**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 developed an economy is, which is based on the amount of accumulated knowledge a place has. 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 offer to businesses, the UK’s businesses with more knowledge tend to cluster within its urban areas. Consequently, on average cities are more complex – and therefore more productive – than others parts of the country.

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 yet reflected in high productivity. The size of their most complex sectors is comparatively small: unlike the successful cities in the Greater South East, they tend to account for less than 20 per cent of all ‘exporting’ jobs. 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 most 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 complexity’ trap. By increasing their levels of accumulated knowledge, these cities were able to attract more complex jobs.

Some argue that this turnaround has been driven by policy directly targeted towards big cities at the cost to other parts of the UK. Instead, the economy has specialised in more knowledge-based activities over this period as a result of increasing globalisation and big cities have been well placed to take advantage of this change. When looking back at the whole range of policy interventions since the 1980s, there was little direct policy focused on big cities. However, these places – due to their characteristics – implicitly benefit the most from policies such as Higher Education investment.

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 jobs have shown a preference to locate in these 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. With the UK economy shifting towards new activities, cities that have continued to specialise in the same 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 and services. 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 and adoption 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 this process. The amount of knowledge and knowhow (in particular ‘tacit’ knowledge, which is communicated face-to-face, as opposed to codified knowledge, which is written down) in economies determines which occupations exist and their complexity levels.

Large levels of accumulated knowledge lead economies to be more complex, which is likely to drive productivity (see *Box 2* for further details). Meanwhile, places with a comparatively low base of knowledge often specialise in activities that are associated with low complexity. Consequently, those areas are less likely to generate vast webs of knowledge within their economies, which the theory argues drives new innovations and growth in existing and in new sectors.

For example, a place is more likely to move from computer software development to smartphone app development, than it is to go from shirt production to app development.[[2]](#footnote-2) Moving from one complex activity to another, as described previously, highlights the importance inherent knowledge to attract new occupations. 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. **[[3]](#footnote-3)**

**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.[[4]](#footnote-4) 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 product, industry or activity. This idea is connected to capabilities approach and the cross-industry knowledge spillovers ideas described by Jacobs.[[5]](#footnote-5)

**What is a complex occupation?**

The economic complexity concept, by comparing activities across geographies, is able to identify how complex is one activity by simultaneously analysing its individual ubiquity (number of places that are able to make a product) but also how common are the remaining activities in that economy.

**A rare occupation is not necessarily a complex one**. 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.

**A complex economy** is generally characterised by having competitive advantages in several occupations with high complexity (PCI). Such combination reflects both economic diversity and the existence of accumulated knowledge do perform complex occupations. That said, **the productivity of an economy is also linked with the size of its most complex occupations**: if two economies have comparative advantages in the same sectors, we would expect the one with a higher employment share in the most complex jobs to be more productive.

**Economic complexity at the urban level**

In recent years, economic complexity has been applied at the urban level in several countries like the UK, USA and others.[[6]](#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**, 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. A place will be considered complex if its respective Economic Complexity Indicator (ECI) is above zero.[[7]](#footnote-7) Moreover, Product Complex Indicator (PCI) is based on employment data by occupation.

**In terms of economic sectors, we measure economic complexity based on exporting activities**. Because they are not tied to a local market, these exporters could, in theory, locate anywhere but in reality cluster in certain places, and so it is these activities that are of particular interest.**[[8]](#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 and benefit from scale, 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 areas were, on aggregate, substantially more complex than non-urban areas.

**Figure 1:** Urban areas are more likely to be complex than non-urban areas because they can more easily allow tacit knowledge to be shared

Source: ONS; Centre for Cities’ calculations.[[9]](#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.[[10]](#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.[[11]](#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.[[12]](#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.[[13]](#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 activities (defined solely by exporting sectors, see Box 2 for further details) are typically associated with knowledge-based services, such as finance, advertising and programming. These findings are in line with the existing research for the British economy.[[14]](#footnote-14)

The fact that few cities have a competitive advantage in this type of activities – and they are usually clustered next to other competitively rare activities – shows that they require high levels of accumulated knowledge. Meanwhile, manufacturing and mining jobs rank among the least complex activities in Britain (Figure 2). These more complex activities tend 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 activities associated with exporting 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. [[15]](#footnote-15)

**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 areas performing even below the non-urban average.[[16]](#footnote-16) This is important because, as Figure 3 shows, more complex economies are more productive, while 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.[[17]](#footnote-17) 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 actually willing to pay a premium, in the form of more expensive commercial space, to locate in these parts of the country. [[18]](#footnote-18)

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 access to pools of lower-skilled workers and low-cost land.

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

As bigger cities offer access to larger pools of workers and knowledge, complexity should increase with city size. This broadly holds in Britain, as Figure 4 illustrates. Larger cities – when adjusting for the number of workers in commutable distance - are more likely to have a more complex economy than its smaller peers.

**Figure 4:** Bigger cities are more complex

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 underperformance 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.[[19]](#footnote-19) Currently, most large cities have competitive advantages in some complex activities.

However, those sectors employ a comparatively low share of workers, when compared with the most successful economies in the Greater South East, which **tend to have more 20 per cent of their exporting jobs in their five most complex activities** (Figure 5). As a consequence, large cities’ most complex activities – and therefore most productive – are not large enough to drive up overall 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 occupations. 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 occupations.[[20]](#footnote-20)

**Figure 5:** In large cities, where there is a gap between complexity and productivity, complex sectors employ less than 20 per cent of the total number of exporting jobs

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 above average complexity.[[21]](#footnote-21) In contrast only three out of nine British cities (Bristol, Leeds and Manchester) had complexity levels above average.[[22]](#footnote-22) 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[[23]](#footnote-23)

Source: ONS , INSEE and Destatis.

That complex activities have shown a preference to locate either in highly productive cities or in the largest cities. This shows that further policies to improve the economies of British biggest cities would work with the grain of business investment in recent years. 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)**

**Cities, 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 (excluding London) have shifted from having below average levels of complexity in 1981 to being substantially more complex than the urban average today (see Figure 7), leading the growing relative complexity of cities and large towns overall.[[24]](#footnote-24)

**Figure 7:** Cities, in particular the largest ones, have become more relevant in the last four decades[[25]](#footnote-25)

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 levels of accumulated knowledge in 1981 – mainly in the Greater South East - remained more complex in the decades ahead. These cities had a higher likelihood of innovating and attracting highly knowledge workers and businesses. Box 4 looks in more detail at London’s development over this period which goes well beyond the general characterisation of the impact of the ‘Big Bang’.

At the opposite end 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 have consequently increased their productivity.

**Figure 8:** The Great South East cities tended to remain complex between 1981 and 2019, while some of 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 specific changes in the industry itself, combined with 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).[[26]](#footnote-26) In 2019, other knowledge-based services (e.g. design, computer programming, advertising) accounted for 47.2 per cent of all exporting jobs, above the 26.5 per cent from Finance and Insurance related activities.

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

Source: ONS; Census, 1981.

The rise of the financial sector is likely to have played a role in developing knowledge-based services. That said, national accounts from the last two decades show that finance and insurance sector has not been the main driver of London’s growth. The sector, as a percentage of London’s economy, remained mostly unchanged (13.7 per cent in 2019). Meanwhile, ‘Information and communication; combined with Professional, scientific and technical activities’ account for 25.1 per cent of London’s economy in 2019, a substantial increase from 16.1 per cent in 1998.

The findings above highlight that London’s success cannot be entirely explained by the rise of finance. London’s was able to attract talent, innovate and diversify its economic base; instead of simply replicating previous competitive advantages.

**Large cities dominate the places that were able to break out of the ‘low complexity’ trap, as** Figure8 illustrates. These cities were able to attract knowledge to their economies in the last decades, which is reflected in more complex economies. As Box 5 discusses, some cities were able to attract complex businesses without having a large share of jobs in related activities by 1981. Within the largest cities, Birmingham and Sheffield are the two exceptions: they had comparatively low complexity economies in 1981 and saw their complexity declining in relative terms.

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 – often in Britain’s biggest cities – 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.[[27]](#footnote-27) 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 activities 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 10:** 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 activities. Liverpool was able to build a competitive advantage in research-related activities, one of the most complex sectors the city has today, while it ranked 49th out of 63 cities in Research and Development activities in 1981.[[28]](#footnote-28) 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. If cities can attract talent, therefore increase their accumulated knowledge, complex economic activities are likely to emerge.

**The emergence of larger cities is result of structural changes and their ability to benefit from government policies. Not from policy directed towards them.**

The turnaround of most of the large cities 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 why this has happened. The first is that large cities have ‘had it too good’, as has been argued in some quarters, and have been explicitly favoured by policy in recent decades. This has sucked jobs into cities, so the argument goes, at the cost of their surrounding areas. 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.[[29]](#footnote-29) 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. The dates below are the year the policy was introduced.

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

2011 City Deals

2012 Coastal Communities Fund

2012 Enterprise zones

2014 Local Growth Fund

2014 Mayoral Devolution Deals

2019 Towns Fund

2019 Future High streets fund

2021 Levelling Up Fund

Cities, due to their characteristics, were able to indirectly take advantage from policy, which were specifically targeted to them. For instance, 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. But this hasn’t been the result of an explicit policy focus and is more of a reflection of larger cities being able to host a number of higher education institutions and provide greater economic opportunity to migrant workers.

The second reason is that as the overall economy moved from manufacturing towards knowledge-based services. The inherent benefits that large cities offer *–* combined with implicit policy described above *–* have meant that they have been well positioned to make the most 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.

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

When looking at the cities are large towns that have struggled in Figure 8, the data suggests policy makers should be cautious about economic strategies that encourage struggling places to 'build on their strengths' and ‘smart specialisation’. It is through doubling down on their comparative advantages that has resulted either in these places continuing to specialise in existing activities or replacing one set of low knowledge activities with another set of low knowledge sectors. These cities fall broadly into three groups.

*Cities that did not develop new specialisms*

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 found in the top left of Figure 8 – such Aberdeen, Blackpool or Swansea – have taken a backward step in the last 40 years. They had above average levels of complexity in 1981 but below average levels in 2019.

A common characteristic between these cities is that they continued to specialise in the same activities while the global economy shifted towards knowledge-based services. Aberdeen hasn’t moved beyond oil. Blackpool continues to specialise in aerospace manufacture. And steel still dominates in Swansea. This is in contrast to those cities that remained complex throughout the period, such as Reading and Edinburgh, which developed new specialisms over time. These cities changed their main specialisation patterns from electronics to IT-related activities, allowing them to maintain their comparatively high productivity levels (see Figure12).

**Figure 11:** Those places that continued to specialise in the same industries became less complex

The 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.

*Cities dominated by a single industry*

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. From the 15 cities that were dominated by a single industry (20 per cent or more of their exporting jobs) in 1981, only three are complex today.[[30]](#footnote-30) As illustrated in, *Figure 12* shows that cities with 20 per cent or more of their exporting jobs in a single activity, such as Luton and Plymouth have struggled since, with the exception of Oxford.

While being less specialised in a single sector has not been a guaranteed recipe for success in all cities (e.g. Birmingham and Newcastle), those cities have been more likely to see a subsequent improvement in complexity, when compared with cities specialised in the same activities. This is likely to be because overreliance on a small number of activities has limited the ability of cities to innovate and move to new economic activities.[[31]](#footnote-31) The observed dynamic has similarities with the economic concept of ‘resource curse’, which argues that high reliance on few economic activities, associated with natural resources, hinders long-term growth.[[32]](#footnote-32)

**Figure 12:** 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.

*Cities that moved from one low complexity activity to another*

The final set of cities are those that have been ‘trapped’ in low complexity activities in the last four decades, shown in the bottom left of Figure 8. These cities offer the counter example to the experience of most large cities. Like the large cities, their development also appears to have been guided by the inherent benefits that they offer to businesses, such as the ability to share information and inputs (*Box 3*), rather than their past industrial structure. The problem is that the benefits they have offered, such as large pools of unskilled labour and cheap land, have appealed to lower productivity activities (e.g. warehousing, distribution or food manufacturing). Box 7 looks at how coal mining cities and large towns have developed over the last 40 years.

Box 7: How coal economies evolved in the last decades

From the 22 cities and large towns that are ‘trapped’ in low complex activities, six of them were specialised on coal in 1981. Nowadays, these urban areas had moved away from coal are specialised in other sectors. None of these sectors are related to coal mining, suggesting their earlier specialism had no direct impact on the subsequent specialisms they developed. But all are lower skilled activities, suggesting that it is the inherent benefits – often driven by indirect legacy of previous activities (e.g. contamination affecting land values) – that these places offer to businesses that has driven their development, rather than the specific accumulated knowledge from past industrial structure.

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

  
Source: ONS; Census, 1981.

**The past economic capabilities and knowledge did not directly attract Nissan to Sunderland**

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.[[33]](#footnote-33) Before the car plant, Sunderland’s economy was mostly dominated by coal mining and shipbuilding.[[34]](#footnote-34) That said, there is little evidence that the accumulated knowledge from such activities was the reason why Nissan located in Sunderland.

If Nissan has moved to Sunderland mainly result of the specific capabilities built from previous industries, we should expect to see a strong relationship between the sectors stated 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 making vehicles.

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

**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, Portsmouth and Newcastle, 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 did not share Sunderland’s economic features in 1981. Unlike Sunderland, Coventry and Birmingham transitioned from cycle to car manufacturing in the previous century.[[35]](#footnote-35)

At the same time, places focused in mining and shipbuilding like Barnsley or Doncaster did not move their economic structure towards car manufacturing. Sunderland was able to attract Nissan due to other benefits, such as public subsidies, that were not directly related to the accumulated knowledge and capabilities from its previous industrial structure. That said, legacy effects from its past industrial base, indirectly supported Sunderland’s competitive advantages such as the availability of cheap land and labour.

1. **Implications for levelling up**

There are two main policy messages for levelling up that looking at economic complexity in Britain, and how it has changed over the last 40 years, offers.

1. **Levelling up build on the slow but positive progress of big cities, and this approach would work with the grain**

While large cities currently underperform, an underperformance that Centre for Cities conservatively estimates as costing the UK economy at least £48 billion per year,[[36]](#footnote-36) 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 yet not as strong as their European counterparts, and policy should focus on changing this.

This does not come at the cost of ignoring smaller places. But policy must recognise that it’s ability to bring about economic change in these places is more limited, and the outcomes of success (should it be achieved) for the national economy are very small. The Government will not level up the economy if it ignores the potential of Birmingham, Glasgow and Manchester in particular.

1. **Calls for places to ‘build on their strengths’ should be received with caution**

Recent calls by northern Conservative MPs for levelling up to focus on manufacturing in the North is the latest in the long line of rallying calls over the years for struggling places to build on their strengths.[[37]](#footnote-37) The analysis above shows that the challenge is what these places are missing, rather what they have. The aim of policy should therefore be to change the nature of these inherent benefits where it has the ability to do so, such as improving the skills of workers, to help them to reinvent their economies rather than further replicating what they already have.

Centre for Cities’ recent briefing *So You Want to Level Up* sets out what policy should focus on to achieve levelling up. It should focus on six areas: skills, devolution, public services, local transport and city centres, and detailed proposals on each are set out in the publication.[[38]](#footnote-38)

1. **Appendices**

**Appendix 1:** Economic complexity indicators

**Figure 15:** ECI at urban level (PUA) 1981 and 2019

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **PUA** | **ECI (1981)** | **Rank (1981)** | **ECI (2019)** | **Rank (2019)** |
| Cambridge | 1.8 | 1 | 2.3 | 4 |
| London | 1.7 | 2 | 3.7 | 1 |
| Edinburgh | 1.6 | 3 | 2.7 | 2 |
| Oxford | 1.5 | 4 | 2.4 | 3 |
| Aldershot | 1.5 | 5 | 1.1 | 12 |
| Worthing | 1.4 | 6 | 0.4 | 20 |
| Crawley | 1.3 | 7 | 1.4 | 8 |
| Reading | 1.3 | 8 | 2.3 | 5 |
| Brighton | 1.1 | 9 | 2.1 | 6 |
| Norwich | 1.0 | 10 | 0.2 | 28 |
| Slough | 1.0 | 11 | 1.0 | 14 |
| Southampton | 0.9 | 12 | 0.2 | 25 |
| Southend | 0.9 | 13 | 0.0 | 30 |
| Exeter | 0.8 | 14 | 0.6 | 16 |
| Gloucester | 0.7 | 15 | -0.5 | 36 |
| York | 0.7 | 16 | 1.1 | 11 |
| Bristol | 0.7 | 17 | 1.3 | 9 |
| Aberdeen | 0.7 | 18 | -0.2 | 32 |
| Ipswich | 0.7 | 19 | 0.4 | 21 |
| Swindon | 0.6 | 20 | 0.8 | 15 |
| Plymouth | 0.6 | 21 | -0.5 | 35 |
| Peterborough | 0.6 | 22 | 0.5 | 19 |
| Bournemouth | 0.6 | 23 | 0.4 | 22 |
| Luton | 0.5 | 24 | 0.0 | 31 |
| Blackpool | 0.5 | 25 | -1.0 | 45 |
| Milton Keynes | 0.4 | 26 | 0.2 | 27 |
| Cardiff | 0.4 | 27 | 1.2 | 10 |
| Basildon | 0.4 | 28 | -0.5 | 33 |
| Northampton | 0.2 | 29 | -0.5 | 34 |
| Portsmouth | 0.2 | 30 | 0.3 | 24 |
| Swansea | 0.2 | 31 | -1.4 | 56 |
| Telford | 0.0 | 32 | -1.4 | 55 |
| Leicester | 0.0 | 33 | -0.9 | 41 |
| Newport | -0.2 | 34 | -1.1 | 47 |
| Hull | -0.2 | 35 | -1.1 | 46 |
| Liverpool | -0.3 | 36 | 0.5 | 17 |
| Birkenhead | -0.3 | 37 | -0.5 | 38 |
| Glasgow | -0.3 | 38 | 1.8 | 7 |
| Birmingham | -0.4 | 39 | -1.0 | 44 |
| Leeds | -0.5 | 40 | 1.1 | 13 |
| Preston | -0.6 | 41 | -0.8 | 40 |
| Middlesbrough | -0.6 | 42 | -1.5 | 57 |
| Warrington | -0.6 | 43 | 0.2 | 26 |
| Sunderland | -0.7 | 44 | -1.2 | 50 |
| Sheffield | -0.7 | 45 | -0.9 | 43 |
| Newcastle | -0.7 | 46 | -0.5 | 37 |
| Dundee | -0.7 | 47 | 0.4 | 23 |
| Derby | -0.8 | 48 | -1.3 | 54 |
| Blackburn | -0.9 | 49 | -0.8 | 39 |
| Nottingham | -1.0 | 50 | 0.0 | 29 |
| Bradford | -1.0 | 51 | -1.2 | 49 |
| Manchester | -1.1 | 52 | 0.5 | 18 |
| Coventry | -1.1 | 53 | -0.9 | 42 |
| Stoke | -1.3 | 54 | -1.7 | 60 |
| Doncaster | -1.4 | 55 | -1.3 | 53 |
| Huddersfield | -1.6 | 56 | -1.6 | 59 |
| Wigan | -1.7 | 57 | -1.2 | 51 |
| Burnley | -1.7 | 58 | -1.3 | 52 |
| Barnsley | -1.8 | 59 | -1.7 | 61 |
| Mansfield | -1.9 | 60 | -1.2 | 48 |
| Wakefield | -2.2 | 61 | -1.5 | 58 |

**Figure 16:** Economic complexity in urban areas increased in the last four decades

**Appendix 2:** Economic complexity indicators in comparison with Germand and French counterparts.

**Figure 17:** Including French and German cities do not significantly change how British cities compare with each other

Source: ONS, INSEE and Destatis.

**Figure 18:** 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. Hausmann R, Hidalgo CA, Bustos S, Coscia M, Chung S, Jimines J, Simoes A, Yildirim MA (2013) The Atlas of Economic Complexity: Mapping Paths to Prosperity, Cambridge: MIT Press. [↑](#footnote-ref-2)
3. Hausmann R and Hidalgo CA (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-3)
4. Our economic complexity calculations are based on the ‘Method of Reflections‘ in line with Hausmann R, and Hidalgo CA (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)
5. Jacobs J (19693) The Economy of Cities, New York: Vintage Press. [↑](#footnote-ref-5)
6. 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)
7. Note that complexity scores are a relative measure between geographies. This means that there will always be places with negative scores. [↑](#footnote-ref-7)
8. Both Mealy and 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-8)
9. 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)
10. 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)
11. 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)
12. 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)
13. Swinney P and Serwicka I (2016), Trading Places: Why firms locate where they do, London: Centre for Cities [↑](#footnote-ref-13)
14. 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. [↑](#footnote-ref-14)
15. Swinney P and Serwicka I (2016), Trading Places: Why firms locate where they do, London: Centre for Cities [↑](#footnote-ref-15)
16. Hull, Telford and Burnley are amongst the local authorities that perform below the non-urban weighted average complexity score. Meanwhile Bath and North East Somerset and Windsor and Maidenhead are examples of non-urban local authorities that perform significantly above the urban average. [↑](#footnote-ref-16)
17. A place will be considered complex if its respective Economic Complexity Indicator (ECI) is above zero. [↑](#footnote-ref-17)
18. 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-18)
19. 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-19)
20. Most complex activities are defined as the five occupations with the highest Product Complexity Index (PCI) for each city. [↑](#footnote-ref-20)
21. High complexity defined by a ECI score above zero. [↑](#footnote-ref-21)
22. Nine largest cities excluding London: Birmingham, Bristol, Glasgow, Leeds, Liverpool, London, Manchester, Newcastle, Nottingham, Sheffield. [↑](#footnote-ref-22)
23. 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 2, shows that these findings are in line with the remaining complexity analysis at the British urban level. [↑](#footnote-ref-23)
24. Figure 16 (Appendix 1) shows that urban local authorities become more complex from 1981 to 2019. [↑](#footnote-ref-24)
25. The cities considered as largest are the following: Birmingham; Bristol; Glasgow; Liverpool; Leeds; Manchester; Newcastle; Nottingham; Sheffield. [↑](#footnote-ref-25)
26. **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.

    **Finance and insurance-related services include (2019):** Monetary intermediation; Activities of holding companies; Trusts, funds and similar financial entities; Other financial service activities, except insurance and pension funding; Insurance; Reinsurance; Pension funding; Activities auxiliary to financial services, except insurance and pension funding; Activities auxiliary to insurance and pension funding; Fund management activities.

    **Finance and insurance-related services include (1981):** Banking/bill-discounting; Other financial institutions; Activities auxiliary to banking/finance; Activities auxiliary to insurance [↑](#footnote-ref-26)
27. 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-27)
28. Cities ranked by sector’s job prevalence, as a share of all exporting jobs. [↑](#footnote-ref-28)
29. Despite its name, ‘City Challenge’ also covered local authorities that the Centre for Cities does not consider urban areas such as Sefton and Hartlepool. In other cases, the policy targeted peripheral urban local authorities (e.g. Sandwell and Walsall). [↑](#footnote-ref-29)
30. Those cities are Oxford with 24.9 per cent of exporting jobs in Motor vehicle bodies; Crawley with 23.8 per cent of exporting jobs in Air transport; and Peterborough with 25.1 per cent of exporting jobs in Internal combustion engines. The activities they specialised does not seem to be reason why these cities were able to remain complex as some low complexity cities had competitive advantages in the same sectors (e.g. Luton). [↑](#footnote-ref-30)
31. 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-31)
32. The term resource curse was first used by Richard Auty in 1993 to describe how resource-rich countries tended to be relatively poor. Today, the IMF considers a nation ‘resource-rich’ if at least 20 per cent of exports or fiscal revenue is derived from ‘non-renewable natural resources’.

    Aunty R (1993), Economic and Political Reform in Developing Countries: Economic Development and the Resource Curse Thesis (page 58 to 80). [↑](#footnote-ref-32)
33. 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-33)
34. Followed by manufacturing activities like other glass products; mechanical lifting/handling equipment and active components/sub-assemblies. [↑](#footnote-ref-34)
35. Clayton N & Mandair R, (2014) Cities Outlook 1901, London: Centre for Cities [↑](#footnote-ref-35)
36. Swinney, P (2021), So you want to level up? London: Centre for Cities. [↑](#footnote-ref-36)
37. Northern Research Group of Tory MPs call on Boris Johnson to 'show the North some love' and help create a 'science and engineering corridor', Yorkshire Post, 13th July 2021 [↑](#footnote-ref-37)
38. Swinney, P (2021), So you want to level up?, London: Centre for Cities. [↑](#footnote-ref-38)