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ARTICLE

THE PRODUCTIVITY PERFORMANCE OF DIFFERENT TYPES OF UK REGIONS AND THE CHALLENGES OF LEVELLING UP

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Abstract

This article examines the key features of the UK's spatial productivity relationships and discusses some of the key questions currently being articulated or debated as they relate to potential devolution-related discussions. The paper demonstrates that the local productivity challenges facing UK regions are nationwide in nature rather than local, and systemic rather than specific. In particular, the scale-productivity relationships across cities and regions which are evident in almost all other OECD countries are largely absent in the UK. Instead, previous prosperity is the dominant marker of current local prosperity, suggesting that cumulative causation processes define the UK regional and urban economic landscape rather than scale relations. This article explains these features in a manner which is accessible to a wide audience, in order to provide greater clarity regarding the fundamental economic problems to be addressed and also the underlying objectives which the Levelling Up agenda needs to achieve.

Keywords: regions; cities; productivity scale.

JEL codes: R11; R12; O18; O47.

1. Introduction

The UK has some of, if not the, largest interregional productivity inequalities of any advanced OECD country (Carrascal-Incera *et al.*, 2020; Davenport and Zarenko, 2020; McCann, 2020a; Raikes *et al.*, 2019), especially given the UK's small geographical size. These local productivity differences feed into differences in overall living standards and quality of life because local productivity is very closely related to overall prosperity and overall multi-dimensional living standards (Veneri and Murtin, 2019). While some parts of the UK enjoy very high levels of productivity and overall prosperity by international standards, many other parts of the country enjoy neither, and these differences are also reflected in major regional differences in social mobility, access to healthcare, quality of life and life expectancy (McCann and Ortega-Argilés, 2021a,b). These local and regional productivity variations are also a national problem, because the economically weaker parts of the country offset many of the productivity gains of the more prosperous parts of the country, thereby limiting overall national productivity growth. In addition, the economically weaker parts of the country also appear to be much less resilient in responding to economic shocks than the more prosperous parts of the country, thereby entrenching the interregional inequalities, an issue which will in all likelihood become even more important in the light of the aftermath of both Brexit and the Covid-19 pandemic.

In the case of the UK, however, an awareness of the scale of UK interregional productivity inequalities has only cut through in high-level government circles in recent years (O'Brien and Miscampbell, 2020). To a

significant extent, the rapidly-growing recent awareness of these issues was due to the impacts of the geography of the 2016 pro-Brexit vote (McCann and Ortega-Argilés, 2021a,b), but the prior lack of awareness was due in part to the UK's ultra-centralised governance systems allied with a lack of robust and comparable statistics between countries. However, enormous programmes of detailed data construction by the OECD and Eurostat (Carrascal-Incera *et al.*, 2020) have recently allowed for a much deeper reconsideration of these issues, and it is now widely accepted empirically (Davenport and Zarenko, 2020; McCann, 2016, 2020a; Raikes *et al.*, 2019) that the UK exhibits amongst the highest interregional productivity inequalities in the industrialised world. Moreover, these high inequalities are evident over very short distances, such that it has been argued that the country appears to have been decoupling (McCann, 2016) and partitioning (Venables, 2021) internally on many levels over the last four decades (Rice and Venables, 2021). Furthermore, there are now powerful arguments and evidence which suggest that alongside the UK's specific geographical features and the asymmetric impacts of modern globalisation, the ultra-centralised and top-down nature of the UK governance system has itself also been a major contributor to these inequalities (Carrascal-Incera *et al.*, 2020), in that nationwide policy-design and decision-making has been especially indifferent and insensitive to these interregional differences (McCann, 2016).

Many of the specifics of governance-related arguments have been discussed in detail elsewhere and are largely beyond the remit of this article (McCann, 2016, 2021; McCann *et al.*, 2021). However, in this article, we will examine the key features of the UK's spatial productivity relationships and discuss some of the key economic questions currently being articulated or debated regarding potential devolution-related discussions. Current discussions regarding 'Levelling Up', 'Left-Behind' places and so on, are characterised by a plethora of claims and beliefs regarding how the different parts of the UK fare with respect to one another, as well as how the UK compares to other countries in this regard. Most of these arguments, especially as they are articulated in political or media circles, tend to focus on specific examples and very local perspectives on these issues, and the types of remedies and responses advocated thereby also tend to reflect these very local perspectives. Yet, the productivity challenges facing UK regions are nationwide in nature rather than local, and systemic rather than specific. The aim of this article is to explain these features in a manner which is accessible to a wide audience, in order to provide greater clarity regarding the fundamental economic problems to be addressed and also the underlying objectives which any Levelling Up agenda needs to achieve.

The rest of the article is organised as follows. In Section 2, we briefly review the productivity performance of the UK's 12 large regions spanning the decade prior to the 2008 global financial crisis and also the decade following the crisis. We then move on to Section 3 to examine these patterns in more detail on the basis of data on the UK's 179 smaller regions.¹ Assessing the performance of the UK's large regions by examining the performance distributions of smaller regions nested within the large regions is an approach already deployed elsewhere (Carrascal-Incera *et al.*, 2020; CBI, 2020). In Section 4, we repeat this exercise but this time using the standardised definitions of urban areas. The results and insights of these analyses are then further explored in Section 5, which also discusses potential explanations and responses to these observed patterns. Our arguments suggest that in economic terms, for any devolution-related initiatives undertaken as part of the Levelling Up agenda to be successful in the long run, what is required is for there to be fundamental shifts in the UK relationships between local productivity and local scale, and also in the local relationships between prior prosperity and subsequent prosperity.

¹For empirical and comparative purposes, in this article, we use the OECD Territorial Level definition and classification system of regions, which since the UK left the EU, is adopted as the new statistical reference framework for the UK, replacing the EU NUTS system. In the UK (alone) this classification system is now referred to as the 'ITL International Territorial Level' system, with the ITL1 classification within the UK being consistent with the OECD-TL2 and EU NUTS1 classifications, the ITL2 classification being consistent with the EU NUTS2 regions, and the ITL3 classification being consistent with the OECD-TL3 and EU NUTS3 classifications. In the UK, the ITL1 and OECD-TL2 classification is comprised of 12 Large OECD-TL2 regions which conform to the 9 former Government Office Regions plus the three Devolved Administrations, with an average size of 5.5 million people, and ranging from 1.88 million in Northern Ireland to 9.2 million in the South East of England. The 179 OECD-TL3/ITL3 small regions have an average population of 370,000 people. In this article, we will also examine the 40 UK Metropolitan Urban Areas with populations of over 250,000 people. This uses a different definition of places (OECD, 2012).

2. The economic features of the UK's large regions

Over the last four decades (Carrascal-Incera *et al.*, 2020; McCann, 2016) since the second half of the 1980s, a large core-periphery interregional divide has opened up in UK productivity levels and more recently, even more strongly in productivity growth. During the twentieth century, productivity variations between UK regions narrowed steadily for nearly half a century from the 1930s through to the late 1970s and early 1980s (Carrascal-Incera *et al.*, 2020), while at the same time as UK urban populations steadily converged towards a Zipf's Law-type distribution (McCann, 2016). By the 1980s, the productivity premium of London over other UK regions remained largely constant and of the order of 25–28 per cent (McCann, 2016). However, from the second half of the 1980s onwards (Martin *et al.*, 2021; McCann, 2016), regional productivity levels across the UK as a whole began to diverge, accelerating rapidly during the early 1990s, driven primarily by surges in London, and to a lesser extent also in other southern regions. The result was that the UK increasingly started to display a strong core-periphery productivity structure to its economic geography, with the more prosperous core regions being those in and around the London economy and its very large hinterland including the South East, East and South West regions plus to some extent also Scotland, while the economically peripheral regions include those in the Midlands and North of England, plus Wales and Northern Ireland (Martin *et al.*, 2021; McCann, 2016). This divergence continued unabated during the 2000s, right up to the onset of the 2008 Global Financial Crisis. Meanwhile, during this initial period of divergence period from the 1980s to the 2008 crisis, the UK urban distribution also diverged sharply away from Zipf's Law, with the growth of London becoming a marked outlier even by the standards of centralised unitary states (McCann, 2016).

These various trends are clearly evident when examined at the level of the UK's 12 large regions, as we see in figure 1. The nature of UK regional productivity distributions changed in the aftermath of the 2008 Global Financial Crisis. During the pre-crisis decade, interregional productivity divergence was associated with steady productivity growth in all UK regions. However, in the wake of the 2008 crisis, interregional productivity divergence was associated with a flatlining in productivity in many non-core regions. As we see in figure 1, when defined in terms of GDP per capita, not only are the productivity levels in these core regions noticeably higher than those in the peripheral regions, but their response to the global financial crisis has also been markedly different. Although the London economy was initially in the eye of the storm during the immediate aftermath of the 2008 global financial crisis, as we see in figure 1, it soon emerged strongly from the crisis, whereas regions such as the North East, Yorkshire & Humber, East Midlands, Wales and Northern Ireland have displayed productivity performance which has flatlined to such an extent that in real terms, today's productivity levels in these regions are largely the same as those which persisted prior to the 2008 global financial crisis. In other words, in real terms, the overall productivity growth in these regions over more than a decade has been approximately 0. Other regions in the Midlands and the North have fared only slightly better. The result has been that the interregional inequalities have increased further since the 2008 crisis, while at the same time the overall UK economy has exhibited a dramatic overall productivity slowdown. On many socio-economic levels, a combination of slow or non-existent national productivity growth and widening regional inequalities is the worst recovery trajectory possible, short of an outright economic depression.

3. The productivity-related features of the UK's small regions

These divergent productivity trends which are observable at the level of the UK's 12 large OECD-TL2 regions both reflect and to some extent may also mask productivity differences at more local scales. Obviously, not all areas in the wider south and southeast are prosperous and not all areas in the Midlands and North are economically weak. For example, outlying areas such as Cornwall and some coastal towns in East Anglia struggle economically, as do many parts of central western Scotland, while many mediaeval cathedral or small university cities in the Midlands and Northern regions of England and part of Wales are economically very prosperous. The UK's spatial inequalities are comprised of interregional inequalities, interurban and also intraregional inequalities, and by international



Figure 1. (Colour online) UK: OECD-TL2 regional productivity: GDP per capita.

Source: OECD regional and urban datasets

Note: Productivity is defined here in terms of GDP per capita and calculated as US\$ per head, at constant prices, constant purchasing power parity, base year 2015. This is the international benchmark definition for cross-country and time-period comparisons [GDP per capita is a very broad and all-encompassing definition of productivity, and other measures of productivity such as productivity per hour worked vary rather less across regions than GDP per capita (Sells, 2021). However, the broader variations in GDP per capita also capture differences in the number of hours worked, the number and quality of the job opportunities available, returns to capital and land and the overall demand for employment and worker participation, all of which are critical features of an economy's dynamism and prosperity. For the purposes of this article, we will therefore employ these broader definitions of productivity in order to capture the broader economic features of the regions].

comparisons, the UK is high on each of these counts (Carrascal-Incera *et al.*, 2020). UK interregional inequalities account for some 60 per cent (Arbabi *et al.*, 2019; Zymek and Jones, 2020) of overall inequalities while intraregional inequalities account for some 40 per cent (Arbabi *et al.*, 2019; Zymek and Jones, 2020) of overall spatial inequalities. In countries which are interregionally very equal, almost all spatial inequalities are very local intraregional inequalities, whereas in countries such as the UK interregional inequalities both reflect and also overlay intraregional inequalities. Part of the explanation might be that qualitatively different types of places have displayed different productivity experiences and that the global economy has favoured certain types of places over others. However, how this intraregional issue relates to the interregional issue in the UK is further complicated by the fact that recently, there has also emerged in the UK something of a 'towns versus cities' narrative which posits that in recent decades economic prosperity has favoured the large cities and their 'metropolitan elites', largely at the expense of small towns and rural regions (McCann and Ortega-Argilés, 2021a,b), and this narrative is currently very powerful in shaping policy responses to local and regional economic development challenges (McCann and Ortega-Argilés, 2021a,b). Yet, the empirical evidence on these matters suggests that the UK has amongst the smallest gaps between urban and rural regions in the OECD (Garcilazo and Oliveira-Martins, 2020), and also tiny productivity differentials between large cities, towns or even villages (ONS, 2017, 2019, 2020). As such, there needs to be greater clarity regarding these relationships, and for these

reasons, it is important to examine productivity differences at smaller geographical scales and for different types of places, in order to further uncover the specific characteristics of the individual large region's performance.

In order to examine this argument, we can delve deeper into the characteristics of different types of places by analysing the productivity economic performance of smaller OECD-TL3 regions, of which there are 179 such areas within the UK. There are on average 15 OECD-TL3 regions per TL2 region, with an average population of just under 370,000 people. Our aim here is to understand the extent to which different types of places experience different productivity performances, because the literature contends that this is likely to be a key determinant of local productivity performance. In order to facilitate this discussion, we can exploit the fact that the OECD classifies TL3 small regions into five different categories according to their built and natural environment characteristics, namely: Large Metro regions; Metro regions; Non-Metro regions with Close Access to Metro Areas; Non-Metro areas with Access to a Small City or Town; Remote Rural regions. In figure 2, these different categories of small regions are coloured differently, with large Metro regions coloured in dark blue; Metro regions in maroon; Non-Metro regions with Close Access to Metro areas are coloured in green; Non-Metro regions with Close Access to Small or Medium Cities are coloured in yellow-gold; and remote rural regions are coloured in grey.

In figure 2, we begin by plotting the relationship between the average annual growth in GDP per Capita 2000–2018 for each small region and the GDP per capita in 2000 for the respective region. This allows us to examine whether there are any regional cumulative causation-type processes in operation by identifying the extent to which places which were previously more prosperous typically exhibited stronger growth in subsequent decades, while those areas which were previously less prosperous exhibited weaker growth. Our starting point is the year 2000, as this is the first year when fully comparable data are available.

In figure 2, what we initially observe is that there is an upward sloping relationship between productivity levels in 2000 and productivity growth over the following two decades, which suggests that endogenous processes may be operating whereby already-prosperous places become even more prosperous. However, the scatterplot also suggests that this relationship is dependent on a few key outlier regions. In figure 2, the regions which are outliers with very high GDP per capita levels in 2000 are all Large Metro regions in and around London. The rest of the regions are bunched together in a

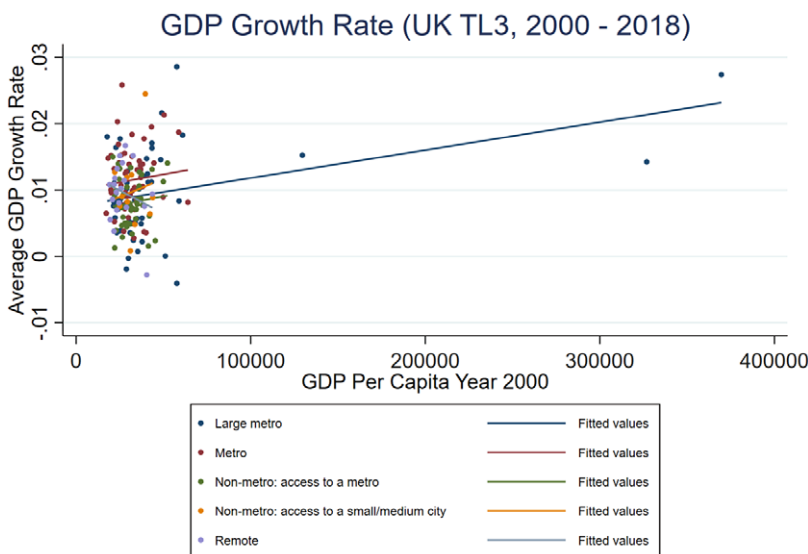


Figure 2. (Colour online) Growth performance in different types of OECD-TL3 regions

concentrated ‘cloud’ in which the pattern of the growth performance of different types of regions appears to be similar to each other and largely independent of prior productivity levels.

In order to examine these relationships in more detail, we can exclude these outlier regions whose GDP per capita levels in 2000 were above \$100,000 and compare the economic performance of the rest of the UK’s small TL3 regions, as depicted in figure 3. Similarly, figure 4 repeats the same exercise after removing both the high GDP per capita outliers and also the very high GDP per capita growth outliers. What we see in both figures 3 and 4, is that there is almost no relationship between GDP per capita in

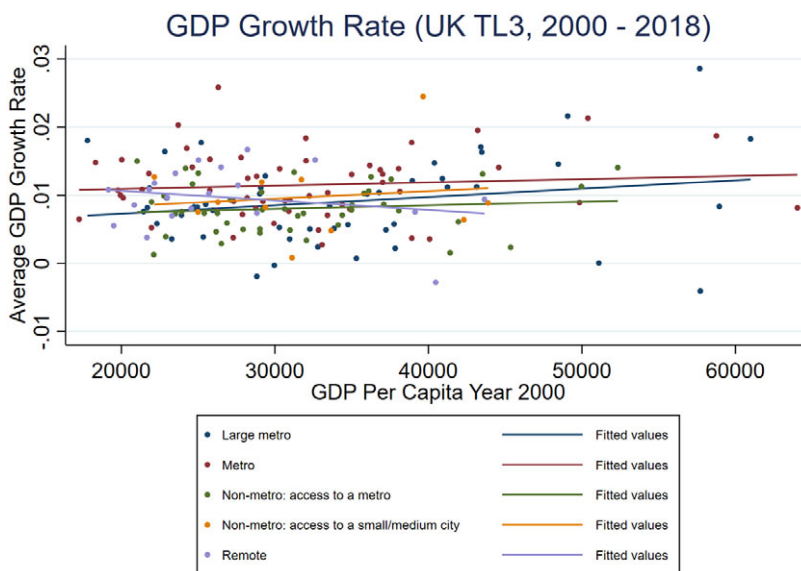


Figure 3. (Colour online) Growth performance in different types of OECD-TL3 regions (after removing very high productivity outliers)

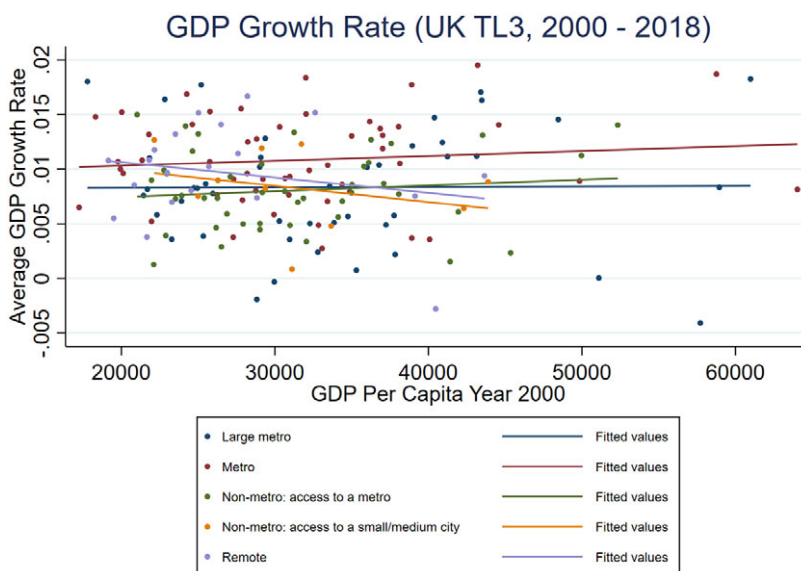


Figure 4. (Colour online) Growth performance in different types of OECD-TL3 regions (after removing very high productivity and productivity growth outliers)

2000 and subsequent growth in GDP per capita. In other words, the prosperity of a place in 2000 was not a clear marker of productivity growth over the following two decades for any particular type of region. In particular, for Large Metro regions, there is no observable relationship, with the trend line being completely flat.

Another way of examining these issues is to consider interregional labour flows. Standard disequilibrium theories of migration would suggest that labour will flow to areas of higher productivity paying higher wages, whereas equilibrium theories of migration suggest that such flows will depend on the spatial variations in amenities as well as wages, such that prosperity and quality of living may not be entirely related to productivity and wage-incomes (McCann, 2013). Therefore, in order to understand UK regional evolutions, it may be instructive to see if there are any particular population growth patterns evident across different types of places, which are related to either the type of place or the size of a place and which reveal aspects of local prosperity. In order to do this, we can also repeat the same exercise as above, but this time by using the size of the place in the year 2000 and 2018, respectively, as the benchmarks, rather than the GDP per capita of that year. This is done in figures 5 and 6.

Again, what we see from figures 5 and 6 is that neither the scale nor the type of place appears to play any real role in determining subsequent local productivity growth. Indeed, if anything, the relationships between productivity growth and scale are slightly negative, especially for large metro regions, excluding London.

There is evidence that there are demographic differences between different types of places with larger urban areas, including both large towns and cities, displaying higher proportions of younger age cohorts and lower shares of older age cohorts (ONS, 2021). Population growth in small towns is dominated by older age cohorts, both due to demographic change associated with baby-boomers, but also migration, while working towns exhibit higher growth than residential towns (ONS, 2021). However, these demographic differences between different types of places do not appear to systematically translate in any way into productivity or prosperity differentials associated with scale.

This lack of any scale-related observation is a fundamental part of the UK's 'productivity puzzle' (McCann, 2020b). In the UK neither local productivity levels nor productivity growth is related to the scale of places in the way that they are in many other countries (McCann, 2016). In textbook models, large places will tend to have higher level of productivity, and if agglomeration economies are important,

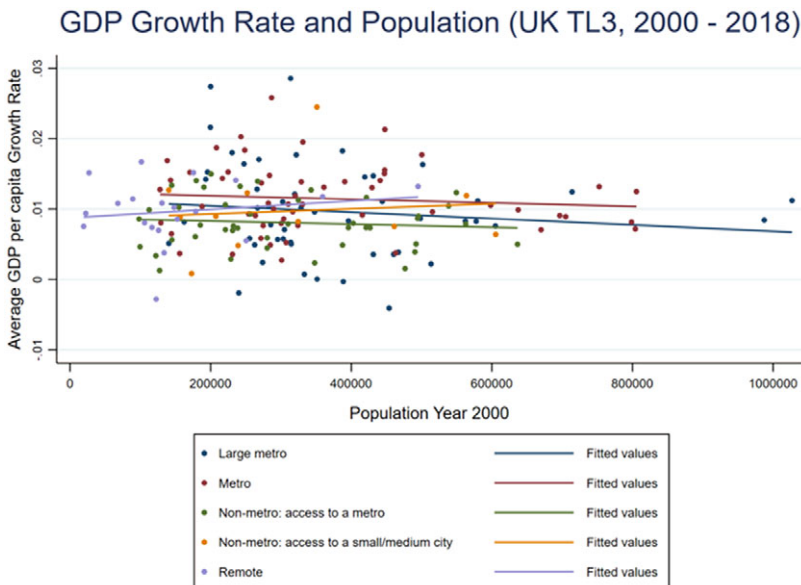


Figure 5. (Colour online) Population scale (2000)-productivity growth relationships in different types of OECD-TL3 regions

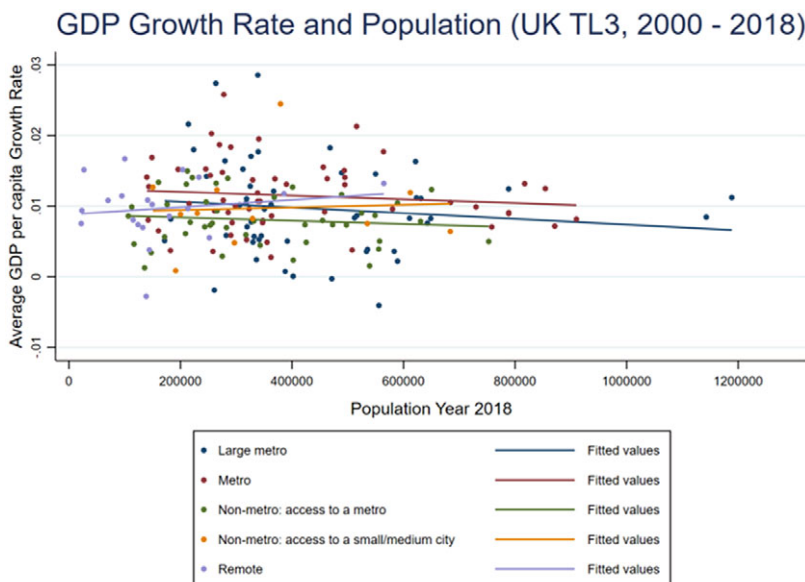


Figure 6. (Colour online) Population scale (2018)-productivity growth relationships in different types of OECD-TL3 regions

then growth would be expected to be associated with productivity levels. However, while this has been the case in recent years in countries such as the USA, this has not been the case in the UK. At the same time, the prosperity of a place also appears to be no indicator of its future prospects. While these observations might on face value interpreted as being consistent with Zipf's law, in reality, the UK urban system does not even nearly conform to Zipf's Law (McCann, 2016), with London being an extreme outlier even by the standards of countries with unitary governance systems (McCann, 2016). In other words, in the UK over the last two decades, neither local population scale, local prosperity nor the type of place appears to play any real role in determining the subsequent local growth patterns for any particular type of place. Indeed, it is these relationships, or rather the lack thereof, which largely account for the fact that the UK's gaps between urban and rural regions (Garcilazo and Oliveira-Martins, 2020) and between large cities, towns or even villages (ONS, 2017, 2019, 2020) are so tiny by OECD standards.

The most direct explanation of these observations is that the growing UK regional divide is exactly that, it is a regional divide, such that in the economically prosperous core regions, most types of places are enjoying growing prosperity irrespective of whether they are large cities, towns or rural areas, whereas in economically weak regions, low productivity is pervasive across most types of places including large cities, towns and rural areas.

4. The productivity performance of the UK's metropolitan urban areas

An alternative way to consider these issues is to examine the productivity features of metropolitan areas. The UK is one of the most highly urbanised societies in the world (McCann, 2016), and it may be that various clues to the UK regional evolutions could be found specifically in terms of the performance of their cities. In order to do this, we use the OECD (2012) definition of Metropolitan Urban Areas which is based on a composite of adjacent or neighbouring built-up urban localities combined with a commuting threshold between adjacent or neighbouring built-up areas. In the case of the UK, this implies that metropolitan areas will jump over local greenbelt boundaries, and these Metropolitan Urban Area definitions typically spread beyond individual OECD-TL3 small regions but are contained within OECD-TL2 large regions, except for the case of London where it spreads beyond the OECD-TL2

definition of London. There are 40 UK Metropolitan Urban Areas over 250,000, accounting for some 49.5 million people, or rather 74 per cent of the UK population. Of this number, some 12.434 million are accounted for just by the London Metropolitan Urban Area, which amounts to one-quarter of the total UK Metropolitan Urban Area populations.

Figures 7 and 8 plot the relationship between the GDP per capita of the metropolitan area and its population size in 2018 both including London, and excluding London, respectively. Typically, from both international evidence and also the analytical frameworks central to urban economics, we would expect to see an upward-sloping relationship between productivity levels and city size. However, in the UK, we only see such a relationship when London is included in the sample. When London is excluded, as in figure 8, then this relationship entirely disappears. Indeed, in figure 8 the relationship is if anything slightly negative, and this is heavily driven by the relatively weak productivity of the UK's large cities (Martin *et al.*, 2021; McCann, 2016), many of which are less productive than much smaller urban areas. As we see in Supplementary figures A4 and A5, broadly this same lack of any urban productivity-scale relationships has persisted for decades, and was almost exactly the same back in 2000 as it was more recently in 2018.

The UK's lack of any meaningful urban productivity-scale relationship is also evident in terms of growth rates. Figure 9 plots the relationship between previous urban population scale in 2001 and the average annual GDP per capita growth 2001–2018. In figure 9, we see that the relationship between annual productivity growth and population scale is only very slightly upward-sloping, and is almost entirely dependent on the outlier of the London Metropolitan Urban Area economy, which is larger than the next 14 Metropolitan Urban Area economies combined. If we remove London from the scatterplot, as is done in figure 10, we see that the relationship is actually slightly negative, with smaller Metropolitan Urban Areas achieving slightly higher growth over the last two decades than larger areas, although there is significant variability around this trend.

However, the broad trend is basically 0, with no real relationship between productivity growth and scale. However, while on the one hand, this observation might appear to be consistent with Zipf's Law,

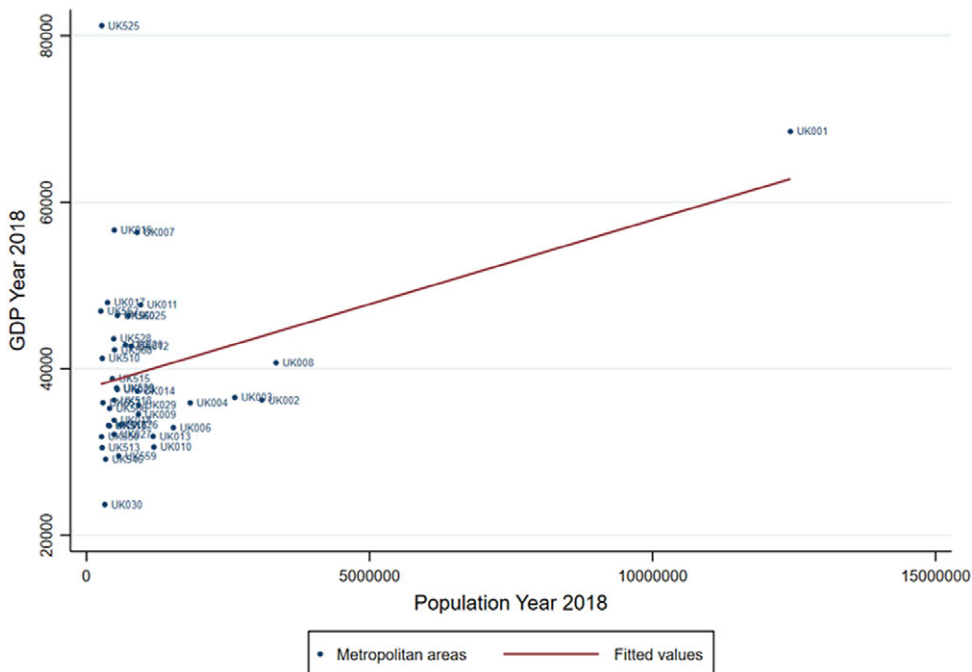


Figure 7. (Colour online) Productivity levels and population scale (2018) for UK metropolitan urban areas

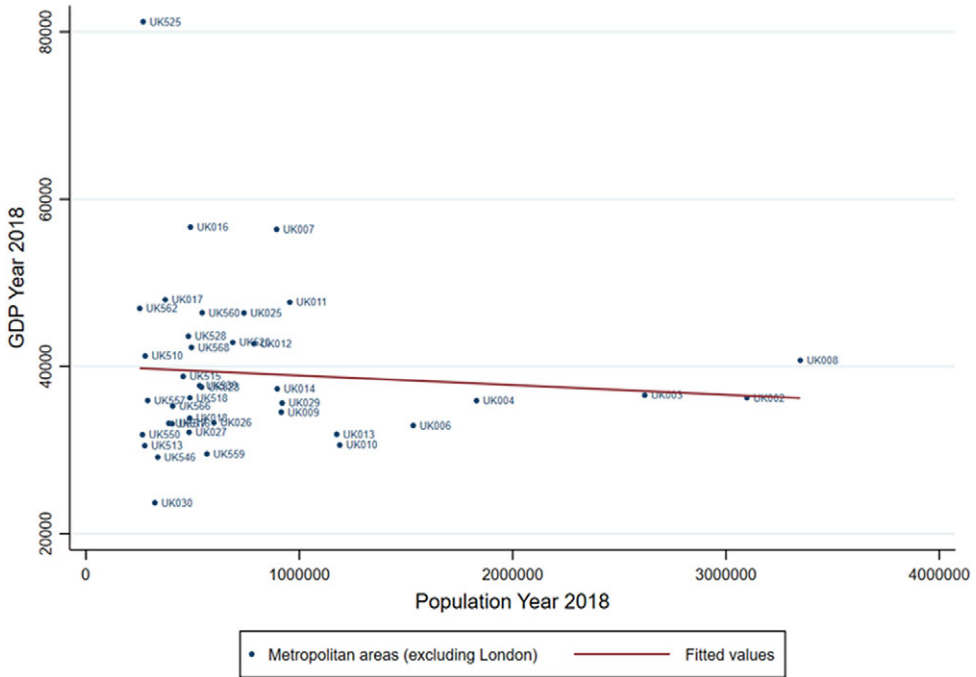


Figure 8. (Colour online) Productivity levels and population scale (2018) for UK metropolitan urban areas (excluding London)

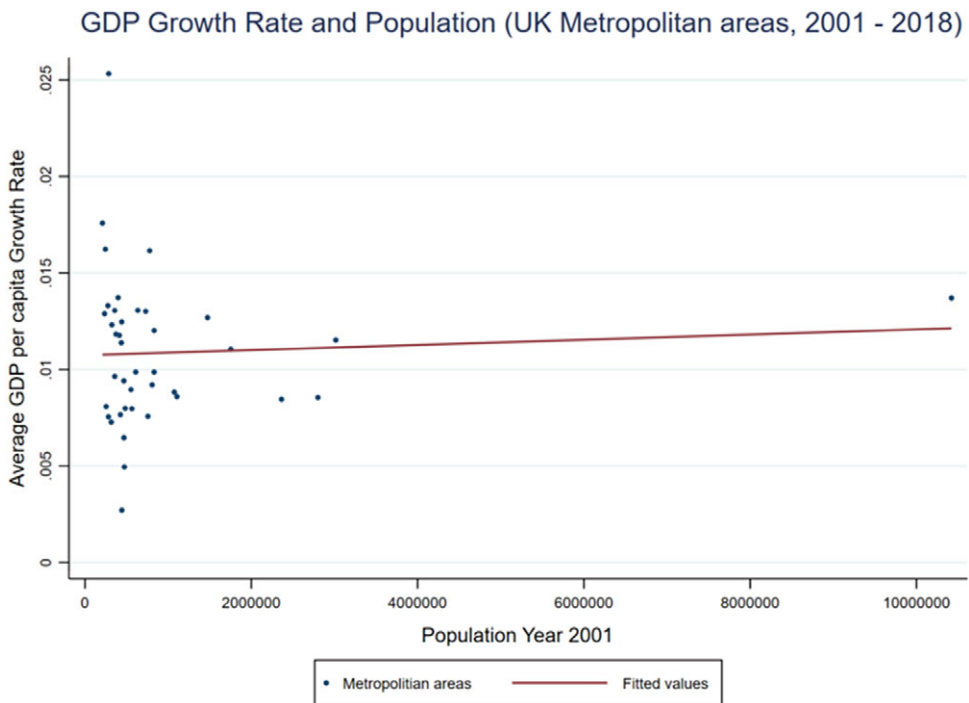


Figure 9. (Colour online) Productivity growth and urban population (2001) for UK metropolitan urban areas (2001–2018)

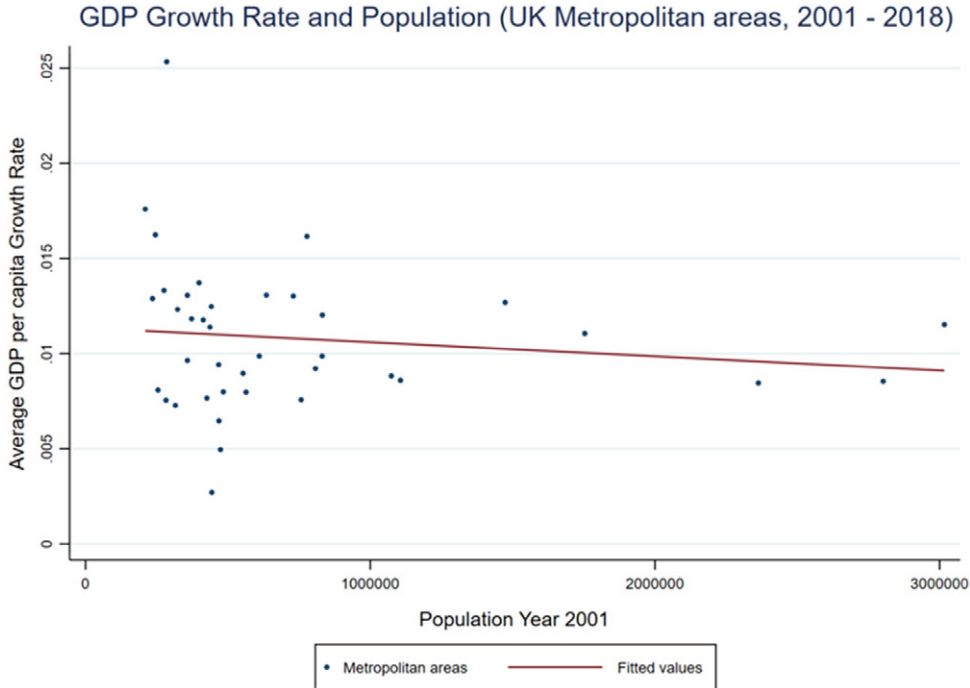


Figure 10. (Colour online) Productivity growth and urban population (2001) for UK metropolitan urban areas (2001–2018) after removing London

neither the UK's observed city-size distribution (McCann, 2016) nor the patterns outlined here are consistent with urban growth dynamics typically observed across many other countries on the other hand. Moreover, in figure 10, even after removing London from the scatterplot, what we still observe is that for UK Metropolitan Urban Areas there are no clear relationships between growth and scale. Indeed, again, if anything the relationship is slightly negative.² What therefore becomes clear, is that there is a lack of any general agglomeration-related scale-productivity or scale-productivity growth relationships across the UK urban system, and the lack of such relationships is also evident for all other types of UK areas and places.

Again, as with the different types of OECD-TL3 regions, we can also assess the extent to which there are cumulative causation types of processes operating by examining the extent to which subsequent urban productivity growth is associated with previous levels of productivity and prosperity. In order to examine this issue, figure 11 plots the relationship between average annual productivity growth in urban areas and the productivity levels in 2001. What we observe in figure 11 is that there is an upward-sloping relationship, which suggests that the cities which were already relatively prosperous two decades ago on average subsequently grew faster than less prosperous cities over the following two decades.

However, the general relationship depicted in figure 11 might be affected by the presence of a small number of high productivity growth urban areas of Milton Keynes (UK525), Edinburgh (UK007) and Aberdeen, and a small number of very low productivity but high productivity growth places, namely Sunderland (UK510) and Medway (UK513), one low growth area Derby (UK518) plus one very low productivity and productivity growth area Wirral (UK). Therefore, if we remove these outliers and focus on the remaining group of Metropolitan Urban Areas, we see in figure 12, the productivity growth

²One argument could be that these scatterplots are rather static. Therefore, another way to consider these issues is to examine the relationship between productivity growth and population growth, as is done in the Supplementary Appendix. The Supplementary Appendix also contains other related scatterplots which check additional aspects of these potential scale-related relationships. Again, in general, they are all generally little different than 0.

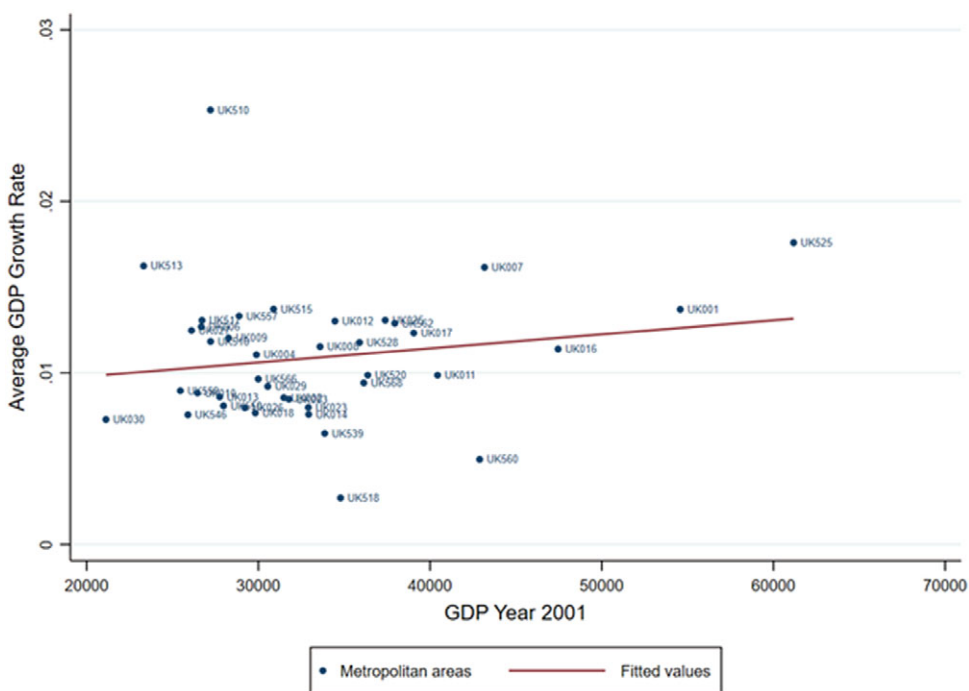


Figure 11. (Colour online) Productivity growth and productivity levels (2001) for UK metropolitan urban areas (2001–2018)

relationships are still positive. In other words, in general, cities and urban areas which were originally more prosperous subsequently grew faster than those which were less prosperous. This points to something of an urban cumulative causation process in operation in cities. Importantly, however, this is not a scale-related urban phenomenon, as we have already seen in figure 7.

In terms of the scale of these cumulative causation relationships, what we also see from figures 11 and 12 is that over the last two decades approximately half of the UK's Metropolitan Urban Areas have exhibited annual average GDP per capita productivity growth of less than 1 per cent while 40 per cent of the UK's Metropolitan Urban Areas have exhibited annual productivity growth of between 1 and 1.5 per cent. Only 10 per cent of the UK's Metropolitan Urban Areas exhibit annual productivity growth of more than 1.5 per cent over the last two decades. Again, these figures are not typical of strong and widespread agglomeration processes at work across the country.

Supplementary figure A4 depicts the GDP per capita trends across all 40 UK Metropolitan Urban Areas for the years 2001–2018. On this measure, the highest productivity centres in descending order are Milton Keynes, London, Aberdeen, Edinburgh, Oxford and Cambridge, while the lowest productivity centres in ascending order are Wirral, Middlesbrough, Colchester, Sheffield, Liverpool and Stoke-on-Trent. What is clear is that there is heterogeneity across UK urban areas with high-performing, medium-performing and low-performing urban areas scattered across the country. Having said that, one of the key features of the UK spatial economy is the weak performance of many of the largest urban areas outside of the wider South and South East (CFC, 2018, 2021; McCann, 2016). As we see in Supplementary figure A4, the productivity performance of the West Midlands urban area, Liverpool, Sheffield, Kingston-Upon-Hull, Middlesbrough and Newcastle-Upon-Tyne are all consistently low by national standards. This is because, in general, the broad interregional divides we have already observed are also reflected in the differential geography of urban performance.³

³The Supplementary Appendix presents some further sets of relationships, which confirm those reported here.

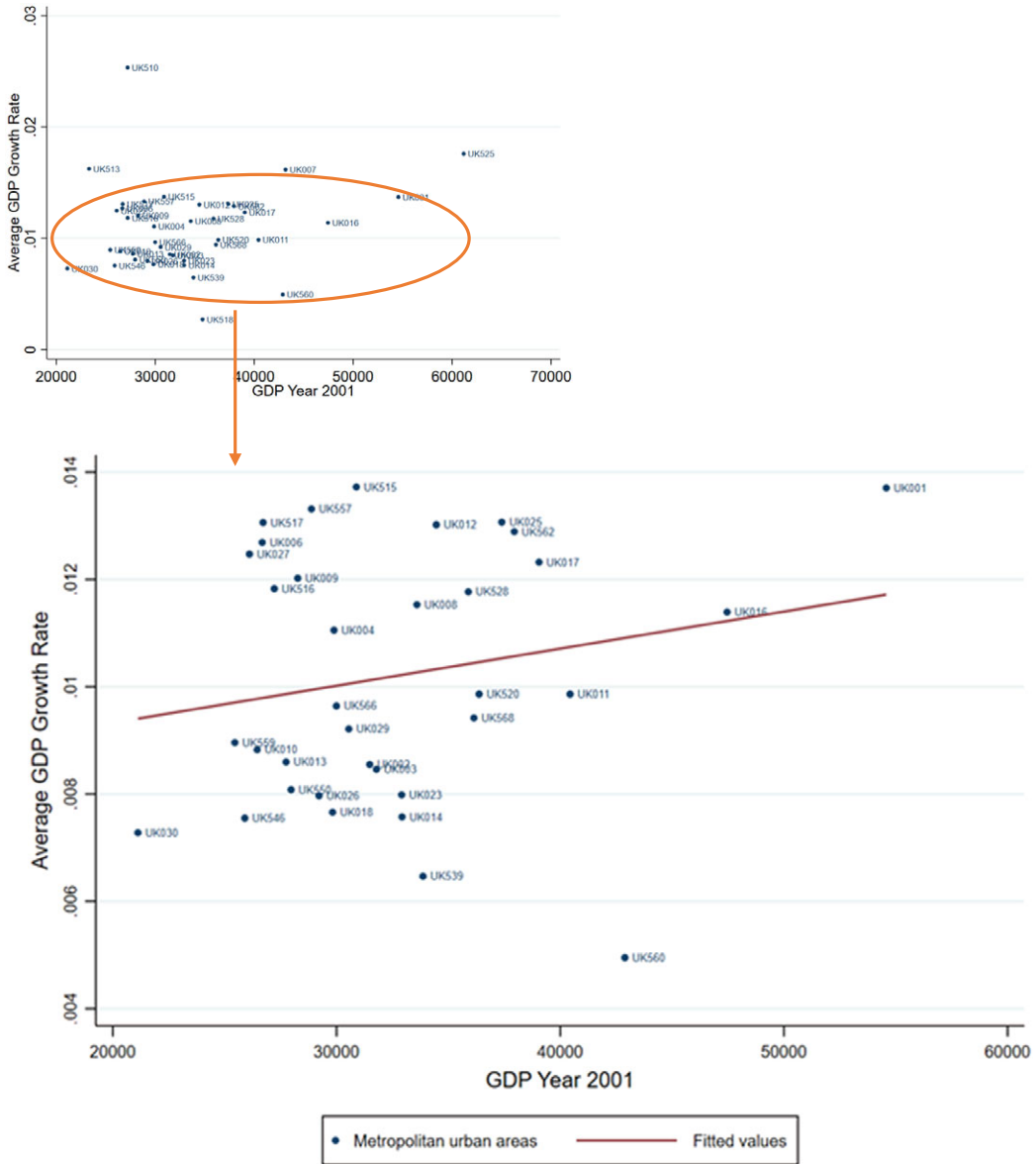


Figure 12. (Colour online) Productivity growth and productivity levels (2001) for UK metropolitan urban areas (2001–2018) after removing specific outliers

These scatterplots depicting the UK city and regional relationships between productivity and scale, productivity growth and scale, productivity growth and previous productivity levels have uncovered some clear patterns. Firstly, there are no economy-wide scale-productivity or scale-productivity growth relationships operating in UK regions and cities. Instead, what we do observe is that there is a positive relationship between urban productivity and subsequent urban productivity growth, when measured in terms of functional Metropolitan Urban Areas, but no such relationships are evident when we consider different types of places.

This lack of agglomeration-related processes taking place across the UK is one of the key explanations of both the UK's poor productivity performance and also its unequal economic geography and

interregional inequalities (Centre for Cities, 2021; McCann, 2016). In particular, a key part of the national productivity puzzle in the UK concerns primarily the under performance of the UK's cities outside of the more prosperous core parts of the economy (Martin *et al.*, 2021; McCann, 2016; OECD, 2020a). Urban scale seems to be much less of an indicator of economic fortunes in the UK than in other countries, such that many of the standard scale-related agglomeration-type arguments evident in other countries appear to have little relevance for the UK over recent decades.

These observations are important because nowadays many UK political narratives contend that there is an economic and prosperity divide between cities and towns, between so-called 'metropolitan elites' and those living in more provincial areas (McCann and Ortega-Argilés, 2021a,b). However, the empirical evidence suggests that this is simply not the case. The data presented here and elsewhere (ONS, 2017, 2019, 2021) shows that the UK gaps between large cities, small cities, towns, villages and rural localities are very small, and indeed amongst the smallest in the OECD (Garcilazo and Oliveira-Martins, 2020). In particular, in the economically weaker regions of the UK, the gaps are minimal or even non-existent, whereas in more prosperous regions, where all types of localities display high levels of productivity, the gaps between large and small cities, and between urban and rural areas, are more marked (ONS, 2017). Indeed, in many economically weaker regions, rural and small-town areas are often more productive than urban areas, including large cities.

On the other hand, however, by OECD benchmarks, the UK does have very high interurban productivity divides (Carrascal-Incera *et al.*, 2020) as well as very high interregional productivity divides. Broadly, economically stronger regions contain stronger urban economies while economically weaker regions contain weaker urban economies (McCann, 2016; ONS, 2017). In addition, in more economically prosperous regions, large urban areas are not only markedly more prosperous than urban areas in economically weaker regions, but they are also relatively more prosperous than smaller towns and rural areas within their own large regions, which in turn are more prosperous than large urban areas in weaker regions. In contrast, in economically weaker regions, large urban areas display little or no productivity premia over smaller towns and rural areas in those same regions (ONS, 2017), while at the same time they are less productive than even small towns and rural areas in prosperous regions. As such, in the more prosperous UK regions, cities do appear to function more effectively as agglomeration economies than cities in weaker regions, and this also benefits the hinterland towns in those same regions (Swinney *et al.*, 2018).⁴ As such, in the core regions of the UK, large cities typically function economically in a manner consistent with other countries and also as textbook models would suggest, whereas in the UK's economically weaker regions, this is not the case, and this observation appears to be at the heart of both the regional and national productivity challenge.

In terms of urban, regional and national productivity, enhancing UK economic growth and inter-regional convergence, which in economic terms is what Levelling Up should be about, requires that all of the UK urban and regional scale-productivity relationships depicted in figures 5–11, and also in Supplementary figures A4 and A5, should all be upward-sloping rather than being horizontal or downward-sloping as they currently are, and that all of the relationships between previous productivity and subsequent productivity growth depicted in figures 2–4, 11 and 12, and also figures in the Supplementary Appendix, should all be downward-sloping, rather than being either horizontal or upward sloping, as they currently are. In economic terms, how to bring about these changes is the economic crux of the Levelling Up challenge.

5. Features and explanators of the UK regional productivity puzzle

Regarding the hurdles to addressing this challenge, the UK economy has been described as a 'hub with no spokes' (Haldane, 2018) in that in discussions about the role of R&D in the economy, when it comes to

⁴At the same time, employment rates and deprivation rates in small towns are higher and lower, respectively, than the national average (ONS, 2019), with lower deprivation towns being the fastest growing places in the UK (ONS, 2017).

the links between research *R* and the three *Ds* of Development, Diffusion and Dissemination, the UK is strong in the former and very weak in all three of the latter dimensions, especially in regional terms (McCann, 2020b). The geography of UK knowledge diffusion and total factor productivity effects appears to display a strong core-periphery structure which dominates its urbanisation features (Harris and Moffat, 2012, 2021). The productivity premium of London plus its wider hinterland exists beyond firms' characteristics (Harris and Moffat, 2021), sectoral structures (Martin *et al.*, 2018) and industry specialisation patterns (Brown *et al.*, 2021). As such, there are unresolved debates regarding the different roles played by diffusion versus absorption, but essentially, this is an endemic feature of the UK regional problem, and raises the questions of what we need to do to improve the diffusion of knowledge across geographies such that the scale-related and prosperity-related relationships with productivity and productivity growth are adjusted accordingly.

In addition, as well as a general lack of scale-related productivity relationships in UK regions, another problematic feature of the UK economy has been the pattern of recovery. The post-crisis trajectory has also been puzzling in that prior to the mid-1980s productivity tended to increase in post-recession periods whereas in the aftermath of the 2008 crisis this was not the case (The Economist, 2017). Although during the decade prior to the 2008 crisis many of these urban areas experienced uplifts (Martin *et al.*, 2018; McCann, 2016), the fledgling upward growth trajectories of these cities were largely stalled by the crisis (OECD, 2020a,b). Some explanations for the UK's national and regional productivity flatlining relate to the UK's long tail of low productivity firms (Haldane, 2018). However, one of the largely unexplained impacts of the 2008 crisis was to most severely affect the performance of the most productive firms in the economically weaker cities outside of the core regions (CFC, 2018; McCann, 2020b). In other words, in the aftermath of the 2008 crisis, the key productivity base of the core cities in weaker regions appears to have suffered more than in cities in more prosperous regions, and these effects appear to still be largely evident in the data reported above. Yet, sectoral differences appear to provide little explanation as to the productivity growth trajectories (Martin *et al.*, 2018) and resilience of UK cities (Martin and Gardiner, 2019). It is only at the very fine-grained level of 5-digit sub-sectoral decompositions that we find that more prosperous places do benefit from greater specialisation, whereas in the majority of places it appears that non-specialisation-related effects still dominate (Cambridge Econometrics, 2021). As such, exactly why the economically weaker regions are also less resilient is still unclear, but the important point is that UK regional disparities have been enhanced by adverse economic shocks going back to the 1970s (Rice and Venables, 2021) and continuing after the 2008 crisis (Martin *et al.*, 2021; McCann, 2016). Again, this raises the question of what we need to do to improve the resilience of weaker regions such that the scale-related and prosperity-related relationships with productivity and productivity growth are adjusted accordingly.

Various different arguments have been advocated to account for these observations and to point towards potential policy rectifiers. Arguments from labour economics emphasise the notion that the interregional migration of human capital has led to major interregional skills imbalances, and especially flows of university graduates into London. The UK is already the second most spatially mobile society in the OECD (2011), with interregional flows of the order of 1 per cent per annum for OECD-TL2 regions, 2–3 per cent for counties (Fielding, 2012), and 4 per cent for OECD-TL3 regions (McCann, 2016). There are also significant 'escalator'-type (Fielding, 2012) flows operating, whereby young high human capital people move into cities, and especially recent university graduates, and then later in life move away for lifestyle reasons, to be replaced by other younger people. However, to the extent that these processes operate, they are almost entirely related to the London economy and its very large hinterland, and until very recently, there was little by way of similar flows in other cities.⁵ As such, while graduate human

⁵ Across the UK, the share of locally domiciled graduates employed in the local labour market is typically between two-thirds and three-quarters for most English regions, whereas for the three Devolved Administrations the figures are between 80 and 90 per cent, and graduates who stay in their home domicile region for employment display almost identical human capital levels across the country, including those in London (McCann, 2016). Graduate employment shares in 10 UK regions and nations differ by less than 1.6 percentage points from their overall population shares, such that the spatial patterns of graduate

capital-migration and spatial sorting mechanisms are clearly important and statistically significant (McCann and Faggian, 2006, 2009), the scale of these is still very small and largely unchanging in comparison to the scale of the productivity differences,⁶ and especially given the fact that the UK's interregional inequalities arose prior to any regional differences in education levels (McCann, 2016).⁷ Indeed, the ability of skills or wage-related analyses to account for local prosperity actually falls as the levels of local prosperity fall (SMC, 2020a,b), given that the persistence of adverse shocks is locally intergenerational (Rice and Venables, 2021). Other countries with lower levels of interregional mobility do not exhibit such large interregional inequalities, so the notion that if these flows were to be increased via increased land use deregulation in the more prosperous core, they will play primarily a corrective role in terms of interregional imbalances, has little explanatory power. They are just as likely to exacerbate prior existing prosperity-related rather than scale-related trends. The Supplementary Appendix presents further evidence regarding the lack of any UK-wide relationships between local and urban productivity growth and local and urban population growth.

From industrial economics, another explanation for these regional productivity imbalances emphasises the role of investment flows. Adverse economic shocks impacted on many peripheral regions during the 1970s and 1980s (Rice and Venables, 2021), and since the advent of modern globalisation in the late 1980s and early 1990s, new shifting spatial patterns of investments have tended to favour the UK's core regions. These patterns have been accentuated by the fact that the UK is unusual in that all of its major trade routes and modes of transportation are channelled through the already-prosperous core regions (McCann, 2016). There are now very marked total factor productivity differences across all sectors between the core regions and the rest of the country (Harris and Moffat, 2012). Foreign inward investment flows have increasingly been dominated by London and its hinterland. In particular, these regions have increasingly dominated the lion's share of new inward investment projects (Beauhurst, 2021; Dimitropoulou *et al.*, 2013; McCann, 2016) relative to other regions, while large cities outside of the core regions of the south and southeast have lagged behind.⁸ Similarly, public research and development flows and other growth-enhancing public expenditures (Forth and Jones, 2020; Fraser *et al.*, 2021; O'Brien and Miscampbell, 2020) have been overwhelmingly focused on London and the South East, as have private venture capital and angel financing (Mason, 2020). These trends have also been exacerbated by the workings of the tax system (Blagden *et al.*, 2021) and the nature of the UK banking (Mayer *et al.*, 2021) and corporate ownership systems (Mayer, 2022). Moreover, the resulting regional wealth distortions in the housing market are also likely to have profound cumulative impacts on subsequent geography of entrepreneurship and innovation, given that real estate is the largest form of collateral for start-up investment and real estate investment flows are overwhelmingly London-centric (McCann, 2016). In other words, over the last four decades, all forms of both private and public growth-enhancing

employment very closely reflect the overall population distributions (HECSU, 2020). The only exceptions here are the East of England region, where graduate employment is 2.3 percentage points above its population share, and London, where the difference is 9.3 percentage points (HECSU, 2020).

⁶Detailed HESA survey data shows that graduate inflows into the London labour market from outside of the Greater London region amount annually to 10 per cent of the approximately half a million UK university graduating cohort, or in other words, something of the order of 50,000 graduates (McCann, 2016). This represents less than 1 per cent of the London labour market and is roughly equivalent to two-thirds of the employment at Heathrow airport. At the same time, the interregional movements of graduates between regions not involving the London region are more than double those of movements into London (McCann, 2016). There is a slight human capital premium to graduate inflows into London in comparison to graduate inflows to other regions in that some 10 per cent more of London-bound graduates have a 2.1 or higher grade than graduates moving to other regions (McCann, 2016), but still this difference is unlikely to be significant explanation of the London productivity premium given that it is a fraction of a tiny fraction of the overall London labour market.

⁷Over the last three decades, international flows of human capital mean that London has the highest imported human capital premium of any world city (OECD, 2011). Clues as to the labour market contributions to the UK's regional divergence patterns are more likely to be found in terms of international flows of human capital rather more important than interregional flows.

⁸The analysis by EY (2019) gives the impression that it is cities that have dominated FDI flows largely at the expense of towns and rural areas, but when London is separated from the rest of the UK's large cities (McCann and Yuan, 2022), the picture is very different, with large cities underperforming in terms of attracting FDI relative to other types of places.

investments have been increasingly skewed towards the UK's more prosperous regions. These observations suggest that some sort of industrial policy types of regional interventions may be meaningful.

More recently, another set of explanations has arisen regarding the UK's interregional productivity disparities which have profound political and policy consequences, and this relates to the issue of governance. There is increasing OECD-wide evidence that the nature and forms of central-sub-central governance systems influence the geography of economic growth. In particular, more decentralised and devolved governance systems tend to lead to more interregionally balanced economic growth patterns, with no overall loss of national growth (Carrascal-Incera *et al.*, 2020), whereas more centralised governance systems tend to lead to more regionally unbalanced economic growth. The OECD-wide evidence on these issues has only evolved during the last decade and a half, and these insights have only seriously begun to influence UK thinking in the last few years. All medium and large advanced countries which are more prosperous than the UK grow more evenly interregionally than the UK and no large countries are as dominated by a single city as much as the UK is (McCann, 2016). Governance centralisation and interregional growth patterns appear to be closely connected, and the fact that the UK is both the most interregionally unbalanced economy in the OECD along with the fact that it also has the most centralised governance system of any large economy (McCann and Ortega-Argilés, 2021a,b; McCann *et al.*, 2021) has increasingly spurred efforts to devolve and decentralise sub-central governance activities. Indeed, it is this specific combination of high regional imbalances and governance centralisation which has given rise to the so-called 'Levelling Up' agenda, which is now a central feature of government policy debates. A core element of this agenda is likely to involve institutional and governance changes which favour more decentralised decision-making and some movements towards increased fiscal devolution and decentralisation.

As already mentioned, in terms of urban, regional and national productivity, Levelling Up should be about shifting all of the UK urban and regional scale-productivity relationships so that they are upward-sloping rather than being horizontal or downward-sloping as they currently are, and that all of the relationships between previous productivity and subsequent productivity growth should be adjusted so that they become downward-sloping, rather than being either horizontal or upward sloping, as they currently are. Yet, precisely how a redesigned skills-training system, specific industrial policy-type interventions or sub-central governance changes can help to bring about the required core-periphery changes in these urban, regional economic relationships is not at all obvious analytically.

Even if we did know how to do this, this task is made all the more difficult because the underlying nature and logic of the UK central-sub-central fiscal system militates against more devolved and place-based policy-making (McCann, 2021), and in addition, there are also three major economic headwinds blowing against the UK's less prosperous regions, due to Brexit, Covid-19 and climate change mitigation.

In terms of Brexit, there is now a large body of evidence (Billing *et al.*, 2019; McCann and Ortega-Argilés, 2021a,b) including the UK government's own analyses (HMG, 2018), which suggests that Brexit itself will widen UK interregional imbalances, primarily because the non-core regions of the UK tend to be more dependent on EU markets for their trade (Chen *et al.*, 2018; Los *et al.*, 2017; Thissen *et al.*, 2020). As such, many of the UK's economically weaker regions will have to restructure to a greater extent than the UK's more prosperous regions in order to adapt to the post-Brexit realities. However, the existing regional productivity imbalances would suggest that doing this successfully without significant public policy help may be rather unlikely, to say the least. In addition, there are also strong arguments that the Covid-19 pandemic will also more adversely impact the UK's weaker regions than its stronger regions (McCann and Ortega-Argilés, 2021a,b), and that such an outcome is also to some extent associated with the UK's levels of governance centralisation (McCann *et al.*, 2021). In part, this is because core regions of the economy have higher shares of people who have been able to telework effectively from home throughout the pandemic (OECD, 2020b; ONS, 2021) and in part also because once the various furlough schemes have been withdrawn, there are likely to be major financial and capital shocks which are unlikely to favour weaker regions (McCann and Ortega-Argilés, 2021a,b). Finally, the commercial risks, costs and opportunities associated with climate change mitigation heavily favour the UK's more prosperous regions (Corfe and Norman, 2021). In addition to these major headwinds, UK governance and policy

in regional development are also dysfunctional. Each of these countervailing influences is pushing against our ability to change the slopes of the urban and regional relationships as required in order to ensure Levelling Up really takes place.

Most observers view the best hope of bringing about these required scale, prosperity, productivity and productivity growth changes as being via a combination of policy packages addressing governance, skills and investment in a holistic fashion, rather than in a piecemeal manner. The Levelling Up White Paper (HMG, 2022) provided a sound analytical case for addressing regional productivity disparities, although the subsequent governance reforms heralded by the Levelling Up White Paper agenda are as yet unclear. The requisite fiscal and governance changes needed for devolution to work effectively cannot be underestimated (McCann, 2022a) and the prospectus of the 'UK Shared Prosperity Fund', which is designed to replace the former EU Cohesion Policy (McCann *et al.*, 2021), appears rather underwhelming in this regard (Brien, 2022a,b). Boldness and clarity on central-subcentral governance reforms in the post-Brexit and post-pandemic context are much-needed in order to give confidence to potential investors in places, and especially in the economically weaker regions (McCann, 2022a). While some commentators would like to see Levelling Up articulated as essentially a localism agenda, the UK interregional imbalances are a combination of interregional and intraregional imbalances, and this means that primarily localism-type agendas can only help to address the intraregional part of the problem and not the part of the problem which makes the UK such an outlier internationally, namely the entrenched interregional imbalances. A policy schema is required which both radically increases the fiscal firepower brought to bear on the regional imbalances whilst also addressing the multi-level governance gaps in the UK institutional system (McCann, 2020b), ranging from ultra-local to inter-regional coordination failures (UK2070).

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