in the larger secondary centres of creative industry employment. This include centres in the commuting hinterlands and 'motorway corridors' to South West, West and North East of London, and it also includes a relatively small number of regional cities such as Leicester and Leicestershire, West of England, Manchester, and Leeds City Region. In terms of employment, these more successful secondary city centres are only about the same size as LEP totals in the South East region such as South East, Enterprise M3, and Thames Valley Berkshire. The importance of the connected corridors with access to London shows that there are policy lessons to be drawn about the importance of connectivity between creative locations and a larger nodal city. This is a pattern that could possibly be mirrored around other larger successful creative industry locations. However, one of the key geographical trends, has been lower rates of total creative industry employment growth in many regional cities, such as Greater Birmingham and Solihull, North East, Liverpool City Region, and Humber.

The other areas of fast growth have been much smaller rural areas where, in some sub-sectors rates of growth have been faster than those in London, although the absolute scale of this growth has, of course, been much lower. The degree of growth in rural areas varies strongly across the sub-sectors however, and it has been strongest in Design and designer fashion, IT, software and computer services, Music, performing and visual arts, and Crafts. Interestingly, fast growth has occurred in some predominantly rural LEPs in different regions, such as York, North Yorkshire and East Riding, and Cornwall and the Isles of Scilly. This suggests that place-based policy in rural authorities might focus on these sub-sectors.

4. It is not possible to use the constructed database to explore such fine sector-geography combinations as the sampling is not robust enough. An alternative would be to use firm-level data sources.

One of the key findings of this research has been that the different sub-sectors have shown quite different geographical patterns. For example, in some sub-sectors (including Publishing, Architecture, and Film, broadcasting and photography), employment has declined over the period in some regions and areas, which implies that place-based policy support measures for these industries are likely to face a much harder and more risky challenge, outside of their areas of established specialisation. The different locational trends in different creative sub-sectors point to the diversity of these industries and to variation in firms' locational preferences. Co-location between different sub-sectors at a LEP scale does not appear to be strong, although the most successful LEPs such as London have a diversified profile of employment across the major sub-sectors.

While there are important variations between creative sub-sectors, in general the lowest rates of creative industry employment growth have been in some Northern LEPs (Cumbria, the Black Country, Tees Valley, Lancashire, Stoke on Trent, and Humber) and in some areas dominated by other strong sectors of industry (such as Coventry and Warwickshire, and Cheshire and Warrington). It may be that legacies and inherited effects in manufacturing and heavy industrial areas (such as skills, hard infrastructure, market potential and place-image) make it harder for creative industries to expand in these areas. Another priority for further research is to explore these effects and how best to alleviate the obstacles to growth, as well as the impact of clusters based around parts of the creative economy not identified here, for example Coventry and its digital creative sectors, as identified in Roper et al (2017).

The paper has shown also that because of the fast growth of some rural areas and the mixed performance of the larger centres, there is no evidence that outside of London, initial size of employment has been a strong driver of employment growth. This is perhaps surprising given the relationships between size and agglomeration economies, the findings of earlier research, and also because of the cost pressures in London that would lead us to expect some dispersion. In fact, the performance of the larger cities outside London have been very mixed, which underlies the uneven regional outcomes. A few large cities, such as Leicester, Bristol and Bath, Manchester and Leeds have done relatively well, but others have struggled and been marked by relatively weak employment growth (including Greater Birmingham and Solihull, Newcastle, Liverpool City Region, and Humber). A key imperative for further research and policy analysis is to understand the causes of these different outcomes in larger cities and learn from the more successful cases. The complex mosaic of creative industry change underlines the need for more detailed research into the evolution of creative sub-sectors and clusters in particular locations. This should focus on firm characteristics and quality, and their finer specialisations in terms of functions and markets, networks and connections, and examine how these connect with the key characteristics of place, including the supply of skilled labour and entrepreneurs, amenities and services, and the support provided by local government and other policy agencies.

4

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Appendices

The following detail is included in the appendices:

Appendix A

Details on the construction of the employment database

Appendix B

The statistics used to measure industry specialisation, concentration, and co-location are explained and discussed.

Appendix C

Remaining charts and maps unused in the main body of the report are included for completeness and reference.

Appendix A: Data sources and database construction

A1 Introduction

This appendix focuses on the indicators, data sources, and construction methods used for creating the time series database of local creative cluster development. Employment, as measured by the number of jobs, is the indicator of choice, but other options are discussed. Moving on from this, the main data sources for employment are described with their limitations outlined. Finally, the process by which the data sources are combined to arrive at a final consistent and detailed dataset is described.

A2 Data sources and indicators

Creative sub-sectors and industries

Table A2 shows the full list of industries linked to each of the DCMS sub-sectors.

Table A1: Creative sub-sectors and their constituent industries

Creative industry sub-sectors	SIC 2007	Detailed industry description
1. Advertising and marketing	70.21	Public relations and communication activities
	73.11	Advertising agencies
	73.12	Media representation
2. Architecture	71.11	Architectural activities
3. Crafts	32.12	Manufacture of jewelry and related articles
4. Design and designer fashion	74.1	Specialised design activities
5. Film, TV, video, radio and photography	59.11	Motion picture, video and television programme production activities
	59.12	Motion picture, video and television programme postproduction activities
	59.13	Motion picture, video and television programme distribution activities
	59.14	Motion picture projection activities
	60.1	Radio broadcasting
	60.2	Television programming and broadcasting activities
	74.2	Photographic activities
6. IT, software and computer services	58.21	Publishing of computer games
	58.29	Other software publishing
	62.01	Computer programming activities
	62.02	Computer consultancy activities
7. Publishing	58.11	Book publishing
	58.12	Publishing of directories and mailing lists
	58.13	Publishing of newspapers
	58.14	Publishing of journals and periodicals
	58.19	Other publishing activities
	74.3	Translation and interpretation activities
8. Museums, Galleries and Libraries	91.01	Library and archive activities
	91.02	Museum activities
9. Music, performing and visual arts	59.2	Sound recording and music publishing activities
	85.52	Cultural education
	90.01	Performing arts
	90.02	Support activities to performing arts
	90.03	Artistic creation
	90.04	Operation of arts facilities

Source: DCMS.

Employment as choice of indicator

Employment is the main indicator used to represent the scale and development of local-sector clusters. As a volume measure employment is useful in that it is unaffected by prices, and so requires little further adjustment to be of use in comparisons over time and space. It is also one of the more readily available and robust (easily countable and comparable) indicators at small spatial-sector scales.

Other (competing) indicators

Other indicators that could have been considered are metrics such as turnover and business counts. For a sector where there has been significant change over time in average firm size and where sub-sectoral and regional variation in average size are large, and also in the current policy environment where productivity is a top priority for government, these would be useful indicators to construct.

The main issue surrounding extending the coverage to other indicators is time and resources. Other (firm-level) datasets (e.g. Annual Business Inquiry / Survey) do exist which would allow business counts and turnover to be collected. However, using these kind of (firm-level) datasets would mean the need to go through the ONS Secure Data Service, which can incur significant amounts of time due to data checking, and which may also not release the data due to disclosure issues in cases of small LAD/sector samples.

BRES database

The Business Register and Employment Survey (BRES) and earlier employment publications (the Annual Business Inquiry and Annual Employment Survey) publish employee and employment data at detailed geographical and sector levels (up to 5-digit Standard Industrial Classification (SIC) level) for areas in Great Britain. The employment measure in BRES adds the number of working owners to the number of employees employed by a business, where working owners include sole traders, sole proprietors and partners who receive drawings and/or a share of the profits but are not paid via pay-as-you-earn (PAYE). For the purpose of this study, the employee data are used, with a fuller estimate of self-employment calculated separately, as outlined below.

The table below lists the vintages of the various employment surveys, the period they cover, and the SIC they use.

Table A2: Coverage of BRES and previous database vintages

	Years	SIC
BRES	2015-2017	2007
BRES (excluding units registered for PAYE only)	2009-2015	2007
Annual Business Inquiry	2007-2008	2007
Annual Business Inquiry	1998-2008	2003
Annual Employment Survey	1991, 1993, 1995-1998	1992

Source: ONS.

Mapping across different SIC codes

One issue that needed to be considered when combining the various datasets is the change in industrial classifications. ONS provide tables mapping 4-digit sectors between SIC 1992, SIC 2003 and SIC 2007 employment data, which can be used to convert the 1991-2008 Annual Employment Survey (AES) and Annual Business Inquiry (ABI) data to SIC 2007.

As highlighted in the table above, AES only provides data for 1991, 1993 and 1995-1998. It does not provide data for 1992 and 1994. The data for the missing years can be interpolated using the 1991, 1993 and 1995 AES data, however.

The only issue is the lack of an overlap year between the SIC 2003 and SIC 2007 data from BRES. Previously, there was a version of BRES available on NOMIS which included 2008 but this has since been removed. Communication with the ONS suggested that these data could be obtained, but only through a secure data service request, which can take months to realise, but even then the ONS caution against its use for methodological reasons.

Changes in LAD definitions

All the datasets listed in Table A2 provide data for the 380 local authorities (LA) in Great Britain, as defined up to April 2019. Since 2019, the local authority classification has been updated to 371 local authorities. The employment datasets covering the earlier years are not available by the latest 371 LA classification. In order to use a consistent geographical classification over the study period, the analysis is be based on the 380 LA classification.

LFS / APS database

As noted above, although BRES covers employees (part and full-time) and self-employment, it is used only for the former in this study. However, the nature of creative industries is that they tend to have a higher-than-average proportion of self-employed workers, and so it is important to account for these numbers in any estimate of their size and evolution over time. Hence an alternative data source is required to provide this information.

A readily-available source is published by ONS[5] which identifies the employees – self-employment split in the 9 creative industry sub-sectors at national level over the period 2011-18. These data are based on the Annual Population Survey (APS).

Both the Labour Force Survey (LFS) and (as noted above) the APS, contain information on the employment status of individuals, including employment type (employee or self-employed, part-time or full-time, by occupation and sector. The LFS is typically used for national and regional analysis, whilst the APS is specifically designed to produce reliable estimates for a specific set of variables at a local authority level.

The APS aims to provide enhanced annual data for England, covering a target sample of at least 510 economically active persons for each Unitary Authority (UA)/Local Authority District (LAD) and at least 450 in each Greater London Borough. In combination with local LFS boost samples such as the WLFS and SLFS, the survey provides estimates for a range of indicators down to Local Education Authority (LEA) level across the United Kingdom.

The APS is derived from the LFS. Quarterly LFS data is available from 1992 onwards, with each quarter of data containing around 80,000 cases. Although both surveys contain many of the same variables, the LFS does not contain any information at below regional level.

5. https://www.gov.uk/government/statistics/dcms-sectors-economic-estimates-2018-employment

End user and Secure Access versions

There are two versions of each APS dataset accessible via the UK data service. One is available under the standard End User Licence (EUL) agreement, and the other is a Secure Access version. The EUL version includes Government Office Region geography, banded age, 3-digit SOC and industry sector (SIC 2007) for main, second and last job. The Secure Access version contains more detailed variables relating to (in the context of this study):

- **Geography**: including county, unitary/local authority, place of work, Nomenclature of Territorial Units for Statistics 2 (NUTS2) and NUTS3 regions, and whether the respondent lives and works in same local authority district.
- **Industry**: including industry, industry class and industry group for main, second and last job, and industry made redundant from.
- **Occupation**: including 4-digit Standard Occupational Classification (SOC) for main, second and last job and job made redundant from.

The Secure Access data have more restrictive access conditions than those made available under the standard EUL. Prospective users need to gain ONS Accredited Researcher status (which CE has) and demonstrate to the data owners exactly why they need access to the additional variables. The UK Data Service advises that it can take up to three months to access data.

As the EUL version of the APS only contains information on broad industry sector (single digit level), the Labour Force Survey is used in this study to provide estimates of self-employment by 4-digit industry sector and Government Office Region.

A3 Database construction

There are three main components to the construction of the employment database. Firstly, the BRES employee data (and earlier equivalent database vintages), secondly the LFS/APS self-employment data, and finally the combination of the two to create a total employment database. Within the first two of these, there are a further three stages: extracting the data, converting the data to a common SIC (2007) classification, and finally splicing the converted vintages together to form a consistent dataset. Each of these processes is described below.

BRES (employee) data

Data extraction

The different vintages of BRES/ABI/AES as described in Table A1 were downloaded from the NOMIS database and the relevant sector/LAD/LEP data were extracted.

Data conversion

For the first two SIC code changes, the consistency is a one-way consideration, i.e. it is a question of how well the 1992 codes translate to 2003, and the same for 2003 to 2007.

- SIC 1992-2003

The ONS provide a mapping table and converter which translates the SIC 1992 to SIC 2003 codes. Table A3 provides the detail. In this respect, there should be no correspondence issue, and there is also an overlap year (1998) with which to compare employee levels.

Table A3: SIC 1992-2003 correspondence table

SIC 2003	Sector titles	SIC 1992	Sector titles
2211	Publishing of books	2211	
2212	Publishing of newspapers	2212	
2213	Publishing of journals and periodicals	2213	
2214	Publishing of sound recordings	2214	
2215	Other publishing	2215	
2222	Printing not elsewhere classified	2222	
3622	Manufacture of jewellery and related articles not elsewhere classified	3622	
6420	Telecommunications	6420	
7210	Hardware consultancy	7210	
7221	Publishing of software	7220	Software consultancy and supply
7222	Other software consultancy and supply	7220	Software consultancy and supply
7240	Database activities	7240	
7414	Business and management consultancy activities	7414	
7420	Architectural and engineering activities and related technical consultancy	7420	
7440	Advertising	7440	
7481	Photographic activities		
7485	Secretarial and translation activities	7483	Secretarial and translation activities
7487	Other business activities not elsewhere classified	7484	Other business activities not elsewhere classified
7514	Supporting service activities for the government as a whole	7514	
8042	Adult and other education not elsewhere classified	8042	
9211	Motion picture and video production	9211	
9212	Motion picture and video distribution	9212	
9213	Motion picture projection	9213	
9220	Radio and television activities	9220	
9231	Artistic and literary creation and interpretation	9231	
9232	Operation of arts facilities	9232	
9234	Other entertainment activities not elsewhere classified	9234	
9240	News agency activities	9240	
9251	Library and archive activities	9251	
9252	Museum activities and preservation of historical sites and buildings	9252	

Source: ONS.

As can be seen from the highlighted cells, most of the sectors do not change, except for the following:

- **Sector 7220**: Software consultancy and supply in SIC 1992 is split in two sectors 7221 and 7222 in SIC 2003.
- **Sector 7483**: Secretarial and translation activities in SIC 1992 is split into two sectors 7485 and 7486 in SIC 2003. Only sector 7485 is relevant.
- Sector 7484 in SIC 1992 is changed to sector 7487 in SIC 2003.

For these sectors, the overlapping proportions in 1998 are used to allocate the number of employees across the SIC codes.

- **SIC 2003-2007**
  For the SIC 2003 to SIC 2007 mapping, the situation is a bit more complex with less one-to-one correspondence between sectors. However, the ONS provide a full mapping table of proportions between the SICs to allow a smooth conversion to take place.
- **SIC 2007 sample change**
  As noted previously, there was a change in the BRES sample survey design in 2015 to include solely PAYE based businesses, thus creating a potential problem in comparing the two (pre and post-2015) data series. The two datasets run from 2009-15 and 2015-17, which means that 2015 provides a crossover year with which to compare the levels.

Data splicing

As noted above, in most cases there is an overlap year between the vintages, so that when the appropriate SIC conversion has been undertaken the employee levels can be directly compared. Here there are three possibilities that might be encountered (for any given sector-LAD series):

i. **The data across the vintages (for the crossover year) are the same**
   In these circumstances there is nothing to do and both series are left unaltered

ii. **The more recent vintage is greater than the preceding vintage**
   To avoid the risk of increasing the volatility of the preceding vintage, an absolute shift process is applied, e.g. if the more recent vintage is 50 jobs greater than the preceding vintage for the overlap year, then the entire preceding historical series is shifted up by 50 jobs. If a ratio adjustment had been applied (i.e. a multiple of 5) there would be a risk of high volatility resulting.

iii. **The more recent vintages is lower than the preceding vintage**
   In cases where a downwards shift is required, a ratio (of the new-to-old vintage overlap year) is applied. This has the advantage that it avoids the potential of turning the previous vintage negative, particularly if the more recent vintage is close to zero. This will have the additional consequence of dampening down any historical volatility of the series, but it is seen as a better outcome than having negative jobs results.

One final point to note is that in all cases, the most recent vintage of data are considered to be the most accurate and the one to which all other vintages must be made consistent.

Additional data cropping

Splicing between vintages enabled a consistent series to be established for each of the sub-sectors, but there remained occasions where growth rates or absolute change seemed abnormal, and could be a function of the sample size and lack of robustness. For this reason, a decision was made to crop (i.e. remove with an interpolation) the extreme situations of absolute and percentage growth. The method chosen was to calculate the standard deviation of absolute and percentage growth for each area and sub-sector combination. Data were removed where the growth and the absolute change exceeded +/- 1.68 times the standard deviation of the original series, i.e. outside of 90% of the variance limits.

LFS/APS (self-employment) data

Data extraction

EUL versions of the quarterly LFS datasets have been obtained from the UK Data Service, covering the years 1994-2018, as 1994 is the first year in which industry sectors are classified using the SIC 1992 classification and going back any further would have caused more correspondence issues.

LFS respondents are interviewed in up to 5 consecutive quarters, with each interview being referred to as a wave. After an individual reaches wave 5, they drop out of the survey. So an individual who is interviewed for the first time in, say, the January-March quarter of 2017 will be interviewed in each subsequent quarter up to and including January-March 2018, before dropping out of the survey (assuming they agree to participate in all waves).

In order to obtain the largest sample sizes possible, the LFS quarterly datasets for a given year have been combined. This has been achieved by taking wave 1 individuals from each of the April-June, July-September and October-December quarters for that year and appending them to the January-March dataset. This avoids the problem of double-counting, since the same wave 1 individuals do not appear in any other quarters.

The drawback of this approach is that population estimates cannot be considered as representative for the years in question. However, this is less of a concern since the indicator of interest is the ratio of self-employment to total employment and not the overall number of people in either classification.

An alternative approach would be to produce estimates using the same single quarter of data for each year. However, it is highly likely that the population estimates would still not be representative, due to the small sample sizes involved.

Data conversion

The first step is to obtain aggregate figures by sectors, years and regions, as they appear in the data. Then data must be converted to SIC 2007 to provide a homogeneous sectoral breakdown across time. SIC 1992 has been used in the LFS datasets from 1994 to 2008, while SIC 2007 has been used in the following periods. There is no correspondence table available to convert directly from SIC 1992 to SIC 2007, therefore data in the period 1994-2008 must be converted first to SIC 2003.

As outlined above, SIC 1992 and SIC 2003 are broadly similar apart for a few sectors. The difficulty in this conversion exercise, compared to the previous one is that it is not possible to use multiple datasets with overlapping years to construct whole series. Therefore, to split sectors 7220 from SIC 1992 to the sectors 7221 and 7222 in SIC 2003, the average share of employment of those sectors within 7220, derived from the ABI dataset, is applied. SIC 92 sector 7483 is split into sectors 7485 and 7486 in SIC 2003 but it is not possible to calculate employment shares using the ABI. To estimate employment in sectors 7485 and 7486, the corresponding SIC 2007 sectors in the year 2009 (the first year that SIC 2007 sectors are used in the LFS data) have been identified in order to determine the respective shares of employment within sector 7483. Those shares are then applied in all the preceding years.

Then, the mapping table available from the ONS is applied to convert data from SIC 2003 to SIC 2007. After data for all years have been categorised according to SIC 2007, the share of self-employed over employment in each sector is computed.

Data splicing

An adjustment was implemented for sector 7410 ('Design and designer fashion'), since there was a clear break in the series between 2008 and 2009, due to the change in job classifications between SIC 2003 and SIC 2007. In this case, the absolute shift method described above was followed: the difference between the 2008 and 2009 values was computed and used to uplift the estimates for 1994-2008 to create a consistent time series.

Data reliability

The nature of the LFS means that sample sizes for several year and sector combinations across regions are small. This can present potential disclosure issues and mean that estimates of the self-employment shares may not be representative of activity in that region.

To address these issues, any self-employment shares that are based on cell sizes of fewer than 5 self-employed or 5 employees in a year/industry combination were removed. Missing values were then replaced with the corresponding trend estimate – a predicted value for that year, based on the overall trend in that regional sector over the time period. In some regions, such as the North East, sample sizes were such that nearly all the estimates were removed and replaced. In such cases, the trend estimates themselves will be based on small sample sizes, which may influence their reliability.

An examination of the data revealed that in most cases, a linear trend was appropriate. However, in the Publishing sector in the West Midlands, the North East and Wales, the data exhibited more of an exponential trend, as the self-employment share increased following the 2008/9 recession.

The self-employment shares were then extended back to 1991 using the trend calculations, with care taken to ensure that the results were sensible and consistent with the overall pattern in the data. Table A4 shows the proportion of estimates that were removed and replaced, by region and industry. As shown in the table, estimates appear more reliable in London, the South East and South West, and the East of England. 'Crafts' and 'Museums, Galleries and Libraries' are the least reliable sectors, with estimates in 'Advertising and marketing' and 'Architecture' suffering sample size issues in many regions.

Total employment

The final component of the database construction process is arguably the easiest. It involves the self-employment-to-total employment ratio database created from the LFS/ APS data being applied to the BRES data to calculate the resulting total jobs count.

Table A4: Proportion of self-employment shares replaced, by region

	UK	London	South East	East of England	South West	West Midlands	East Midlands	Yorkshire and Humberside	North West	North East	Wales	Scotland	Northern Ireland
1. Advertising and marketing	0%	0%	0%	12%	12%	52%	64%	68%	20%	96%	100%	80%	100%
2. Architecture	0%	4%	0%	28%	32%	64%	84%	84%	36%	96%	100%	52%	100%
3. Crafts	12%	100%	96%	100%	100%	96%	100%	100%	100%	100%	100%	100%	100%
4. Design and designer fashion	0%	0%	0%	0%	0%	76%	0%	8%	0%	88%	100%	8%	100%
5. Film, TV, video, radio and photography	0%	0%	0%	4%	4%	28%	32%	20%	0%	84%	28%	20%	84%
6. IT, software and computer services	0%	0%	0%	0%	0%	8%	8%	4%	0%	60%	56%	12%	92%
7. Publishing	0%	0%	0%	0%	8%	68%	52%	56%	12%	100%	96%	40%	100%
8. Museums, Galleries and Libraries	16%	88%	96%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
9. Music, performing and visual arts	0%	0%	0%	0%	4%	0%	12%	0%	0%	52%	24%	0%	84%
Creative Industries	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Appendix B: Measures of specialisation and concentration

The report has used the following measures of local specialisation and concentration.

B1 Local area specialisation

Location Quotient (LQ)

The level of specialisation in sub-sectors in specific local areas is measured with the Location Quotient (LQ), which measures whether the share of employment in a sub-sector in a particular area is disproportionate relative to its share in total national employment. It has become the most popular measure used to identify local specialisations and clusters. In simple form, this is the ratio of a region's share of a given national industry to its share of total national activity, that is:

$$LQ_{ir} = (\frac{E_{ir}}{E_{iN}} / \frac{E_r}{E_N}) = (\frac{E_{ir}}{E_r} / \frac{E_{iN}}{E_N})$$

When the percentage of people employed within a particular sector or industry, in a local area, is equal to the national (average) percentage of people employed in that sector/ industry, an LQ of 1 is derived. If LQ is greater than unity then the industry or sector in question is generally considered to be more localised in region r than in other regions: the higher the value of the index the greater the degree of regional concentration.

Industries with a high location quotient in a region are often deemed to be geographically concentrated. However, although related, geographical industrial concentration and regional industrial specialisation should not be conflated. Even if a specific region has a relative specialisation in a specific industry, this industry can, nationally, be characterised by a low geographical concentration index, and vice versa. Furthermore, a high location quotient does not necessarily point to a substantial number of employees in an industry. In fact, a small absolute number of industry employees in a region with a small number of total employees relative to the national total employees can lead to a high location quotient. In contrast, a great absolute number of industry employees in a region with a large number of total employees relative to the national total employees can lead to a low location quotient.

Krugman Specialisation Index (KSI)

Another frequently used measure of regional relative specialisation is the Krugman Specialisation Index (KSI), also sometimes known as the Coefficient of Regional Specialisation (CRS). This is calculated as sum of the absolute differences between each industry's share of regional employment and that industry's share of national employment. In effect, it is an index of regional structural dissimilarity (in relation to the national industrial structure), that is

$$KSI_r = \sum_i \left| \frac{E_{ir}}{E_r} - \frac{E_{iN}}{E_N} \right|$$

where

E_{ir} is employment in industry i in region r

E_r is total employment in region r

E_{iN} is national employment in industry i, and

E_N is total national employment

It is usually stated that the index has a range of between 0 and 1. If a region has exactly the same industrial structure as the nation of which it is a part, (that is the shares of employment are the same for all industries) then the index takes the value 0. If the benchmark used is the national economy, which is usually the case, then the maximum of the KSI must be less than 2 since by definition if the region in question has a certain industry i, then so must the nation of which that region is a part. In this case, the maximum is given as [2(N-1)]/N.

It should be noted that even if a region has an index of 0, meaning it has the same industrial structure as the national economy, it does not necessarily mean that the region is not specialised, only that it has the same structure as the national economy, which itself may be specialised.

B2 Industry area concentration and co-location

The Herfindahl-Hirschman Index (HHI)

The Herfindahl-Hirschman index is an absolute measure that compares the distribution of employment in a particular sector or industry with that of a uniform distribution. It is based on the sum of the squared shares of employment in each region or area.

$$HHI_i = \sum_{r=1}^{R} S_r^2$$

Where Sr is the share of industry i employment in region r.

The value of the index increases with the degree of concentration reaching 1 when all employment is concentrated in one region. It ranges between 1 and 1/R where R is the number or regions/areal units.

A strength of the HHI is that it is sensitive to small differences in the distribution of employment across areas. However, the index shows a weighting towards large regions and works best with equally sized areas. One issue is that the index is sensitive to differences in R and decreases when the number of areas increases (Fornahl and Brenner, 2009).

Ellison-Glaeser (EG) Index

The second measure of concentration used is the Ellison-Glaeser index (Ellison and Glaeser 1997). It measures agglomeration as geographical concentration compared with a completely random distribution of firm locations, thereby measuring the excess concentration beyond the random distribution. This is a relative measure of concentration which controls for the industry structure and overall agglomeration of industry. The full index allows a localization arising from a highly concentrated industrial structure to be distinguished from localization arising from the spatial clustering of small firms in the same geographic area.

The Ellison-Glaeser index is derived from a combination of a sub-index of geographical concentration, which aggregates the employment shares of a certain industry over different regions; the Herfindahl index, which measures firm sizes relative to a specific industry; and a reverse of the latter index. Zero concentration here means that a firm's decision to locate is completely independent of other firms' locations.

The index for a given industry k across regions can be shown as:

$$EG_k^{Agglom} = \frac{\sum_{r=1}^{R}(E_{rk} - \widehat{E_r})^2 - (1 - \sum_{r=1}^{R} \widehat{E_r}^2) \sum_{p=1}^{Q} z_p^2}{(1 - \sum_{r=1}^{R} \widehat{E_r}^2)(1 - \sum_{p=1}^{Q} z_p^2)}$$

where $\widehat{E_r}$ measures the aggregate size of region r, typically modelled by its share of total employment, the sums are over all regions or areas and the $\{z_p\}$ are the sizes of the firms (or plants) in industry k. The last term in both the numerator and denominator of the EG measure is the Hirschman-Herfindahl index, hence, the agglomeration measure is often written as

$$EG_k^{Agglom} = \frac{\sum_{r=1}^{R}(E_{rk} - \widehat{E_r})^2 - (1 - \sum_{r=1}^{R} \widehat{E_r}^2) \sum_{p=1}^{Q} z_p^2}{(1 - \sum_{r=1}^{R} \widehat{E_r}^2)(1 - \sum_{p=1}^{Q} z_p^2)}$$

where H_k is the Hirschman-Herfindahl index for industry k.

Clearly, this measure of industry agglomeration requires micro-level (i.e. firm-level) data. However, Ellison, Glaeser and Kerr (2010) use a simpler version of the measure to study the 'co-agglomeration' of pairs of industries, namely, for industries k and l,

$$EG_{kl}^{Co-agglom} = \frac{\sum_{r=1}^{R}(E_{kr} - \widehat{E_r})(E_{lr} - \widehat{E_r})}{1 - \sum_{r=1}^{R} \widehat{E_r}^2}$$

This measure thus requires industry (sectoral) level data only, which is more suited to the current study's data limitations.

B3 Limitations of the analysis

The measures for geographical concentration and industrial specialisation described above have a number of limitations which have to be recognised when interpreting the analysis and in related discussion.

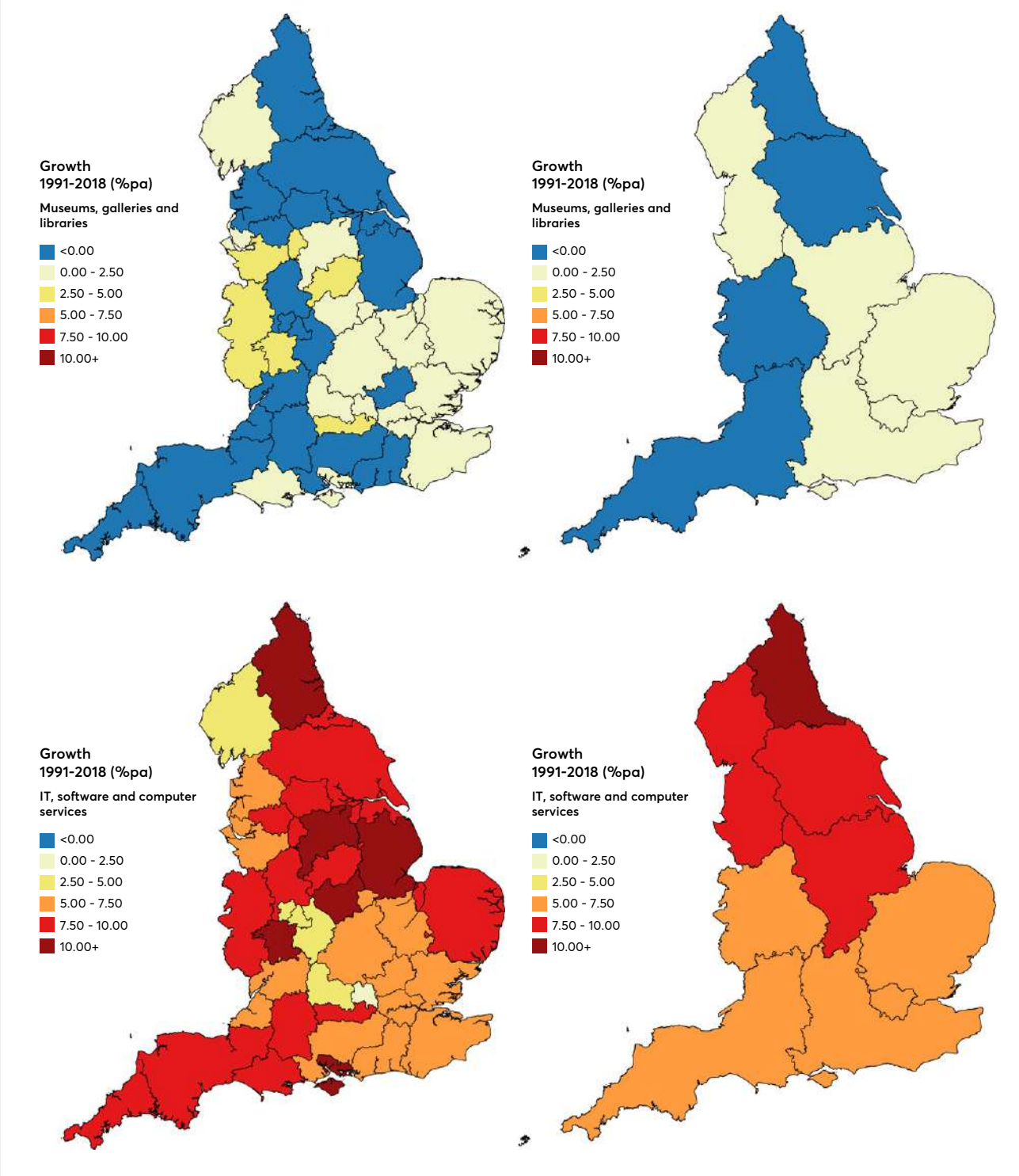
Firstly, neither the measures for geographical industrial concentration nor the measures for industrial specialisation provide a direct insight into the relative size or importance of individual concentrations. They therefore need to be analysed in combination with basic descriptive statistics on the scale of sector concentrations in specific areas.

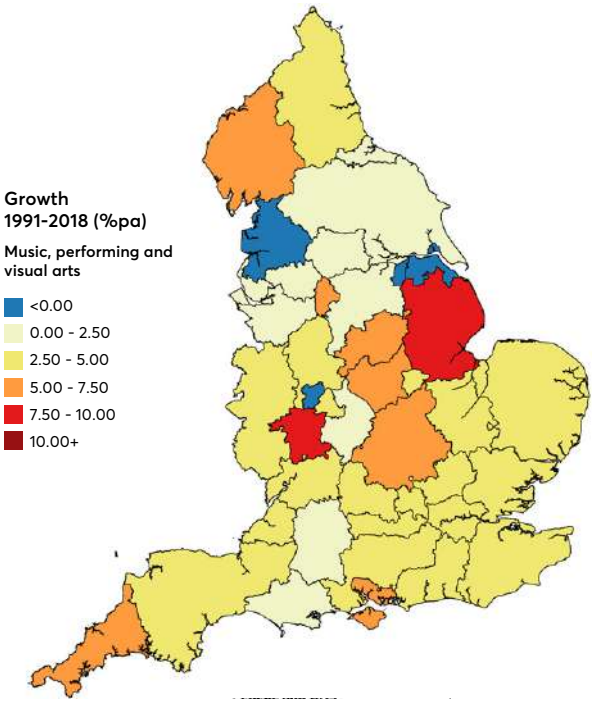
A second shortcoming with these measures (with the exception of the comprehensive Ellison-Glaeser Index) is that they only use employment and are not based on the number of firms. Thus, they may in some cases identify 'one-firm concentrations' based on the presence of a single, very large, firm.

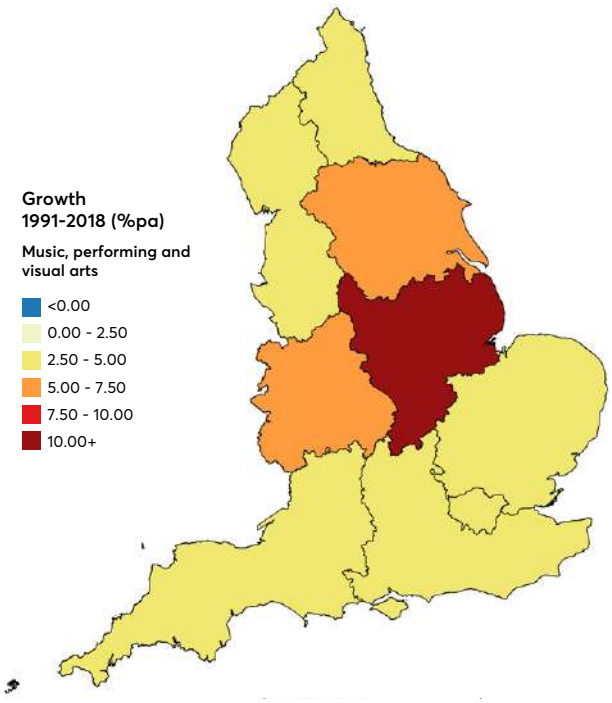
Finally, we have used administrative units (in this case LEPs) which mostly do not correspond with functional economic entities, and therefore may under or over-bound functional clusters and clusters. Utilising these pre-defined local area units is also subject to the modifiable area unit problem, where the results are sensitive to the choice of spatial unit (see Egeraat et al, 2015).

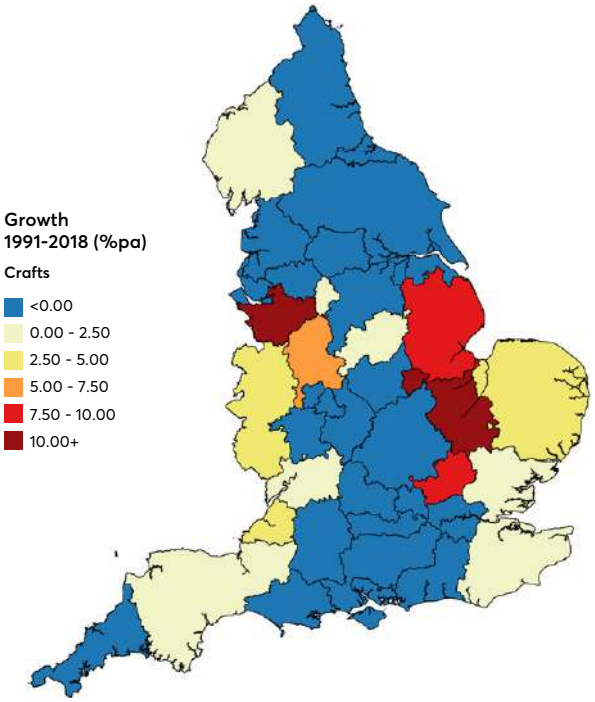
Appendix C: Additional maps and charts

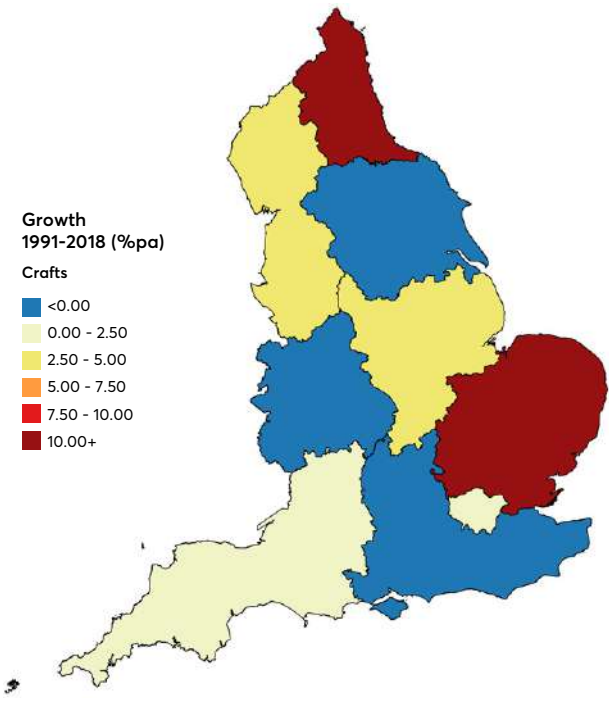
C1 Period growth by English LEP and NUTS1 region



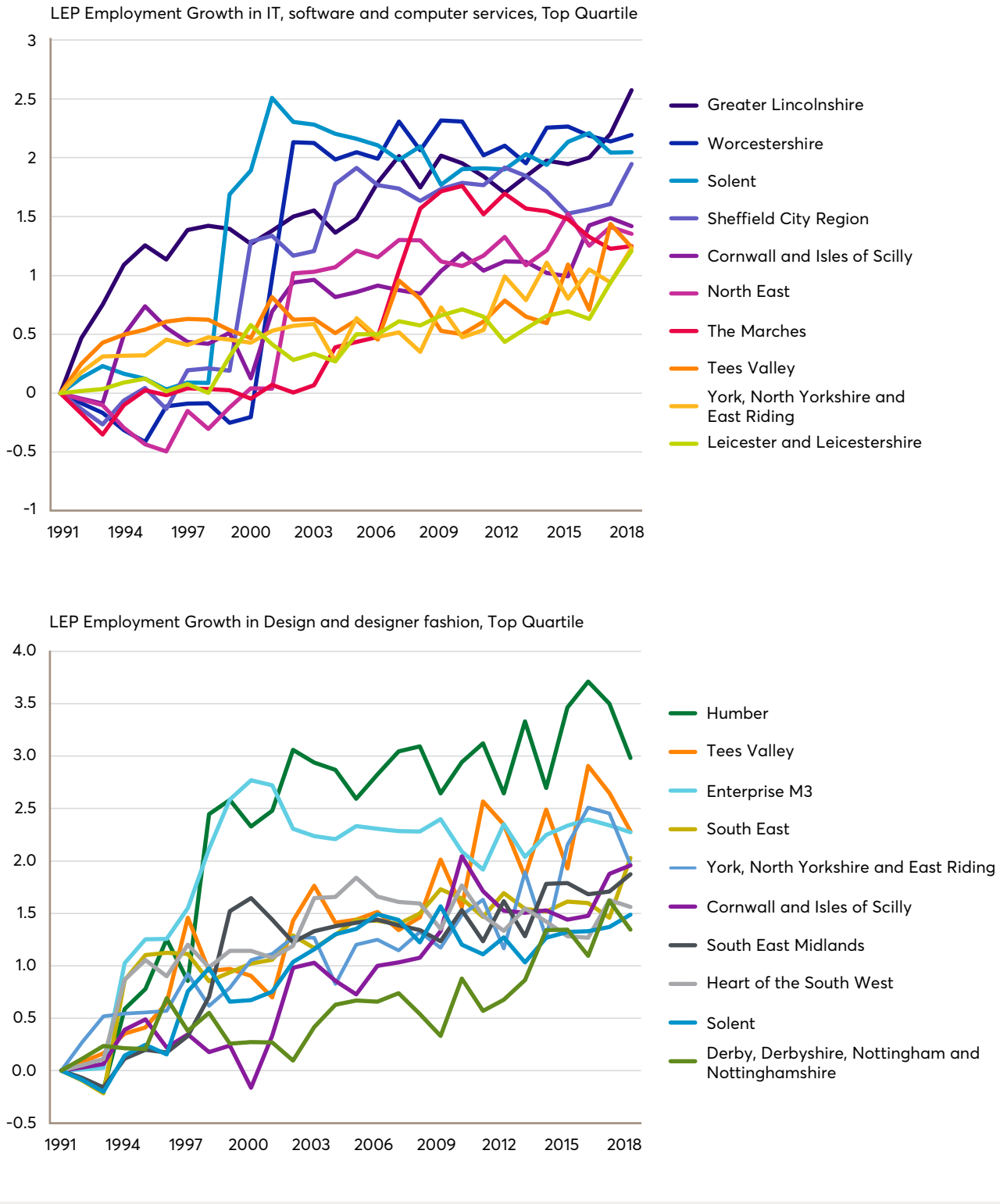

Growth
1991-2018 (%pa)
Music, performing and visual arts
<0.00
0.00 - 2.50
2.50 - 5.00
5.00 - 7.50
7.50 - 10.00
10.00+


Growth
1991-2018 (%pa)
Music, performing and visual arts
<0.00
0.00 - 2.50
2.50 - 5.00
5.00 - 7.50
7.50 - 10.00
10.00+

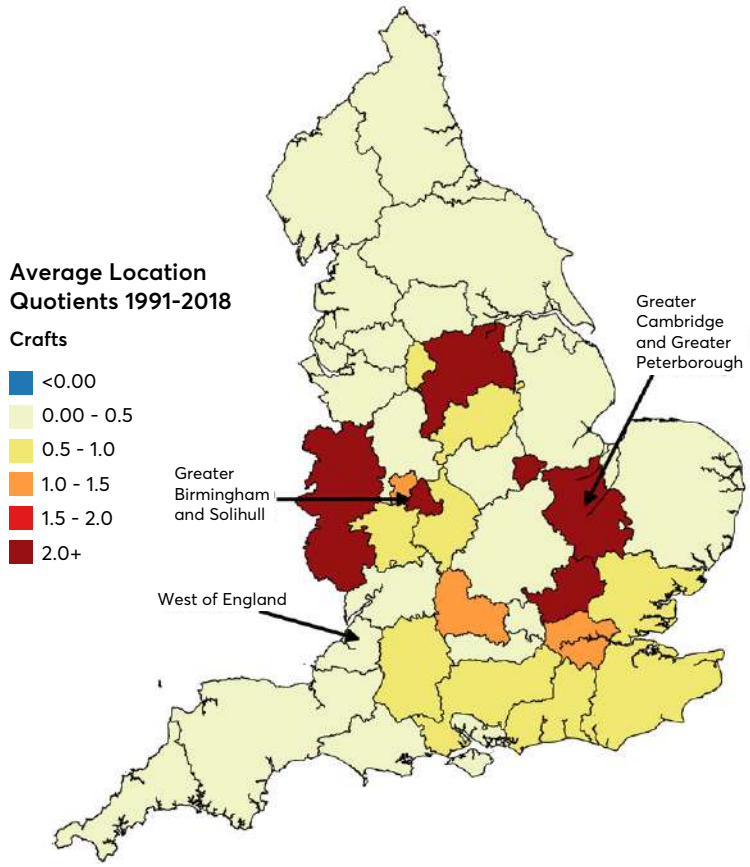

Growth
1991-2018 (%pa)
Crafts
<0.00
0.00 - 2.50
2.50 - 5.00
5.00 - 7.50
7.50 - 10.00
10.00+

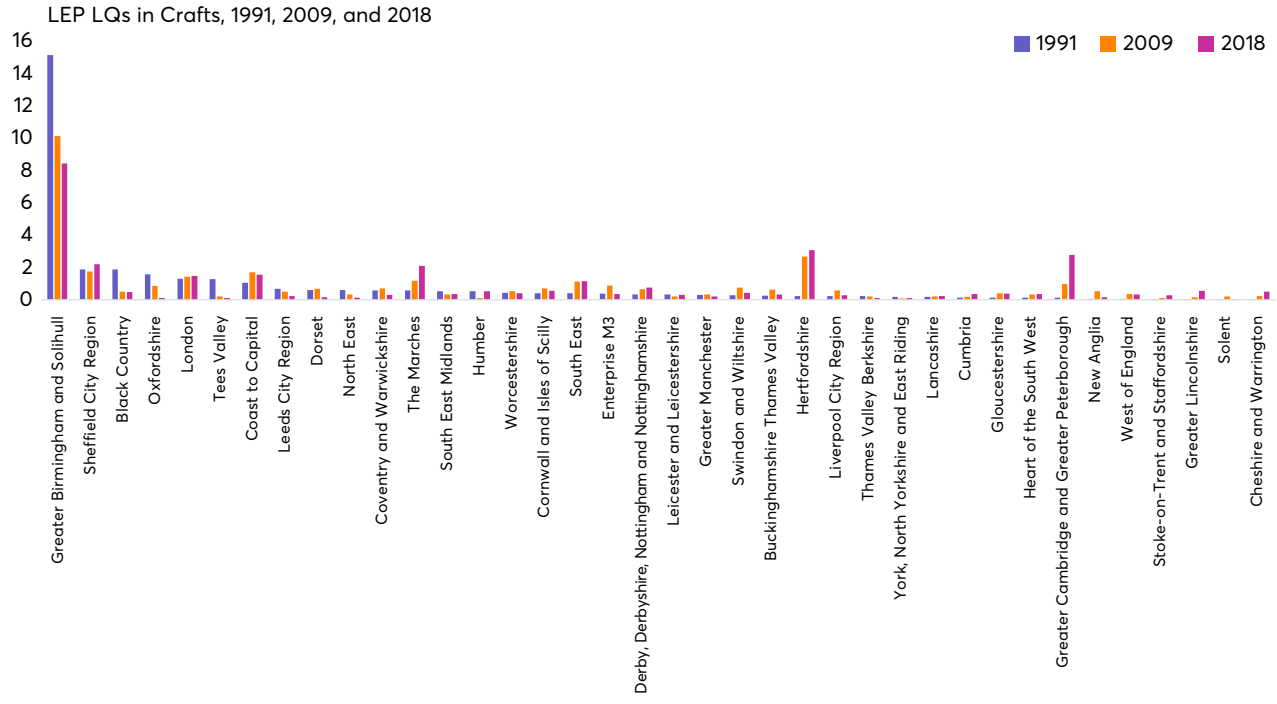

Growth
1991-2018 (%pa)
Crafts
<0.00
0.00 - 2.50
2.50 - 5.00
5.00 - 7.50
7.50 - 10.00
10.00+

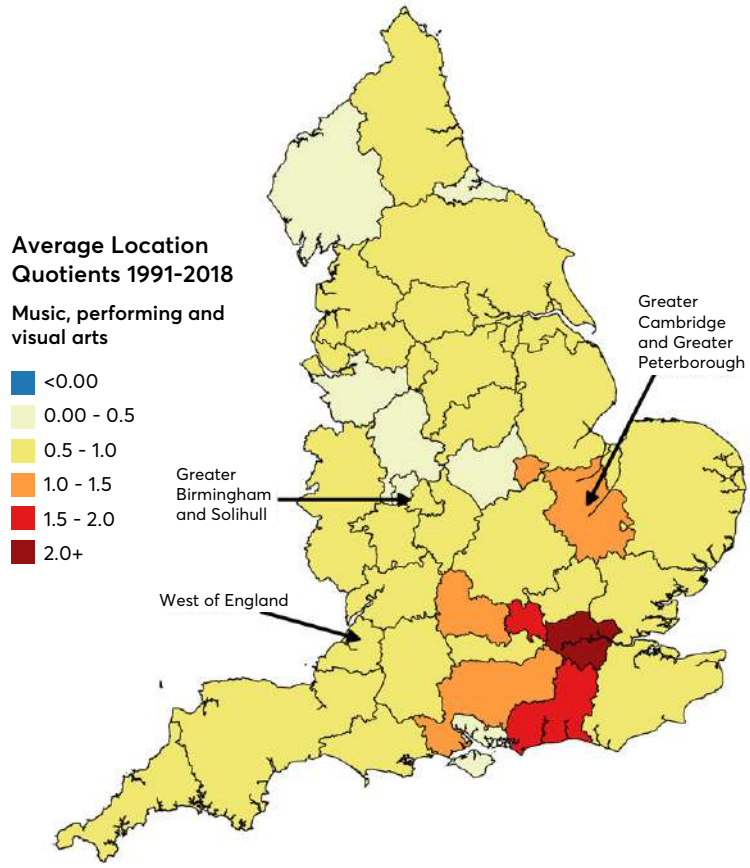
C2 Top quartile growth by LEP

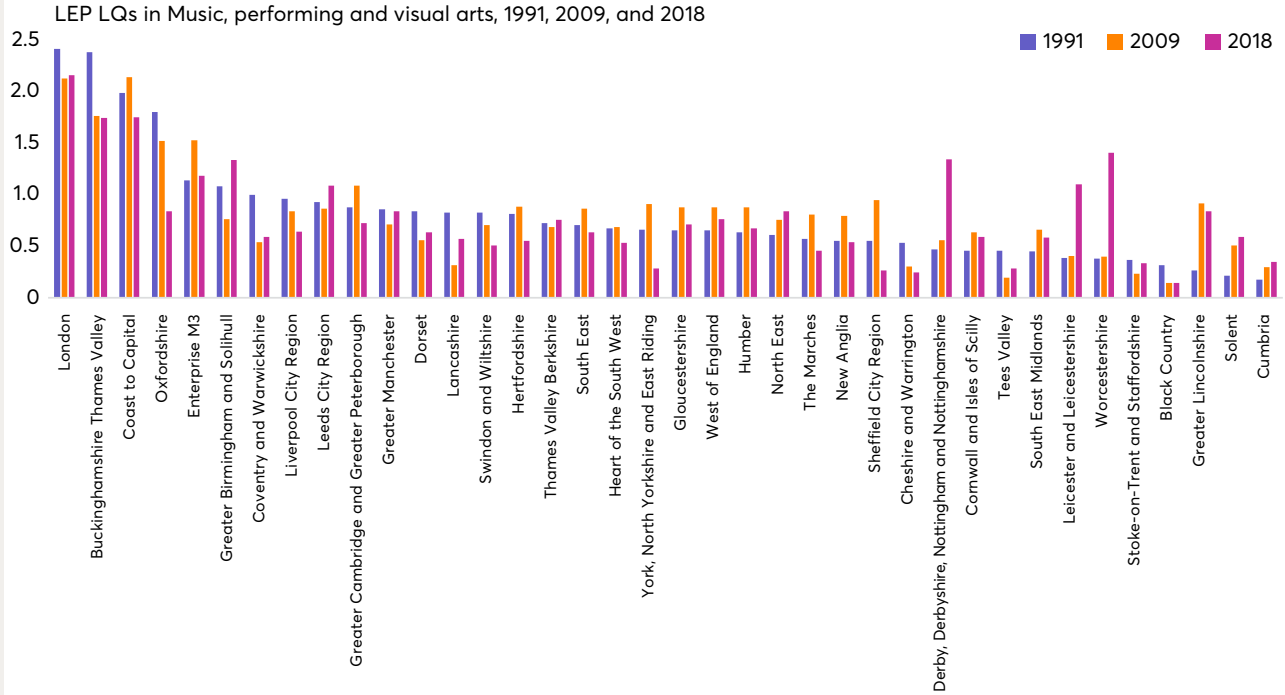


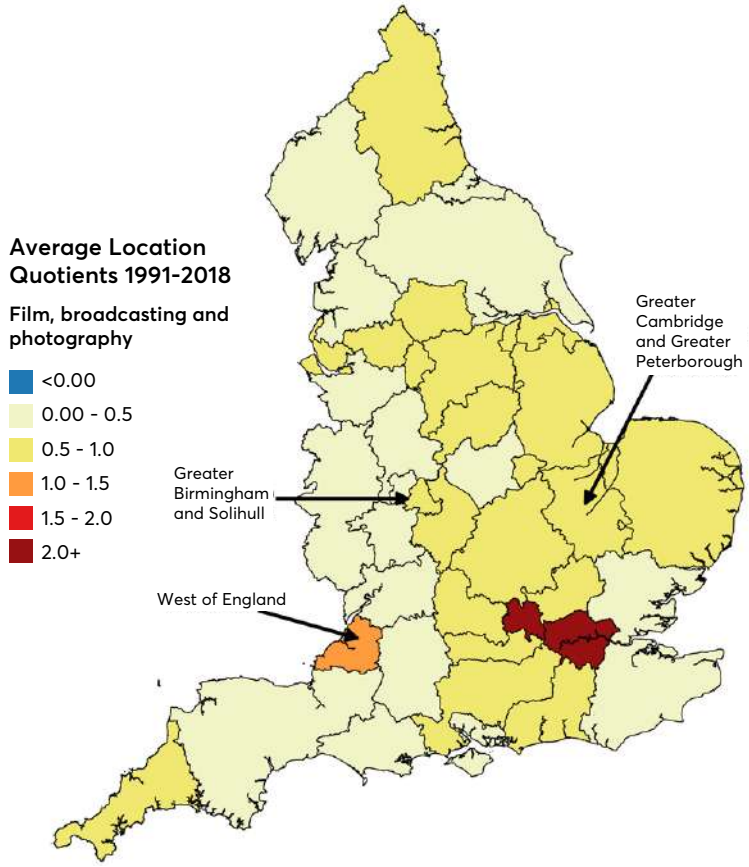
C3 Location quotients

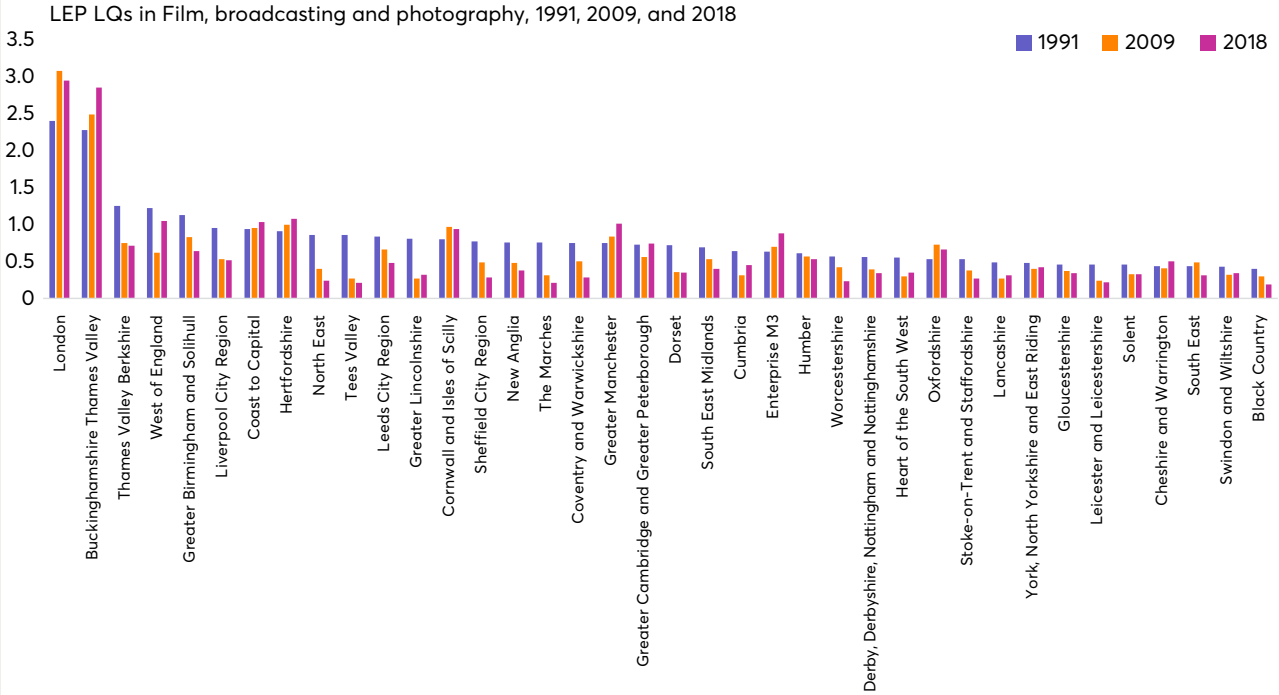


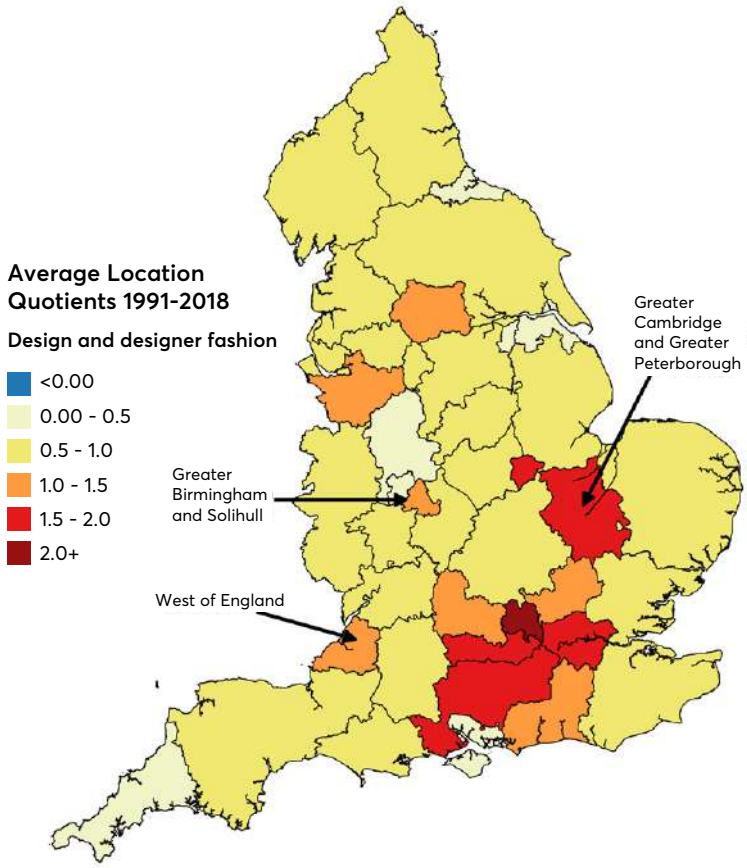



Average Location Quotients 1991-2018
Music, performing and visual arts
<0.00
0.00 - 0.5
0.5 - 1.0
1.0 - 1.5
1.5 - 2.0
2.0+
Greater Cambridge and Greater Peterborough
Greater Birmingham and Solihull
West of England

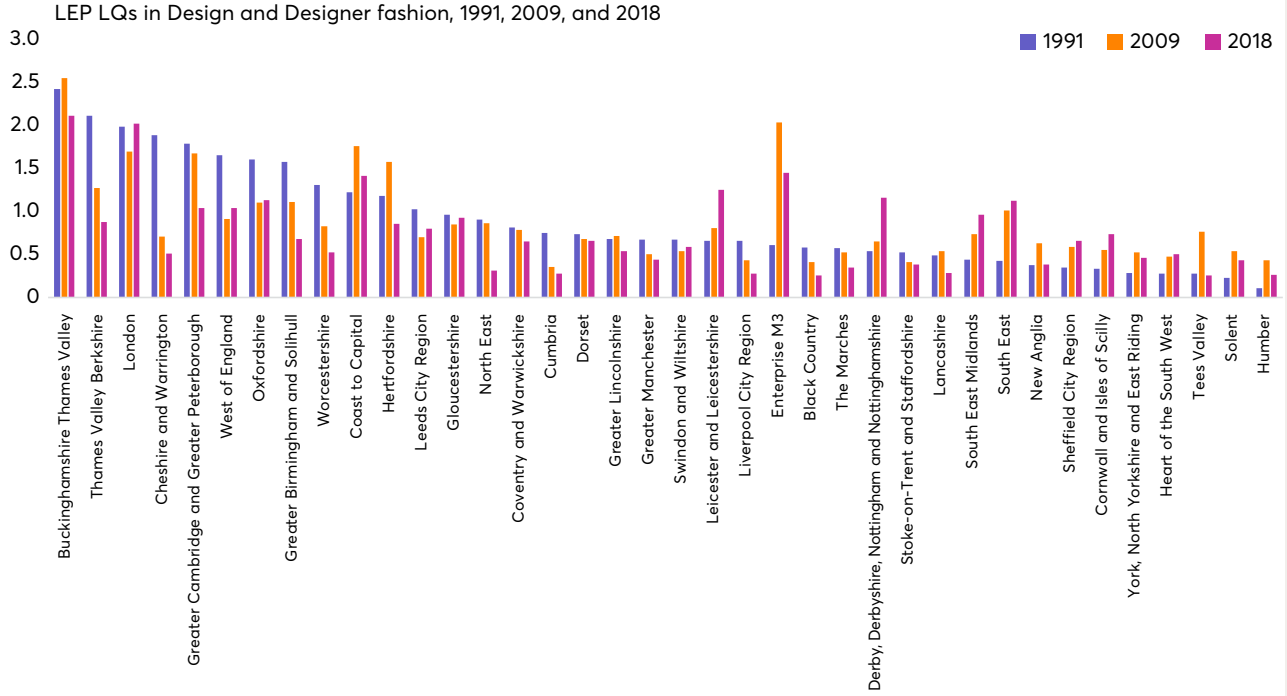

LEP LQs in Music, performing and visual arts, 1991, 2009, and 2018
1991
2009
2018
2.5
2.0
1.5
1.0
0.5
0
London
Buckinghamshire Thames Valley
Coast to Capital
Oxfordshire
Enterprise M3
Greater Birmingham and Solihull
Coventry and Warwickshire
Liverpool City Region
Leeds City Region
Greater Cambridge and Greater Peterborough
Greater Manchester
Dorset
Lancashire
Swindon and Wiltshire
Hertfordshire
Thames Valley Berkshire
South East
Heart of the South West
York, North Yorkshire and East Riding
Gloucestershire
West of England
Humber
North East
The Marches
New Anglia
Sheffield City Region
Cheshire and Warrington
Derby, Derbyshire, Nottingham and Nottinghamshire
Cornwall and Isles of Scilly
Tees Valley
South East Midlands
Leicester and Leicestershire
Worcestershire
Stoke-on-Trent and Staffordshire
Black Country
Greater Lincolnshire
Solent
Cumbria


Average Location Quotients 1991-2018
Film, broadcasting and photography
<0.00
0.00 - 0.5
0.5 - 1.0
1.0 - 1.5
1.5 - 2.0
2.0+
Greater Cambridge and Greater Peterborough
Greater Birmingham and Solihull
West of England


LEP LQs in Film, broadcasting and photography, 1991, 2009, and 2018
1991
2009
2018
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0
London
Buckinghamshire Thames Valley
Thames Valley Berkshire
West of England
Greater Birmingham and Solihull
Liverpool City Region
Coast to Capital
Hertfordshire
North East
Tees Valley
Leeds City Region
Greater Lincolnshire
Cornwall and Isles of Scilly
Sheffield City Region
New Anglia
The Marches
Coventry and Warwickshire
Greater Manchester
Greater Cambridge and Greater Peterborough
Dorset
South East Midlands
Cumbria
Enterprise M3
Humber
Worcestershire
Derby, Derbyshire, Nottingham and Nottinghamshire
Heart of the South West
Oxfordshire
Stoke-on-Trent and Staffordshire
Lancashire
York, North Yorkshire and East Riding
Gloucestershire
Leicester and Leicestershire
Solent
Cheshire and Warrington
South East
Swindon and Wiltshire
Black Country



LEP LQs in Design and Designer fashion, 1991, 2009, and 2018



C4 Classification of LEPs by population density, 1991

LEP	Population (000s)	Classification
Cumbria	71	Very Rural
Greater Lincolnshire	84	Very Rural
York, North Yorkshire and East Riding	94	Very Rural
Greater Cambridge and Greater Peterborough	96	Very Rural
The Marches	101	Very Rural
Cornwall and Isles of Scilly	132	Very Rural
Heart of the South West	147	Rural
New Anglia	153	Rural
Swindon and Wiltshire	164	Rural
Humber	164	Rural
Oxfordshire	173	Rural
Buckinghamshire Thames Valley	197	Rural
Gloucestershire	202	Rural
Enterprise M3	237	Rural
Dorset	247	Rural
North East	248	Rural
South East Midlands	289	Semi-Urban
Worcestershire	294	Semi-Urban
Derby, Derbyshire, Nottingham and Nottinghamshire	315	Semi-Urban
Coast to Capital	336	Semi-Urban
Leeds City Region	361	Semi-Urban
Cheshire and Warrington	370	Semi-Urban
Coventry and Warwickshire	381	Semi-Urban
Stoke-on-Trent and Staffordshire	383	Semi-Urban
Leicester and Leicestershire	396	Urban
South East	414	Urban
Lancashire	456	Urban
Sheffield City Region	496	Urban
Thames Valley Berkshire	595	Urban
Hertfordshire	599	Urban
Greater Birmingham and Solihull	691	Urban
West of England	718	Metropolitan
Tees Valley	826	Metropolitan
Solent	1452	Metropolitan
Greater Manchester	2001	Metropolitan
Liverpool City Region	2153	Metropolitan
Black Country	3110	Metropolitan
London	4340	London

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