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Carrascal Incera, Andre; McCann, Philip; Ortega Argiles, Raquel; Rodríguez-Pose, Andrés

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UK Interregional Inequality in a Historical and International Comparative Context[1]

Andre Carrascal-Incera
City-REDI Institute, Birmingham Business School
University of Birmingham, B15 2TY
a.carrascalincera@bham.ac.uk

Philip McCann
University of Sheffield Management School
1 Conduit Road, Sheffield S10 1FL
p.mccann@sheffield.ac.uk

Raquel Ortega-Argilés
City-REDI Institute, Birmingham Business School
University of Birmingham, B15 2TY
R.OrtegaArgiles@bham.ac.uk

and

Andrés Rodríguez-Pose
Department of Geography and Environment
London School of Economics, Houghton Street, London, WC2A 2AE
A.Rodriguez-Pose@lse.ac.uk

Abstract
This paper explores the nature and scale of inter-regional and inter-urban inequalities in the UK in the context of international comparisons and our aim is to identify the extent to which such inequalities are associated with strong national economic performance. In order to do this, we first discuss the evolution of UK interregional inequalities relative to comparator European economies over more than a century. We then focus specifically on comparisons between the UK and the reunified Germany. These two exercises demonstrate that the experience of the UK has been rather different to other countries. We further explore UK inter-urban inequalities in the light of international evidence and then explain why observations of cities only tell us a partial story about the nature of interregional inequalities, especially in the case of the UK. Finally, we move on an OECD-wide analysis of the relationships between economic growth and interregional inequality. What we observe is that any such relationships are very weak, and the only real evidence of a positive relationship is in the post 2008 crisis period, a result which points to differentials in regional resilience rather than inequality-led growth. Moreover, once former transition economies are removed from the sample, the relationship disappears, or if anything becomes slightly negative. As such, the international evidence suggests that the UK's very high spatial inequalities have hampered, rather than facilitated, national economic growth.

Keywords: Regions, Cities, Inequality, Growth

JEL Categories: R11 R12 O47 O50

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UK Interregional Inequality in a Historical and International Comparative Context

1. Introduction

The aim of this paper is to examine the relationships between interregional economic inequalities and national economic growth in the case of the UK and more generally across OECD countries. The motivation for investigating these issues comes from the fact that empirical evidence appears to be increasingly out of step with earlier analytical frameworks and policy narratives and this is particularly apparent in the case of the UK.

In recent years there has been a growing awareness that interregional inequalities in the UK are not typical of other countries (McCann 2016). The UK today is one of the most geographically unbalanced countries in the industrialised world (McCann 2019; Gal and Egelund 2018; Raikes et al. 2019; Zymek and Jones 2020) with productivity differentials at the OECD-TL3 area level being akin to the whole of the Eurozone. These enormous regional productivity differentials are also reflected in a whole host of other prosperity inequalities relating to health, quality of work, town centre viability and civic and philanthropic engagement (McCann 2016; Harrington 2020). As well as having some of the OECD's most productive and dynamic regions and cities, in the UK today approximately one half the population live in regions whose productivity is no better than the poorer parts of the former East Germany (McCann 2016), whose multi-dimensional living standards (MDLS) are akin to Alabama (Veneri and Murtin 2019), and whose access to quality healthcare is on a similar level to eastern Europe (*The Lancet* 2018).

The UK's extreme interregional inequalities are a result of complex interrelationships between the effects of economic geography, modern globalisation and also issues of governance (McCann 2016). and well beyond the scope of this paper, although they are dealt with in detail elsewhere (McCann 2016). However, over the last three decades the prevalent UK narratives regarding 'London versus the Rest'[2] have tended to justify these inequalities as being a natural consequence of agglomeration effects and broadly good for overall UK economic growth (McCann 2016). Indeed, these UK narratives reflected wider orthodox space-blind narratives prevalent in urban economics, and explicitly articulated in the 2009 World Development Report *Reshaping Economic Geography* (World Bank 2009), that interregional inequality is broadly good for economic growth in that it spurs competition and allows for spillovers to play their natural roles in maximising national growth, and over time these spillovers will also encourage a shift away from interregional divergence to convergence processes. These space-blind arguments, which were also frequently deployed to eschew any need for regional policies, have since been increasingly countered by empirical evidence (OECD 2011; European Commission 2014) which shows that during the last two decades interregional growth in many countries has shifted from being convergent to being divergent, and these shifts have also taken place at the same time as the major post-2008 crisis slowdowns in overall economic growth.

[2] As epitomised by the Evan Davis BBC television programme "Mind the Gap: London vs the Rest: Part 1" which was broadcast on Monday 3rd March 2014 BBC2 21.00-22.00, and "Mind the Gap: London vs the Rest: Part 2" was broadcast on Monday 10th March 2014 BBC2 21.00-22.00.

In addition, the space-blind arguments were based on implicit assumptions regarding how regional economies operated, many of which have since been questioned by place-based thinking (Barca et al. 2012; Muro et al. 2018; Atkinson et al. 2019) and also by profound political shocks associated with a 'geography of discontent' (McCann 2018, 2019; Henrickson et al. 2018) evident in a host of increasingly underperforming and/or stagnating regions – the so-called 'places that don't matter – whose standing in the national economic hierarchy has significantly declined in recent decades (Rodríguez-Pose 2019). As such, there are nowadays increasing doubts in many parts of the world regarding these previously-orthodox arguments, and, in the particular case of the UK, the sheer scale of the inequalities has now led to severe doubts regarding the economic and political viability of these earlier approaches. Overall, it is the case today that both in the specific context of the UK and also more generally across the OECD countries, there remain many unanswered questions and points of debate regarding the nature of the relationship between interregional inequality and economic growth.

The aim of this paper is to consider the UK-specific experience of the relationship between interregional inequality and economic growth in the light of international comparisons using over a century of evidence and also in much more detail over the two decades since the new Millennium. In order to do this we examine the specific trajectory of UK interregional inequality on the context of a particular comparator case, namely that of Germany. We demonstrate that the UK-specific relationships between (extremely high) interregional inequalities and national economic growth are an outlier by international standards and we highlight various features of this by comparisons with Germany. The rationale for this particular comparison is because whereas the UK has had given these issues little or no real public policy priority over many decades Germany had made interregional convergence a national goal. Yet, German public intervention on a massive scale aimed at fostering regional convergence appears not to have been at the cost of national performance when compared with the UK or with the other OECD and EU countries in general.

We then move on to discuss the specific feature of UK urban inequality issues in the light of OECD-wide evidence. The reason for examining urban issues here explicitly is because some commentators have argued that UK urban inequality is typical of most countries, thereby questioning the claim that UK regional inequalities are very high, given that our population is so heavily urbanised. However, contrary to the assertions of some commentators, again we show that the UK displays very high inter-urban inequalities by OECD-wide standards. Indeed, we explain why a careful reading of these urban data actually underpins the region data, and also demonstrates why some currently popular UK policy-thinking is incorrect.

Finally, we then move on to demonstrate empirically that there are no national growth advantages to the levels of spatial inequality displayed by the UK. The reason is that there is no empirical relationship between spatial inequality and national economic growth along the lines of previously orthodox assumptions. The only slight exception here relates to the post-crisis era, but we argue that these observations are in all likelihood reflective of differing degrees of regional resilience rather than the role of inequalities per se.

The rest of the paper is structured as follows. In section 2 we begin by discussing the century-long evolution of UK regional disparities in the light of the experience of other western European countries. After this European-wide benchmarking we then directly compare the interregional experience of the UK with that of Germany since reunification. In section 3 we examine the inter-urban disparities in the UK in the context of OECD-wide evidence. In section 4 we then examine the empirical evidence for any relationships between interregional

inequality and economic growth. In section 5 discusses the evidence, interpretation and implications of these observations for a highly-centralised country such as the UK which is attempting to find ways of devolving and 'levelling up'.

2. The Evolution of UK Interregional Inequality in comparison to European Counterparts

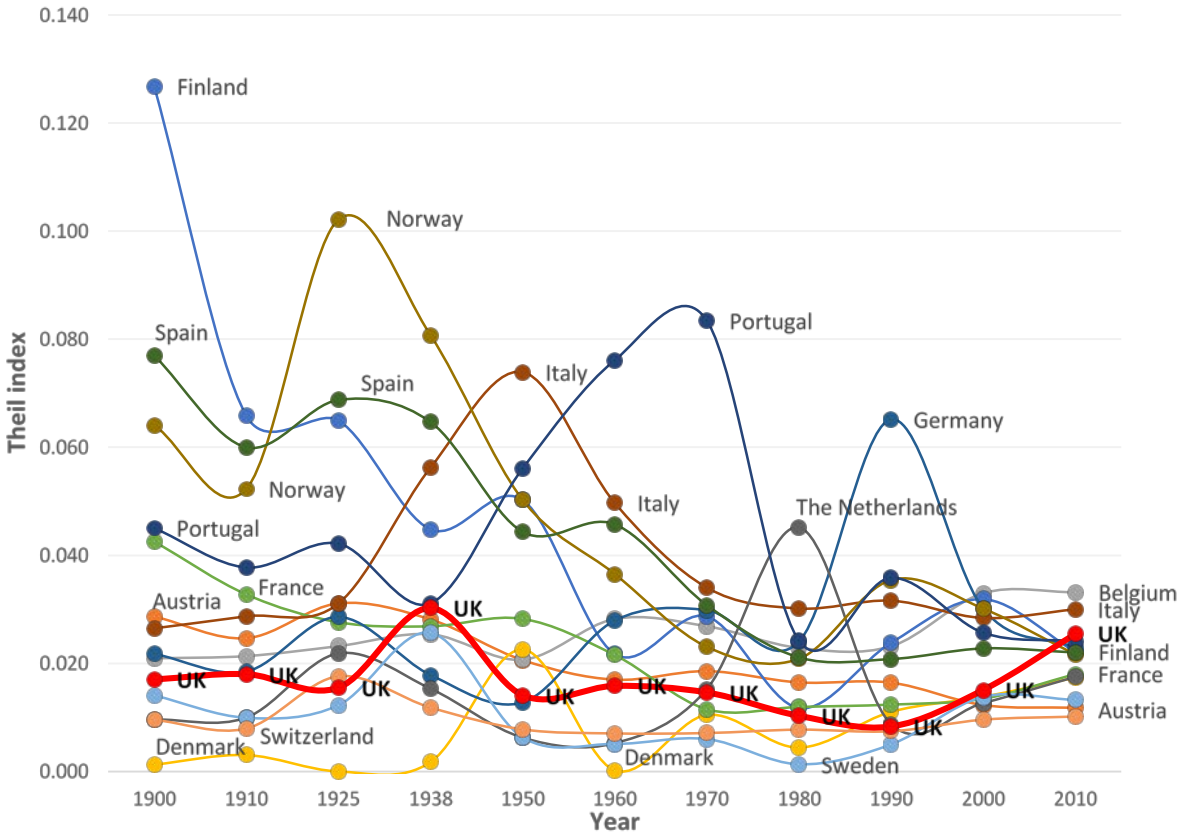
Figure 1 applies a spatial Theil Index[3] to the Roses and Wolf (2019) database in order to plot the long run evolution of interregional inequality in GDP per capita across a range of western European countries during the twentieth century and through until the first decade of the twenty-first century[4].

The UK is marked as a bold red line. What is immediately apparent is that interregional inequality was generally much higher in the early decades of the twentieth century when cross-country productivity variations were also much more significant. During the second half of the century interregional variations fell markedly across Europe as international convergence processes developed (Maddison 2006), and throughout this period UK interregional productivity variations remained small by European standards.

[3] See Appendix for details

[4] The Roses and Wolf (2019) dataset examines historical regional performance across 16 European countries. The European regions in the Roses and Wolf (2019) database correspond almost entirely to the EU-NUTS2 territorial units, and the data is produced for the years 1900, 1910, 1925, 1938, 1950, 1960, 1970, 1980, 1990, 2000 and 2010. The GDP data are calculated as International Geary-Khamis Dollars, and the datasets also provide details of population, area, and sector-level employment for each year. In the case of Germany, the database uses the corrected data from Broadberry and Klein (2012) for estimates of the national GDP of both West Germany and East Germany for the years 1950-1980. Most national GDP figures for 1990-2010 are in the Maddison Project data which in turn are taken from the Total Economy Database of the Conference Board.

Figure 1. The Long-Run Evolution of Interregional Inequality, 1900-2010.



Source of data: Roses and Wolf (2019)

Selection of countries: Austria, Belgium, Denmark, Finland, France, Germany, Italy, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom

It was only from the 1990 onwards that things really started to change for the UK. Having displayed low interregional productivity variations for nine decades, UK inequality begins to increase markedly, such that by 2010 the UK is very unequal interregionally by international standards. This period between the 1990s and the early decades of the twenty-first century appears to be something of an anomaly for the UK, in that not only its interregional inequality levels increased, but that this happened at precisely the time when these values were consistently decreasing in other countries. One argument could be that the growth experience of the UK was very different from these other countries, and the data does to some extent bear this out (Maddison 2006). During the 1990s and early 2000s, the UK was a strong growth performer at the same time that interregional inequality increased sharply. However, since the global financial crisis of 2008 the picture has been very different.

Applying the Theil index to the Roses and Wolf data finds that by 2010 the UK is the third most regionally unbalanced country after Belgium and Italy. However, the while the historical data for almost all of the countries including Belgium and Italy is largely consistent with the

NUTS2 areas the UK data is not. The UK regions are between two and five times the average size of the regions in all of the other countries which makes comparisons somewhat difficult.[5]

In order to understand something more of the scale and nature of the UK interregional inequalities, it is therefore useful to consider the comparison between the UK and Germany during the thirty-year period since German reunification using the OECD-TL2 and OECD-TL3 classifications. Both countries have similar population scales and population densities but their policy approaches to regional inequality have been very different[6].

We can trace the evolution of interregional inequality in the two countries during the last couple of decades. The data is derived from the OECD regional statistics database.[7]. For these types of exercises the smaller OECD-TL3 spatial units are generally preferable to the larger OECD-TL2 spatial units, because the top population percentages by location can be constructed at a very fine-grained scale by adding up the small TL3 areas from the highest value downwards. Similarly, the bottom percentages by location can be constructed at a fine-grained scale from the lowest values upwards[8]. However, here we report measures of inequality constructed at both spatial scales in order to demonstrate that the results are robust to the spatial scales we employ.

[5] The UK spatial units correspond to the OECD-TL2/EU-NUTS1 regions except for the fact that the South East and East regions are combined, as also are the North West and North East regions, respectively. This is in order to be consistent with historical UK regional data which before 1997 has a separate region of East Anglia rather than the much larger East region post-1997, and also Cumbria which was part of the North prior to 1997, not the North West. Other very minor specific individual amalgamations of NUTS2 regions are also undertaken for Germany, Italy, Austria and Belgium, although they barely diverge from the standard NUTS2 areas. As such, the regional breakdowns in 11 EU countries correspond very closely to the NUTS2 territorial classification, while the regions for Norway, Switzerland correspond to the OECD-TL2 classification. The only country in the Roses and Wolf dataset that corresponds to neither the NUTS2 nor the OECD-TL2 classifications is the UK. The 10 UK regions in the Roses and Wolf datasets are one average 5.32 times the size of the 9 Belgian regions (rather than 11 NUTS2 regions) and almost twice the size of the 20 Italian regions (rather than the 21 NUTS2 regions).

[6] In 1990, West Germany's population of 63.25m was 10.5% higher than that of the UK at 57.24m (Broadberry and Klein 2012) while total land area of West Germany was 2.5% higher than the UK. As such, West Germany's population density in 1990 was just under 8% higher than that of the UK. After reunification in 1990, the total population of the reunified Germany population was almost 39% larger than the UK while its population density was 94% of that of the UK.

[7] All data for UK-Germany comparisons are in $US constant purchasing power parity, constant prices, reference year 2010
en?parentId=http%3A%2F%2Finstance.metastore.ingenta.com%2Fcontent%2Fcollection%2Fregion-data-en

[8] In the UK there are 179 OECD-TL3 areas with an average population of 378,000 while in Germany there are 401 OECD-TL3 areas with an average population of 204,000. Although the average sizes are not quite the same, the difference between the two represents only 0.26% and 0.21% of the UK and German populations, respectively, so the estimated top and bottom ratios are very accurate.

Figure 2. OECD-TL2 Regional GDP per Capita: Ratio of Top 10% over the Bottom 10% of the Population in UK and Germany 1990-2016 Using the System of National Accounts for 1993 and 2008.

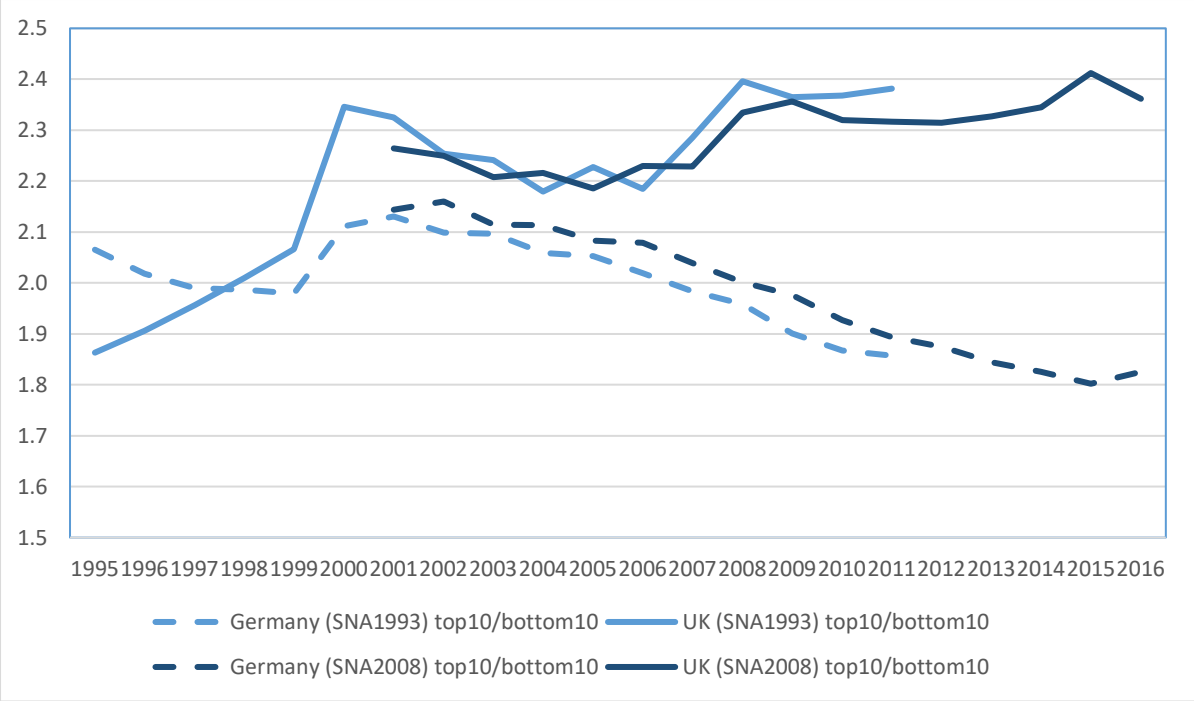
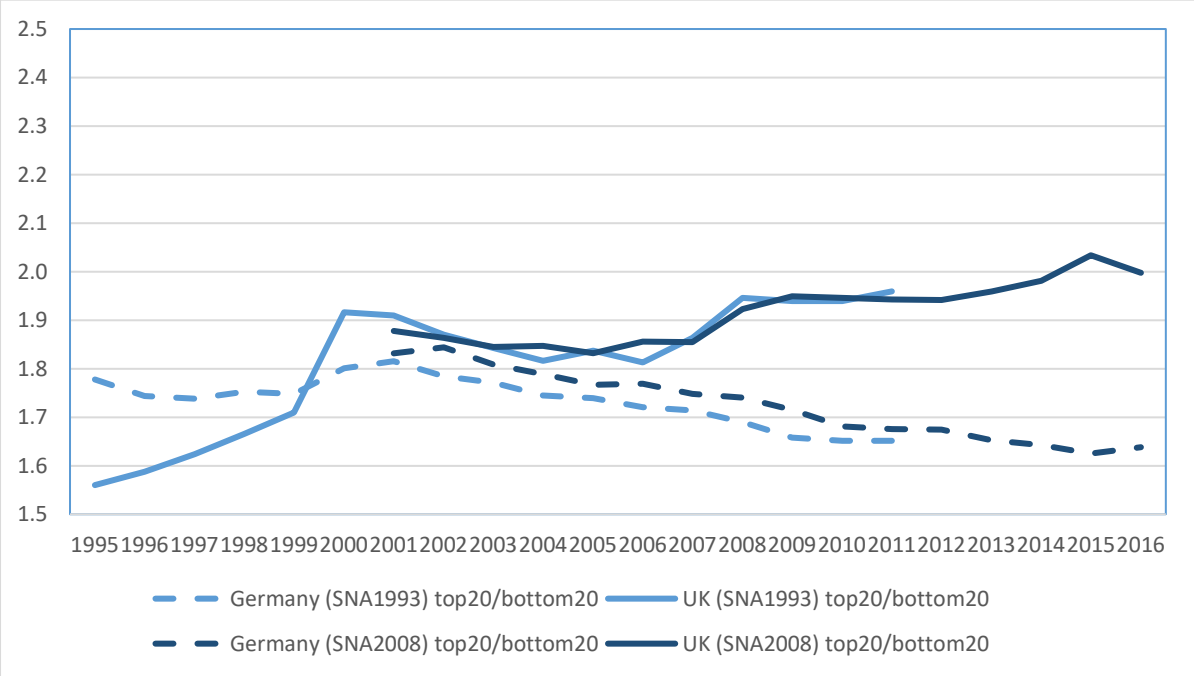


Figure 3. OECD-TL2 Regional GDP per Capita: Ratio of Top 20% over the Bottom 20% of the Population in UK and Germany 1990-2016 Using the System of National Accounts for 1993 and 2008.



We can trace the evolution of interregional inequality in the two countries during the last three decades. Figure 2 plots the relationship between the regional GDP per capita ratio of the top 20% of the population over the bottom 20% of the population for UK and Germany OECD-TL2 Regions, while Figure 3 plots the relationship between the regional GDP per capita ratio of the top 10% of the population over the bottom 10% for UK and German OECD-TL2 Regions. This is done in each case using both the 1993 and the 2008 Systems of National Accounts. As we see in Figures 2 and 3, the trajectory of the two countries is also exactly the opposite. Since reunification Germany interregional inequality has consistently fallen, while that in the UK has consistently increased, and the trajectories of the two countries cross around the New Millennium. On these two specific measures, UK interregional inequality is now more than comparable to what it was in Germany at the time of German reunification.

At a different spatial scale, for the years 2000-2016, Figure 4 plots the ratio of the regional GDP per capita of the top 10% of the population by location over the bottom 10% of the population by location at the OECD-TL3 area level. Figure 5 does this for the top 20% of the population by location over the bottom 20% of the population by location. In order to allow for specific spikes in regional productivity, Figure 6 plots the ratio of the regional GDP per capita of the top 10% of the population by location over the bottom 75% of the population by location, at the OECD-TL3 area level.

Figure 4. OECD-TL3 Regional GDP per Capita: Ratio of Top 10% over the Bottom 10% of the Population in UK and Germany 2000-2016

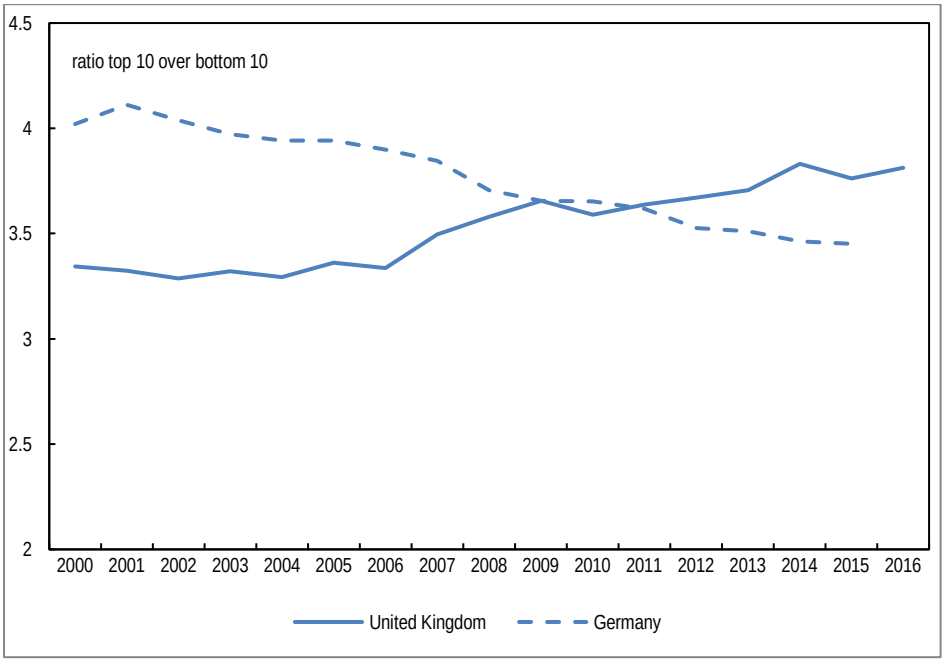


Figure 5. OECD-TL3 Regional GDP per Capita: Ratio of Top 20% over the Bottom 20% of the Population in UK and Germany 2000-2016

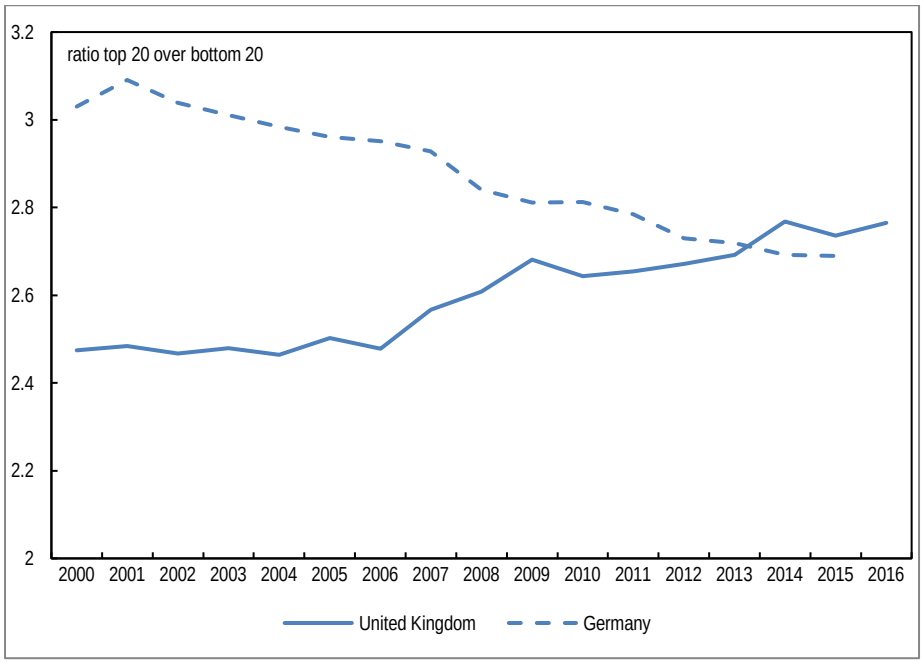
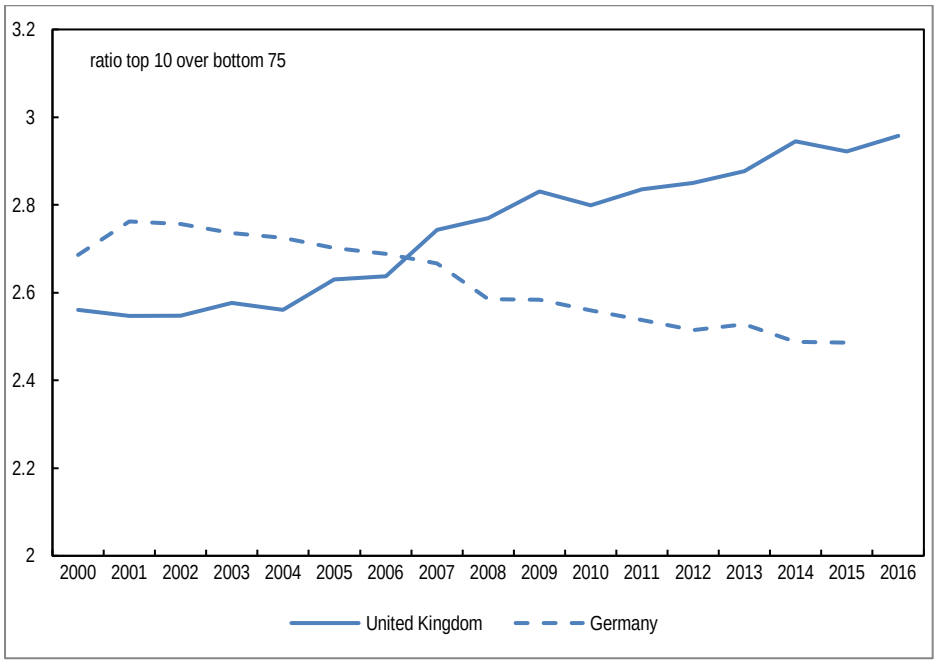


Figure 6. OECD-TL3 Regional GDP per Capita: Ratio of Top 10% over the Bottom 75% of the Population in UK and Germany 2000-2016



As we see in Figures 4-6, the trajectories of the two countries are the opposite of each other. In particular, in terms of GDP per capita constructed at the OECD-TL3 area level the UK became

more interregionally unequal than Germany in all three indicators around the time of, or soon after, the global financial crisis.

Of course, such arguments are always open to the suggestion that the results depend on a specific, or a small number of specific measures of interregional inequality, or on the specific spatial units employed (McCann 2019; Giles 2019, 2020). In order to ensure that our insights are not overly dependent on specific measures or spatial units, it is therefore appropriate to plot similar relationships for OECD-TL2 spatial units, and also for a range of other inequality measures such as GDP per worker, or Gini and Theil indices of inequality at both the OECD-TL2 and OECD-TL3 areas.

In terms of the UK-Germany comparisons, the results are reported in the accompanying on-line Supplementary Material. These same patterns outlined here are also observable at all of the other OECD-TL3 measures examined, as well as for various OECD-TL2 measures, which suggest that the UK and German trajectories may have crossed even earlier than reported here. While some OECD-TL2 measures suggest that the upward-sloping inequality trajectory of the UK has not yet crossed the downward trajectory of Germany, at the NUTS2 levels the UK today is also shown to be more interregionally unequal than Germany (Zymek and Jones 2020). Moreover, across a broader range of inequality measures at different spatial levels and across many OECD countries the UK is seen to be more interregionally unequal than Germany on 17 measures while Germany is more unequal on 4 measures (McCann 2019).

Similar pairwise comparisons between the UK and any other OECD or EU country is possible, but the German case is particularly instructive for understanding the long-run national UK experience (UK2070). At the time of German reunification in 1990, GDP per capita in West Germany was 12.3% higher than that in the UK, while in East Germany GDP per capita was only 31% of that of West Germany and just under 35% of that of the UK (Broadberry and Klein 2012). The result was that at the moment of reunification, the new reunified Germany had a GDP per capita of only 92.6% of that of the UK. At this point Germany was, unsurprisingly, more interregionally unequal than the UK, having just absorbed the former East Germany. Since reunification Germany has invested something of the order of €2 trillion in East Germany (*The Economist* 2019) or, on average, some €70 billion per annum, in regional development, rebalancing and levelling-up activities involving investments in infrastructure, education, skills and research systems, as well as in widespread institution-building programmes. However, by 2017, the 13.2% premium in GDP per capita that a unified Germany had over the UK is slightly larger than the GDP per capita premium that West Germany enjoyed over the UK in 1990. Given that in 1990 the newly-unified Germany trailed the UK in productivity by 7.4% (Broadberry and Klein 2012), this means that per capita GDP growth in Germany as a whole has outstripped that of the UK by a cumulative amount of almost 21 percentage points between 1990 and 2017. In other words, the story depicted by Figures 2-6, and also by the graphs in the on-line Supplementary Material, suggests that the UK has not only become much more interregionally unequal during the last three decades relative to Germany, but also that it has also significantly trailed in terms of economic growth.

The comparison between these two countries suggests that a growing regional polarisation in the UK relative to Germany has not been associated with higher long-run UK economic growth, as has sometime been implied elsewhere (World Bank 2009). Moreover, the enormous German interregional fiscal transfers to lift East Germany up may not have been detrimental for overall German national economic growth. Higher inequality in the UK may, thus, be becoming a drag for the country's economic growth. Almost half of the UK economy today exhibits GDP per

capita levels similar to the poorer parts of the former East Germany (McCann 2016), whereas in Germany the weaker eastern regions only account for less than one fifth of the national population. In other words, in this particular UK-Germany comparative case, higher UK interregional inequality has not been associated with higher national growth. However, it has been claimed that when we consider just cities and urban areas, then the UK is not more interregionally unequal than other OECD countries (Giles 2019). Therefore, before we investigate further the relationship between national economic growth and regional economic growth and the UK positioning in this debate, we will first also consider the question of inter-urban inequality within the UK.

3. UK and OECD Inter-Urban Inequality

McCann (2019) has already demonstrated that, contrary to the views of some London-based media, across 28 different indicators and 30 different countries, the UK is the third most interregionally unbalanced country in the industrialised world, and the most spatially unbalanced large advanced OECD economy. Zymek and Jones (2020) have also found more or less the same outcome with respect to EU countries using an additional index based on NUTS2 areas. This reality is, however, at best not being noticed by the media. At worst, it is flatly ignored (McCann 2019). For example, recently, a couple of very high profile newspaper articles (Giles 2019, 2020)[9] have continued to argue that UK interregional inequality is really little or no different to that of other countries. They reach this conclusion primarily by looking at the OECD data on functional urban areas. It is therefore also necessary to address this particular issue.

The UK is a highly urbanised country. 32% of the population lives in 7 large metropolitan areas of over 1 million; 45% in 20 large functional urban areas of over 500,000 (McCann 2016); 68% in 46 functional urban areas of over 250,000[10]; and 74% in functional urban areas of over 50,000 (OECD 2013). As such, discussing UK interregional inequalities based exclusively on the performance of the functional urban areas of over 250,000 means missing out the prosperity-related experiences of almost one third of the UK population, or of over 21 million people. Bearing this important caveat in mind, we now examine the UK inequalities associated with urban productivity distributions.

[9] See also: "Are Britain's Regional Divides Large or Small? A Response to Chris Giles", https://productivityinsightsnetwork.co.uk/2019/05/britains-regional-divides/ and: https://twitter.com/productivityNW/status/1129047279661395968 and: https://www.ft.com/content/c9db4c66-5971-11ea-a528-dd0f971febbc

[10] These figures are calculated using the OECD (2012) definition of Metropolitan Urban Areas with a minimum threshold or cut-off of 250,000. Prior to this the OECD Metropolitan Urban Area definitions were reported at a minimum of 500,000 threshold or cut-off between 2012 and early May 2019, after which the new datasets we use here were reported with a minimum threshold or cut-off of 250,000. The 500,000 and the 250,000 cut-off definitions are not strictly comparable with each other because they are calculated on the basis of degrees of spatial contiguity of built-up areas as well as different absolute commuting thresholds. For example, using the 500,000 population threshold the population of the Metropolitan Urban Area of London in 2012 was 12,090,254 whereas using the 250,000 threshold it was 11,407,304 in 2012 and 11,984,435 in 2016 (McCann 2016). Similarly, using the 500,000 threshold the population of Liverpool in 2012 was 943,613 whereas using the 250,000 threshold the population in 2012 was 1,176,966, while for Manchester the 2012 population using the 500,000 threshold was 1,855,530 while using the 250,000 threshold it was 3,233,252.

Table 1. Ratio of the Top 10% over the Bottom 10% of the Urban Population by Countries 2001, 2008, 2016

Ranking	Country	2001	Country	2008	Country	2016
1	DE	2.4896	PL	2.7614	PL	2.8810
2	IT	2.2422	US	2.3128	IT	2.4441
3	US	2.2305	IT	2.2597	US	2.4437
4	PL	2.1478	DE	2.2379	FR	2.2858
5	**UK**	**2.1154**	**UK**	**2.2043**	**UK**	**2.2494**
6	CZ	2.0840	FR	2.1436	DE	2.0508
7	KOR	2.0230	KOR	2.1226	KOR	2.0458
8	BE	1.9874	CZ	2.0390	ES	1.9540
9	FR	1.9757	CA	2.0230	BE	1.9421
10	ES	1.9072	BE	1.9045	CZ	1.9225
11	NL	1.6162	NL	1.8247	CA	1.7420
12	CA	1.6065	ES	1.8079	NL	1.6406
13	CH	1.5713	CH	1.5713	GR	1.6291
14	JP	1.5296	PT	1.5536	SE	1.6125
15	PT	1.5112	JP	1.5308	CH	1.5319
16	SE	1.4465	SE	1.5131	AU	1.4594
17	GR	1.4381	GR	1.4941	JP	1.4379
18	AU	1.1792	AU	1.4450	PT	1.4109
19	AT	1.1406	AT	1.1344	AT	1.1801

OECD Regional Database

Table 2. Ratio of the Top 20% over the Bottom 20% of the Urban Population by Countries 2001, 2008, 2016.

Ranking	Country	2001	Country	2008	Country	2016
1	IT	2.1753	PL	2.5367	PL	2.6486
2	DE	2.1056	IT	2.2315	IT	2.4049
3	CZ	2.0840	**UK**	**2.0803**	FR	2.1459
4	**UK**	**2.0161**	CZ	2.0371	**UK**	**2.1238**
5	BE	1.9287	FR	2.0278	US	2.0224
6	FR	1.8946	DE	1.9358	CZ	1.9029
7	US	1.8639	US	1.9309	ES	1.8608
8	ES	1.8148	BE	1.8428	DE	1.8593
9	PL	1.7389	ES	1.7314	BE	1.8517
10	KOR	1.6272	CA	1.6981	GR	1.6291
11	NL	1.5241	NL	1.6606	KOR	1.6072
12	PT	1.4819	KOR	1.6510	NL	1.5833
13	CH	1.4699	PT	1.5325	SE	1.5807
14	CA	1.4489	SE	1.4985	CA	1.5556
15	SE	1.4447	GR	1.4941	CH	1.4392
16	GR	1.4381	CH	1.4699	PT	1.4062
17	JP	1.4216	JP	1.4454	JP	1.3666
18	AU	1.1380	AU	1.3034	AU	1.3494
19	AT	1.1201	AT	1.0921	AT	1.0922

OECD Regional Database

Table 3. Ratio of the Top 10% over the Bottom 75% of the Urban Population by Countries 2001, 2008, 2016.

Ranking	Country	2001	Country	2008	Country	2016
1	DE	1.8287	PL	1.869	PL	1.9087
2	**UK**	**1.6636**	CA	1.814	**UK**	**1.7259**
3	PL	1.5960	**UK**	**1.7204**	DE	1.6378
4	FR	1.5067	DE	1.7002	US	1.6022
5	KOR	1.5000	FR	1.5864	FR	1.5988
6	US	1.4920	US	1.5470	IT	1.5589
7	CZ	1.4270	KOR	1.5386	CA	1.5237
8	CA	1.4084	IT	1.4433	KOR	1.5126
9	IT	1.3796	CZ	1.4194	ES	1.3998
10	ES	1.3715	AU	1.3811	AU	1.3776
11	BE	1.2920	NL	1.3679	CZ	1.3493
12	SE	1.2142	ES	1.3291	NL	1.2721
13	JP	1.2121	BE	1.2446	SE	1.2561
14	NL	1.2076	SE	1.2293	BE	1,2181
15	PT	1.1867	JP	1.2139	CH	1.1998
16	CH	1.1622	PT	1.1993	JP	1.1669
17	GR	1.0975	CH	1.1622	PT	1.1575
18	AU	1.0822	GR	1.1080	AT	1.1525
19	AT	1.0527	AT	1.1001	GR	1.1327

OECD Regional Database

Table 1 reports the ratio of the GDP per capita of the top 10% of the urban population over the bottom 10% of the national urban population for a range of OECD countries for the years 2001, 2008 and 2016. Table 2 repeats the exercise but this time calculates the ratio of top 20% of the urban population over the bottom 20%. Table 3 does the same for the ratio of the top 10% over the bottom 75%. These tables all suggest that the UK is highly unequal by OECD standards, and has consistently remained so over the last two decades. These urban Tables 1-3 parallel the regional data reported in Figures 2-9. In terms of ratios of the most to least prosperous urban areas, these tell a similar story to the regional results reported in McCann (2019): relative to other OECD countries, UK inter-regional inequalities are markedly higher than its inter-urban inequalities.

Tables 4 and 5 consider two other continuous measures of inter-urban inequality: the Gini index and the Theil index. All urban areas are considered. The results reported in Tables 4 and 5 parallel the results reported in Figures 10-13. The UK not only has a highly unequal urban productivity distribution by OECD standards, but also it has been becoming more unequal in recent years and, especially since the onset of the global financial crisis. Today urban productivity inequalities in the UK are comparable to those in the USA, whereas in the past this was not the case.

Table 4. Gini Index Ranking of Inter-Metropolitan Inequality by Countries 2001, 2008, 2016.

	Gini Index					
Ranking	**Country**	**2001**	**Country**	**2008**	**Country**	**2016**
1	HU	0.1809	HU	0.1989	HU	0.1894
2	KOR	0.1595	KOR	0.1643	KOR	0.1545
3	CZ	0.1506	CZ	0.1527	US	0.1463
4	BE	0.1471	US	0.1433	**UK**	**0.1427**
5	US	0.1427	BE	0.1395	BE	0.1374
6	DE	0.1352	**UK**	**0.1352**	IT	0.1326
7	**UK**	**0.1293**	DE	0.1260	ES	0.1286
8	ES	0.1224	CA	0.1248	CZ	0.1276
9	IT	0.1212	IT	0.1224	CA	0.1249
10	PT	0.1002	ES	0.1175	EL	0.1238
11	CA	0.0848	NL	0.1165	DE	0.1192
12	FI	0.0799	PT	0.1064	NL	0.1075
13	SE	0.0779	EL	0.0991	SE	0.0951
14	FR	0.0763	CH	0.0882	PT	0.0899
15	NO	0.0713	SE	0.0859	DK	0.0884
16	JP	0.0659	FR	0.0809	FR	0.0874
17	DK	0.0648	NO	0.0712	CH	0.0826
18	AU	0.0350	JP	0.0701	FI	0.0820
19	AT	0.0277	FI	0.0650	AU	0.0784
20	CH	Na	DK	0.0639	NO	0.0631
21	EL	Na	AU	0.0625	JP	0.0621
22	NL	Na	AT	0.0278	AT	0.0296

OECD Regional Database

Table 5. Theil Index Ranking of Inter-Metropolitan Inequality by Countries 2001, 2008, 2016.

	Theil Index					
Ranking	Country	2001	Country	2008	Country	2016
1	HU	0.0589	HU	0.0766	HU	0.0661
2	KOR	0.0447	KOR	0.0476	KOR	0.0435
3	CZ	0.0435	CZ	0.0473	**UK**	**0.0350**
4	BE	0.0349	US	0.0331	US	0.0341
5	US	0.0323	BE	0.0319	BE	0.0321
6	DE	0.0295	CA	0.0318	CA	0.0316
7	IT	0.0287	**UK**	**0.0318**	CZ	0.0314
8	**UK**	**0.0283**	IT	0.0272	IT	0.0311
9	ES	0.0235	DE	0.0251	EL	0.0310
10	PT	0.0196	PT	0.0227	ES	0.0269
11	SE	0.0125	ES	0.0223	DE	0.0225
12	FI	0.0125	NL	0.0221	NL	0.0187
13	CA	0.0124	EL	0.0198	SE	0.0181
14	FR	0.0109	SE	0.0144	PT	0.0164
15	NO	0.0084	CH	0.0143	FR	0.0156
16	DK	0.0081	FR	0.0134	DK	0.0155
17	JP	0.0068	FI	0.0091	FI	0.0143
18	AU	0.0022	NO	0.0082	AU	0.0122
19	AT	0.0013	AU	0.0080	CH	0.0116
20	CH	Na	DK	0.0080	NO	0.0064
21	EL	Na	JP	0.0076	JP	0.0060
22	NL	Na	AT	0.0016	AT	0.0023

OECD Regional Database

Yet, when we only examine functional urban areas in order to detect interregional productivity differences, care should be exercised in particular in the case of the UK, for two reasons. First, these data miss out one third of the UK population and between one third and half of the population of the other OECD countries. Second and for the UK specifically, there are features of interregional inequalities that do not correspond to textbook arguments regarding the relationships between the characteristics of cities and their performance. This makes interpreting urban inequality in the UK particularly difficult. It is not just the performance distribution of cities which is important for understanding interregional inequalities, but also their spatial locations which matter.

In the case of the UK high productivity cities tend to be clustered in a limited number of regions in the South of the country, while low productivity cities also tend to be clustered in the Midlands and the North. This spatial segregation between high and low productivity cities is a key defining feature of the UK economy. It is a feature that signals it out from most other advanced economies, whose high and low productivity cities are more evenly spatially dispersed. High productivity cities dynamise areas in their immediate hinterland, in accordance with textbook-type models, whereas low productivity cities, by contrast, are unable to do this. High productivity UK regions contain many high productivity large urban areas along with high productivity small towns and rural areas, while low productivity UK regions contain many low productivity large urban areas surrounded by low prosperity towns, villages and rural areas. The intra-regional clustering of, and the interregional segregation between, high and low productivity places, is what most markedly characterises UK regional inequalities. Geographical inequalities in the UK are therefore primarily a core-periphery region-vs-region

problem and not an urban-vs-rural problem or a city-vs-town problem, as is the case in some other countries (McCann 2019; ONS 2017).

In the USA, Australia, Canada and, to a lesser extent, France – and on a far smaller scale in Austria and Sweden – the main spatial differences in productivity and prosperity are between cities and small towns or between urban and rural areas. In these countries larger, more urbanised and more densely populated regions typically display higher productivity levels than the smaller and less densely populated areas (Dijkstra et al. 2013; OECD 2015). In these countries the relationships between city size and productivity are largely reflective of agglomeration-type arguments. Moreover, in Australia, Canada, Germany, Japan, Spain, France and New Zealand, both more productive and less productive cities are relatively more evenly distributed across the country than in the UK, such that urban productivity differentials do not show up as regional productivity differentials to the same degree as in the UK. In addition, and almost uniquely amongst OECD countries, the relationship between city size and productivity in the UK is almost non-existent (Ahrend et al. 2014), except for the case of London. Many small UK towns display higher productivity than much larger cities. Some low population density regions also display higher productivity than high population density regions (McCann 2016). At the same time, there are considerable variations in productivity between urbanised areas and also amongst rural areas, irrespective of population size or density. The result is that the UK differences in productivity between large cities and small cities, between cities and towns, between towns and villages, and between urban and rural areas are all small (ONS 2017), and only average by international standards. They are also very small in comparison to the overall UK interregional inequalities (McCann 2019).

Taken together, all of this implies that in the case of the UK we cannot simply look at urban productivity distributions and then try to infer insights regarding interregional productivity differentials. Rather, in order to understand regional inequalities, we need to consider variations in, or changes in, the performance of cities in the explicit context of their spatial and locational patterns, because these also shape the fortunes of their wider hinterlands, which are not included in the purely urban datasets. In the case of the UK it is a combination of the extreme intra-regional spatial clustering and interregional spatial segregation of high and low productivity cities, along with an absence of any city size-productivity relationships, which gives rise to the very high UK interregional inequalities.

4. National Growth and Interregional Inequality

As mentioned earlier, for many years urban economists assumed that regional inequalities were largely irrelevant (or even good) for national economic growth (World Bank 2009) and this thinking was also pervasive in the UK (Leunig and Swaffield 2007). However, as our discussion of the different interregional fortunes of the UK and Germany shows, interregional inequality is neither irrelevant nor advantageous for national economic growth, even allowing for the fact that reducing such inequalities may require considerable interregional fiscal transfers. Indeed, the fact that that UK productivity growth has been so slow since the 2008 crisis as UK interregional inequality has been rising on various indicators should give cause for reflection on these assumptions. This raises the question again, as to the overall relationship between regional inequality and economic growth and where the experience of the UK sits in this regard.

In order to capture interregional inequality, for our purposes here we prefer to employ a Theil index rather than other indices because, as a member of the family of generalised entropy indices, it is decomposable and therefore particularly suitable for analysing spatial inequalities. Moreover, the index is constructed comprising all of the individual units (in this case regions) and not reliant on just a small number of observations. Furthermore, only the family of generalised entropy indices, of which the Theil index is one, fully satisfy all of the welfare axioms specified by Cowell (Cowell 2011) as being essential for a good indicator of inequality.

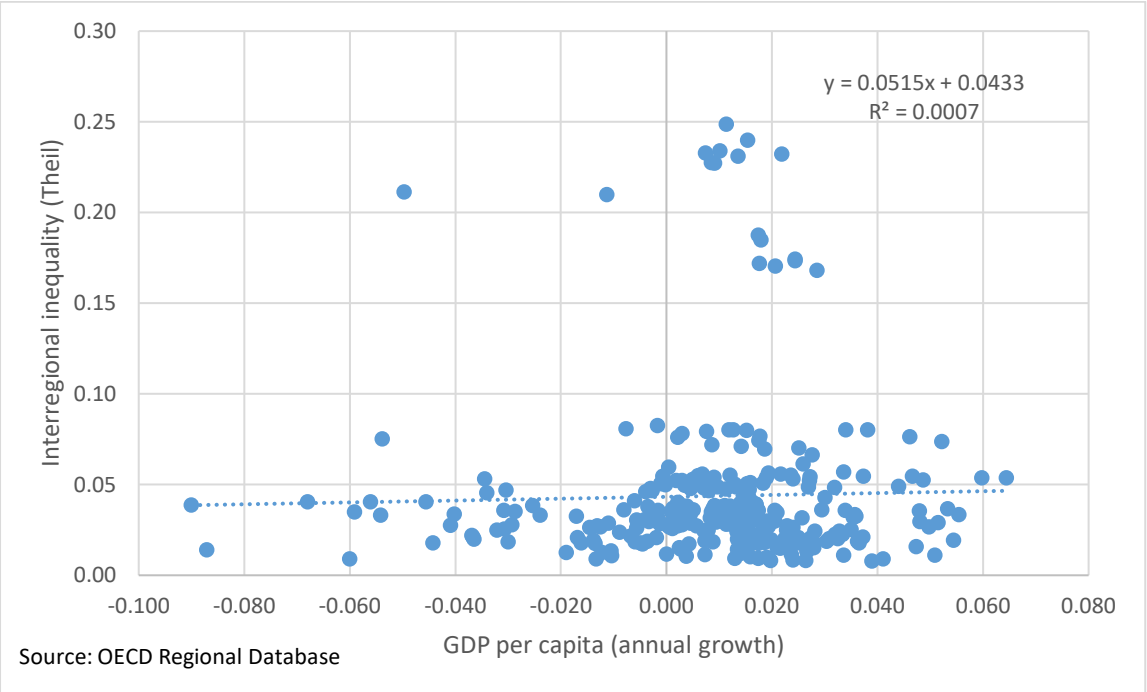
So as to examine the relationship between interregional inequality and economic growth, we plot in Figures 7-9 the relationship between annual national economic growth and interregional inequality (using a Theil index) at the OECD-TL3 territorial level across OECD countries for the period 2000-2017 and for the pre- and post-crisis periods of 2000-2008 and 2008-2017, respectively.[11] Each observation in the scatterplot relates the national GDP per capita growth rate for a particular country in a particular year and also the Theil index of interregional inequality for that same country in that same year. The GDP per capita values are in real $US, constant purchasing power parity (PPP), constant prices, with the reference year 2016[12].

Here we plot the relationships across the OECD countries after removing the former transition economies as well as Turkey, Chile and Mexico, each of which is at a much earlier stage of development than the UK and its comparator countries. See the on-line Supplementary Material associated with this paper for the scatterplots including the former transition economies.

[11] As we see in the on-line Supplementary Material, the extent to which any of these lines are upward-sloping – suggesting a positive relationship between national growth and regional inequality - is largely due to due to the transition economies.

[12] Source:
https://www.oecd-ilibrary.org/urban-rural-and-regional-development/data/oecd-regional-statistics/regional-economy_6b288ab8-

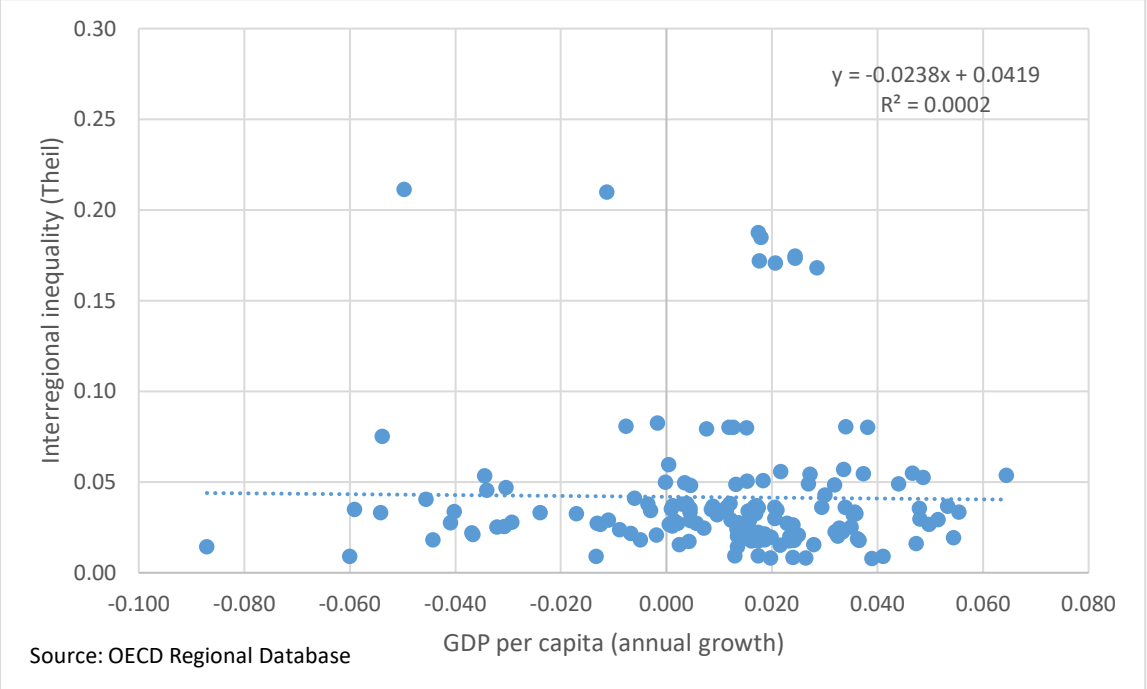
Figure 7. GDP per capita Annual Growth and Interregional Inequality, 2000-2017, OECD TL3 Regions (excluding former Transition Economies).



Source: OECD Regional Database

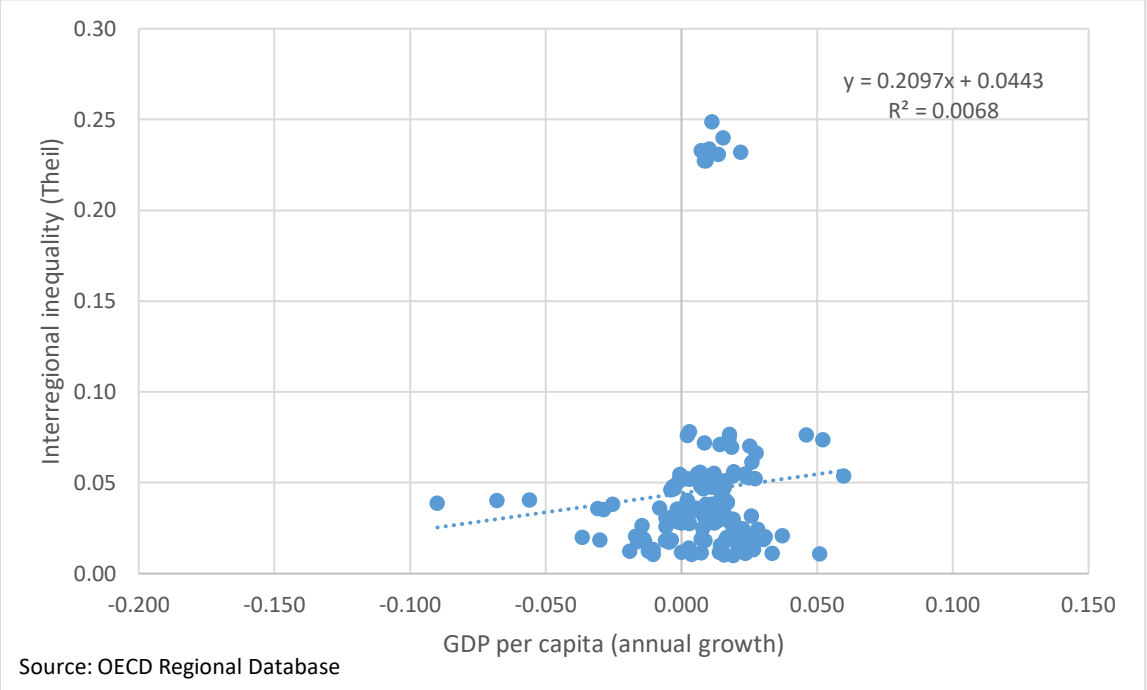
For the whole period 2000-2017, we see from Figure 7 shows that there is very slight positive relationship between interregional inequality and annual economic growth. Yet, there is also a great deal of dispersion around this trend. The period 2000-2017, however, spanned two profoundly different macroeconomic periods, namely a period of strong growth across the OECD countries prior to 2008 followed by a period of rapid decline and then only slow growth during the aftermath of the post-2008 crisis. We, therefore, separate these two periods.

Figure 8. GDP per Capita Annual Growth and Interregional Inequality, 2000-2008, OECD TL3 Regions (excluding former Transition Economies).



Source: OECD Regional Database

Figure 9. GDP per Capita Annual Growth and Interregional Inequality, 2008-2017, OECD TL3 Regions (excluding former Transition Economies).



Source: OECD Regional Database

By splitting the scatterplots into two separate pre-crisis and post-crisis time-periods, the relationship between interregional inequality and national GDP per capita growth in the buoyant pre-crisis period was slightly negative (Figure 8). In other words, the countries which were more interregionally equal grew faster, in terms of GDP per capita growth during the strong growth era prior to the crisis. In contrast, during the slow growth post-crisis period, the relationship between interregional inequality and national economic growth became very slightly positive.

The fact that the slightly positive relationship between inequality and growth was not observed during the buoyant pre-crisis era, but only for advanced OECD countries in the slow growth post-crisis era, a period also of increasing interregional divergence, suggests that this positive relationship is a result of the fact that prosperous areas also tend to be the most resilient to adverse economic shocks (Kitsos et al. 2019; Fratesi and Rodríguez-Pose, 2016). When such shocks are severe, as with the 2008 crisis, then it is only these types of places that are able to respond relatively quickly.

5. Discussion and Conclusions

The OECD-wide evidence put forward here suggests that in strong growth periods there is no real national growth advantage to having high internal regional inequalities. Moreover, as shown for Germany, large interregional fiscal transfers are not necessarily a drag on national growth, if the financial resources are used effectively and wisely. Investments in lagging- or falling-behind regions can allow weaker regions to access into their untapped potential and mobilise the resources needed to put them anew on more resilient growth trajectories. In this respect, the high UK spatial inequalities, both at the regional and urban scale, appear to have clipped the wings of the country's economy, and these inequalities in turn appear to be intrinsically related to the hyper-centralised British governance structure (McCann 2016).

On the basis of the evidence presented here and elsewhere we can conclude that there are four main intertwined features about the links between economic development and interregional inequality, which have become clearer over the last two decades and which are especially pertinent to UK-wide discussions.

First, in terms of the relationship between governance devolution and national economic growth, we know that neither extreme fiscal decentralisation (Rodriguez-Pose and Ezcurra 2011) nor extreme fiscal centralisation (Thieβen 2003) are advantageous for national economic growth. However, this does not mean that governance centralisation or decentralisation are unrelated to national or regional economic growth. The OECD-wide empirical evidence for 1995-2011 suggests that sub-national fiscal decentralisation is positively related to national economic growth, productivity and human capital (Blöchliger and Égert 2013), both for unitary and federal states. Greater sub-national decentralisation is also associated with higher levels of interregional convergence (Blöchliger et al. 2016). The hyper-centralised UK would therefore appear to be at a serious structural disadvantage both in terms of fostering national economic growth and also in terms of fostering interregional equality.

Second, and following directly on the first point, sub-national decentralisation and alignment between local revenue-generation and expenditure also appears to generate greater returns to

public investments due to the pressure for having better-designed local economic development policies (Bartolini et al. 2016; Blöchliger et al. 2016). In terms of sub-national local revenue generation and sub-national expenditure the UK is an outlier in comparison to our competitor and comparator countries. Out of 35 OECD countries in 2016 the UK was ranked as 29th in terms of the share of sub-national government revenues raised locally and 26th in terms of the share of total national public investment which is accounted for by sub-national government investment (OECD 2019b). In both cases the only countries ranked below the UK are countries which are very much smaller than the UK or countries at much lower levels of development, while our main comparator and competitor countries display respective share which are between two and four times the UK shares. Indeed, taken together, the overall levels of sub-national governance autonomy in the UK are below Romania and Ukraine and akin to countries such as Moldova or Albania (OECD 2019c). In contrast, the evidence suggests that beyond a decentralisation threshold of close to 50% of public investments, national economic growth is positively related to further decentralisation (Carniti et al. 2019), and these are the types of sub-national revenue-generation and expenditure shares which are typical of the UK's main comparator and competitor countries. As such, the hyper-centralised UK would therefore appear to be at a serious structural disadvantage also in term of generating higher returns from public investments.

Third, the challenge of moving towards greater sub-national devolution from a position of extreme interregional inequality is very real and is fraught with difficulties because devolution also requires strong fiscal support for weaker places. On the positive side, governance decentralisation in the UK could potentially alter the spatial patterns of economic growth for the better. At present we know that more politically decentralised (Ezcurra and Pasqual 2008) and higher quality (Ezcurra and Rodriguez-Pose 2014) governance systems tend to be associated with lower interregional inequalities and with a lower dominance by any particular individual city-region (OECD 2015). In decentralised states the ratio of the size of the dominant city in comparison to the size of the second city is typically half of what we observe in centralised unitary states (OECD 2015). In the case of the UK's very highly-centralised state, the relative dominance of London over the second city is more than 1.5 times the average for unitary states (OECD 2015 Metropolitan Century), and even more in terms of economic output (McCann 2016). As such, a movement towards more devolved locally-generated public revenues and expenditure could therefore lead to more interregionally balanced growth (Blöchliger et al. 2016). On the negative side, however, greater sub-national governance devolution in the UK starting from a position of such high regional inequalities could potentially lead to even greater inequalities, if sufficient interregional fiscal stabilisers are not established (Blöchliger et al. 2016; Bartolini et al. 2016).

Fourth, OECD-wide evidence also suggests that intra-regional inequality is also detrimental for regional growth in regions characterised by medium to large-sized cities (Royuela et al. 2019) and only appears to be beneficial for regional growth in less developed countries (de Dominicis 2014). Close to half of the UK population lives in medium to large sized cities and while UK interregional inequalities are amongst the highest in the industrialised world (McCann 2019), approximately half of these overall spatial inequalities are accounted for by intraregional inequalities (Zymek and Jones 2020).

The implication of these four observations, allied with the evidence presented in this paper, is that the UK economy as a whole has suffered from regional inequalities and our governance structure has almost certainly contributed to the problem. As such, devolution in a highly centralised advanced economy, such as the UK, if carefully designed and implemented with

appropriate interregional fiscal stabilisers, could potentially help to increase national economic growth (Thieβen 2003). Well-crafted devolution could also contribute to help to reduce both spatial inequalities and the economic dominance of London (Rodríguez-Pose and Ezcurra, 2010). At the same time, however, the evidence from Germany along with detailed UK evidence (UK2070 Commission 2020) also means that the scale of what is required in order to address these issues should not be underestimated, and nor should the political difficulties involved in making these changes. The combination of high interregional inequalities and hyper-centralised governance not only undermines public faith in institutions (Collier 2018) but also makes the much-needed governance reforms even harder to undertake because incumbents and entrenched interests who benefit from the status quo (Collier and Venables 2018) will resist the requisite changes. Having political narratives which correctly reflect the economic and institutional challenges is therefore essential.

Unfortunately, many of the current UK academic and political narratives appear not to dovetail with the economic experience of the UK, as discussed here and elsewhere (McCann 2016, 2019), and this mis-alignment potentially limits the efficacy of any levelling-up responses. Since the 2016 EU Referendum many policy narratives are focused on the purported disparities between cities and towns (Jennings et al. 2017), whereas in reality these are only a tiny fraction of the UK interregional inequalities (ONS 2017). In contrast, the major spatial productivity and prosperity problems in the UK concern the large urban areas in the non-core regions of the Midlands, the North, Wales and Northern Ireland (Martin et al. 2018) which do not perform as expected by international standards, when compared with similar-sized cities in many other countries (McCann 2016). In particular, the biggest partitioning is between cities in the prosperous core areas of London and its wider regional hinterland plus parts of Scotland versus cities in the regions in the remaining rump of country. Cities outside of these core areas have systematically fallen behind UK productivity growth over the last four decades. These cities are unable to support their regional hinterlands as would be expected on the basis of international evidence, and it is this which results in many UK regions being much less productive than would be expected given their population sizes and densities. As has been documented in great detail (McCann 2016; OECD 2020), it is the weakness of the large cities outside of the core regions which is at the heart of the UK's regional economic inequalities.

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Appendix

The Theil coefficient of income inequality (Theil, 1967; Cowell, 2011) may be written as:

$$T = \frac{1}{n}\sum_{i=1}^{n}\frac{y_i}{y} ln \frac{y_i}{y}$$

where T denotes the overall income inequality, n is the population size (the total number of regions), y is the average income per capita and y_i is the income of the *ith* sub-region. If the country is territorially divided into k mutually-exclusive regions, then T can be expressed as:

$$T = \left(\sum_{j=1}^{k}\frac{n_j}{n}\frac{y_j}{y} ln \frac{y_j}{y}\right) + \left(\sum_{j=1}^{k}\frac{1}{n}\frac{y_j}{y}\sum_{i=1}^{n_j}\frac{y_{ij}}{y_j} ln \frac{y_{ij}}{y_j}\right) = B + W$$

Overall inequality measured by the absolute Theil coefficient (T) falls within the interval between 0 (perfect equality) and $ln\ n$ (maximum inequality). When the average income of all regions are identical ($B = 0$), then T = W, which means that all inequality is due to income variability within the sub-regions. On the other hand, if all sub-regions in one region have the same income, but not necessarily the same income as other sub-regions from another region, ($W = 0$), then all income inequality is due to regional disparities ($T = B$). Thus, B/T (or the *relative* Theil coefficient) ranges between 0 and 1.