**Economic Complexity and Levelling up**

1. **Executive Summary**

Cities offer a number of inherent benefits to more knowledge-based forms of economic activity. The most successful ones offer access to large numbers of high-skilled workers, and they provide greater opportunity to create and share knowledge face-to-face.

Economic complexity is an analytical approach that attempts to measure how sophisticated an economy is. It has been widely used to compare countries, but to date has been less commonly applied at the subnational level, especially in the UK.

Using this approach shows that because of the inherent advantages that cities have, they are more complex than other parts of the country. The UK’s most knowledge-based activities tend to cluster within its urban areas.

City size plays a role in its complexity levels. Larger cities tend to be more complex than their smaller peers. But there are two problems for large UK cities. The first is that this is not reflected in higher productivity levels. The second is that despite their stronger performance in terms of complexity in the UK context, they still lag their French and German comparators.

This snapshot though hides what has been an improving picture for the big cities over the last 40 years. Applying the economic complexity approach for the first time to historical data in Britain, this briefing shows that the big cities have become more complex over the last four decades. In 1981, the largest cities outside the South of England had complexity levels below average. But since then, many of these places have been able to break out of their ‘low knowledge’ trap to attract in more knowledge-based activities.

Some argue that this turnaround has been policy driven, with a bias shown towards big cities at the cost to other parts of the UK. Looking back at the whole range of policy interventions since then, it is difficult to see any favouring through policy. Instead, as the UK economy has specialised in more knowledge-based activities over this period as a result of increasing globalisation, big cities have been well placed to take advantage of this change because of the inherent benefits they offer – namely access to large pools of workers and a network of other knowledge-based businesses.

But clearly there is work to be done. Despite their improvement, the continued underperformance of Britain’s large cities creates a cost to the national economy that the Centre for Cities estimates is at least £48 billion per year. In order for the UK economy to get the most out of what is has, there needs to be greater focus on the performance of large cities, particularly if the Government wants to level up the economy. As this paper shows that complex industries have shown a preference to locate in theses cities, policies to further improve their economies would work with the grain.

This research also offers a note of caution for those who urge areas to ‘play to their strengths’ when attempting to improve their economies. Those cities that have continued to specialise in similar types of activities, such as Blackpool in aerospace, are the ones that have become less complex in recent years. This suggests that in many struggling places, it is not what a place has, but rather what a place doesn’t have that should be of concern. Many places in North and Midlands won’t see a turnaround in the coming years if they continue to focus on what they already have, particularly in lower-skilled parts of manufacturing. They need to focus on addressing the barriers that stop more complex activities from investing in their areas.

1. **Introduction**

This autumn the Government will publish its Levelling Up White Paper, which will set out how it intends to deliver on a slogan has been the bedrock of its domestic agenda.

There have been a number of policies badged under the levelling up banner but the lack of strategy for delivering and a well-defined purpose has meant that policy so far has been boiled down to ad-hoc pots of money and symbolic prizes for some areas, such as the Levelling Up Fund and freeports. In particular, these actions have not so far matched up the Government’s stated ambition in its recent Plan for Growth to have one internationally competitive city per region.

Centre for Cities recently defined what levelling up should aim to do and highlighted the requirement to improve the performance of big cities if it is to narrow the gap between different parts of the UK and between the UK and its international competitors.[[1]](#footnote-1) This briefing uses the idea of economic complexity to show how different parts of the UK economy have developed over time and sets put the implications this has for the Government’s levelling-up agenda.

It first looks at how complexity varies across Britain, revealing Britain’s most and least complex cities and large towns. Then it looks at how this has changed over time, using data from 1981 to show how the geography of complex activities has changed over the last 40 years.

**Box 1:** Methodology

**Definition of a city**

Centre for Cities research focuses on the UK’s 63 largest towns and cities. Unless otherwise stated, here cities refer to Primary Urban Areas (PUAs), using a measure of the built-up area of a large city or town, which sometimes spans beyond the core local authority of a city. Due to data availability, Belfast is not included in this briefing.

**Data used for this research**

This paper uses a number of publicly available datasets. These include the employment at the local authority level by industry from the 1981 Census (‘1980 Standard Industrial Classification, 4-digit’) and the UK Business Register and Employment Survey (BRES) for 2019 (‘2007 Standard Industrial Classification, 3-digit’). Productivity levels for 2019 shown in the report are computed from ONS’s Regional Gross Value Added (GVA) dataset and employment numbers from BRES.

Other sources include the France’s National Institute of Statistics and Economic Studies (Insee), German Federal Statistics Office (Destatis).

1. **The geography of economic complexity in Britain**

**What is economic complexity?**

The creation and use of new knowledge is what drives economies on, be that through the invention of new technology or improvements to the ways that we work. Those economies that are the most developed are the ones that have been best able to do this.

Economic Complexity attempts to capture the amount of knowledge and knowhow in economies by looking at the types of sectors that do business within them. According to the theory, as individuals are limited in what they can know and produce, new industries emerge as result of the accumulated knowledge in an economy.

The most productive economies tend to have large levels of accumulated knowledge, which allow them to benefit substantially from the transmission of tacit knowledge – both between workers and firms – and innovate in the future. Meanwhile, places with comparatively low levels of complexity often specialise in activities that do not require a strong base of knowledge. Consequently, those areas are less likely to generate vast webs of knowledge within their economies, which would drive new innovations and growth. a place is more likely Box 2 discusses methodology in more detail.

Box 2: **Economic Complexity, definition and methodology**

***Definition***

The concept of economic complexity, developed by Hidalgo and Hausmann in 2009, examines countries’ exports and identifies in which products an economy has a competitive advantage, by analysing international trade data. A country is considered specialised in a product if it holds a revealed comparative advantage (RCA): its export share of a product is higher than the product’s share in overall world trade. **[[2]](#footnote-4)**

**Revealed Comparative Advantage (RCA) = Sector’s weights in one place is higher than its weight in the overall economy**

Under this approach, economies are defined on how diverse (how many products it has a specialisation) they are; and how ubiquitous (number of places that are able to make a product) their areas of specialisation are.[[3]](#footnote-5) As result – by interacting diversity with ubiquity – it is possible to assign an Economic Complexity Indicator (ECI) for each geography and Product Complex Indicator (PCI) for each industry.

**A rare activity is not necessarily a complex one**

The economic complexity concept, by comparing activities across geographies, is able to identify complex and non-complex activities that are equally rare. For instance, a product that is rare only because of its geography (e.g. diamonds and oil) is likely to be located in a place that produces several non-rare (high ubiquity) goods (e.g. agricultural products). At the opposite end of the spectrum, a rare and complex activity is usually bundled next to other rare (low ubiquity) products, suggesting the product requires a certain level of accumulated knowledge to be produced. Complex activities such as software development are likely to be located new to other high-knowledge (complex) activities like pharmaceutics.

**Economic complexity at the urban level**

In recent years, economic complexity has been applied at the urban level in several countries like the UK (Mealy and Coyle, 2019), US (Fritz and Manduca, 2019) and others.[[4]](#footnote-6)Unlike cross-country comparisons, revealed comparative advantages are measured using employment data, instead of international trade data.A city or town has a RCA in a particular sector if employment in that activity is more prevalent than the overall average. For example, if mining represents 2 per cent of total employment in one country/region, all cities with more than 2 per cent of its workers working in mining will have a competitive advantage in that specific sector.

**For the purpose of this paper, we measure economic complexity based on exporting activities**. Because they are not tied to a local market, these exporters could, in theory, locate anywhere in Britain, and so it is these activities that are of particular interest.**[[5]](#footnote-7)** Moreover, economic complexity for Britain as a whole considers all local authorities separately; while urban economic complexity solely covers the 62 urban areas defined by the Centre for Cities as cities or large towns. [[6]](#footnote-8)

**What are exporting businesses?**

Exporting businesses (also known as business to business (B2B) or tradable businesses) sell to regional, national or international markets. They form the export base of the local economy. The markets these businesses sell to do not tie them to a specific location, and so long as they can easily access their target market, they are free to set up wherever they want. But given the different requirements of goods (e.g. car manufacturers) and services (e.g. computer programming) exporters, their location decisions are likely to look very different. For this research we have defined exporters and local services firms using Standard Industrial Classification (SIC) codes.

**Urban economies are more complex**

Because tacit (as opposed to codified) knowledge is best transmitted face-to-face, cities in principle have an inherent advantage in attracting more complex activities. And this is reflected in the data for British cities and large towns. As Figure 1 shows, in 2019 urban local authorities were, on aggregate, substantially more complex than non-urban areas.

**Figure 1:** Urban areas are more likely to be complex than non-urban areas, a result of the inherent benefits they offer to businesses

Source: ONS; Centre for Cities’ calculations.[[7]](#footnote-9)

**Box 3:** How agglomeration affects the location of businesses within cities

Agglomeration is the process by which concentrating economic activity in one place increases the productivity of that activity. Benefits are characterised into three types: learning, which reflects the ability to share ideas and information; sharing, the sharing of inputs such as roads and broadband; and matching, the matching of workers to jobs and jobs to workers.[[8]](#footnote-10)

These benefits of agglomeration play out over very different geographies.

- The labour pool that businesses have access to stretches well beyond its boundaries. Although this is likely to vary depending on geography, previous research suggests that this effect extends up to a drive time of 80 minutes from a British city, with the effect becoming weaker as distance from a city increases.[[9]](#footnote-11)

- The ability to exchange ideas and information, known as ‘knowledge spillovers’ tends to operate over very small geographies. For example, for the advertising industry in Manhattan it has been estimated that these knowledge spillovers operate over a distance of just over 750 metres, while other research finds that these agglomeration effects are strongest over a distance of one mile.[[10]](#footnote-12)

On the latter, this is why we see much activity – and high-skilled activity in particular – locate within city centres. In 2015, city centres in Britain collectively accounted for 0.1 per cent of all land. But they accounted for 14 per cent of all jobs and 25 per cent of all jobs in more productive services businesses.[[11]](#footnote-13)

The firms most influenced by agglomeration are ‘exporting’ businesses – those that sell to regional, national and international markets. Because they sell to so many markets, they are more likely to choose their location based on the benefits and costs set out above.

The location of local services businesses, on the other hand (such as hairdressers and restaurants), is instead governed by where their customer base is located. Their location decisions are much less likely to be directly influenced by agglomeration, and more by centres of population.

It is exporter businesses, and high-skilled ones in particular, that are crucial for determining productivity because of their ability to absorb new innovations. That means that its ability to attract or grow its exporting base determines the overall productivity performance of a city.

The most complex occupations (defined solely by exporting sectors, see Box 2 for further details) are typically associated with knowledge-based services, such as finance-related, advertising and programming occupations. Meanwhile, manufacturing and mining jobs rank among the least complex activities in Britain (Figure 2). Previous research from the Centre for Cities has shown that the industries defined as more complex here are more likely to locate in cities, particularly in city centres, where they can benefit from the inherent benefits they offer (known as agglomeration, which is discussed in Box3). Meanwhile exporters of goods, which Figure 2 shows tend to be less complex, are more likely to be in suburbs or non-urban areas because land and premises are cheaper. [[12]](#footnote-14)

**Figure 2:** Exporting occupations by complexity, 2019

|  |  |
| --- | --- |
| **Top 10 occupations** | **Bottom 10 occupations** |
| Reinsurance | Mining of hard coal |
| Fund management activities | Manufacture of refractory products |
| Trusts, funds and similar financial entities | Manufacture of basic iron and steel and of ferro-alloys |
| Advertising | Processing and preserving of meat and production of meat products |
| Manufacture of magnetic and optical media | Manufacture of tanks, reservoirs and containers of metal |
| Computer programming, consultancy and related activities | Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms |
| Market research and public opinion polling | Manufacture of basic precious and other non-ferrous metals |
| Passenger air transport | Manufacture of other products of first processing of steel |
| Television programming and broadcasting activities | Casting of metals |
| Data processing, hosting and related activities; web portals | Manufacture of other fabricated metal products |

Source: ONS.. Centre for Cities’ calculations.

**Urban areas are not equally complex**

While on average Britain’s largest urban areas are more complex than the rest of the country there is much variation between them, with some urban local authorities performing below the non-urban average.[[13]](#footnote-15) This is important because, as Figure 3 shows, more complex economies are more productive: the least productive cities and large towns have competitive advantages in low complexity sectors (e.g. mining, warehousing, etc.), which have low productivity.

**Figure 3:** Highly complex economies are more productive

**Urban average**

Source: ONS. Centre for Cities’ calculations.

There is a clear geography in Britain’s economic complexity. Most of cities and large towns that have high complexity and productivity are located in the Greater South East. As previous Centre for Cities’ research has shown, highly-skilled exporters – which tend to be more productive– are predominant in that region because cities have been able to offer both access to lots of skilled workers and networks of other highly–skilled businesses. Crucially for ongoing policy discussions around whether subsidies should be used to level up the economy, in order to access those advantages and the accumulated knowledge associated with them, highly productive firms are willing to pay a premium, in the form of more expensive commercial space. [[14]](#footnote-16)

Cities and large towns with lower levels of complexity are generally located in the North and Midlands, where their competitive advantages, such as distribution, warehousing and storage, usually require access to a different set of benefits – namely pools of lower-skilled workers and low-cost land.

**Most big cities are punching below their weight**

As cities are places that offer access to large pools of workers and networks of businesses, a link between a city’s size (a proxy of the agglomeration benefits they are able to offer) and its complexity should be expected. This broadly holds in Britain’s urban context, as Figure 4 illustrates. Larger cities – when adjusting for the number of workers in commutable distance - are more likely to have a complex economy than its smaller peers.

Figure 4: Big cities promote higher benefits from agglomeration, promoting complex sectors

Source: ONS ; Census 2011. Centre for Cities’ calculations.

Despite this, most of Britain’s largest cities – such as Glasgow, Manchester, and Liverpool – **have productivity below average.** The mismatch is partially explained by the relatively small size of the sectors that make those cities complex – it is possible for a city to have a competitive advantage in an industry but for that industry to play a small role in the economy.[[15]](#footnote-17) Currently, most large cities have competitive advantages in some complex activities. However, those sectors employ a comparatively low level of workers, when compared with other complex economies (Figure 5). As a consequence, large cities’ most complex activities – and therefore most productive – are not large enough to substantially drive up productivity.

For example, Glasgow and Brighton are similarly complex but their productivity substantially differs, which is partially driven by the differing number of jobs in their most complex activities. Brighton, a city which is highly productive, has 54 per cent of its exporting jobs in its most complex activities. Meanwhile, in Glasgow – which has productivity below national average – only 13 per cent of its exporting jobs come from its most complex activities.[[16]](#footnote-18)

**Figure 5:** In cities where there is a gap between complexity and productivity, complex sectors employ small shares of workers

Source: ONS; Centre for Cities’ calculations. Complex cities defined by places with ECI above zero.

**Despite being relatively complex in the British context, large cities are less complex than their French and German equivalents**

As is the case with productivity, large British cities lag large French and German cities in terms of complexity too (see Figure 6). From the eighteen largest French and German cities analysed, all of them have high complexity.[[17]](#footnote-19) In contrast only three out of nine British cities (Bristol, Leeds and Manchester) had complexity level above average.[[18]](#footnote-20) Smaller cities and towns in Britain also lag their French counterparts, but the gap is much smaller than for large cities.

**Figure 6:** Big cities significantly lag their German and French counterparts[[19]](#footnote-21)

Source: ONS , INSEE and Destatis.

That complex industries have shown a preference to locate in big cities shows that policies to further improve the economies of these places would work with the grain. But that this neither feeds through to higher levels of productivity, or puts them on par with complexity levels in large French and German cities, shows that there is much work to be done.

1. **The last four decades of economic complexity (1981-2019)**

**Urban areas, especially the biggest ones, have become more complex**

The relatively complex nature of the economies of large cities today are the result of four decades of improvement. This has meant that as a group Britain’s large cities have shifted from having below average levels of complexity in 1981 to being substantially more complex than the average urban area today (see Figure 7), leading the growing relative complexity of cities and large towns overall.

**Figure 7:** Cities, in particular the largest ones, have become more relevant in the last four decades[[20]](#footnote-22)

Source: ONS; Census, 1981. Centre for Cities’ calculations. Urban ECI computed at the Local Authority level including all local authorities. City’s ECI computed at the PUA level, including urban areas only. Largest cities measured by total employment and ECI scores are a weighted average considering each PUA’s size.

This reversal of fortunes goes against the general trend. Figure 8 shows that those cities that were the most complex in 1981 are also the most complex today. In line with the theory of economic complexity, cities and large towns with higher complexity – mainly in the Greater South East - accumulated more knowledge, had a higher likelihood of innovating and so remained more complex in the decades ahead. Box 4 shows that London grew and remained highly productive over the last decades by diversifying its economic base; and attracting new economic sectors, instead of simply replicating its’ existing strengths in the finance sector.

At the opposite side of the spectrum, most cities and large towns in the North and Midlands remained ‘trapped’ in low complexity economies. With comparatively little accumulated knowledge, these cities struggled to attract new innovative businesses, which would consequently increase their productivity.

**Figure 8:** The Great South East remained mostly complex in 1981-2019, while the biggest cities emerged

Source: ONS; Census, 1981. Centre for Cities’ calculations.

Box 4: London’s growth and the role of the financial sector

The rise of London in the last decades is generally associated with the ‘Big Bang’, a set of financial deregulation reforms by the mid-80s that lead to the expansion of the financial sector. However, London’s economic turnaround has been much more than finance, which supports the logic behind the economic complexity theory.

The rise in finance happened in a context of globalisation and an overall economic shift towards the service sector. When compared with other knowledge-based services, London’s rise of finance-related jobs was dwarfed by sectors like programming, design, advisement or research (Figure 9).[[21]](#footnote-23) In 2019, other knowledge-based services accounted for 47.2 per cent of all exporting jobs, above the 26.5 per cent from ‘Finance and Insurance’.

**Figure 9:** Finance-related employment rose but not as much as other services.

Source: ONS; Census, 1981.

Moreover, national accounts from the last two decades also support the idea that ‘*Finance and Insurance’* sector has not been the main driver of London’s economic performance. The sector, as a percentage of London’s economy, remained mostly unchanged. While *‘Information and Communication’*; combined with *‘Professional, scientific and technical activities’* have risen significantly, partially being the driver of London’s growth in the last decades. In 2019, those sectors jointly accounted for 25.1 per cent of London’s economy, an increase of 8.9 percentage points when compared with 1998. Moreover, their weights are substantially above the ‘*Finance and Insurance’*, which stood at 13.7 per cent in 2019.

The findings above highlight that London’s success was mainly caused by its ability to innovate, diversify its economic base and attract new productive sectors; instead of simply replicating previous competitive advantages.

**Large cities dominate the places that were able to break out of the ‘low complexity’ trap** and attract in more complex businesses, with only Dundee and Warrington being the exceptions (Figure8). As Box 5 discusses, they were able to do this without having substantial knowledge in related activities by 1981. That said, not all large cities were able to emerge from its low complexity economy. Newcastle had modest complexity gains in the last four decades, but remained comparatively low complexity. While Birmingham and Sheffield continued being a comparatively low complexity economies, without experiencing relative improvements.

Box 5: Cities can develop sectors without previous knowledge in similar areas

In recent years, some of Britain’s largest cities were able to become relatively more complex by specialising in new high-knowledge activities. Data at the occupational level suggests that in some cases, the observed improvements were unlikely to be a result of the existing economic structure in 1981.

**Computer-related activities**

In 2019, economies with a strong IT-related sector were generally specialised in electronics-related occupations in 1981 (Figure 10); with both sectors being considered complex in 2019 and 1981 respectively.[[22]](#footnote-24) Half of the cities with a competitive advantage in the IT sector – the ones like Reading, Slough, London or Brighton – were specialised in the electronics sector 38 years before. Nevertheless, Leeds and Nottingham were able to become to specialised in IT-related activities, without having an electronics’ legacy from 1981; Nottingham ranked 37th out of 62 cities in terms of being specialised in electronics.

**Figure 11:** Economies focused on electronics were more likely to move towards IT-related occupations but there are some notable exceptions

Source: ONS; Census, 1981.

A similar trend can be found in a number of other occupations. Liverpool was able to build a competitive advantage in research-related activities, one of the most complex sectors today, while it ranked 49th out of 63 cities in Research and Development activities in 1983.[[23]](#footnote-25) Additionally, cities like Manchester, Nottingham and Slough were some of the least specialised economies in the ‘Telecommunications’ in 1981; while having a competitive advantage in ‘Wireless telecommunications’ activities 38 years later.

The theory of Economic Complexity suggests that places develop specialisms based on previous specialisms. At the city level, this data suggests that having a previous specialism may not be a necessary condition to develop one today.

**The emergence of larger cities is not result of direct policy towards cities but structural changes in the global economy**

This goes somewhat against economic complexity theory, which says that the evolution of an economy is related to its past specialisms. British large cities appear to have broken this pattern.

There are two explanations for this. The first is that large cities have ‘had it too good’, and have been explicitly favoured by policy in recent decades. This has sucked jobs into cities, so the argument goes. But finding evidence of this is difficult. There have been city specific policies, such as Michael Heseltine’s City Challenge or City Deals under the Cameron-led government. But as Box 6 illustrates, in the wide gamut of local growth policies that have been put in place in the last 40 years, very few have been city focussed.

Box 6: A time line of sub-national policiesWhile not exhaustive, the below sets out a long list of local growth initiatives that have been put in place since the 1980s. Only three have had an explicit city focus – City Challenge, City Deals and Mayoral Devolution Deals. Meanwhile there have been a number of initiatives that have been more explicit in not having a city focus, such as the creation of the Coalfield Regeneration Trust, Coastal Communities Fund and the recently announced Towns Fund.

1981 Enterprise Zones

1991 City Challenge

1999 Coalfield Regeneration Trust

1997 Single Regeneration Budget

1998 Regional Development Agencies

2001 Neighbourhood Management Pathfinder Programme

2001 New Deal for Communities

2006 Local Enterprise Growth Initiative

2011 Local Enterprise Partnerships

2012 Coastal Communities Fund

2014 Local Growth Fund

2012 Enterprise zones

2011 City Deals

2011 Mayoral Devolution Deals

2019 Towns Fund

2019 Future High streets fund

2021 Levelling Up Fund

Other non-spatial policies have inadvertently helped cities. The expansion of higher education has seen the growth of universities that are largely city based. And immigration policy has also benefited London in particular.

The second reason is that as the overall economy moved from manufacturing towards knowledge-based services, the inherent benefits that large cities offer have meant that they have been well positioned to take advantage of this change. Skills-biased technological change and a shift to an ever more services-based economy has changed the nature of firms in the national economy. These businesses have different locational preferences to those of the past, looking for the benefits that density provides. And these benefits have seemingly become increasingly desirable despite advances in communications technologies.

While large cities underperform, an underperformance that Centre for Cities conservatively estimates as costing the UK economy at least £48 billion per year,[[24]](#footnote-26) this analysis shows that the Government’s aspiration to have an internationally competitive city in each region is achievable. The analysis shows that these cities are offering to some extent the benefits that big cities should offer to businesses, and this has increased over time. But these benefits are clearly not as strong as their European counterparts, and policy should focus on changing this.

**‘Building on your strengths’ is unlikely to turn around struggling economies**

When looking at the cities are large towns that have struggled, the data suggests we should be caution about economic strategies that encourage places to 'build on their strengths'. Most of these places, in one way or another, kept taking advantage of their inherent benefits, resulting either in the replication of existing activities or attracting new low knowledge sectors.

In contrast to the improving complexity of many large cities, there is a group of cities where the opposite is the case, and have become less complex. Cities in the top left of Figure 8, such Aberdeen, Blackpool or Swansea – had above average levels of complexity in 1981 but below average levels in 2019.

A common characteristic between these cities is that they replicated their economies, continuing to specialise in the same activities while the global economy shifted towards knowledge-based services. This is in contrast to those cities that remained complex throughout the period, such as Reading and Edinburgh, which reinvented themselves. These cities changed their main specialisation patterns from electronics to IT-related occupations, allowing them to maintain their comparatively high productivity levels (see Figure12).

**Figure 12:** Those places that continued to specialise in the same industries became less complex

Reinventors vs. Replicators - most prevalent occupation by share of exporting jobs in 1981 and 2019

|  |  |  |  |
| --- | --- | --- | --- |
| **PUA** | **1981** | **2019** | **Complexity (1981-2019)** |
| Edinburgh | Radio/electronic capital goods (8.2%) | Computer programming, consultancy and related activities (19.0%) | Remained high |
| London | Banking/bill-discounting (8.4%) | Computer programming, consultancy and related activities (16.8%) | Remained high |
| Reading | Electronic data processing equipment (4.8%) | Computer programming, consultancy and related activities (37.4%) | Remained high |
| Aberdeen | Extraction: mineral oil/natural gas (24.5%) | Extraction: mineral oil/natural gas (28.3%) | Deteriorated |
| Blackpool | Aerospace manufacture/repairing (20.6%) | Aerospace manufacture/repairing (26.7%) | Deteriorated |
| Swansea | Iron and Steel industry (12.1%) | Manufacture of basic iron and steel and of ferro-alloys (13.6%) | Deteriorated |

Source: ONS; Census, 1981.

**Many weak economies simply moved from one low complexity activity to another**

Unlike the cities stated above, urban economies ‘trapped’ in low complexity activities in the last four decades — mostly located in the North and Midlands — had their comparative advantages changing in the last decades. But these economies moved from one low complexity activity to another as their inherent benefits, such as large pools of unskilled labour and cheap land, are likely to absorb low productivity jobs (e.g. warehousing, distribution or food manufacturing). As illustrated in Box 7, the observed changes in the last four decades did not promote knowledge accumulation, which would allow these cities to improve their productivity in the long-term.

Box 7: How coal economies evolved in the last decades

From the 22 cities and large towns that are ‘trapped’ in low knowledge activities, six of them were specialised on coal in 1981. Nowadays, these urban areas had moved mostly moved away from coal and specialised in different sectors, which typically continue to require low-cost labour or land. However, the new competitive advantages had no economic relationship with coal mining, meaning that these cities are not benefiting from accumulated knowledge from their previous economic structure.

**Figure 13:** Most prevalent exporting occupation as share of exporting jobs, 1981-2019

  
Source: ONS; Census, 1981.

This highlight how low complexity activities are unlikely to drive places towards economic sophistication through the gradual development of its existing sector (e.g. moving from mining to mining tool manufacturing, etc.). Instead, cities tend to attract other low knowledge activities, based on their existing strengths, hindering its future prospects.

**Sunderland’s previous strengths did not attract Nissan**

In 1984, the British government and Nissan reached an agreement to open a car plant in Sunderland and Nissan has been able to benefit from further government support in recent years.[[25]](#footnote-27) Before the car plant, Sunderland’s economy was dominated by coal mining, shipbuilding and other manufacturing activities. That said, there is little evidence that Sunderland’s economic structure was the reason why Nissan located there.

If Nissan has moved to Sunderland mainly result of its industrial and labour capabilities, we should expect to see a strong relationship between the sectors state above and car manufacturing in other British cities. It is shown in Figure 14 that there is no relation between Sunderland’s previous advantages and the likelihood of producing car-related goods.

**Figure 14:** Cities with car manufacturing plants were not similar to Sunderland in the early 80’s.

**Source:** ONS; Census, 1981. **Methodology:** Top five car manufacturing cities in 2019 include Oxford, Coventry, Luton, Liverpool and Birmingham. The most similar cities to Sunderland in 1981 are Barnsley, Plymouth, Doncaster, Mansfield and Portsmouth, based on their percentage of 1981 jobs in the following sectors: deep coal mining; Shipbuilding and repairing; Other glass products; Mechanical lifting/handling equipment; and active components/sub-assemblies.

Urban economies with some degree of specialisation in car manufacturing today (e.g. Luton, Birmingham or Oxford) did not share Sunderland’s economic features in 1981. At the same time, places focused in mining and shipbuilding like Portsmouth or Doncaster did not move their economic structure towards car manufacturing. Sunderland was able to attract Nissan due to other benefits that were not directly related to its industrial base such as public subsidies; and availability of cheap land and labour.

**A city being dominated by a single low knowledge sector has legacy effects**

Several cities that struggle today, regardless their past complexity levels, were dominated by a single sector in 1981. Cities with low complexity today, tended to be more specialised in a single activity in 1981, having, on average, 18.8 cent of their exporting jobs in a single occupation, compared with 11.1 per cent in other cities.

This feature seems to have negative long-term impacts to some cities, even if they changed their economic structure in recent decades, Figure 15 illustrated some of these cases.[[26]](#footnote-28) Cities with the same type of specialisation in 1981, but different degrees of concentration, followed different trajectories in the decades ahead. Cities like Mansfield and Luton, which were dominated by coal mining and car manufacturing in 1981 respectively, struggled to develop more complex activities compared to Nottingham and Liverpool, two of their more diversified peers. This is likely to be because overreliance on a small number of activities has limited the ability of the former two places to accumulate knowledge and innovate.[[27]](#footnote-29)

**Figure 15:** Divergence between cities with the same specialisation in 1981 but different degrees of specialisation

|  |  |  |  |
| --- | --- | --- | --- |
| **PUA** | **Within the top 3 most prevalent exporters (1981)** | **Sectorial concentration: % exporting jobs** | **Complexity (1981-2019)** |
| Plymouth | Shipbuilding/repairing | 36.8 | Deteriorated |
| Portsmouth | 15.8 | Thriving |
| Newcastle | 10.1 | Remained Low |
| Glasgow | 5.2 | Improved |
| Luton | Vehicle-related manufacturing | 29.6 | Deteriorated |
| Oxford | 25.0 | Thriving |
| Telford | 16.7 | Deteriorated |
| Liverpool | 10.8 | Improved |
| Birmingham | 7.7 | Remained Low |
| Mansfield | Deep coal mines | 26.6 | Remained Low |
| Nottingham | 6.8 | Improved |
| Leeds | 4.3 | Improved |
| Derby | Aerospace manufacture/repairing | 27.5 | Trapped |
| Blackpool | 20.6 | Deteriorated |
| Bristol | 13.2 | Thriving |
| Bournemouth | 6.3 | Thriving |
| Manchester | 3.4 | Improved |

Source: ONS; Census, 1981. Centre for Cities’ calculations.



In terms of ‘level-up’, economies ‘trapped’ in low knowledge occupations should not aim to ‘build on their strengths’. The last four decades showed that such strategy did not bring significant benefits to these economies. Under the current economic structure, these cities are unlikely to benefit from knowledge spillovers.[[28]](#footnote-33)

In order to improve productivity in the long-term, these cities need to diversify its economy away from low-skilled occupations, such as low-skilled manufacturing and distribution. It will require investments in skills and improving conditions for businesses (e.g. commercial office space). Based on the cities that were able to improve its complexity since 1981, it should be noted that this is likely to be a decades-long process.

1. **What needs to change?**

In order to level up the whole country, this paper – which is supported by previous Centre for Cities level up briefing – highlights that policies should not be applied equally across all geographies as they have different features and ‘productivity potential’.[[29]](#footnote-34)

1. **Recognise the central role of cities in levelling up the economy**

Cities tend to be more complex than non-urban areas as the result of an overall shift towards a knowledge-based economy. However, many of the policies associated with levelling up to date have centred on pots of cash for lucky winners in a government bidding competition, without any focus on urban economies. Tackling the Britain’s productivity problem, and therefore level up, will be impossible without putting cities at the centre of the agenda.

1. **The biggest cities require focussed policy support to achieve their full potential**

Most of Britain’s largest cities have gradually improved its economic structure (complexity) in the last decades but are still lagging both in national and international terms. The current ‘productivity gap’ shows that these cities are still in an ongoing process of development that should be supported. Both central and local governments must guarantee large economies keep developing and strengthening competitive advantages in knowledge-based services. This paper highlights that large cities are in a better position to become internationally competitive, an ambition from government’s Plan for Growth.

**Economies stuck in low complexity activities need to diversify their base**

The economic developments in Britain’s largest cities shows that the process of economic development can be long: most places with complexity gains in the last four decades are still lagging in terms of productivity. As result, central government should not expect cities and large towns ‘trapped’ in low-knowledge activities to improve their productivity rapidly.

Nevertheless, the observed developments in some cities shows that it is possible for a city to reinvent itself. As a first step, national and local leaders need to understand this does not happen by replicating existing strengths and competitive advantages. **Policies focused on attracting large manufacturing plants or freeports may bring some jobs in the short-term but they will do little to change the economic structure of a cities in the decade to come.**

Finally, to level up, policy should focus on six areas: skills, devolution, public services, local transport and city centres, as detailed in the previous Centre for Cities’ briefing on levelling up.[[30]](#footnote-35)

**Central and local governments should implement the following policies, with a special focus on the biggest cities, with the ‘largest productivity potential’:**

* **Improve local transport** 
  + **Franchise the buses in the Mayoral Combined Authorities.** Greater Manchester will franchise its services from 2023. Other areas should ensure that they benefit from this too.
  + Invest in new transport infrastructure where the current system is under pressure
* **Research and development**
  + Government should focus its increased R&D spend in the places where it is most likely to have an impact – those places that have a degree of innovation happening in them already that further public support may boost.[[31]](#footnote-36)

**Central and local governments should implement the following policies everywhere, which are a necessary condition for cities to break out its ‘low knowledge trap’**

* **Skills**
  + Continue its devolution journey by devolving more power to local government;
  + Increase funding for further education and set multi-year budgets for further education colleges;
  + Introduce a human capital tax credit to match the well-established R&D tax credit system
* **Improve business conditions in city centres**
  + The Government should create at £5 billion City Centre Productivity Fund to improve the economies of city centres, funded from the existing National Productivity Infrastructure Fund. The types of interventions are likely to include: demolition or conversion of dated commercial space, the creation of new office space, public realm and public transport.
* **Devolve further powers**
  + Reorganising local government to build institutional capacity and remove overlap and duplication.
  + Give the to the Combined Authorities the same powers London has for the last 20 years.
  + Reforming local government funding by giving more autonomy to local authorities.

1. **Appendices**

**Appendix 1:** Economic complexity indicators (ECI) by local authority; Britain’s cities; French and German cities.

**Figure 16:** ECI at local authority level 1981

|  |  |
| --- | --- |
| **Local Authority** | **ECI** |
| City of London | 3.2 |
| Camden | 2.7 |
| Kensington and Chelsea | 2.5 |
| Westminster, City of | 2.4 |
| Croydon | 2.2 |
| Islington | 2.1 |
| Epsom and Ewell | 2.1 |
| Dacorum | 2.1 |
| Barnet | 2.0 |
| Kingston upon Thames | 2.0 |
| Brighton | 2.0 |
| Bournemouth | 2.0 |
| Reading | 2.0 |
| Ealing | 1.9 |
| Redbridge | 1.9 |
| Rushmoor | 1.9 |
| Edinburgh City | 1.9 |
| Richmond upon Thames | 1.8 |
| Bromley | 1.8 |
| Southend on Sea | 1.8 |
| Brent | 1.8 |
| Hertsmere | 1.7 |
| Harrow | 1.7 |
| Oxford | 1.7 |
| Tunbridge Wells | 1.7 |
| Merton | 1.7 |
| Lambeth | 1.7 |
| Hove | 1.7 |
| Lewisham | 1.6 |
| Sutton | 1.6 |
| Watford | 1.6 |
| Slough | 1.5 |
| Cambridge | 1.5 |
| Runnymede | 1.5 |
| Woking | 1.5 |
| Newcastle upon Tyne | 1.5 |
| Chester | 1.5 |
| Hammersmith and Fulham | 1.5 |
| Birmingham | 1.5 |
| Stevenage | 1.5 |
| Crawley | 1.5 |
| Luton | 1.5 |
| Eastbourne | 1.5 |
| South Buckinghamshire | 1.5 |
| Harlow | 1.5 |
| Bracknell Forest | 1.4 |
| Reigate and Banstead | 1.4 |
| Haringey | 1.4 |
| Elmbridge | 1.4 |
| Manchester | 1.4 |
| Worthing | 1.4 |
| Enfield | 1.4 |
| Southwark | 1.4 |
| Mid Sussex | 1.4 |
| Wycombe | 1.4 |
| Liverpool | 1.4 |
| Tandridge | 1.4 |
| Hackney | 1.3 |
| Wandsworth | 1.3 |
| Portsmouth | 1.3 |
| Windsor and Maidenhead | 1.3 |
| Brentwood | 1.3 |
| North Hertfordshire | 1.3 |
| Bristol | 1.2 |
| Southampton | 1.2 |
| Hillingdon | 1.2 |
| Welwyn Hatfield | 1.2 |
| Basildon | 1.2 |
| Torbay | 1.1 |
| Guildford | 1.1 |
| Bath | 1.1 |
| Mole Valley | 1.1 |
| Blackpool | 1.1 |
| Havant | 1.1 |
| Norwich | 1.1 |
| Hastings | 1.1 |
| St Albans | 1.1 |
| Surrey Heath | 1.1 |
| Waverley | 1.1 |
| Hounslow | 1.1 |
| Waltham Forest | 1.0 |
| Hart | 1.0 |
| Thamesdown | 1.0 |
| Gillingham | 1.0 |
| Basingstoke and Deane | 1.0 |
| Cheltenham | 1.0 |
| Canterbury | 1.0 |
| Broxbourne | 1.0 |
| Middlesbrough | 1.0 |
| Greenwich | 1.0 |
| Glasgow City | 0.9 |
| Chiltern | 0.9 |
| Fylde | 0.9 |
| Swansea | 0.9 |
| Spelthorne | 0.9 |
| Lewes | 0.8 |
| East Hampshire | 0.8 |
| Epping Forest | 0.8 |
| Weymouth and Portland | 0.8 |
| Three Rivers | 0.8 |
| Solihull | 0.8 |
| Bromsgrove | 0.8 |
| Sevenoaks | 0.8 |
| Leeds | 0.8 |
| Bexley | 0.7 |
| Milton Keynes | 0.7 |
| Cardiff | 0.7 |
| Redditch | 0.7 |
| Bearsden and Milngavie | 0.7 |
| Preston | 0.7 |
| Eastleigh | 0.7 |
| Gosport | 0.7 |
| East Hertfordshire | 0.7 |
| Havering | 0.7 |
| Christchurch | 0.7 |
| Horsham | 0.7 |
| Medina | 0.6 |
| Maidstone | 0.6 |
| Aylesbury Vale | 0.6 |
| Warwick | 0.6 |
| Stafford | 0.6 |
| Thanet | 0.6 |
| Leicester | 0.6 |
| Mid Bedfordshire | 0.6 |
| Sefton | 0.5 |
| Colchester | 0.5 |
| Oldham | 0.5 |
| Exeter | 0.5 |
| Fareham | 0.5 |
| Wolverhampton | 0.5 |
| Northampton | 0.5 |
| Sandwell | 0.5 |
| York | 0.5 |
| Rhuddlan | 0.5 |
| Tower Hamlets | 0.5 |
| Castle Point | 0.5 |
| Wokingham | 0.5 |
| Cumbernauld and Kilsyth | 0.5 |
| Barking and Dagenham | 0.5 |
| Poole | 0.5 |
| Bedford | 0.5 |
| Tewkesbury | 0.5 |
| Uttlesford | 0.5 |
| Gravesham | 0.4 |
| Walsall | 0.4 |
| Knowsley | 0.4 |
| Kingswood | 0.4 |
| Clydebank | 0.4 |
| Newham | 0.4 |
| Ipswich | 0.4 |
| Plymouth | 0.4 |
| Tamworth | 0.4 |
| Dudley | 0.4 |
| Daventry | 0.4 |
| Peterborough | 0.4 |
| Dartford | 0.4 |
| Newbury | 0.4 |
| Worcester | 0.4 |
| Kettering | 0.4 |
| East Kilbride | 0.4 |
| Salford | 0.3 |
| Aberconwy | 0.3 |
| Colwyn | 0.3 |
| Sedgefield | 0.3 |
| Gloucester | 0.3 |
| North Tyneside | 0.3 |
| Arun | 0.3 |
| South Oxfordshire | 0.3 |
| South Bedfordshire | 0.3 |
| Rochford | 0.3 |
| Trafford | 0.3 |
| Coventry | 0.3 |
| Wellingborough | 0.3 |
| Winchester | 0.3 |
| Oadby and Wigston | 0.3 |
| East Dorset | 0.2 |
| St Helens | 0.2 |
| East Wood | 0.2 |
| Harrogate | 0.2 |
| Blyth Valley | 0.2 |
| Blackburn | 0.2 |
| Salisbury | 0.2 |
| Stockport | 0.2 |
| Chelmsford | 0.2 |
| Rhondda | 0.2 |
| Carrick | 0.2 |
| St Edmundsbury | 0.2 |
| Hamilton | 0.2 |
| Rochester upon Medway | 0.1 |
| Wirral | 0.1 |
| Gateshead | 0.1 |
| Dumbarton | 0.1 |
| Wychavon | 0.1 |
| Newport | 0.1 |
| Rugby | 0.1 |
| Lincoln | 0.1 |
| Cotswold | 0.1 |
| Ashford | 0.1 |
| Adur | 0.1 |
| Shrewsbury and Atcham | 0.1 |
| Cherwell | 0.1 |
| Bury | 0.1 |
| Lichfield | 0.1 |
| Corby | 0.1 |
| Sheffield | 0.0 |
| Taff - Ely | 0.0 |
| Stirling | 0.0 |
| Stroud | 0.0 |
| South Cambridgeshire | 0.0 |
| Macclesfield | 0.0 |
| Nottingham | 0.0 |
| The Wrekin | 0.0 |
| Sunderland | 0.0 |
| Test Valley | 0.0 |
| Ogwr | 0.0 |
| Kennet | 0.0 |
| Stratford on Avon | 0.0 |
| Huntingdonshire | 0.0 |
| Llanelli | -0.1 |
| Chesterfield | -0.1 |
| Arfon | -0.1 |
| Suffolk Coastal | -0.1 |
| Tonbridge and Malling | -0.1 |
| Braintree | -0.1 |
| Islwyn | -0.1 |
| Nuneaton and Bedworth | -0.1 |
| Rother | -0.1 |
| Blaby | -0.1 |
| Calderdale | -0.1 |
| West Somerset | -0.1 |
| Hereford | -0.1 |
| West Lothian | -0.1 |
| Shepway | -0.1 |
| Caradon | -0.1 |
| North Cornwall | -0.1 |
| Carlisle | -0.1 |
| Vale of White Horse | -0.1 |
| Broxtowe | -0.2 |
| Scarborough | -0.2 |
| Kingston upon Hull | -0.2 |
| South Wight | -0.2 |
| Forest Heath | -0.2 |
| Tameside | -0.2 |
| Wealden | -0.2 |
| Strathkelvin | -0.2 |
| Woodspring | -0.2 |
| Rotherham | -0.2 |
| South Staffordshire | -0.2 |
| Bradford | -0.2 |
| Inverclyde | -0.2 |
| Rhymney Valley | -0.2 |
| Newcastle under Lyme | -0.2 |
| Vale Royal | -0.2 |
| Purbeck | -0.2 |
| Vale of Glamorgan | -0.2 |
| Burnley | -0.2 |
| Nairn | -0.2 |
| New Forest | -0.2 |
| Wyre Forest | -0.2 |
| Dover | -0.3 |
| West Lancashire | -0.3 |
| Rochdale | -0.3 |
| Meirionnydd | -0.3 |
| Charnwood | -0.3 |
| North Dorset | -0.3 |
| Taunton Deane | -0.3 |
| Inverness | -0.3 |
| East Devon | -0.3 |
| South Tyneside | -0.3 |
| Pendle | -0.3 |
| Wigan | -0.3 |
| Derby | -0.3 |
| Lliw Valley | -0.3 |
| Dundee City | -0.3 |
| Motherwell | -0.3 |
| Harborough | -0.3 |
| West Dorset | -0.3 |
| Rushcliffe | -0.3 |
| Halton | -0.3 |
| Aberdeen City | -0.3 |
| Montgomeryshire | -0.4 |
| Wansdyke | -0.4 |
| Preseli Pembrokeshire | -0.4 |
| Hinckley and Bosworth | -0.4 |
| Cannock Chase | -0.4 |
| Mendip | -0.4 |
| Torridge | -0.4 |
| North East Derbyshire | -0.4 |
| Darlington | -0.4 |
| West Oxfordshire | -0.4 |
| Northavon | -0.4 |
| Torfaen | -0.4 |
| Neath | -0.4 |
| Dwyfor | -0.4 |
| Port Talbot | -0.4 |
| Penwith | -0.4 |
| Chichester | -0.4 |
| Teignbridge | -0.4 |
| Swale | -0.4 |
| Stockton on Tees | -0.4 |
| Broadland | -0.4 |
| Babergh | -0.5 |
| Breckland | -0.5 |
| East Cambridgeshire | -0.5 |
| Sedgemoor | -0.5 |
| Hyndburn | -0.5 |
| Midlothian | -0.5 |
| South Pembrokeshire | -0.5 |
| South Ribble | -0.5 |
| High Peak | -0.5 |
| Ellesmere Port and Neston | -0.5 |
| Badenoch and Strathspey | -0.5 |
| Bolton | -0.5 |
| North Devon | -0.5 |
| Tendring | -0.5 |
| Carmarthen | -0.5 |
| North Wiltshire | -0.5 |
| South Herefordshire | -0.5 |
| South Northamptonshire | -0.5 |
| Great Yarmouth | -0.5 |
| Rossendale | -0.5 |
| Derwentside | -0.5 |
| Cynon Valley | -0.5 |
| Caithness | -0.5 |
| South Somerset | -0.6 |
| Stoke on Trent | -0.6 |
| Warrington | -0.6 |
| Orkney Islands | -0.6 |
| South Norfolk | -0.6 |
| Oswestry | -0.6 |
| Hartlepool | -0.6 |
| Blaenau Gwent | -0.6 |
| East Staffordshire | -0.6 |
| Forest of Dean | -0.6 |
| Merthyr Tydfil | -0.6 |
| Lancaster | -0.6 |
| North Warwickshire | -0.6 |
| Thurrock | -0.6 |
| Congleton | -0.6 |
| Malvern Hills | -0.6 |
| Kirklees | -0.7 |
| Waveney | -0.7 |
| King's Lynn and West Norfolk | -0.7 |
| Monklands | -0.7 |
| Wansbeck | -0.7 |
| Erewash | -0.7 |
| Mansfield | -0.7 |
| Great Grimsby | -0.7 |
| East Northamptonshire | -0.7 |
| East Yorkshire Borough of Beverley | -0.7 |
| Ceredigion | -0.7 |
| Alyn and Deeside | -0.7 |
| Durham | -0.7 |
| North Shropshire | -0.7 |
| Restormel | -0.7 |
| Chorley | -0.7 |
| Maldon | -0.7 |
| South Shropshire | -0.8 |
| Allerdale | -0.8 |
| North Norfolk | -0.8 |
| West Wiltshire | -0.8 |
| Cunninghame | -0.8 |
| Ashfield | -0.8 |
| Ettrick and Lauderdale | -0.8 |
| Monmouth | -0.8 |
| South Kesteven | -0.9 |
| Argyll and Bute | -0.9 |
| Kirkcaldy | -0.9 |
| Bridgnorth | -0.9 |
| Gedling | -0.9 |
| Holderness | -0.9 |
| Renfrew | -0.9 |
| Scunthorpe | -0.9 |
| Hambleton | -0.9 |
| North Kesteven | -0.9 |
| South Hams | -0.9 |
| Doncaster | -1.0 |
| Wrexham Maelor | -1.0 |
| Falkirk | -1.0 |
| East Lothian | -1.0 |
| Barnsley | -1.0 |
| Glyndwr | -1.0 |
| Chester le Street | -1.0 |
| South Derbyshire | -1.0 |
| Boothferry | -1.0 |
| East Yorkshire | -1.0 |
| Cleethorpes | -1.0 |
| Wakefield | -1.0 |
| Skye and Lochalsh | -1.1 |
| South Lakeland | -1.1 |
| Kyle and Carrick | -1.1 |
| Wear Valley | -1.1 |
| Dunfermline | -1.1 |
| Tynedale | -1.1 |
| Rutland | -1.1 |
| Barrow in Furness | -1.1 |
| Easington | -1.1 |
| Boston | -1.1 |
| Isles of Scilly | -1.1 |
| West Devon | -1.2 |
| Wyre | -1.2 |
| Castle Morpeth | -1.2 |
| Amber Valley | -1.2 |
| Bolsover | -1.2 |
| Mid Devon | -1.2 |
| Clydesdale | -1.2 |
| Kerrier | -1.3 |
| Bassetlaw | -1.3 |
| Crewe and Nantwich | -1.3 |
| Langbaurgh on Tees | -1.3 |
| Dinefwr | -1.3 |
| Craven | -1.3 |
| Nithsdale | -1.3 |
| Berwick upon Tweed | -1.3 |
| Ynys Mon - Isle of Anglesey | -1.3 |
| Lochaber | -1.3 |
| Derbyshire Dales | -1.3 |
| West Lindsey | -1.4 |
| East Lindsey | -1.4 |
| Sutherland | -1.4 |
| Radnorshire | -1.4 |
| Shetland Islands | -1.4 |
| Mid Suffolk | -1.4 |
| Angus | -1.4 |
| Copeland | -1.4 |
| Annandale and Eskdale | -1.4 |
| North East Fife | -1.4 |
| Perth and Kinross | -1.4 |
| Ryedale | -1.4 |
| Eden | -1.4 |
| Clackmannan | -1.5 |
| Glanford | -1.5 |
| Brecknock | -1.5 |
| Roxburgh | -1.5 |
| Melton | -1.5 |
| Leominster | -1.5 |
| Fenland | -1.5 |
| Kilmarnock and Loudoun | -1.6 |
| Ribble Valley | -1.6 |
| Delyn | -1.6 |
| North West Leicestershire | -1.6 |
| Stewartry | -1.6 |
| Staffordshire Moorlands | -1.7 |
| Newark and Sherwood | -1.7 |
| Teesdale | -1.7 |
| Kincardine and Deeside | -1.7 |
| Moray | -1.7 |
| South Holland | -1.7 |
| Western Islands | -1.8 |
| Wigtown | -1.8 |
| Selby | -1.8 |
| Ross and Cromarty | -1.8 |
| Richmondshire | -1.8 |
| Gordon | -1.8 |
| Cumnock and Doon Valley | -1.9 |
| Banff and Buchan | -2.2 |
| Tweedale | -2.2 |
| Alnwick | -2.3 |
| Berwickshire | -2.4 |

**Figure 17:** ECI at local authority level 2019

|  |  |
| --- | --- |
| **Local Authority** | **ECI** |
| City of London | 4.5 |
| Tower Hamlets | 4.1 |
| Islington | 3.5 |
| Southwark | 3.4 |
| Westminster | 3.3 |
| Camden | 3.3 |
| Kensington and Chelsea | 2.9 |
| Hammersmith and Fulham | 2.9 |
| Manchester | 2.7 |
| Hackney | 2.7 |
| Cambridge | 2.6 |
| Lambeth | 2.5 |
| Richmond upon Thames | 2.5 |
| City of Edinburgh | 2.3 |
| Brighton and Hove | 2.2 |
| Hounslow | 2.2 |
| Reading | 2.1 |
| Wandsworth | 2.1 |
| Bristol, City of | 2.0 |
| Nottingham | 2.0 |
| Newcastle upon Tyne | 1.9 |
| Glasgow City | 1.9 |
| Oxford | 1.8 |
| St Albans | 1.7 |
| Liverpool | 1.7 |
| Kingston upon Thames | 1.6 |
| Barnet | 1.6 |
| Windsor and Maidenhead | 1.5 |
| Cardiff | 1.5 |
| Three Rivers | 1.5 |
| Hertsmere | 1.5 |
| Lewisham | 1.5 |
| Watford | 1.4 |
| Runnymede | 1.4 |
| Harrow | 1.4 |
| Cheltenham | 1.4 |
| Merton | 1.4 |
| Bracknell Forest | 1.4 |
| Leeds | 1.3 |
| Croydon | 1.3 |
| Haringey | 1.2 |
| Ealing | 1.2 |
| Hillingdon | 1.2 |
| Bath and North East Somerset | 1.2 |
| Redbridge | 1.2 |
| Hart | 1.1 |
| Salford | 1.1 |
| Reigate and Banstead | 1.1 |
| Wokingham | 1.1 |
| Newham | 1.1 |
| Elmbridge | 1.1 |
| Brent | 1.1 |
| Norwich | 1.1 |
| Exeter | 1.0 |
| Solihull | 1.0 |
| Woking | 1.0 |
| Slough | 1.0 |
| Bromley | 1.0 |
| Rushmoor | 1.0 |
| Trafford | 1.0 |
| Stevenage | 1.0 |
| Guildford | 0.9 |
| Crawley | 0.9 |
| Surrey Heath | 0.9 |
| Dacorum | 0.9 |
| Mole Valley | 0.9 |
| York | 0.9 |
| Waltham Forest | 0.8 |
| Spelthorne | 0.8 |
| Milton Keynes | 0.8 |
| Epsom and Ewell | 0.8 |
| Lincoln | 0.7 |
| Winchester | 0.7 |
| East Hertfordshire | 0.7 |
| Warwick | 0.7 |
| Greenwich | 0.7 |
| Welwyn Hatfield | 0.7 |
| Brentwood | 0.7 |
| Mid Sussex | 0.7 |
| Southampton | 0.7 |
| Tunbridge Wells | 0.7 |
| Birmingham | 0.7 |
| Chelmsford | 0.6 |
| Swindon | 0.6 |
| Waverley | 0.6 |
| Bournemouth, Christchurch and Poole | 0.6 |
| Sevenoaks | 0.6 |
| Dundee City | 0.6 |
| Portsmouth | 0.6 |
| Sutton | 0.6 |
| Epping Forest | 0.5 |
| Stockport | 0.5 |
| South Gloucestershire | 0.5 |
| South Oxfordshire | 0.5 |
| Basingstoke and Deane | 0.5 |
| Colchester | 0.5 |
| Luton | 0.5 |
| Vale of White Horse | 0.5 |
| Buckinghamshire | 0.5 |
| Southend-on-Sea | 0.5 |
| West Berkshire | 0.4 |
| Peterborough | 0.4 |
| South Cambridgeshire | 0.3 |
| Eastleigh | 0.3 |
| Uttlesford | 0.3 |
| Cheshire East | 0.3 |
| Plymouth | 0.3 |
| Rushcliffe | 0.2 |
| Northampton | 0.2 |
| North Hertfordshire | 0.2 |
| Sheffield | 0.2 |
| Tonbridge and Malling | 0.2 |
| Cherwell | 0.2 |
| Eastbourne | 0.2 |
| Harborough | 0.2 |
| Havering | 0.1 |
| Enfield | 0.1 |
| Stratford-on-Avon | 0.1 |
| Fylde | 0.1 |
| Lewes | 0.1 |
| Isles of Scilly | 0.1 |
| Warrington | 0.1 |
| Aberdeen City | 0.1 |
| Horsham | 0.1 |
| East Renfrewshire | 0.1 |
| Bromsgrove | 0.1 |
| Inverclyde | 0.1 |
| Worthing | 0.1 |
| Worcester | 0.1 |
| North Tyneside | 0.1 |
| Preston | 0.1 |
| Chichester | 0.1 |
| Cotswold | 0.1 |
| East Hampshire | 0.1 |
| Coventry | 0.0 |
| Broxbourne | 0.0 |
| Tandridge | 0.0 |
| Ipswich | 0.0 |
| Medway | 0.0 |
| Adur | 0.0 |
| Torbay | 0.0 |
| Basildon | 0.0 |
| Swansea | 0.0 |
| East Cambridgeshire | 0.0 |
| Leicester | 0.0 |
| Renfrewshire | 0.0 |
| Folkestone and Hythe | 0.0 |
| Derby | 0.0 |
| Vale of Glamorgan | -0.1 |
| West Dunbartonshire | -0.1 |
| North Somerset | -0.1 |
| Gravesham | -0.1 |
| Maidstone | -0.1 |
| Cheshire West and Chester | -0.1 |
| Harrogate | -0.1 |
| Fareham | -0.1 |
| Bexley | -0.1 |
| Rochford | -0.1 |
| Havant | -0.1 |
| Middlesbrough | -0.1 |
| Blaby | -0.1 |
| Dartford | -0.1 |
| Orkney Islands | -0.1 |
| West Oxfordshire | -0.1 |
| Thanet | -0.1 |
| Sefton | -0.2 |
| North West Leicestershire | -0.2 |
| Daventry | -0.2 |
| Darlington | -0.2 |
| Ashford | -0.2 |
| Hastings | -0.2 |
| Barking and Dagenham | -0.2 |
| Canterbury | -0.2 |
| Bolton | -0.2 |
| Chorley | -0.2 |
| Blackpool | -0.2 |
| Gateshead | -0.2 |
| Midlothian | -0.2 |
| Bury | -0.2 |
| Broxtowe | -0.2 |
| Rugby | -0.3 |
| Blackburn with Darwen | -0.3 |
| Harlow | -0.3 |
| Wirral | -0.3 |
| Central Bedfordshire | -0.3 |
| Newport | -0.3 |
| Castle Point | -0.3 |
| Stirling | -0.3 |
| Conwy | -0.3 |
| Gloucester | -0.3 |
| Malvern Hills | -0.3 |
| Barrow-in-Furness | -0.3 |
| Wiltshire | -0.3 |
| Redditch | -0.3 |
| Kettering | -0.3 |
| East Devon | -0.4 |
| Isle of Wight | -0.4 |
| Somerset West and Taunton | -0.4 |
| East Dunbartonshire | -0.4 |
| East Lothian | -0.4 |
| Bedford | -0.4 |
| Gosport | -0.4 |
| Na h-Eileanan Siar | -0.4 |
| Oadby and Wigston | -0.4 |
| Burnley | -0.4 |
| Lancaster | -0.4 |
| Wealden | -0.4 |
| Stroud | -0.4 |
| Rutland | -0.4 |
| Thurrock | -0.4 |
| Ceredigion | -0.4 |
| Gedling | -0.4 |
| Halton | -0.5 |
| Merthyr Tydfil | -0.5 |
| Shetland Islands | -0.5 |
| East Northamptonshire | -0.5 |
| Arun | -0.5 |
| South Tyneside | -0.5 |
| Maldon | -0.5 |
| Kingston upon Hull, City of | -0.5 |
| East Suffolk | -0.5 |
| Rother | -0.5 |
| Chesterfield | -0.5 |
| Scottish Borders | -0.5 |
| Gwynedd | -0.5 |
| North Lanarkshire | -0.5 |
| Charnwood | -0.5 |
| Ribble Valley | -0.5 |
| Dover | -0.6 |
| Craven | -0.6 |
| Torridge | -0.6 |
| New Forest | -0.6 |
| South Hams | -0.6 |
| Huntingdonshire | -0.6 |
| Bolsover | -0.6 |
| Test Valley | -0.6 |
| Perth and Kinross | -0.6 |
| Newark and Sherwood | -0.6 |
| Sunderland | -0.6 |
| Highland | -0.6 |
| Cornwall | -0.6 |
| South Northamptonshire | -0.6 |
| Mendip | -0.6 |
| Doncaster | -0.6 |
| Rhondda Cynon Taff | -0.6 |
| Copeland | -0.6 |
| Bradford | -0.6 |
| South Lanarkshire | -0.6 |
| Stockton-on-Tees | -0.6 |
| Nuneaton and Bedworth | -0.6 |
| South Norfolk | -0.6 |
| Hinckley and Bosworth | -0.6 |
| Stoke-on-Trent | -0.7 |
| Allerdale | -0.7 |
| Argyll and Bute | -0.7 |
| Tewkesbury | -0.7 |
| Lichfield | -0.7 |
| Wyre Forest | -0.7 |
| Wellingborough | -0.7 |
| Wolverhampton | -0.7 |
| Carlisle | -0.7 |
| South Holland | -0.7 |
| Rochdale | -0.7 |
| Dorset | -0.7 |
| Oldham | -0.7 |
| Knowsley | -0.7 |
| St. Helens | -0.7 |
| Tendring | -0.7 |
| Tameside | -0.7 |
| Teignbridge | -0.7 |
| West Lothian | -0.7 |
| Newcastle-under-Lyme | -0.7 |
| West Devon | -0.7 |
| Great Yarmouth | -0.7 |
| Wigan | -0.7 |
| Mansfield | -0.7 |
| Sandwell | -0.7 |
| Shropshire | -0.7 |
| Braintree | -0.8 |
| High Peak | -0.8 |
| Monmouthshire | -0.8 |
| Hyndburn | -0.8 |
| South Lakeland | -0.8 |
| Rotherham | -0.8 |
| Torfaen | -0.8 |
| North Norfolk | -0.8 |
| East Ayrshire | -0.8 |
| Tamworth | -0.8 |
| Melton | -0.8 |
| Eden | -0.8 |
| Broadland | -0.8 |
| West Suffolk | -0.8 |
| Moray | -0.8 |
| Scarborough | -0.8 |
| South Somerset | -0.8 |
| Wychavon | -0.8 |
| North Warwickshire | -0.8 |
| Richmondshire | -0.8 |
| Flintshire | -0.8 |
| Isle of Anglesey | -0.8 |
| Hartlepool | -0.8 |
| West Lancashire | -0.8 |
| Clackmannanshire | -0.8 |
| Denbighshire | -0.8 |
| Fife | -0.8 |
| North Devon | -0.8 |
| South Ribble | -0.8 |
| North East Lincolnshire | -0.8 |
| Wyre | -0.8 |
| Bridgend | -0.8 |
| Wrexham | -0.8 |
| Bassetlaw | -0.8 |
| Derbyshire Dales | -0.8 |
| Wakefield | -0.9 |
| South Staffordshire | -0.9 |
| Blaenau Gwent | -0.9 |
| Barnsley | -0.9 |
| Stafford | -0.9 |
| Corby | -0.9 |
| Ashfield | -0.9 |
| Walsall | -0.9 |
| Swale | -0.9 |
| East Riding of Yorkshire | -0.9 |
| Cannock Chase | -0.9 |
| Falkirk | -0.9 |
| Pembrokeshire | -0.9 |
| Caerphilly | -0.9 |
| Mid Suffolk | -0.9 |
| Telford and Wrekin | -0.9 |
| Calderdale | -0.9 |
| Redcar and Cleveland | -0.9 |
| King's Lynn and West Norfolk | -0.9 |
| East Lindsey | -0.9 |
| South Kesteven | -0.9 |
| Rossendale | -0.9 |
| North Ayrshire | -0.9 |
| Erewash | -0.9 |
| Breckland | -1.0 |
| South Derbyshire | -1.0 |
| Forest of Dean | -1.0 |
| Herefordshire, County of | -1.0 |
| Dudley | -1.0 |
| East Staffordshire | -1.0 |
| South Ayrshire | -1.0 |
| Amber Valley | -1.0 |
| North Kesteven | -1.0 |
| Carmarthenshire | -1.0 |
| North East Derbyshire | -1.0 |
| Hambleton | -1.0 |
| Selby | -1.1 |
| Pendle | -1.1 |
| Babergh | -1.1 |
| Sedgemoor | -1.1 |
| Kirklees | -1.1 |
| Staffordshire Moorlands | -1.1 |
| Northumberland | -1.1 |
| Ryedale | -1.1 |
| Powys | -1.1 |
| Aberdeenshire | -1.2 |
| Neath Port Talbot | -1.2 |
| County Durham | -1.2 |
| West Lindsey | -1.2 |
| Mid Devon | -1.2 |
| North Lincolnshire | -1.2 |
| Boston | -1.2 |
| Angus | -1.2 |
| Fenland | -1.2 |
| Dumfries and Galloway | -1.3 |

**Figure 18:** ECI at urban level (PUA) 1981

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| **PUA** | **ECI** |
| Cambridge | 1.9 |
| London | 1.7 |
| Aldershot | 1.6 |
| Worthing | 1.6 |
| Reading | 1.5 |
| Edinburgh | 1.4 |
| Oxford | 1.4 |
| Crawley | 1.1 |
| Slough | 1.0 |
| Southend | 0.9 |
| Bournemouth | 0.9 |
| Brighton | 0.8 |
| Norwich | 0.8 |
| Southampton | 0.8 |
| Exeter | 0.8 |
| Ipswich | 0.7 |
| Luton | 0.7 |
| Basildon | 0.7 |
| Plymouth | 0.7 |
| Peterborough | 0.6 |
| Bristol | 0.6 |
| Swindon | 0.6 |
| Swansea | 0.5 |
| Gloucester | 0.5 |
| Northampton | 0.4 |
| Portsmouth | 0.4 |
| Aberdeen | 0.4 |
| Cardiff | 0.4 |
| Blackpool | 0.4 |
| Milton Keynes | 0.3 |
| Leicester | 0.0 |
| Newport | -0.1 |
| York | -0.1 |
| Telford | -0.2 |
| Birkenhead | -0.2 |
| Leeds | -0.2 |
| Preston | -0.3 |
| Hull | -0.4 |
| Glasgow | -0.4 |
| Birmingham | -0.5 |
| Dundee | -0.6 |
| Middlesbrough | -0.6 |
| Sunderland | -0.6 |
| Blackburn | -0.7 |
| Newcastle | -0.7 |
| Derby | -0.7 |
| Bradford | -0.7 |
| Manchester | -0.8 |
| Warrington | -0.9 |
| Sheffield | -1.0 |
| Coventry | -1.0 |
| Liverpool | -1.0 |
| Nottingham | -1.1 |
| Stoke | -1.2 |
| Burnley | -1.3 |
| Huddersfield | -1.3 |
| Wigan | -1.7 |
| Doncaster | -1.7 |
| Mansfield | -1.8 |
| Barnsley | -1.9 |
| Wakefield | -2.1 |

**Figure 19:** ECI at urban level (PUA) 2019

|  |  |
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| **PUA** | **ECI** |
| Cambridge | 1.9 |
| London | 1.7 |
| Aldershot | 1.6 |
| Worthing | 1.6 |
| Reading | 1.5 |
| Edinburgh | 1.4 |
| Oxford | 1.4 |
| Crawley | 1.1 |
| Slough | 1.0 |
| Southend | 0.9 |
| Bournemouth | 0.9 |
| Brighton | 0.8 |
| Norwich | 0.8 |
| Southampton | 0.8 |
| Exeter | 0.8 |
| Ipswich | 0.7 |
| Luton | 0.7 |
| Basildon | 0.7 |
| Plymouth | 0.7 |
| Peterborough | 0.6 |
| Bristol | 0.6 |
| Swindon | 0.6 |
| Swansea | 0.5 |
| Gloucester | 0.5 |
| Northampton | 0.4 |
| Portsmouth | 0.4 |
| Aberdeen | 0.4 |
| Cardiff | 0.4 |
| Blackpool | 0.4 |
| Milton Keynes | 0.3 |
| Leicester | 0.0 |
| Newport | -0.1 |
| York | -0.1 |
| Telford | -0.2 |
| Birkenhead | -0.2 |
| Leeds | -0.2 |
| Preston | -0.3 |
| Hull | -0.4 |
| Glasgow | -0.4 |
| Birmingham | -0.5 |
| Dundee | -0.6 |
| Middlesbrough | -0.6 |
| Sunderland | -0.6 |
| Blackburn | -0.7 |
| Newcastle | -0.7 |
| Derby | -0.7 |
| Bradford | -0.7 |
| Manchester | -0.8 |
| Warrington | -0.9 |
| Sheffield | -1.0 |
| Coventry | -1.0 |
| Liverpool | -1.0 |
| Nottingham | -1.1 |
| Stoke | -1.2 |
| Burnley | -1.3 |
| Huddersfield | -1.3 |
| Wigan | -1.7 |
| Doncaster | -1.7 |
| Mansfield | -1.8 |
| Barnsley | -1.9 |
| Wakefield | -2.1 |

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**Appendix 2:** Product complexity indicators (PCI) by local authority and PUA.

**Figure 20:** PCI at local authority level 1981

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| --- | --- |
| **Activity** | **PCI** |
| 8310 : Activities auxiliary to banking/finance | 3.3 |
| 8320 : Activities auxiliary to insurance | 2.3 |
| 8395 : Business services (Other) | 2.2 |
| 3731 : Spectacles/unmounted lenses | 2.1 |
| 8140 : Banking/bill-discounting | 2.1 |
| 8380 : Advertising | 1.9 |
| 3452 : Gramophone records/pre-recorded tapes | 1.9 |
| 3442 : Electrical instruments/control systems | 1.9 |
| 9741 : Radio/television services,theatres,etc | 1.8 |
| 9711 : Film production,distribution/exhibition | 1.8 |
| 7902 : Telecommunications | 1.8 |
| 3443 : Radio/electronic capital goods | 1.7 |
| 9760 : Authors,composers/own account artists | 1.7 |
| 3710 : Measuring,checking/instruments/etc | 1.7 |
| 6190 : Other wholesale distribution | 1.7 |
| 3302 : Electronic data processing equipment | 1.6 |
| 6180 : Wholesale distribution:medical goods | 1.5 |
| 8370 : Professional/technical services (Other) | 1.5 |
| 6149 : Wholesale distribution:machinery etc | 1.5 |
| 3454 : Electronic consumer goods/etc (Other) | 1.5 |
| 4751 : Printing/publishing of newspapers | 1.4 |
| 8150 : Other financial institutions | 1.4 |
| 4920 : Musical instruments | 1.3 |
| 9400 : Research/development | 1.3 |
| 3276 : Printing,bookbinding,etc:machinery | 1.3 |
| 4672 : Shop/office fitting | 1.2 |
| 6150 : Wholesale distribution:household goods | 1.2 |
| 4941 : Toys/games | 1.1 |
| 2582 : Perfumes,cosmetics/toilet preparations | 1.1 |
| 3435 : Electrical equipment:industrial (Other) | 1.1 |
| 4930 : Photographic processing laboratories | 1.1 |
| 3444 : Components:electronic equipment | 1.1 |
| 4832 : Plastics semi-manufactures | 1.1 |
| 3453 : Active components/sub-assemblies | 1.0 |
| 2420 : Cement,lime/plaster | 1.0 |
| 3433 : Alarms/signalling equipment | 1.0 |
| 3720 : Medical/surgical/orthopaedic appliances | 1.0 |
| 7100 : Railways | 1.0 |
| 6130 : Wholesale distribution:timber etc | 1.0 |
| 4560 : Fur goods | 0.9 |
| 6110 : Wholesale distribution:raw materials | 0.9 |
| 2564 : Essential oils/flavouring materials | 0.9 |
| 4160 : Grain milling | 0.9 |
| 2513 : Fertilisers | 0.9 |
| 1620 : Public gas supply | 0.9 |
| 7400 : Sea transport | 0.8 |
| 4910 : Jewellery/coins | 0.8 |
| 4197 : Biscuits/crispbread | 0.8 |
| 3510 : Motor vehicles/their engines | 0.8 |
| 3301 : Office machinery | 0.8 |
| 2570 : Pharmaceutical products | 0.8 |
| 4420 : Leather goods | 0.8 |
| 4663 : Brushes/brooms | 0.7 |
| 2562 : Formulated adhesives/sealants | 0.7 |
| 3460 : Domestic-type electric appliances | 0.7 |
| 6148 : Wholesale distribution:motor vehicles | 0.7 |
| 4221 : Compound animal feeds | 0.7 |
| 3287 : Pumps | 0.7 |
| 1700 : Water supply industry | 0.7 |
| 3162 : Cutlery/similar tableware; razors | 0.7 |
| 3245 : Chemical industry machinery; etc | 0.6 |
| 3284 : Refrigerating machinery, etc | 0.6 |
| 3244 : Food/drink/tobacco processing machinery | 0.6 |
| 4123 : Poultry slaughter/processing | 0.6 |
| 4835 : Plastics packaging products | 0.6 |
| 3211 : Agricultural machinery | 0.6 |
| 4959 : Other manufactures (Other) | 0.6 |
| 6170 : Wholesale distribution:food,drink,etc | 0.6 |
| 2515 : Synthetic rubber | 0.6 |
| 4710 : Pulp/paper/board | 0.5 |
| 4150 : Fish processing | 0.5 |
| 6120 : Wholesale distribution:fuels,ores,etc | 0.5 |
| 3289 : Mechanical,etc engineering (Other) | 0.5 |
| 1630 : Production/distribution:other energy | 0.5 |
| 3420 : Basic electrical equipment | 0.4 |
| 3288 : Industrial valves | 0.4 |
| 4664 : Articles:cork/plaiting materials | 0.4 |
| 3470 : Electric lamps/lighting equipment | 0.4 |
| 2511 : Inorganic chemicals,not industrial gases | 0.4 |
| 2437 : Other building products:concrete,etc | 0.4 |
| 2552 : Printing ink | 0.4 |
| 4723 : Stationery | 0.4 |
| 3740 : Clocks,watches/other timing devices | 0.4 |
| 4130 : Preparation of milk/milk products | 0.4 |
| 2567 : Miscellaneous chemical products | 0.4 |
| 3432 : Batteries/accumulators | 0.3 |
| 5020 : Civil engineering | 0.3 |
| 1610 : Production/distribution:electricity | 0.3 |
| 4556 : Canvas goods,sacks/made-up textiles | 0.3 |
| 1401 : Mineral oil refining | 0.3 |
| 2436 : Ready mixed concrete | 0.3 |
| 2220 : Steel tubes | 0.3 |
| 3281 : Internal combustion engines etc | 0.3 |
| 4539 : Other dress industries | 0.3 |
| 3523 : Caravans | 0.3 |
| 4630 : Builders' carpentry/joinery | 0.3 |
| 3521 : Motor vehicle bodies | 0.3 |
| 3222 : Engineers' small tools | 0.3 |
| 3480 : Electrical equipment installation | 0.3 |
| 4200 : Sugar/sugar by-products | 0.3 |
| 4722 : Household/hygiene products of paper | 0.2 |
| 4954 : Miscellaneous stationers' goods | 0.2 |
| 3138 : Heat/surface treatment of metals,etc | 0.2 |
| 4270 : Brewing/malting | 0.2 |
| 6160 : Wholesale distribution:textiles,etc | 0.2 |
| 4290 : Tobacco industry | 0.2 |
| 2591 : Photographic materials/chemicals | 0.2 |
| 4836 : Plastics products (Other) | 0.2 |
| 2247 : Other non-ferrous metals/alloys | 0.2 |
| 4261 : Wines,cider/perry | 0.1 |
| 0100 : Agriculture and horticulture | 0.1 |
| 2450 : Working:stone/minerals (Other) | 0.1 |
| 3112 : Non-ferrous metal foundries | 0.1 |
| 3164 : Packaging products of metal | 0.1 |
| 3283 : Compressors/fluid power equipment | 0.1 |
| 4610 : Sawmilling/planing,etc of wood | 0.1 |
| 4671 : Wooden/upholstered furniture | 0.1 |
| 4533 : Women's/girls' tailored outerwear | 0.1 |
| 4650 : Other wooden articles (not furniture) | 0.1 |
| 3262 : Ball/needle/roller bearings | 0.0 |
| 3285 : Scales,etc/portable power tools | 0.0 |
| 3610 : Shipbuilding/repairing | 0.0 |
| 2245 : Aluminium/aluminium alloys | 0.0 |
| 2514 : Synthetic resins/plastic materials | 0.0 |
| 4196 : Bread/flour confectionary | 0.0 |
| 2396 : Extraction:other minerals N.E.S. | 0.0 |
| 3530 : Motor vehicle parts | 0.0 |
| 3254 : Construction/earth moving equipment | 0.0 |
| 3167 : Domestic/similar utensils of metal | -0.1 |
| 4240 : Spirit distilling/compounding | -0.1 |
| 3166 : Metal furniture/safes | -0.1 |
| 3221 : Metal-working machine tools | -0.1 |
| 3142 : Metal doors,windows,etc | -0.1 |
| 4728 : Other paper/board products | -0.1 |
| 4942 : Sports goods | -0.1 |
| 4239 : Miscellaneous foods | -0.1 |
| 4532 : Men's/Boys' tailored outerwear | -0.1 |
| 4122 : Bacon curing/meat processing | -0.1 |
| 2599 : Chemical products (Other) | -0.1 |
| 2512 : Basic organic chemicals | -0.2 |
| 4222 : Pet foods/non-compound animal feeds | -0.2 |
| 4121 : Slaughterhouses | -0.2 |
| 7230 : Road haulage | -0.2 |
| 4812 : Other rubber products | -0.2 |
| 3120 : Forging,pressing/stamping | -0.2 |
| 2569 : Adhesive film,cloth/foil | -0.2 |
| 3204 : Fabricated constructional steelwork | -0.2 |
| 3441 : Telegraph/telephone apparatus/equipment | -0.3 |
| 4725 : Packaging products of board | -0.3 |
| 2568 : Formulated pesticides | -0.3 |
| 2310 : Extraction:stone,clay,sand/gravel | -0.3 |
| 2551 : Paints,varnishes/painters' fillings | -0.3 |
| 4180 : Starch | -0.3 |
| 3255 : Mechanical lifting/handling equipment | -0.3 |
| 3169 : Finished metal products (Other) | -0.3 |
| 4620 : Manufacture:semi-finished wood products | -0.3 |
| 4724 : Packaging products of paper/pulp | -0.3 |
| 3246 : Process engineering contractors | -0.3 |
| 1520 : Nuclear fuel production | -0.3 |
| 4340 : Spinning/weaving of flax,hemp/ramie | -0.3 |
| 3286 : Other industrial/commercial machinery | -0.3 |
| 3640 : Aerospace manufacture/repairing | -0.4 |
| 4510 : Footwear | -0.4 |
| 2460 : Abrasive products | -0.4 |
| 4834 : Plastics building products | -0.4 |
| 1300 : Extraction:mineral oil/natural gas | -0.4 |
| 3620 : Railway/tramway vehicles | -0.4 |
| 2100 : Extraction/preparation:metalliferous ore | -0.5 |
| 2410 : Structural clay products | -0.5 |
| 2210 : Iron/steel industry | -0.5 |
| 4126 : Animal by-product processing | -0.5 |
| 4640 : Wooden containers | -0.5 |
| 4831 : Plastic coated textile fabric | -0.5 |
| 3205 : Boilers/process plant fabrications | -0.5 |
| 4410 : Leather (tanning/dressing)/fellmongery | -0.6 |
| 2581 : Soap/synthetic detergents | -0.6 |
| 2563 : Chemical treatment of oils/fats | -0.6 |
| 2440 : Asbestos goods | -0.6 |
| 4536 : Women's/girls' light outerwear,lingerie | -0.6 |
| 2479 : Other glass products | -0.6 |
| 4283 : Soft drinks | -0.6 |
| 3275 : Machinery for working wood,rubber,etc | -0.7 |
| 1402 : Other treatment:petroleum products | -0.7 |
| 2235 : Other drawing,cold rolling/etc:steel | -0.7 |
| 4537 : Hats/caps/millinery | -0.7 |
| 2246 : Copper,brass/other copper alloys | -0.8 |
| 3290 : Ordnance/small arms/ammunition | -0.8 |
| 3434 : Electrical equipment:motor vehicles,etc | -0.8 |
| 4557 : Household textiles | -0.8 |
| 3410 : Insulated wires/cables | -0.8 |
| 4555 : Soft furnishings | -0.8 |
| 4538 : Gloves | -0.9 |
| 2481 : Refractory goods | -0.9 |
| 4820 : Retreading/repairing of rubber tyres | -0.9 |
| 2234 : Drawing/manufacture:steel wire/products | -1.0 |
| 3633 : Motor cycles/parts | -1.0 |
| 4385 : Other carpets,carpeting,rugs/matting | -1.0 |
| 3650 : Other vehicles | -1.0 |
| 3163 : Metal storage vessels (non-industrial) | -1.0 |
| 4398 : Narrow fabrics | -1.0 |
| 3137 : Bolts,etc/other non-precision chains | -1.0 |
| 3111 : Ferrous metal foundries | -1.0 |
| 4721 : Wall coverings | -1.0 |
| 4116 : Processing organic oils/fats | -1.1 |
| 4535 : Men's/boys' shirts,underwear/nightwear | -1.1 |
| 4364 : Warp knitted fabrics | -1.1 |
| 3522 : Trailers/semi-trailers | -1.1 |
| 2489 : Ceramic goods | -1.1 |
| 4531 : Weatherproof outerwear | -1.1 |
| 3165 : Domestic appliances (non-electrical) | -1.1 |
| 4322 : Weaving of cotton,silk/man-made fibres | -1.2 |
| 4534 : Work clothing/men's/boys' jeans | -1.2 |
| 3261 : Precision chains; etc | -1.2 |
| 3230 : Textile machinery | -1.2 |
| 4833 : Plastics floorcoverings | -1.3 |
| 4384 : Pile carpets,carpeting/rugs | -1.4 |
| 4321 : Spinning/doubling on the cotton system | -1.4 |
| 4310 : Woollen/worsted industry | -1.4 |
| 3634 : Pedal cycles/parts | -1.4 |
| 4336 : Throwing,texturing,etc:filament yarn | -1.4 |
| 3161 : Hand tools/implements | -1.4 |
| 4396 : Rope,twine/net | -1.5 |
| 2516 : Dyestuffs/pigments | -1.5 |
| 4395 : Lace | -1.5 |
| 4811 : Rubber tyres/inner tubes | -1.5 |
| 4363 : Hosiery/etc weft knitted goods/fabrics | -1.6 |
| 2565 : Explosives | -1.7 |
| 4115 : Margarine/compound cooking fats | -1.7 |
| 4147 : Processing of fruit/vegetables | -1.7 |
| 4350 : Jute/polypropylene yarns/fabrics | -1.7 |
| 3212 : Wheeled tractors | -1.8 |
| 4370 : Textile finishing | -1.8 |
| 2600 : Production of man-made fibres | -1.9 |
| 1114 : Opencast coal working | -1.9 |
| 4399 : Other miscellaneous textiles | -1.9 |
| 2471 : Flat glass | -1.9 |
| 3251 : Mining machinery | -2.1 |
| 2478 : Glass containers | -2.1 |
| 1115 : Manufacture:solid fuels | -2.2 |
| 1113 : Deep coal mines | -2.3 |
| 1200 : Coke ovens | -2.3 |

**Figure 21:** PCI at local authority level 2019

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| **Activity** | **PCI** |
| 652: Reinsurance | 5.6 |
| 643: Trusts, funds and similar financial entities | 3.6 |
| 663: Fund management activities | 3.1 |
| 731: Advertising | 2.6 |
| 591: Motion picture, video and television programme activities | 2.5 |
| 774: Leasing of intellectual property and similar products, except copyrighted works | 2.3 |
| 732: Market research and public opinion polling | 2.2 |
| 639: Other information service activities | 2.2 |
| 268: Manufacture of magnetic and optical media | 2.2 |
| 620: Computer programming, consultancy and related activities | 2.0 |
| 602: Television programming and broadcasting activities | 2.0 |
| 691: Legal activities | 2.0 |
| 722: Research and experimental development on social sciences and humanities | 1.9 |
| 582: Software publishing | 1.9 |
| 649: Other financial service activities, except insurance and pension funding | 1.9 |
| 743: Translation and interpretation activities | 1.8 |
| 661: Activities auxiliary to financial services, except insurance and pension funding | 1.8 |
| 581: Publishing of books, periodicals and other publishing activities | 1.8 |
| 631: Data processing, hosting and related activities; web portals | 1.8 |
| 592: Sound recording and music publishing activities | 1.7 |
| 823: Organisation of conventions and trade shows | 1.7 |
| 900: Creative, arts and entertainment activities | 1.7 |
| 692: Accounting, bookkeeping and auditing activities; tax consultancy | 1.7 |
| 612: Wireless telecommunications activities | 1.6 |
| 683: Real estate activities on a fee or contract basis | 1.5 |
| 511: Passenger air transport | 1.5 |
| 942: Activities of trade unions | 1.5 |
| 702: Management consultancy activities | 1.5 |
| 854: Higher education | 1.5 |
| 941: Activities of business, employers and professional membership organisations | 1.3 |
| 799: Other reservation service and related activities | 1.2 |
| 613: Satellite telecommunications activities | 1.2 |
| 619: Other telecommunications activities | 1.2 |
| 856: Educational support activities | 1.2 |
| 641: Monetary intermediation | 1.1 |
| 742: Photographic activities | 1.1 |
| 791: Travel agency and tour operator activities | 1.1 |
| 182: Reproduction of recorded media | 1.1 |
| 491: Passenger rail transport, interurban | 1.0 |
| 701: Activities of head offices | 1.0 |
| 829: Business support service activities n.e.c. | 1.0 |
| 502: Sea and coastal freight water transport | 1.0 |
| 651: Insurance | 1.0 |
| 559: Other accommodation | 0.9 |
| 474: Retail sale of information and communication equipment in specialised stores | 0.9 |
| 562: Event catering and other food service activities | 0.9 |
| 741: Specialised design activities | 0.9 |
| 801: Private security activities | 0.8 |
| 601: Radio broadcasting | 0.7 |
| 821: Office administrative and support activities | 0.7 |
| 803: Investigation activities | 0.7 |
| 411: Development of building projects | 0.7 |
| 662: Activities auxiliary to insurance and pension funding | 0.7 |
| 711: Architectural and engineering activities and related technical consultancy | 0.7 |
| 781: Activities of employment placement agencies | 0.7 |
| 949: Activities of other membership organisations | 0.7 |
| 783: Other human resources provision | 0.7 |
| 503: Inland passenger water transport | 0.6 |
| 812: Cleaning activities | 0.6 |
| 642: Activities of holding companies | 0.6 |
| 782: Temporary employment agency activities | 0.6 |
| 264: Manufacture of consumer electronics | 0.5 |
| 721: Research and experimental development on natural sciences and engineering | 0.5 |
| 951: Repair of computers and communication equipment | 0.5 |
| 321: Manufacture of jewellery, bijouterie and related articles | 0.5 |
| 62: Extraction of natural gas | 0.5 |
| 465: Wholesale of information and communication equipment | 0.5 |
| 681: Buying and selling of own real estate | 0.5 |
| 99: Support activities for other mining and quarrying | 0.5 |
| 749: Other professional, scientific and technical activities n.e.c. | 0.4 |
| 352: Manufacture of gas; distribution of gaseous fuels through mains | 0.4 |
| 267: Manufacture of optical instruments and photographic equipment | 0.4 |
| 262: Manufacture of computers and peripheral equipment | 0.4 |
| 811: Combined facilities support activities | 0.4 |
| 464: Wholesale of household goods | 0.4 |
| 561: Restaurants and mobile food service activities | 0.4 |
| 861: Hospital activities | 0.4 |
| 266: Manufacture of irradiation, electromedical and electrotherapeutic equipment | 0.3 |
| 920: Gambling and betting activities | 0.3 |
| 479: Retail trade not in stores, stalls or markets | 0.3 |
| 822: Activities of call centres | 0.3 |
| 611: Wired telecommunications activities | 0.2 |
| 504: Inland freight water transport | 0.2 |
| 476: Retail sale of cultural and recreation goods in specialised stores | 0.2 |
| 851: Pre-primary education | 0.2 |
| 493: Other passenger land transport | 0.2 |
| 302: Manufacture of railway locomotives and rolling stock | 0.2 |
| 477: Retail sale of other goods in specialised stores | 0.2 |
| 802: Security systems service activities | 0.2 |
| 771: Renting and leasing of motor vehicles | 0.2 |
| 351: Electric power generation, transmission and distribution | 0.2 |
| 532: Other postal and courier activities | 0.1 |
| 61: Extraction of crude petroleum | 0.1 |
| 353: Steam and air conditioning supply | 0.1 |
| 855: Other education | 0.1 |
| 322: Manufacture of musical instruments | 0.1 |
| 492: Freight rail transport | 0.0 |
| 889: Other social work activities without accommodation | 0.0 |
| 478: Retail sale via stalls and markets | 0.0 |
| 841: Administration of the State and the economic and social policy of the community | 0.0 |
| 141: Manufacture of wearing apparel, except fur apparel | 0.0 |
| 682: Renting and operating of own or leased real estate | 0.0 |
| 152: Manufacture of footwear | 0.0 |
| 531: Postal activities under universal service obligation | -0.1 |
| 324: Manufacture of games and toys | -0.1 |
| 960: Other personal service activities | -0.1 |
| 522: Support activities for transportation | -0.1 |
| 254: Manufacture of weapons and ammunition | -0.1 |
| 931: Sports activities | -0.1 |
| 454: Sale, maintenance and repair of motorcycles and related parts and accessories | -0.1 |
| 273: Manufacture of wiring and wiring devices | -0.1 |
| 265: Manufacture of instruments and appliances for measuring, testing and navigation; watches and clocks | -0.1 |
| 390: Remediation activities and other waste management services | -0.1 |
| 412: Construction of residential and non-residential buildings | -0.1 |
| 272: Manufacture of batteries and accumulators | -0.2 |
| 910: Libraries, archives, museums and other cultural activities | -0.2 |
| 469: Non-specialised wholesale trade | -0.2 |
| 869: Other human health activities | -0.2 |
| 461: Wholesale on a fee or contract basis | -0.2 |
| 551: Hotels and similar accommodation | -0.2 |
| 842: Provision of services to the community as a whole | -0.2 |
| 325: Manufacture of medical and dental instruments and supplies | -0.2 |
| 370: Sewerage | -0.2 |
| 772: Renting and leasing of personal and household goods | -0.2 |
| 422: Construction of utility projects | -0.2 |
| 495: Transport via pipeline | -0.2 |
| 204: Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations | -0.2 |
| 843: Compulsory social security activities | -0.2 |
| 952: Repair of personal and household goods | -0.3 |
| 274: Manufacture of electric lighting equipment | -0.3 |
| 332: Installation of industrial machinery and equipment | -0.3 |
| 451: Sale of motor vehicles | -0.3 |
| 463: Wholesale of food, beverages and tobacco | -0.3 |
| 862: Medical and dental practice activities | -0.3 |
| 211: Manufacture of basic pharmaceutical products | -0.3 |
| 712: Technical testing and analysis | -0.3 |
| 263: Manufacture of communication equipment | -0.3 |
| 381: Waste collection | -0.4 |
| 360: Water collection, treatment and supply | -0.4 |
| 143: Manufacture of knitted and crocheted apparel | -0.4 |
| 853: Secondary education | -0.4 |
| 512: Freight air transport and space transport | -0.4 |
| 475: Retail sale of other household equipment in specialised stores | -0.4 |
| 301: Building of ships and boats | -0.4 |
| 181: Printing and service activities related to printing | -0.4 |
| 303: Manufacture of air and spacecraft and related machinery | -0.4 |
| 212: Manufacture of pharmaceutical preparations | -0.4 |
| 192: Manufacture of refined petroleum products | -0.4 |
| 107: Manufacture of bakery and farinaceous products | -0.4 |
| 275: Manufacture of domestic appliances | -0.4 |
| 773: Renting and leasing of other machinery, equipment and tangible goods | -0.4 |
| 421: Construction of roads and railways | -0.4 |
| 205: Manufacture of other chemical products | -0.5 |
| 291: Manufacture of motor vehicles | -0.5 |
| 104: Manufacture of vegetable and animal oils and fats | -0.5 |
| 563: Beverage serving activities | -0.5 |
| 881: Social work activities without accommodation for the elderly and disabled | -0.5 |
| 472: Retail sale of food, beverages and tobacco in specialised stores | -0.5 |
| 852: Primary education | -0.5 |
| 261: Manufacture of electronic components and boards | -0.5 |
| 281: Manufacture of general purpose machinery | -0.5 |
| 433: Building completion and finishing | -0.5 |
| 452: Maintenance and repair of motor vehicles | -0.5 |
| 501: Sea and coastal passenger water transport | -0.5 |
| 271: Manufacture of electric motors, generators, transformers and electricity distribution and control apparatus | -0.5 |
| 466: Wholesale of other machinery, equipment and supplies | -0.5 |
| 237: Cutting, shaping and finishing of stone | -0.5 |
| 471: Retail sale in non-specialised stores | -0.5 |
| 89: Mining and quarrying n.e.c. | -0.5 |
| 279: Manufacture of other electrical equipment | -0.5 |
| 323: Manufacture of sports goods | -0.5 |
| 932: Amusement and recreation activities | -0.5 |
| 750: Veterinary activities | -0.6 |
| 103: Processing and preserving of fruit and vegetables | -0.6 |
| 429: Construction of other civil engineering projects | -0.6 |
| 202: Manufacture of pesticides and other agrochemical products | -0.6 |
| 872: Residential care activities for learning disabilities, mental health and substance abuse | -0.6 |
| 813: Landscape service activities | -0.6 |
| 873: Residential care activities for the elderly and disabled | -0.6 |
| 231: Manufacture of glass and glass products | -0.6 |
| 331: Repair of fabricated metal products, machinery and equipment | -0.6 |
| 133: Finishing of textiles | -0.6 |
| 432: Electrical, plumbing and other construction installation activities | -0.6 |
| 473: Retail sale of automotive fuel in specialised stores | -0.6 |
| 24: Support services to forestry | -0.6 |
| 203: Manufacture of paints, varnishes and similar coatings, printing ink and mastics | -0.6 |
| 871: Residential nursing care activities | -0.6 |
| 151: Tanning and dressing of leather; manufacture of luggage, handbags, saddlery and harness; dressing and dyeing of fur | -0.6 |
| 32: Aquaculture | -0.6 |
| 453: Sale of motor vehicle parts and accessories | -0.6 |
| 382: Waste treatment and disposal | -0.7 |
| 106: Manufacture of grain mill products, starches and starch products | -0.7 |
| 110: Manufacture of beverages | -0.7 |
| 120: Manufacture of tobacco products | -0.7 |
| 329: Other manufacturing | -0.7 |
| 304: Manufacture of military fighting vehicles | -0.7 |
| 521: Warehousing and storage | -0.7 |
| 253: Manufacture of steam generators, except central heating hot water boilers | -0.7 |
| 171: Manufacture of pulp, paper and paperboard | -0.8 |
| 467: Other specialised wholesale | -0.8 |
| 439: Other specialised construction activities n.e.c. | -0.8 |
| 383: Materials recovery | -0.8 |
| 206: Manufacture of man-made fibres | -0.8 |
| 284: Manufacture of metal forming machinery and machine tools | -0.8 |
| 879: Other residential care activities | -0.8 |
| 282: Manufacture of other general-purpose machinery | -0.8 |
| 234: Manufacture of other porcelain and ceramic products | -0.8 |
| 244: Manufacture of basic precious and other non-ferrous metals | -0.8 |
| 221: Manufacture of rubber products | -0.8 |
| 105: Manufacture of dairy products | -0.8 |
| 23: Gathering of wild growing non-wood products | -0.8 |
| 91: Support activities for petroleum and natural gas extraction | -0.8 |
| 108: Manufacture of other food products | -0.8 |
| 310: Manufacture of furniture | -0.9 |
| 309: Manufacture of transport equipment n.e.c. | -0.9 |
| 162: Manufacture of products of wood, cork, straw and plaiting materials | -0.9 |
| 22: Logging | -0.9 |
| 257: Manufacture of cutlery, tools and general hardware | -0.9 |
| 255: Forging, pressing, stamping and roll-forming of metal; powder metallurgy | -0.9 |
| 21: Silviculture and other forestry activities | -0.9 |
| 239: Manufacture of abrasive products and non-metallic mineral products n.e.c. | -0.9 |
| 431: Demolition and site preparation | -0.9 |
| 17: Hunting, trapping and related service activities | -0.9 |
| 102: Processing and preserving of fish, crustaceans and molluscs | -0.9 |
| 289: Manufacture of other special-purpose machinery | -0.9 |
| 172: Manufacture of articles of paper and paperboard | -0.9 |
| 494: Freight transport by road and removal services | -0.9 |
| 235: Manufacture of cement, lime and plaster | -0.9 |
| 233: Manufacture of clay building materials | -1.0 |
| 292: Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semitrailers | -1.0 |
| 139: Manufacture of other textiles | -1.0 |
| 222: Manufacture of plastics products | -1.0 |
| 16: Support activities to agriculture and post-harvest crop activities | -1.0 |
| 293: Manufacture of parts and accessories for motor vehicles | -1.0 |
| 81: Quarrying of stone, sand and clay | -1.0 |
| 256: Treatment and coating of metals; machining | -1.0 |
| 31: Fishing | -1.0 |
| 242: Manufacture of tubes, pipes, hollow profiles and related fittings, of steel | -1.0 |
| 109: Manufacture of prepared animal feeds | -1.0 |
| 462: Wholesale of agricultural raw materials and live animals | -1.1 |
| 201: Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms | -1.1 |
| 553: Camping grounds, recreational vehicle parks and trailer parks | -1.1 |
| 245: Casting of metals | -1.1 |
| 552: Holiday and other short stay accommodation | -1.1 |
| 243: Manufacture of other products of first processing of steel | -1.1 |
| 132: Weaving of textiles | -1.1 |
| 161: Sawmilling and planing of wood | -1.1 |
| 10: DEFRA/Scottish Executive Agricultural Data | -1.1 |
| 251: Manufacture of structural metal products | -1.1 |
| 259: Manufacture of other fabricated metal products | -1.1 |
| 236: Manufacture of articles of concrete, cement and plaster | -1.1 |
| 252: Manufacture of tanks, reservoirs and containers of metal | -1.1 |
| 232: Manufacture of refractory products | -1.2 |
| 131: Preparation and spinning of textile fibres | -1.2 |
| 241: Manufacture of basic iron and steel and of ferro-alloys | -1.2 |
| 142: Manufacture of articles of fur | -1.2 |
| 101: Processing and preserving of meat and production of meat products | -1.2 |
| 283: Manufacture of agricultural and forestry machinery | -1.3 |
| 191: Manufacture of coke oven products | -1.5 |
| 51: Mining of hard coal | -1.6 |

**Figure 22:** PCI at urban level (PUA) 1981

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| **Activity** | **PCI** |
| 8310 : Activities auxiliary to banking/finance | 3.3 |
| 8320 : Activities auxiliary to insurance | 2.3 |
| 8395 : Business services (Other) | 2.2 |
| 3731 : Spectacles/unmounted lenses | 2.1 |
| 8140 : Banking/bill-discounting | 2.1 |
| 8380 : Advertising | 1.9 |
| 3452 : Gramophone records/pre-recorded tapes | 1.9 |
| 3442 : Electrical instruments/control systems | 1.9 |
| 9741 : Radio/television services,theatres,etc | 1.8 |
| 9711 : Film production,distribution/exhibition | 1.8 |
| 7902 : Telecommunications | 1.8 |
| 3443 : Radio/electronic capital goods | 1.7 |
| 9760 : Authors,composers/own account artists | 1.7 |
| 3710 : Measuring,checking/instruments/etc | 1.7 |
| 6190 : Other wholesale distribution | 1.7 |
| 3302 : Electronic data processing equipment | 1.6 |
| 6180 : Wholesale distribution:medical goods | 1.5 |
| 8370 : Professional/technical services (Other) | 1.5 |
| 6149 : Wholesale distribution:machinery etc | 1.5 |
| 3454 : Electronic consumer goods/etc (Other) | 1.5 |
| 4751 : Printing/publishing of newspapers | 1.4 |
| 8150 : Other financial institutions | 1.4 |
| 4920 : Musical instruments | 1.3 |
| 9400 : Research/development | 1.3 |
| 3276 : Printing,bookbinding,etc:machinery | 1.3 |
| 4672 : Shop/office fitting | 1.2 |
| 6150 : Wholesale distribution:household goods | 1.2 |
| 4941 : Toys/games | 1.1 |
| 2582 : Perfumes,cosmetics/toilet preparations | 1.1 |
| 3435 : Electrical equipment:industrial (Other) | 1.1 |
| 4930 : Photographic processing laboratories | 1.1 |
| 3444 : Components:electronic equipment | 1.1 |
| 4832 : Plastics semi-manufactures | 1.1 |
| 3453 : Active components/sub-assemblies | 1.0 |
| 2420 : Cement,lime/plaster | 1.0 |
| 3433 : Alarms/signalling equipment | 1.0 |
| 3720 : Medical/surgical/orthopaedic appliances | 1.0 |
| 7100 : Railways | 1.0 |
| 6130 : Wholesale distribution:timber etc | 1.0 |
| 4560 : Fur goods | 0.9 |
| 6110 : Wholesale distribution:raw materials | 0.9 |
| 2564 : Essential oils/flavouring materials | 0.9 |
| 4160 : Grain milling | 0.9 |
| 2513 : Fertilisers | 0.9 |
| 1620 : Public gas supply | 0.9 |
| 7400 : Sea transport | 0.8 |
| 4910 : Jewellery/coins | 0.8 |
| 4197 : Biscuits/crispbread | 0.8 |
| 3510 : Motor vehicles/their engines | 0.8 |
| 3301 : Office machinery | 0.8 |
| 2570 : Pharmaceutical products | 0.8 |
| 4420 : Leather goods | 0.8 |
| 4663 : Brushes/brooms | 0.7 |
| 2562 : Formulated adhesives/sealants | 0.7 |
| 3460 : Domestic-type electric appliances | 0.7 |
| 6148 : Wholesale distribution:motor vehicles | 0.7 |
| 4221 : Compound animal feeds | 0.7 |
| 3287 : Pumps | 0.7 |
| 1700 : Water supply industry | 0.7 |
| 3162 : Cutlery/similar tableware; razors | 0.7 |
| 3245 : Chemical industry machinery; etc | 0.6 |
| 3284 : Refrigerating machinery, etc | 0.6 |
| 3244 : Food/drink/tobacco processing machinery | 0.6 |
| 4123 : Poultry slaughter/processing | 0.6 |
| 4835 : Plastics packaging products | 0.6 |
| 3211 : Agricultural machinery | 0.6 |
| 4959 : Other manufactures (Other) | 0.6 |
| 6170 : Wholesale distribution:food,drink,etc | 0.6 |
| 2515 : Synthetic rubber | 0.6 |
| 4710 : Pulp/paper/board | 0.5 |
| 4150 : Fish processing | 0.5 |
| 6120 : Wholesale distribution:fuels,ores,etc | 0.5 |
| 3289 : Mechanical,etc engineering (Other) | 0.5 |
| 1630 : Production/distribution:other energy | 0.5 |
| 3420 : Basic electrical equipment | 0.4 |
| 3288 : Industrial valves | 0.4 |
| 4664 : Articles:cork/plaiting materials | 0.4 |
| 3470 : Electric lamps/lighting equipment | 0.4 |
| 2511 : Inorganic chemicals,not industrial gases | 0.4 |
| 2437 : Other building products:concrete,etc | 0.4 |
| 2552 : Printing ink | 0.4 |
| 4723 : Stationery | 0.4 |
| 3740 : Clocks,watches/other timing devices | 0.4 |
| 4130 : Preparation of milk/milk products | 0.4 |
| 2567 : Miscellaneous chemical products | 0.4 |
| 3432 : Batteries/accumulators | 0.3 |
| 5020 : Civil engineering | 0.3 |
| 1610 : Production/distribution:electricity | 0.3 |
| 4556 : Canvas goods,sacks/made-up textiles | 0.3 |
| 1401 : Mineral oil refining | 0.3 |
| 2436 : Ready mixed concrete | 0.3 |
| 2220 : Steel tubes | 0.3 |
| 3281 : Internal combustion engines etc | 0.3 |
| 4539 : Other dress industries | 0.3 |
| 3523 : Caravans | 0.3 |
| 4630 : Builders' carpentry/joinery | 0.3 |
| 3521 : Motor vehicle bodies | 0.3 |
| 3222 : Engineers' small tools | 0.3 |
| 3480 : Electrical equipment installation | 0.3 |
| 4200 : Sugar/sugar by-products | 0.3 |
| 4722 : Household/hygiene products of paper | 0.2 |
| 4954 : Miscellaneous stationers' goods | 0.2 |
| 3138 : Heat/surface treatment of metals,etc | 0.2 |
| 4270 : Brewing/malting | 0.2 |
| 6160 : Wholesale distribution:textiles,etc | 0.2 |
| 4290 : Tobacco industry | 0.2 |
| 2591 : Photographic materials/chemicals | 0.2 |
| 4836 : Plastics products (Other) | 0.2 |
| 2247 : Other non-ferrous metals/alloys | 0.2 |
| 4261 : Wines,cider/perry | 0.1 |
| 0100 : Agriculture and horticulture | 0.1 |
| 2450 : Working:stone/minerals (Other) | 0.1 |
| 3112 : Non-ferrous metal foundries | 0.1 |
| 3164 : Packaging products of metal | 0.1 |
| 3283 : Compressors/fluid power equipment | 0.1 |
| 4610 : Sawmilling/planing,etc of wood | 0.1 |
| 4671 : Wooden/upholstered furniture | 0.1 |
| 4533 : Women's/girls' tailored outerwear | 0.1 |
| 4650 : Other wooden articles (not furniture) | 0.1 |
| 3262 : Ball/needle/roller bearings | 0.0 |
| 3285 : Scales,etc/portable power tools | 0.0 |
| 3610 : Shipbuilding/repairing | 0.0 |
| 2245 : Aluminium/aluminium alloys | 0.0 |
| 2514 : Synthetic resins/plastic materials | 0.0 |
| 4196 : Bread/flour confectionary | 0.0 |
| 2396 : Extraction:other minerals N.E.S. | 0.0 |
| 3530 : Motor vehicle parts | 0.0 |
| 3254 : Construction/earth moving equipment | 0.0 |
| 3167 : Domestic/similar utensils of metal | -0.1 |
| 4240 : Spirit distilling/compounding | -0.1 |
| 3166 : Metal furniture/safes | -0.1 |
| 3221 : Metal-working machine tools | -0.1 |
| 3142 : Metal doors,windows,etc | -0.1 |
| 4728 : Other paper/board products | -0.1 |
| 4942 : Sports goods | -0.1 |
| 4239 : Miscellaneous foods | -0.1 |
| 4532 : Men's/Boys' tailored outerwear | -0.1 |
| 4122 : Bacon curing/meat processing | -0.1 |
| 2599 : Chemical products (Other) | -0.1 |
| 2512 : Basic organic chemicals | -0.2 |
| 4222 : Pet foods/non-compound animal feeds | -0.2 |
| 4121 : Slaughterhouses | -0.2 |
| 7230 : Road haulage | -0.2 |
| 4812 : Other rubber products | -0.2 |
| 3120 : Forging,pressing/stamping | -0.2 |
| 2569 : Adhesive film,cloth/foil | -0.2 |
| 3204 : Fabricated constructional steelwork | -0.2 |
| 3441 : Telegraph/telephone apparatus/equipment | -0.3 |
| 4725 : Packaging products of board | -0.3 |
| 2568 : Formulated pesticides | -0.3 |
| 2310 : Extraction:stone,clay,sand/gravel | -0.3 |
| 2551 : Paints,varnishes/painters' fillings | -0.3 |
| 4180 : Starch | -0.3 |
| 3255 : Mechanical lifting/handling equipment | -0.3 |
| 3169 : Finished metal products (Other) | -0.3 |
| 4620 : Manufacture:semi-finished wood products | -0.3 |
| 4724 : Packaging products of paper/pulp | -0.3 |
| 3246 : Process engineering contractors | -0.3 |
| 1520 : Nuclear fuel production | -0.3 |
| 4340 : Spinning/weaving of flax,hemp/ramie | -0.3 |
| 3286 : Other industrial/commercial machinery | -0.3 |
| 3640 : Aerospace manufacture/repairing | -0.4 |
| 4510 : Footwear | -0.4 |
| 2460 : Abrasive products | -0.4 |
| 4834 : Plastics building products | -0.4 |
| 1300 : Extraction:mineral oil/natural gas | -0.4 |
| 3620 : Railway/tramway vehicles | -0.4 |
| 2100 : Extraction/preparation:metalliferous ore | -0.5 |
| 2410 : Structural clay products | -0.5 |
| 2210 : Iron/steel industry | -0.5 |
| 4126 : Animal by-product processing | -0.5 |
| 4640 : Wooden containers | -0.5 |
| 4831 : Plastic coated textile fabric | -0.5 |
| 3205 : Boilers/process plant fabrications | -0.5 |
| 4410 : Leather (tanning/dressing)/fellmongery | -0.6 |
| 2581 : Soap/synthetic detergents | -0.6 |
| 2563 : Chemical treatment of oils/fats | -0.6 |
| 2440 : Asbestos goods | -0.6 |
| 4536 : Women's/girls' light outerwear,lingerie | -0.6 |
| 2479 : Other glass products | -0.6 |
| 4283 : Soft drinks | -0.6 |
| 3275 : Machinery for working wood,rubber,etc | -0.7 |
| 1402 : Other treatment:petroleum products | -0.7 |
| 2235 : Other drawing,cold rolling/etc:steel | -0.7 |
| 4537 : Hats/caps/millinery | -0.7 |
| 2246 : Copper,brass/other copper alloys | -0.8 |
| 3290 : Ordnance/small arms/ammunition | -0.8 |
| 3434 : Electrical equipment:motor vehicles,etc | -0.8 |
| 4557 : Household textiles | -0.8 |
| 3410 : Insulated wires/cables | -0.8 |
| 4555 : Soft furnishings | -0.8 |
| 4538 : Gloves | -0.9 |
| 2481 : Refractory goods | -0.9 |
| 4820 : Retreading/repairing of rubber tyres | -0.9 |
| 2234 : Drawing/manufacture:steel wire/products | -1.0 |
| 3633 : Motor cycles/parts | -1.0 |
| 4385 : Other carpets,carpeting,rugs/matting | -1.0 |
| 3650 : Other vehicles | -1.0 |
| 3163 : Metal storage vessels (non-industrial) | -1.0 |
| 4398 : Narrow fabrics | -1.0 |
| 3137 : Bolts,etc/other non-precision chains | -1.0 |
| 3111 : Ferrous metal foundries | -1.0 |
| 4721 : Wall coverings | -1.0 |
| 4116 : Processing organic oils/fats | -1.1 |
| 4535 : Men's/boys' shirts,underwear/nightwear | -1.1 |
| 4364 : Warp knitted fabrics | -1.1 |
| 3522 : Trailers/semi-trailers | -1.1 |
| 2489 : Ceramic goods | -1.1 |
| 4531 : Weatherproof outerwear | -1.1 |
| 3165 : Domestic appliances (non-electrical) | -1.1 |
| 4322 : Weaving of cotton,silk/man-made fibres | -1.2 |
| 4534 : Work clothing/men's/boys' jeans | -1.2 |
| 3261 : Precision chains; etc | -1.2 |
| 3230 : Textile machinery | -1.2 |
| 4833 : Plastics floorcoverings | -1.3 |
| 4384 : Pile carpets,carpeting/rugs | -1.4 |
| 4321 : Spinning/doubling on the cotton system | -1.4 |
| 4310 : Woollen/worsted industry | -1.4 |
| 3634 : Pedal cycles/parts | -1.4 |
| 4336 : Throwing,texturing,etc:filament yarn | -1.4 |
| 3161 : Hand tools/implements | -1.4 |
| 4396 : Rope,twine/net | -1.5 |
| 2516 : Dyestuffs/pigments | -1.5 |
| 4395 : Lace | -1.5 |
| 4811 : Rubber tyres/inner tubes | -1.5 |
| 4363 : Hosiery/etc weft knitted goods/fabrics | -1.6 |
| 2565 : Explosives | -1.7 |
| 4115 : Margarine/compound cooking fats | -1.7 |
| 4147 : Processing of fruit/vegetables | -1.7 |
| 4350 : Jute/polypropylene yarns/fabrics | -1.7 |
| 3212 : Wheeled tractors | -1.8 |
| 4370 : Textile finishing | -1.8 |
| 2600 : Production of man-made fibres | -1.9 |
| 1114 : Opencast coal working | -1.9 |
| 4399 : Other miscellaneous textiles | -1.9 |
| 2471 : Flat glass | -1.9 |
| 3251 : Mining machinery | -2.1 |
| 2478 : Glass containers | -2.1 |
| 1115 : Manufacture:solid fuels | -2.2 |
| 1113 : Deep coal mines | -2.3 |
| 1200 : Coke ovens | -2.3 |

**Figure 23:** PCI at urban level (PUA) 2019

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| **Activity** | **PCI** |
| 652: Reinsurance | 5.2 |
| 663: Fund management activities | 2.6 |
| 643: Trusts, funds and similar financial entities | 2.5 |
| 731: Advertising | 2.3 |
| 268: Manufacture of magnetic and optical media | 2.3 |
| 620: Computer programming, consultancy and related activities | 2.1 |
| 732: Market research and public opinion polling | 2.1 |
| 511: Passenger air transport | 1.9 |
| 602: Television programming and broadcasting activities | 1.9 |
| 631: Data processing, hosting and related activities; web portals | 1.7 |
| 612: Wireless telecommunications activities | 1.7 |
| 722: Research and experimental development on social sciences and humanities | 1.7 |
| 661: Activities auxiliary to financial services, except insurance and pension funding | 1.6 |
| 639: Other information service activities | 1.6 |
| 591: Motion picture, video and television programme activities | 1.6 |
| 702: Management consultancy activities | 1.5 |
| 649: Other financial service activities, except insurance and pension funding | 1.4 |
| 662: Activities auxiliary to insurance and pension funding | 1.1 |
| 743: Translation and interpretation activities | 1.1 |
| 651: Insurance | 1.1 |
| 267: Manufacture of optical instruments and photographic equipment | 1.0 |
| 613: Satellite telecommunications activities | 0.9 |
| 619: Other telecommunications activities | 0.9 |
| 264: Manufacture of consumer electronics | 0.9 |
| 601: Radio broadcasting | 0.9 |
| 721: Research and experimental development on natural sciences and engineering | 0.9 |
| 352: Manufacture of gas; distribution of gaseous fuels through mains | 0.9 |
| 182: Reproduction of recorded media | 0.9 |
| 742: Photographic activities | 0.8 |
| 266: Manufacture of irradiation, electromedical and electrotherapeutic equipment | 0.7 |
| 701: Activities of head offices | 0.7 |
| 262: Manufacture of computers and peripheral equipment | 0.6 |
| 611: Wired telecommunications activities | 0.6 |
| 741: Specialised design activities | 0.6 |
| 642: Activities of holding companies | 0.5 |
| 641: Monetary intermediation | 0.5 |
| 592: Sound recording and music publishing activities | 0.5 |
| 321: Manufacture of jewellery, bijouterie and related articles | 0.5 |
| 749: Other professional, scientific and technical activities n.e.c. | 0.4 |
| 254: Manufacture of weapons and ammunition | 0.3 |
| 322: Manufacture of musical instruments | 0.3 |
| 61: Extraction of crude petroleum | 0.2 |
| 265: Manufacture of instruments and appliances for measuring, testing and navigation; watches and clocks | 0.2 |
| 353: Steam and air conditioning supply | 0.2 |
| 325: Manufacture of medical and dental instruments and supplies | 0.2 |
| 301: Building of ships and boats | 0.2 |
| 351: Electric power generation, transmission and distribution | 0.2 |
| 141: Manufacture of wearing apparel, except fur apparel | 0.2 |
| 23: Gathering of wild growing non-wood products | 0.1 |
| 522: Support activities for transportation | 0.1 |
| 261: Manufacture of electronic components and boards | 0.1 |
| 324: Manufacture of games and toys | 0.0 |
| 274: Manufacture of electric lighting equipment | 0.0 |
| 212: Manufacture of pharmaceutical preparations | 0.0 |
| 151: Tanning and dressing of leather; manufacture of luggage, handbags, saddlery and harness;dressing and dyeing of fur | 0.0 |
| 273: Manufacture of wiring and wiring devices | -0.1 |
| 152: Manufacture of footwear | -0.1 |
| 32: Aquaculture | -0.1 |
| 91: Support activities for petroleum and natural gas extraction | -0.1 |
| 104: Manufacture of vegetable and animal oils and fats | -0.1 |
| 271: Manufacture of electric motors, generators, transformers and electricity distribution and control apparatus | -0.1 |
| 204: Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations | -0.1 |
| 303: Manufacture of air and spacecraft and related machinery | -0.1 |
| 275: Manufacture of domestic appliances | -0.1 |
| 99: Support activities for other mining and quarrying | -0.1 |
| 205: Manufacture of other chemical products | -0.2 |
| 263: Manufacture of communication equipment | -0.2 |
| 211: Manufacture of basic pharmaceutical products | -0.2 |
| 181: Printing and service activities related to printing | -0.2 |
| 24: Support services to forestry | -0.3 |
| 62: Extraction of natural gas | -0.3 |
| 203: Manufacture of paints, varnishes and similar coatings, printing ink and mastics | -0.3 |
| 291: Manufacture of motor vehicles | -0.3 |
| 279: Manufacture of other electrical equipment | -0.3 |
| 31: Fishing | -0.4 |
| 202: Manufacture of pesticides and other agrochemical products | -0.4 |
| 329: Other manufacturing | -0.4 |
| 281: Manufacture of general purpose machinery | -0.4 |
| 192: Manufacture of refined petroleum products | -0.4 |
| 21: Silviculture and other forestry activities | -0.4 |
| 284: Manufacture of metal forming machinery and machine tools | -0.4 |
| 323: Manufacture of sports goods | -0.4 |
| 120: Manufacture of tobacco products | -0.4 |
| 143: Manufacture of knitted and crocheted apparel | -0.4 |
| 237: Cutting, shaping and finishing of stone | -0.5 |
| 107: Manufacture of bakery and farinaceous products | -0.5 |
| 106: Manufacture of grain mill products, starches and starch products | -0.5 |
| 257: Manufacture of cutlery, tools and general hardware | -0.5 |
| 304: Manufacture of military fighting vehicles | -0.5 |
| 102: Processing and preserving of fish, crustaceans and molluscs | -0.5 |
| 310: Manufacture of furniture | -0.5 |
| 206: Manufacture of man-made fibres | -0.5 |
| 272: Manufacture of batteries and accumulators | -0.5 |
| 16: Support activities to agriculture and post-harvest crop activities | -0.5 |
| 110: Manufacture of beverages | -0.5 |
| 162: Manufacture of products of wood, cork, straw and plaiting materials | -0.5 |
| 22: Logging | -0.5 |
| 132: Weaving of textiles | -0.5 |
| 512: Freight air transport and space transport | -0.6 |
| 282: Manufacture of other general-purpose machinery | -0.6 |
| 133: Finishing of textiles | -0.6 |
| 17: Hunting, trapping and related service activities | -0.6 |
| 289: Manufacture of other special-purpose machinery | -0.6 |
| 172: Manufacture of articles of paper and paperboard | -0.6 |
| 231: Manufacture of glass and glass products | -0.6 |
| 253: Manufacture of steam generators, except central heating hot water boilers | -0.6 |
| 171: Manufacture of pulp, paper and paperboard | -0.6 |
| 105: Manufacture of dairy products | -0.6 |
| 139: Manufacture of other textiles | -0.7 |
| 81: Quarrying of stone, sand and clay | -0.7 |
| 10: DEFRA/Scottish Executive Agricultural Data | -0.7 |
| 103: Processing and preserving of fruit and vegetables | -0.7 |
| 256: Treatment and coating of metals; machining | -0.7 |
| 109: Manufacture of prepared animal feeds | -0.7 |
| 191: Manufacture of coke oven products | -0.7 |
| 521: Warehousing and storage | -0.7 |
| 302: Manufacture of railway locomotives and rolling stock | -0.8 |
| 234: Manufacture of other porcelain and ceramic products | -0.8 |
| 233: Manufacture of clay building materials | -0.8 |
| 221: Manufacture of rubber products | -0.8 |
| 108: Manufacture of other food products | -0.8 |
| 309: Manufacture of transport equipment n.e.c. | -0.8 |
| 89: Mining and quarrying n.e.c. | -0.8 |
| 255: Forging, pressing, stamping and roll-forming of metal; powder metallurgy | -0.8 |
| 142: Manufacture of articles of fur | -0.8 |
| 293: Manufacture of parts and accessories for motor vehicles | -0.8 |
| 222: Manufacture of plastics products | -0.8 |
| 161: Sawmilling and planing of wood | -0.8 |
| 292: Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semitrailers | -0.9 |
| 251: Manufacture of structural metal products | -0.9 |
| 239: Manufacture of abrasive products and non-metallic mineral products n.e.c. | -0.9 |
| 283: Manufacture of agricultural and forestry machinery | -0.9 |
| 236: Manufacture of articles of concrete, cement and plaster | -0.9 |
| 235: Manufacture of cement, lime and plaster | -1.0 |
| 131: Preparation and spinning of textile fibres | -1.0 |
| 242: Manufacture of tubes, pipes, hollow profiles and related fittings, of steel | -1.0 |
| 259: Manufacture of other fabricated metal products | -1.0 |
| 245: Casting of metals | -1.1 |
| 243: Manufacture of other products of first processing of steel | -1.1 |
| 244: Manufacture of basic precious and other non-ferrous metals | -1.1 |
| 201: Manufacture of basic chemicals, fertilisers and nitrogen compounds, plastics and synthetic rubber in primary forms | -1.2 |
| 252: Manufacture of tanks, reservoirs and containers of metal | -1.2 |
| 101: Processing and preserving of meat and production of meat products | -1.2 |
| 241: Manufacture of basic iron and steel and of ferro-alloys | -1.2 |
| 232: Manufacture of refractory products | -1.3 |
| 51: Mining of hard coal | -1.6 |

**Appendix 3:** Britain’s cities; French and German cities, economic complexity

**Figure 24:** PCI for British, French and German cities (2018-2019)

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| **Activity** | **PCI** |
| 60 : Programming and broadcasting activities | 2.4 |
| 51 : Air transport | 2.3 |
| 70 : Activities of head offices; management consultancy activities | 1.7 |
| 63 : Information service activities | 1.7 |
| 62 : Computer programming, consultancy and related activities | 1.7 |
| 73 : Advertising and market research | 1.2 |
| 72 : Scientific research and development | 1.2 |
| 12 : Manufacture of tobacco products | 1.1 |
| 59 : Motion picture, video and television programme production, sound recording and music publishing activities | 0.6 |
| 26 : Manufacture of computer, electronic and optical products | 0.5 |
| 61 : Telecommunications | 0.3 |
| 64 : Financial service activities, except insurance and pension funding | 0.2 |
| 65 : Insurance, reinsurance and pension funding, except compulsory social security | 0.2 |
| 19 : Manufacture of coke and refined petroleum products | 0.2 |
| 11 : Manufacture of beverages | 0.0 |
| 66 : Activities auxiliary to financial services and insurance activities | -0.1 |
| D 35 : Electricity, gas, steam and air conditioning supply | -0.2 |
| 29 : Manufacture of motor vehicles, trailers and semi-trailers | -0.2 |
| 15 : Manufacture of leather and related products | -0.2 |
| 21 : Manufacture of basic pharmaceutical products and pharmaceutical preparations | -0.3 |
| 30 : Manufacture of other transport equipment | -0.3 |
| 74 : Other professional, scientific and technical activities | -0.3 |
| 20 : Manufacture of chemicals and chemical products | -0.3 |
| 52 : Warehousing and support activities for transportation | -0.4 |
| 27 : Manufacture of electrical equipment | -0.5 |
| 32 : Other manufacturing | -0.5 |
| 28 : Manufacture of machinery and equipment n.e.c. | -0.6 |
| 10 : Manufacture of food products | -0.7 |
| A Agriculture | -0.7 |
| 24 : Manufacture of basic metals | -0.8 |
| 18 : Printing and reproduction of recorded media | -0.9 |
| 17 : Manufacture of paper and paper products | -0.9 |
| 14 : Manufacture of wearing apparel | -1.0 |
| 23 : Manufacture of other non-metallic mineral products | -1.0 |
| 25 : Manufacture of fabricated metal products, except machinery and equipment | -1.0 |
| 22 : Manufacture of rubber and plastic products | -1.1 |
| 31 : Manufacture of furniture | -1.1 |
| 16 : Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials | -1.1 |
| 13 : Manufacture of textiles | -1.4 |

**Figure 25:** ECI for British, French and German cities (2018-2019)

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|  | **ECI** |
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**Figure 26:** Including French and German cities do not significantly change how British cities compare with each other

Source: ONS, INSEE and Destatis.

**Figure 27:** Urban ECI from British, French and German cities is highly correlated with their productivity levels.

Source: EUROSTAT, ONS, INSEE and Destatis.

1. Swinney, P (2021), So you want to level up? London: Centre for Cities [↑](#footnote-ref-1)
2. Cesar A. Hidalgo, Ricardo Hausmann (2009) ["The Building Blocks of Economic Complexity](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2705545), Proceedings of the National Academy of Sciences. [↑](#footnote-ref-4)
3. Our economic complexity calculations are based on the ‘Method of Reflections‘ in line with Cesar A. Hidalgo, Ricardo Hausmann (2009) ["The Building Blocks of Economic Complexity](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2705545), Proceedings of the National Academy of Sciences. [↑](#footnote-ref-5)
4. Mealy, P and Coyle, D (2019) “Economic complexity analysis”: A technical report for the research on Innovation & Global Competitiveness, Manchester: Greater Manchester Independent Prosperity Review; Benedikt S F and Manduce R (2019) “The Economic Complexity of US Metropolitan Areas”. [↑](#footnote-ref-6)
5. Both Mealyand Coyle (2019); and Fritz and Manduca (2019) consider both exporters and local services in their Economic Complexity Indicators. That said, as Fritz and Manduca (2019) mention, there are several economists who identified the specific importance of exporters to urban economies. [↑](#footnote-ref-7)
6. Note that complexity scores are a relative measure between geographies. This means that there will always be places with negative scores. [↑](#footnote-ref-8)
7. Weighted-average of economic complexity scores at the Local Authority level; the higher the score, the more complex the economy is. The most complex Local Authority is the City of London, followed by Tower Hamlets, while Dumfries and Galloway ranks last. Note that complexity scores are relative to other local authorities, meaning that there will always be local authorities with negative scores. [↑](#footnote-ref-9)
8. For example, see Rosenthal S and Strange W (2004), Chapter 49 – Evidence on the Nature and Sources of Agglomeration Economies, Handbook of Regional and Urban Economics, Volume 4, Pages 2119-2171 [↑](#footnote-ref-10)
9. Rice P, Venables AJ and Patacchini E (2006), Spatial Determinants of Productivity: Analysis for the Regions of Great Britain, Regional Science and Urban Economics 36 (6), 727-752. A study on the largest US cities suggests that agglomeration has an effect over a 60 minute drive time, with the majority of the gains concentrated in the first 20 minutes. See Melo P, Graham D, Levinson D and Aarabi S (2015) Agglomeration, accessibility and productivity: Evidence for large metropolitan areas in the US, Urban Studies [↑](#footnote-ref-11)
10. Arzaghi M & Henderson J (2008) Networking Off Madison Avenue, Review of Economic Studies (October 2008), pp. 1011-1038; Rosenthal S & Strange W (2003) Geography, Industrial Organization, and Agglomeration, Review of Economics and Statistics (May 2003), pp. 377-393 [↑](#footnote-ref-12)
11. Swinney P and Serwicka I (2016), Trading Places: Why firms locate where they do, London: Centre for Cities [↑](#footnote-ref-13)
12. Swinney P and Serwicka I (2016), Trading Places: Why firms locate where they do, London: Centre for Cities [↑](#footnote-ref-14)
13. When analysing economic complexity at the local authority level, it can be found that urban local authorities such as Hull, Telford and Burnley perform below the non-urban weighted average complexity score. Furthermore, there are examples of non-urban local authorities (Bath and North Sommerset; or Windsor and Maidenhead) that perform significantly above the urban average. [↑](#footnote-ref-15)
14. Swinney P (2018), The wrong tail? London: Centre for Cities; Clayton N and Serwicka I (2017), Trading Places 2: The role of cities in delivering the industrial strategy London: Centre for Cities [↑](#footnote-ref-16)
15. Complexity looks at employment within an industry relative to other parts of the country. It does not take account of that industry’s size relative to other industries within the same economy. [↑](#footnote-ref-17)
16. Most complex activities are defined as the five occupations with the highest Product Complexity Index (PCI) for each city. [↑](#footnote-ref-18)
17. High complexity defined by a ECI score above zero. [↑](#footnote-ref-19)
18. Nine largest cities excluding London: Birmingham, Bristol, Glasgow, Leeds, Liverpool, London, Manchester, Newcastle, Nottingham, Sheffield. [↑](#footnote-ref-20)
19. The Economic Complexity scores are calculated using SIC-2 employment codes for 39 different exporting occupations. The sample include 122 cities and large towns: 63 from Britain, 48 from France and 11 from Germany. Due to data availability, only large German cities are included. Figure 26 and *Figure 27*, from Appendix 3, shows that these findings are in line with the remaining complexity analysis at the British urban level. [↑](#footnote-ref-21)
20. The cities considered as largest are the following: Birmingham; Bristol; Glasgow; Liverpool; Leeds; Manchester; Newcastle; Nottingham; Sheffield. [↑](#footnote-ref-22)
21. **Other knowledge-related services include (2019):** Activities of head offices; Management consultancy activities; Research and experimental development on natural sciences and engineering; Research and experimental development on social sciences and humanities; Advertising; Market research and public opinion polling; Specialised design activities; Photographic activities; Translation and interpretation activities; Other professional, scientific and technical activities n.e.c.; Computer programming, consultancy and related activities; Data processing, hosting and related activities; web portals; Other information service activities.

    **Other knowledge-related services include (1981):** Business services (Other); Advertising; Professional/technical services (Other); Research/development [↑](#footnote-ref-23)
22. IT-related occupations include “Computer programming, consultancy and related activities” and “Data processing, hosting and related activities; web portals”; and Electronics-related occupations include “Electronic data processing equipment” and “Radio/electronic capital goods”. [↑](#footnote-ref-24)
23. Cities ranked by sector’s job prevalence, as a share of all exporting jobs. [↑](#footnote-ref-25)
24. Swinney, P (2021), So you want to level up? London: Centre for Cities. [↑](#footnote-ref-26)
25. See Centre for Cities’ blog ‘Does Nissan provide a model for levelling up?’ at https://www.centreforcities.org/blog/does-nissan-provide-a-model-for-levelling-up/ [↑](#footnote-ref-27)
26. There are exceptions to this trend as the table shows. Oxford had a substantially high concentration of exporting job in vehicle-related manufacturing and its economy remained complex. Birmingham and Newcastle, despite the low levels of concentration in a single sector, were not able to be as successful of some of their peers. [↑](#footnote-ref-28)
27. This is echoed in existing research. Moretti’s ‘The New Geography of Jobs’ (2012) explains the problems caused by the heavily dependence on manufacturing in cities like Detroit (page 75), and shows how the most sophisticated technologies become more common and less value with time (page 82). [↑](#footnote-ref-29)
28. Graham D (2007) Agglomeration Economies and Transport Investment, Journal of Transport Economics and Policy 41 (3) [↑](#footnote-ref-33)
29. Swinney, P (2021), So you want to level up? London: Centre for Cities. [↑](#footnote-ref-34)
30. Swinney, P (2021), So you want to level up?, London: Centre for Cities. [↑](#footnote-ref-35)
31. Enenkel K, Ramuni L and Swinney P (2020), Identifying potential growth centresacross Great Britain, London: Centre for Cities [↑](#footnote-ref-36)