East Anglia's Productivity Challenge

Author:
Owen Garling[x]
University of Cambridge
Yamini Cinamon Nair[x]
University of Cambridge

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Author contact:
og287@cam.ac.uk

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The Productivity Institute, headquartered at Alliance Manchester Business School, The University of Manchester, Booth Street West, Manchester, M15 6PB.

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Introduction

In recent decades, productivity performance has become a major drag on the UK economy. This threatens future economic growth and the potential for shared prosperity across the country.

Historically, UK labour productivity has grown by around two per cent per year but since the 2008-09 recession it has stagnated. In 2019, ranked on Gross Domestic Product (GDP) per hour worked, the UK came fourth highest out of the G7 countries; about 14 per cent below the United States, France and Germany which were more or less at par. This represents the largest productivity gap relative to those economies since at least 1995 when the ONS data series began.

Figure 1: Productivity (GDP per hour)

Source: [House of Commons Library 2022)](#).

The UK's productivity puzzle has many dimensions, but one of the most striking is the level, by international standards, of productivity variability between regions. The UK has regions that are amongst the most productive in the developed world, and others that are now less prosperous than the former East Germany.

The Productivity Institute, funded by the Economic and Social Research Council (ESRC), aims to advance the understanding of UK productivity performance through a world-class action-focused research agenda. The objective is to build capacity to drive the UK productivity agenda, and act as a transformational hub, with extensive regional reach including the public and the private sector.

A central aim of the Productivity Institute is to examine the regional disparities in productivity, understand their root causes, and identify how policy makers, businesses, and individuals can make changes that improve productivity performance in all parts of the country. Eight Productivity Forums across the UK (five in England and one in each of the three devolved nations) have been established to lead this regional work.

This Green Paper presents our first assessment of the productivity picture for East Anglia and sets the agenda for the East Anglia Regional Productivity Forum. The first part of the paper gives an overview of productivity performance in the region in comparison to the rest of the UK as well as examining differences within the region. The second section sets the context for East Anglia's economic performance and considers the role of geography, place, and the citizens of East Anglia. The final section of the paper introduces a series of short Insight pieces that provide a more

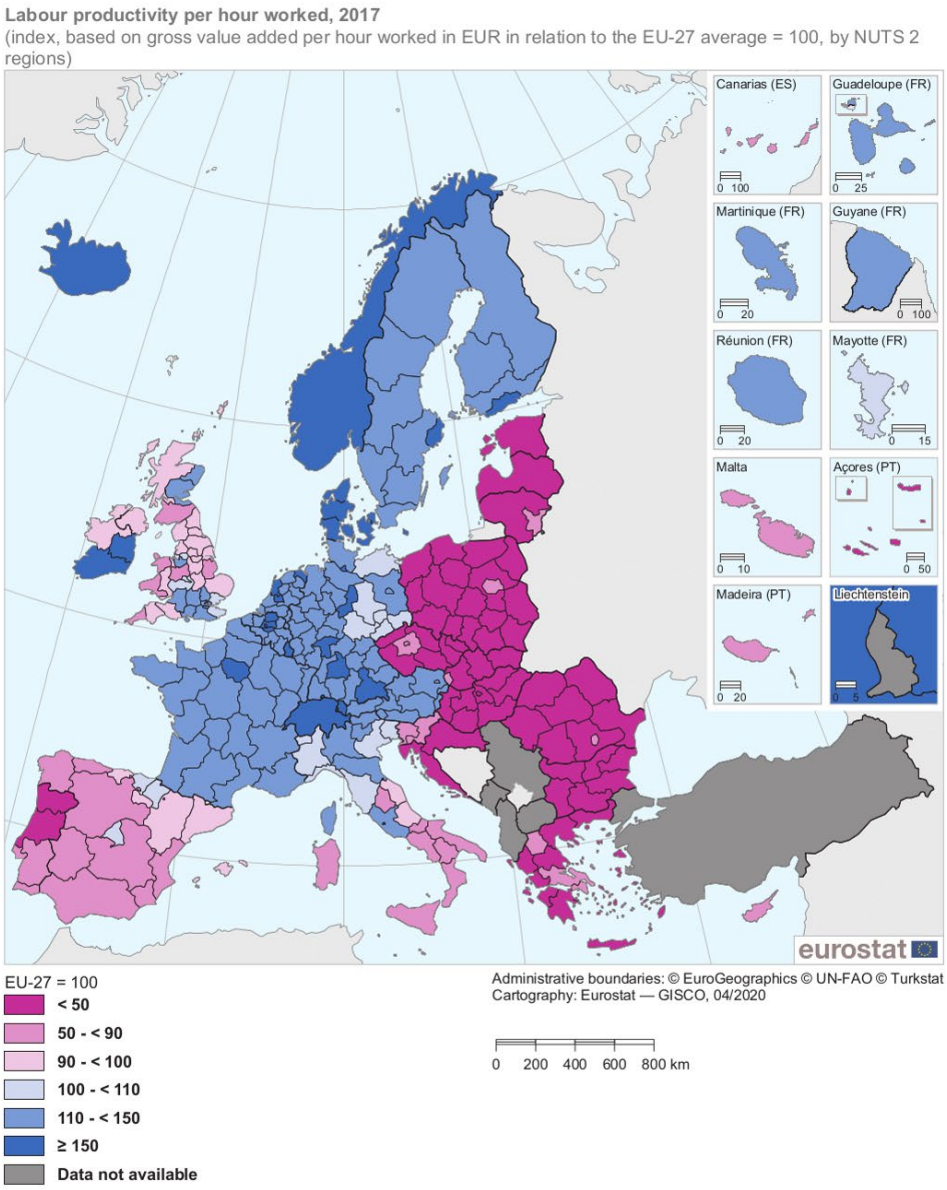
detailed view of some of the issues facing East Anglia. It is from these that we intend to build the research agenda for East Anglia.

With so many challenges to people's health and wellbeing and the future prospects for their jobs and incomes due to the Coronavirus pandemic, one may ask if now is the right time to focus on productivity. We argue that, given the significant global challenges we face, unless we improve productivity, we will not be able to do the things that matter to us all – creating high quality and sustainable jobs, raising pay and living standards, and improving education, health, and other public services. Higher productivity needs to be at the heart of what is meant by levelling up and 'building back better'.

1. East Anglia's productivity performance

The United Kingdom has a productivity problem, in terms of both the national average level and the regional disparities. As can be seen from the following map, labour productivity per hour worked across the UK's regions, outside of Greater London and Eastern Scotland, is comparable to the Iberian Peninsula and southern Italy (Figure 2). Coupled with this, the UK is one of the most regionally unequal of the OECD countries (OECD, 2020).

Figure 2: Labour productivity per hour worked, 2017



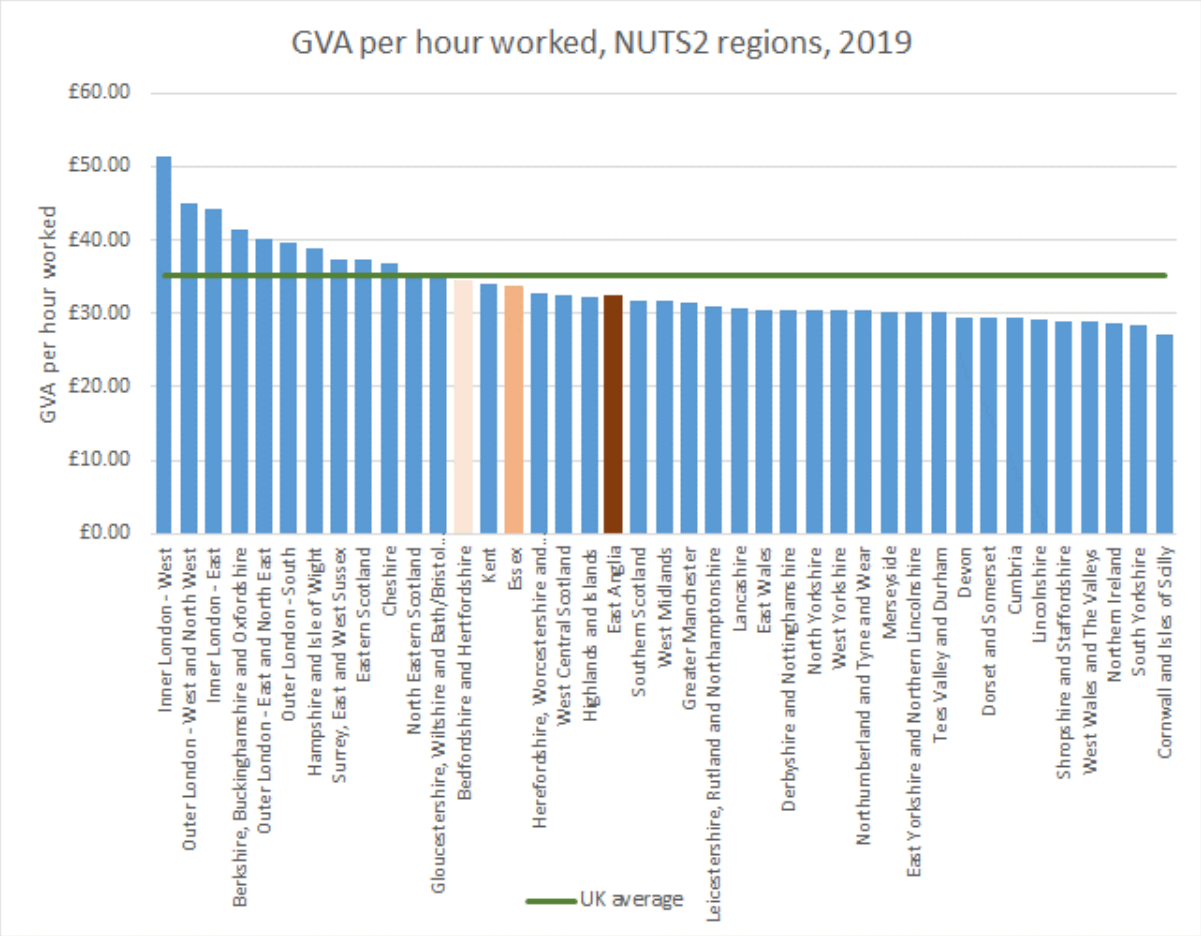
Note: Norway and Switzerland, national data. Germany: estimates. Bulgaria, Greece, Spain, France, the Netherlands and Iceland: provisional. Sostinės regionas (LT01), Vidurio ir vakarų Lietuvos regionas (LT02), Warszawski stołeczny (PL91) and Mazowiecki regionalny (PL92): definition differs. France and Italy: 2016.
Source: Eurostat (online data codes: nama_10r_3gva, nama_10_a10, nama_10r_2emhrw and nama_10_a10_e)

Source: Eurostat

East Anglia's productivity level (in terms of GVA per hour worked – see Appendix B for a discussion) is £32.27 per hour. Within the UK, this falls slightly below the UK NUTS2 average of £35.15 per hour worked.

East Anglia is ranked 19th of the 41 NUTS2 regions that make up the United Kingdom and falls slightly below the two other regions which together make up the East of England: Bedfordshire & Hertfordshire at £34.49 per hour and Essex at £33.59 per hour.

Figure 3: GVA per hour worked, NUTS2 regions, 2019



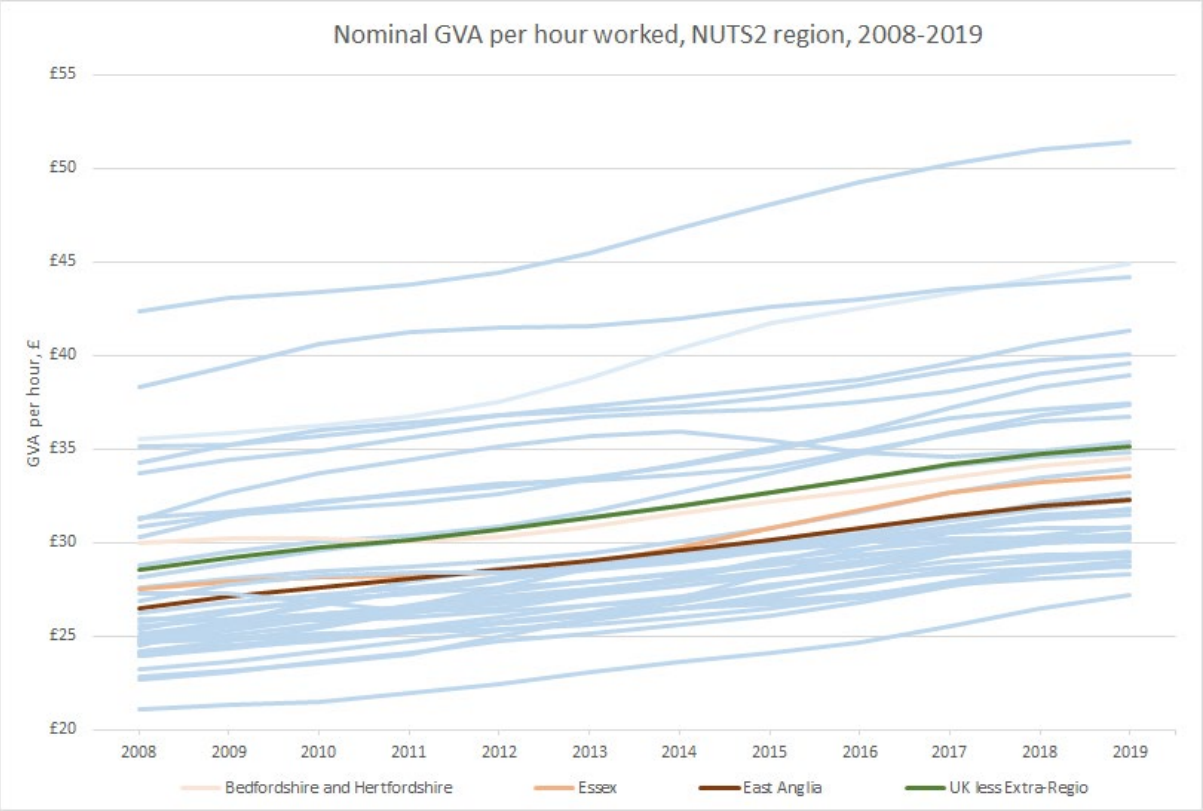
ONS (2021a).

The level of productivity also varies within East Anglia. Looking at the NUTS3 regions that make up East Anglia[a] shows that there is a substantial variation in GVA per hour worked. It was lowest in Breckland & South Norfolk at £29.20 per hour, which places it between Lincolnshire (£29.07 per hour) and Sefton (£29.24 per hour). In contrast, it was highest in Peterborough at £34.22 per hour, almost equal to Essex Thames Gateway (£34.23) and slightly above Brighton & Hove (£33.92).

[a] Note that these data predate the local government re-organisation that took place in Suffolk in 2019

In the period from 2008 to 2019, East Anglia's GVA per hour worked (in nominal terms, not adjusted for inflation) increased from £26.50 to £32.27 per hour. Over the same period, the UK's GVA per hour worked increased from £28.58 to £35.15 per hour (Figure 4).

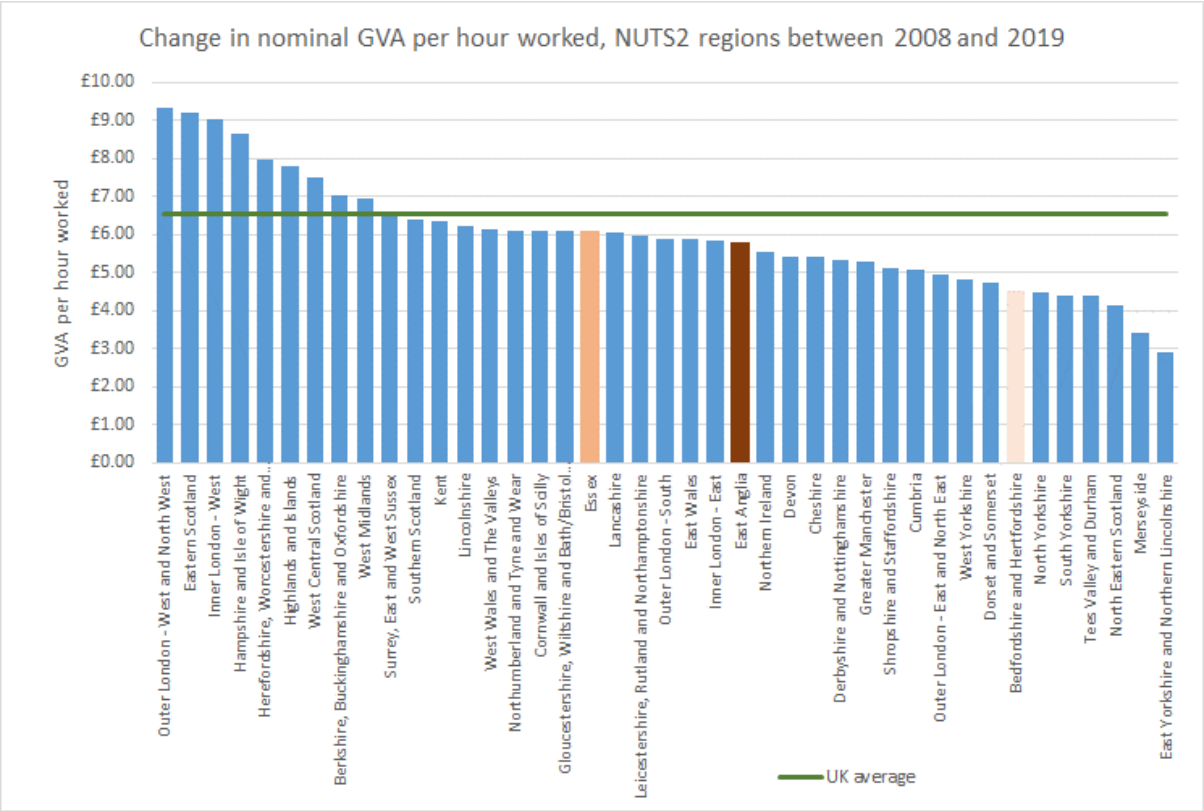
Figure 4: GVA per hour worked, NUTS2 regions, 2009-2018



ONS (2021a).

Compared to other NUTS2 regions, East Anglia's increase in productivity by £5.77 per hour over the period from 2008 to 2019 was the 24th largest increase among 41 NUTS2 regions – slightly below the increase of Inner London – East (£5.84) and ahead of Northern Ireland (£5.53). GVA per hour in Essex increased somewhat faster at £6.06 over the same period, while Bedfordshire & Hertfordshire saw a significantly smaller increase at £4.48 (Figure 5).

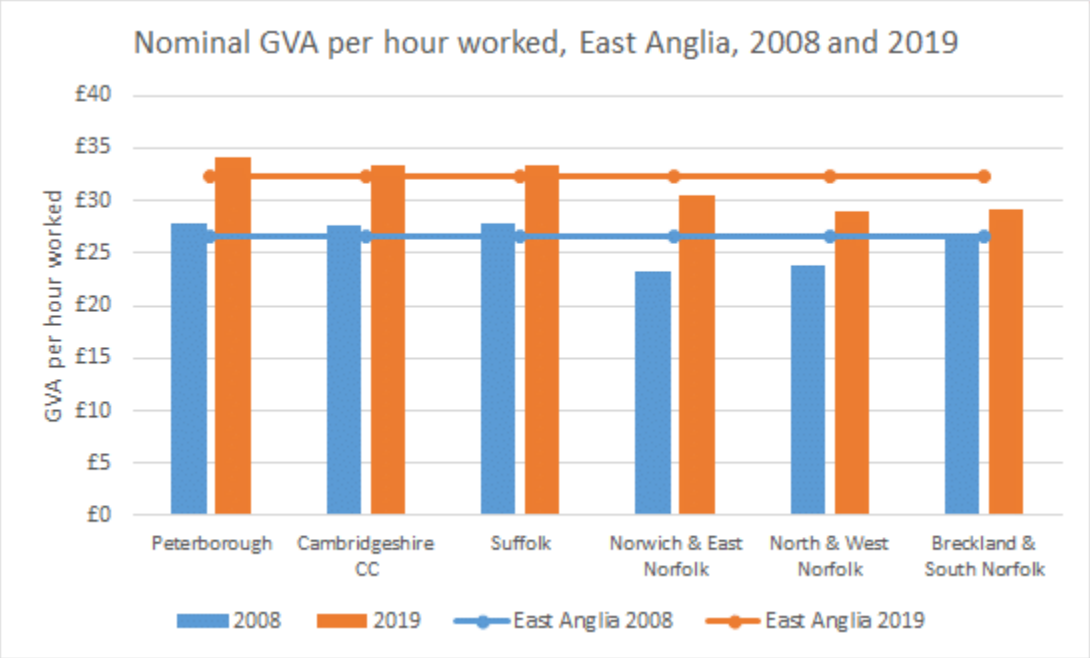
Figure 5: Change in nominal GVA per hour worked, NUTS2 regions between 2008 and 2019



ONS (2021a)

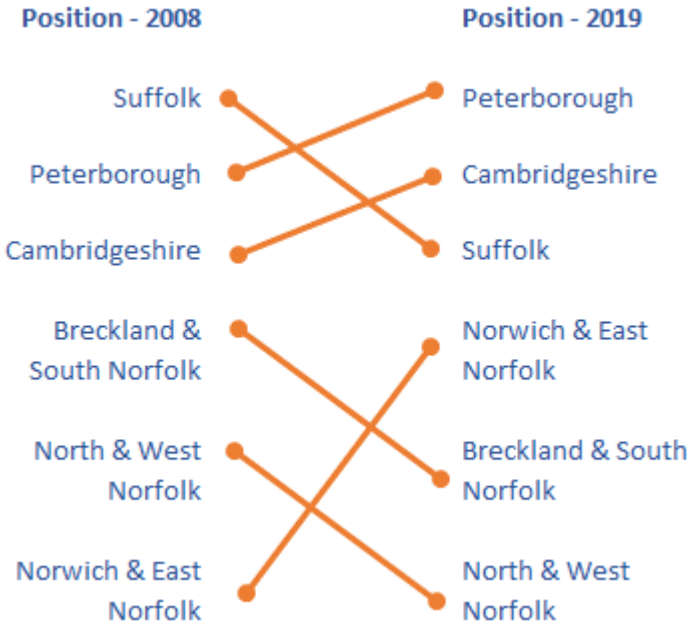
Again, it is also instructive to look at NUTS3 areas within East Anglia to see how the changes in GVA per hour worked have differed over time for different areas. As shown by Figures 6 and 7, Suffolk, Peterborough and Cambridgeshire have a higher productivity level than the other three areas (Norwich & East Norfolk, North & West Norfolk and Breckland & South Norfolk). In 2018 Peterborough's GVA per hour worked in 2019 (£34.22 per hour) had overtaken Suffolk (£33.29 per hour) and had widened its advantage over Cambridgeshire (£33.29 per hour) compared to 2008. Breckland & South Norfolk (which showed an increased from £26.34 to £29.20 per hour) has seen the smallest increase in GVA per hour. This has enabled Norwich & East Norfolk (£30.51 per hour) to move ahead of Breckland and South Norfolk by 2019.

Figure 6: Nominal GVA per hour worked, East Anglia, 2009 – 2018



ONS (2021a)

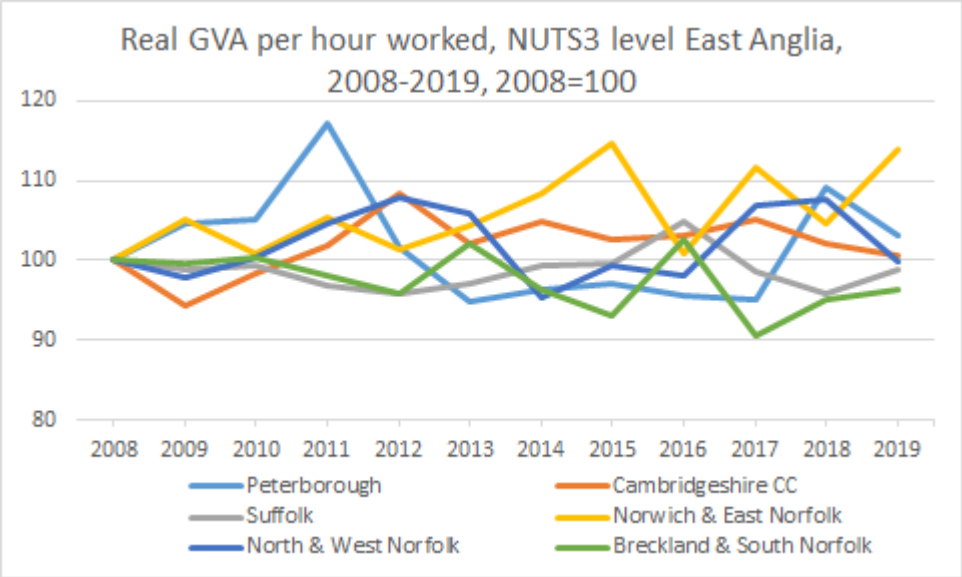
Figure 7: Change in ranking, East Anglia, 2008–2019



ONS (2021a)

Figure 8 shows that, in real terms (i.e. adjusted for inflation), labour productivity in Norwich and East Norfolk showed the largest increase in GVA per hour worked since 2008 (well ahead of the UK as a whole), while Peterborough and Cambridgeshire experienced a smaller productivity increases compared to 2008. Productivity in Breckland & South Norfolk declined by almost 4 percent from 2008 to 2019.

Figure 8: Real GVA per hour worked Indices, East Anglia, 2008-19



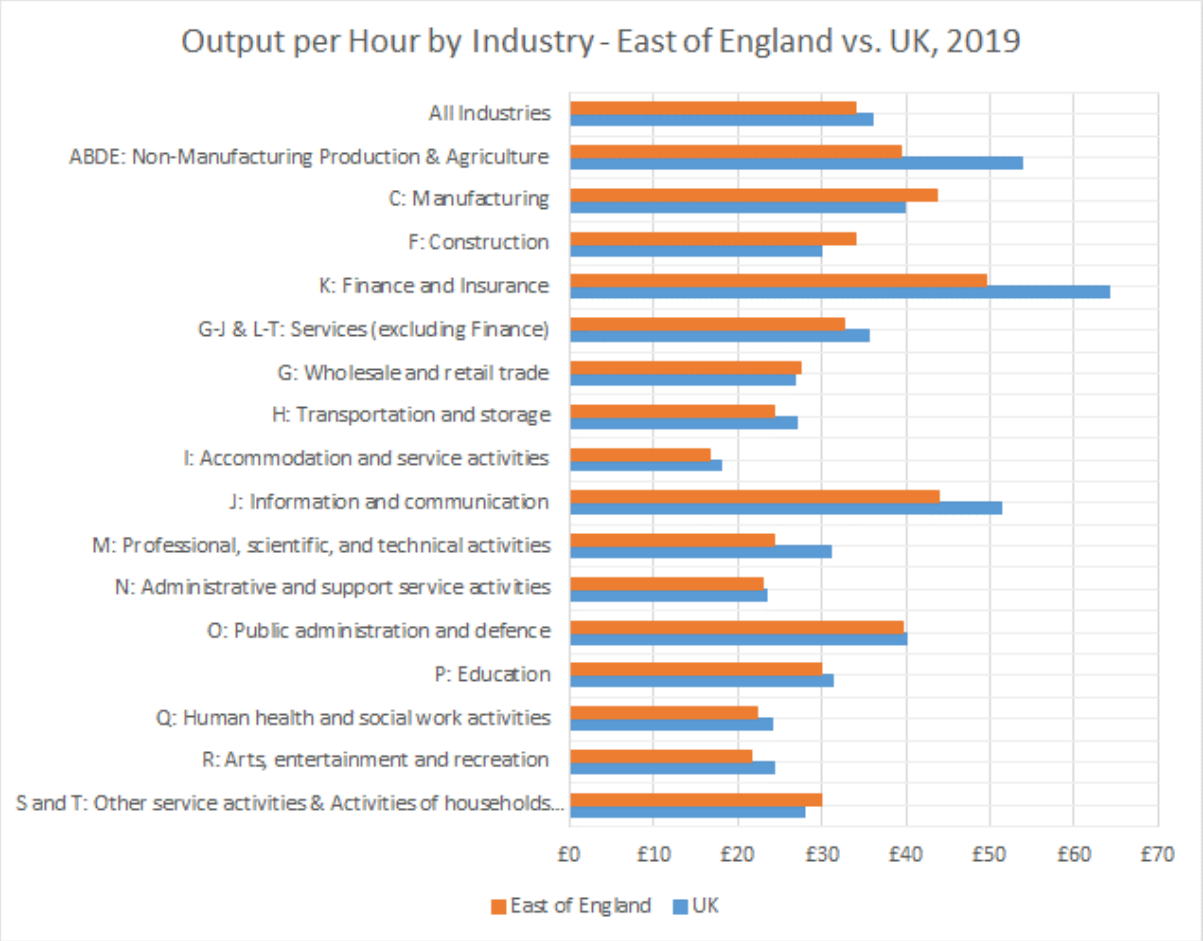
Source: ONS (2021a)

Output per hour by industry section data does not exist at a NUTS2 level, and so it is not straightforward to look at this data for East Anglia. However, the data is available for the wider East of England (Figure 9).[b] In most industries, the East of England's levels of productivity are slightly behind those of the UK as a whole. The largest shortfalls compared to the UK are in Non-Manufacturing Production & Agriculture, Finance & Insurance, and in Information and Communication. However, the region has higher levels of productivity relative to the UK level in Manufacturing, Construction and Wholesale and Retail Trade.

Figure 10 shows the industrial sectors with the lowest and highest outputs per hour, showing there is a gap of more than £30 per hour between the most and least productive industry sectors in the East of England.

[b] The East of England covers East Anglia plus the counties of Bedfordshire & Hertfordshire and Essex, incl. the Unitary Authorities of Southend-on-Sea and Thurrock.

Figure 9: Output per Hour by Industry Section - East of England and UK



Source: ONS (2021c)

Figure 10: Lowest and Highest Output per Hour by Industry - East of England, 2019

Lowest output per hour	Highest output per hour
• Accommodation & Service Activities (£16.67) • Administrative & Support Service Activities (£19.05) • Human health and social work activities (£22.35)	• Finance & Insurance (£49.53) • Information & Communications (£43.99) • Manufacturing (£43.78)

Note: Output per hour in current prices. Real estate not shown separately (East of England: £333.28; UK: £299.39).
Source: ONS (2021c)

2. Drivers and Barriers to Productivity in East Anglia

East Anglia is made up of the counties of Cambridgeshire, Norfolk and Suffolk, and the unitary authority of Peterborough. It is situated in the east of England and is bordered to the north and east by the North Sea and the Wash. East Anglia has been used as a description of this area since the Kingdom of the East Angles was formed in the early sixth century.[c]

Geography & Place

East Anglia is a predominantly rural area with around three-quarters of the land used for agriculture.[1] It is a particularly fertile landscape, with nearly 50 per cent of England's Grade One agricultural land being found in the Fens. Norfolk and Suffolk have a very high proportion of the UK's most productive land too (25.5 per cent Grades 1 and 2 and 53.8 per cent Grade 3), with a greater proportion of the best grades of food-producing land compared to the average for England (16.9 per cent Grades 1 and 2 and 48.1 per cent Grade 3). Seventy-five per cent of the farmed area in East Anglia is arable, by far the highest share and largest arable area among English regions.

East Anglia is also a particularly low-lying area, hence Noel Coward's famous comment, "Very flat, Norfolk."[2] East Anglia's low-lying nature, low rainfall and the coast's susceptibility to coastal erosion makes the region very vulnerable to climate change and the impacts of increasing incidence of flood and drought.[3] Approximately 20 per cent of the region is below sea level, and the rich soils of the fens are the result of centuries of investment in land management and reclamation. This has created a unique environment and culture.

People

East Anglia is home to approximately 2.5 million people, 1.5 million of whom are of working age. Like the UK in general, the population of East Anglia is ageing. However, different areas of the region are ageing at different rates, with Peterborough being the youngest area of East Anglia, and Norfolk and Suffolk being the oldest (ONS, 2021b).

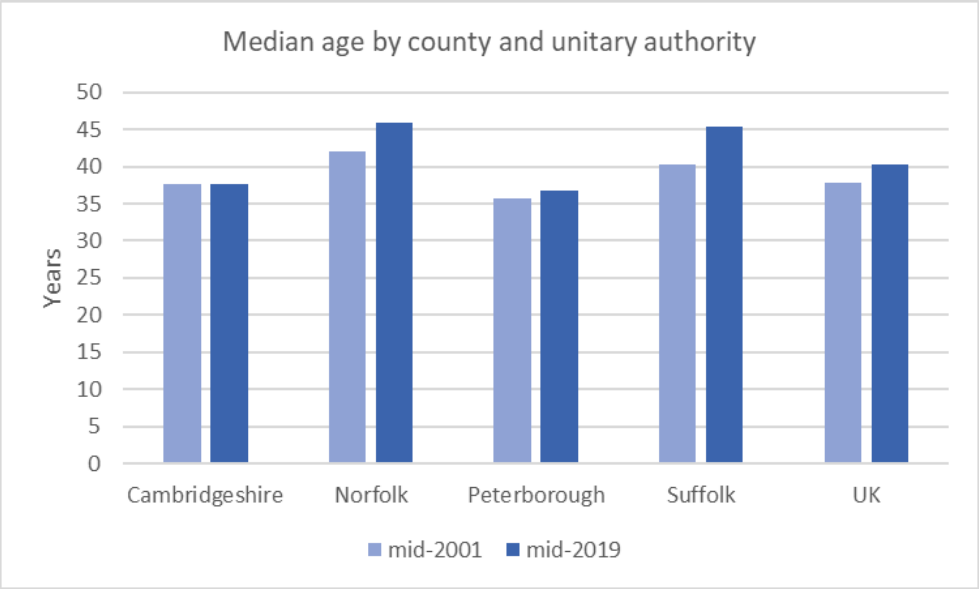
As Figure 11 shows, the median age of Peterborough residents increased by one year between mid-2001 and mid-2019 to 36.7 years, whereas the median age in Suffolk increased by five years to 45.3 in the same time-period. This compares to an increase in the median age for the UK of 2.4 years from 37.9 to 40.3 on the same timescale.

The proportion of people aged 65 and over also varies across of East Anglia from one-third of the population in North Norfolk to only 13 per cent in Cambridge. Only the four urban areas of Cambridge, Ipswich, Norwich and Peterborough have a lower proportion of people aged 65 or over than the UK average (Figure 12).

[c] The other two NUTS2 regions which, together with East Anglia, form the East of England are Bedfordshire & Hertfordshire and Essex. These two areass, which form part of the London commuter belt, are not discussed in detail in the paper. However, see the Executive Summary of the East of England for more detail.

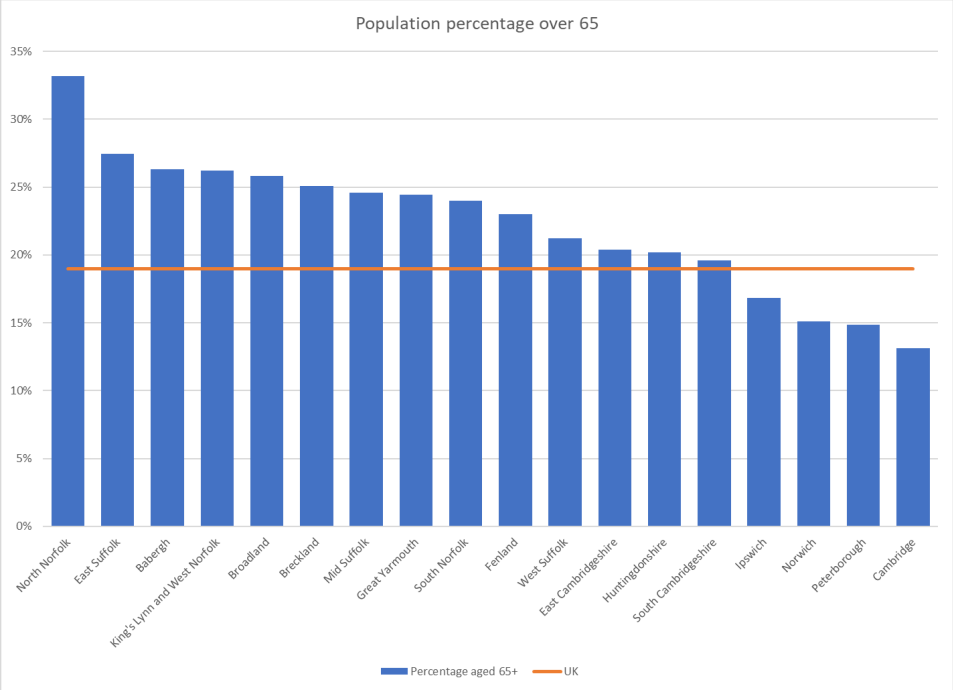
Therefore, in those areas with a high population of over 65 year-olds there is both a reduced pool of labour as well as a higher number of people who may be in greater need of health and social care services.

Figure 11: Median age by county and unitary authority



Source: ONS (2021b).

Figure 12: Population - percentage over 65

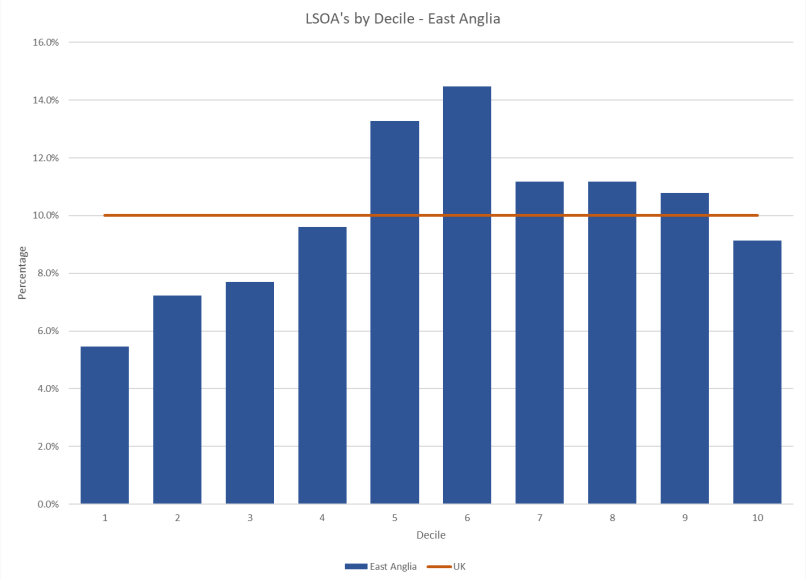


Source: ONS (2021b).

Deprivation

Deprivation also varies across East Anglia (HM Treasury, 2021). Taken as a whole, the spread of Lower Super Output Areas (LSOAs)[d] in East Anglia sits across all ten deciles, with the lower deciles being slightly under-represented and the higher deciles being slightly over-represented compared to the country as a whole (Figure 13).

Figure 13: LSOA's by Decile - East Anglia

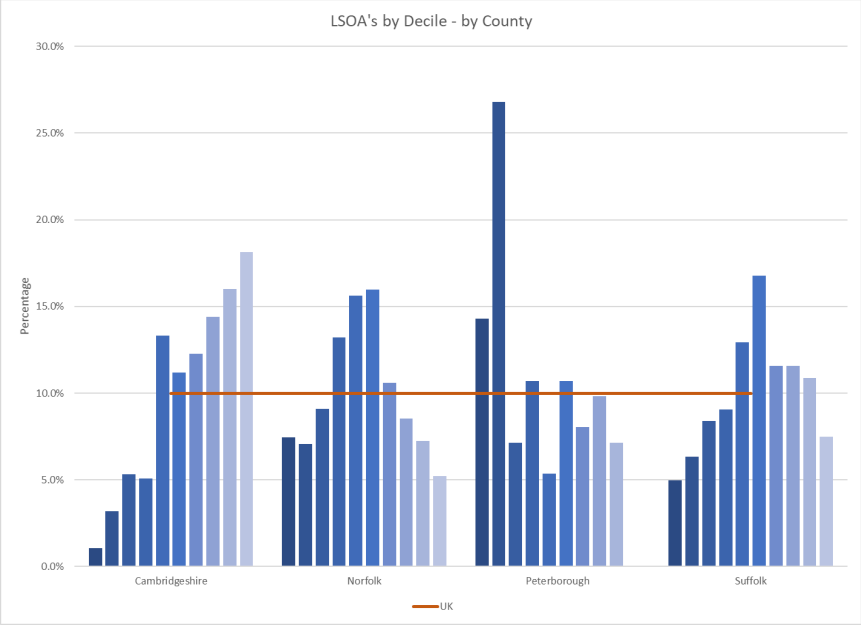


Source: Indices of Multiple Deprivation, 2019 Calculations author's own

However, there is a significant difference in the pattern at a county level. Figure 14 shows that there are fewer deprived LSOA's in the bottom three deciles in Cambridgeshire, Norfolk, and Suffolk. Where there are areas of high deprivation in these counties, they are primarily in East Anglia's coastal and fenland communities. This stands in stark contrast to Peterborough where nearly 50 per cent of LSOA's fall within the lowest three deciles, and there are no areas in the top decile.

[d] Lower Super Output Areas enable the reporting of small area statistics. Each LSOA contains between 1,000 and 3,000 residents in between 400 and 1,200 households.

Figure 14: LSOA's by County and Unitary Authority – East Anglia

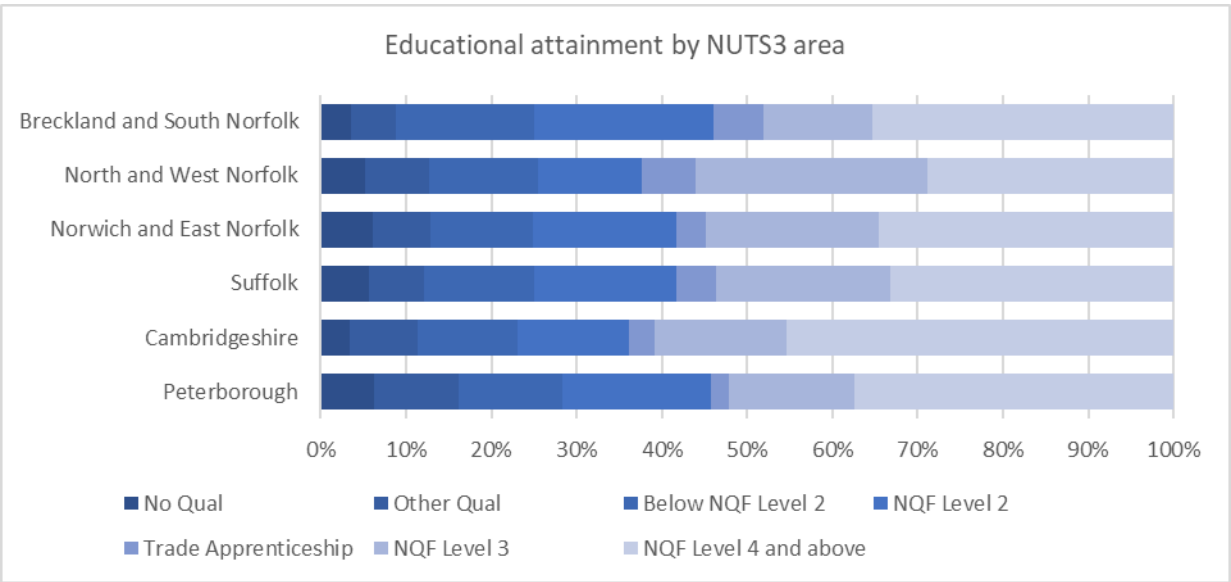


Source: Indices of Multiple Deprivation, 2019 Calculations author's own

Education

Educational levels also vary across East Anglia (ONS, 2018). The number of people with no qualifications is highest in Peterborough (6.3 per cent) and Norwich and East Norfolk (6.1 per cent), whilst those with NQF Level 4 and above is highest in Cambridgeshire (45.4 per cent). The percentage of Trade Apprenticeships also varies from 2.2 per cent in Peterborough to 6.3 per cent in North and West Norfolk (Figure 15).

Figure 15: Educational attainment by NUTS3 area – East Anglia



Source: ONS, 2018.

Ethnicity

East Anglia's population is predominantly White. The counties of Cambridgeshire (92.6 per cent)[4], Norfolk (96.5 per cent)[5], and Suffolk (95.2 per cent)[6] all have a higher percentage of people from White ethnic groups than England (85.4 per cent).

The exception is the city of Peterborough[7] which is home to a more ethnically diverse population than the rest of East Anglia. Peterborough has a higher proportion of Asian/Asian British than average (11.7 per cent) with a high proportion of that community being of Pakistani origin. This is reflected in the lower-than-average White population (82.5 per cent). Peterborough also has a higher proportion of 'Other White' residents than both the UK and the East, reflective of recent EU migration patterns. The impact of Brexit on these patterns is yet to be seen.

Local Geographies

Despite being a predominantly rural area there are very different geographies spread across East Anglia. From the urban centres of Norwich, Cambridge, Peterborough, and Ipswich, to the market towns of much of the area and the coastal resorts dotted along the east coast.

Different parts of East Anglia also reflect a variety of governance structures, with important implications for the possible impact of the government's 'Levelling up' agenda:

- Cambridge, Ipswich, and Norwich have all agreed City Deals with central government and are in different stages of delivery.
- Six of the towns and cities in the region are also on the list of 101 towns eligible for the Towns Fund.[8]

  Funding was agreed for Peterborough[9] and Norwich as part of the first round of announcements.[10] Great Yarmouth,[11] Ipswich,[12] and Lowestoft's[13] successful bids were announced as part of the 2021 budget[14] and the final Towns Fund bid for King's Lynn[15] was announced in June 2021.
- Three of East Anglia's second tier local authorities – Great Yarmouth, King's Lynn and West Norfolk, and Peterborough – are in the highest category of need as defined by the Levelling Up Prospectus announced at the 2021 budget (HM Treasury, 2021). The remaining local authority areas are split between the two lower categories.

Both Local Industrial Strategies for the area (CPCA and New Anglia) also highlight the importance of understanding the different functional geographies of the region and include plans that demonstrate an awareness of the differences between places.

More locally, the Cambridgeshire and Peterborough Combined Authority's Market Town Masterplan programme[16] sets out how investment in market towns across Cambridgeshire will support productivity and "*provide targeted growth and regeneration.*"

Urban Centres

The cities of Norwich, Cambridge, and Peterborough, and the large town of Ipswich are the major urban areas of East Anglia. The three City Deals in place all acknowledge their relationship with the wider functional geography that surrounds them and the important role that these places play in the regional and national economy.

Table 1, adapted from the Centre for Cities City Monitor, sets out some of the key data on these four urban centres.

Table 1: Key data for East Anglia's Urban Centre

	Cambridge	Ipswich	Norwich	Peterborough
Population				
Population (2019)	124,800	136,910	271,360	202,260
Change (2009- 2019)	6.9%	5.9%	7.2%	13.0%
Skills				
Working age population (2019) with high level (NVQ4 and above) qualifications UK = 40.2%	69.6%	32.7%	32.2%	29.5%
with no formal qualifications UK = 7.9%	6.7%	8.4%	7.4%	10.7%
Environment				
CO2 emissions per capita 2018 UK = 5.2	4.1	2.9	4.6	5.0
Number of days a year of poor air quality (2019)	34	30	32	24
Housing				
Mean house price (2020) UK = £296,197	£508,525	£211,255	£257,791	£213,489
Connectivity				
Connections subscribed to 30+ Mbps (2020) UK = 70.6%	80.2%	74.2%	73.6%	73.6%
Productivity				
GDP per worker (2018) UK = £67,534	£59,751	£75,116	£57,842	£61,356
Industrial Structure				
Private knowledge-intensive business services jobs UK = 13.8%	15.3%	14.6%	14.0%	13.9%
Manufacturing jobs UK = 7.8%	1.3%	3.1%	6.7%	7.1%
Publicly funded sector jobs UK = 25.4%	41.8%	31.9%	27.2%	22.5%
Other services jobs UK = 45.1%	39.8%	44.0%	45.4%	51.5%
Other jobs 7.8%	1.8%	6.4%	6.7%	5.1%

Source: Centre for Cities, City Monitor, East.

Greater Cambridge – which takes in Cambridge, South Cambridgeshire, and parts of Huntingdonshire and East Cambridgeshire – is an area of national and international importance due to its success in growing and attracting high-value businesses. However, it is not without its problems. Growth in employment has not been matched by house building or infrastructure provision. As a result, house prices have rocketed and for many, commutes have lengthened. Many see these issues as constraining the possibilities of the area.

Peterborough's origins as a town of industry, first in brickmaking, and then manufacturing, have laid the foundations for a dynamic business environment. It has been a magnet for engineering talent, and trades well upon its connection to strategic infrastructure including access to the A1 and the East Coast Mainline. Its population is young, multiculturally diverse, and growing at a fast rate. However, Peterborough has a lower proportion of higher-level skills than elsewhere in the area, and educational and health outcomes in Peterborough are relatively poor.

Ipswich[17] [18] is the county town of Suffolk. It is ten miles inland from the country's largest container port at Felixstowe. It benefits from regular rail services to London Liverpool Street and good international connections through Stansted airport. The University of Suffolk has its main campus on the Ipswich Waterfront, and the town has one of the highest concentrations of arts and cultural organisations in the country, including DanceEast, the New Wolsey Theatre, the Regent Theatre, and Gecko, and it is host to the annual Spill Festival.

Ipswich is also home to Adastral Park, at the heart of the UK's digital ecosystem, combining a national operation centre, test facilities and a global R&D unit. Adastral Park is home to BT's innovation labs and Innovation Martlesham (an established and growing cluster of circa 150 high-tech ICT companies) as well as educational initiatives such as the Tommy Flowers Network.

Greater Norwich[19] is home to the third highest concentration of research parks in the UK and two leading universities: University of East Anglia (UEA) and Norwich University of the Arts. UEA is recognised as being one of the leading international research institutions on climate change, including the Tyndall Centre for Climate Change. Research at the centre represents a substantial body of the UK's expertise on sustainable responses to climate change from across the scientific, engineering, social science and economic communities.

Norwich is recognised as a centre for excellence and innovation around fin-tech and insur-tech. Established in 2001, Norwich's Financial Industry Group (fig) is the only financial services trade association in England outside London. fig comprises senior executives from leading companies, local government and senior UEA faculty. From UEA, fig employs the latest thinking and research findings for achieving sustainable cluster growth and organises a range of activities to promote the cluster.

The strong supply of creative graduates from these pioneering universities supported a 21 per cent increase in digital businesses between 2010 and 2013.[20]

Market Towns

East Anglia is also a region of market towns. Smaller towns and cities including Bury St Edmunds, Ely, Lowestoft, Great Yarmouth, and King's Lynn are spread out across the region and have played an important part in the economic, social, and cultural life of East Anglia, particularly in its rural heyday. However, as the Cambridgeshire and Peterborough Independent Economic Review notes "*They are also an area of concern for many* [and] *there is a clear worry that many of the market towns are in danger of stagnation, as economic activity drifts towards larger centres, and populations age, not being replaced at the bottom end by younger newcomers."*

Coastal Resorts

East Anglia's coastline includes some coastal resorts, such as Great Yarmouth[21] and Lowestoft, that have struggled to define themselves since the advent of cheap foreign travel in the 1970's, but there is a thriving visitor economy across Norfolk and Suffolk's coastal areas. The areas of greater deprivation are seeing a boom in the energy sector with increasing job opportunities across the build and maintenance of these projects. The North Norfolk coast also has areas of deprivation - there are small pockets on the North Norfolk coast (e.g. Holkham, Burnham Market, Thornham) and Suffolk coast (Aldeburgh, Southwold) which are affluent, but these areas are mainly dominated by second home owners.

The East Anglian coast is home to 9,172 km², of designated Areas of Outstanding Natural Beauty, nature reserves, country estates and parks. Across the two counties of Norfolk and Suffolk, the visitor economy supports 90,000 jobs (11.3 per cent of the total workforce), consists of more than 7,000 businesses, and is estimated to be worth £2.5 billion in terms of spending.

Business Base

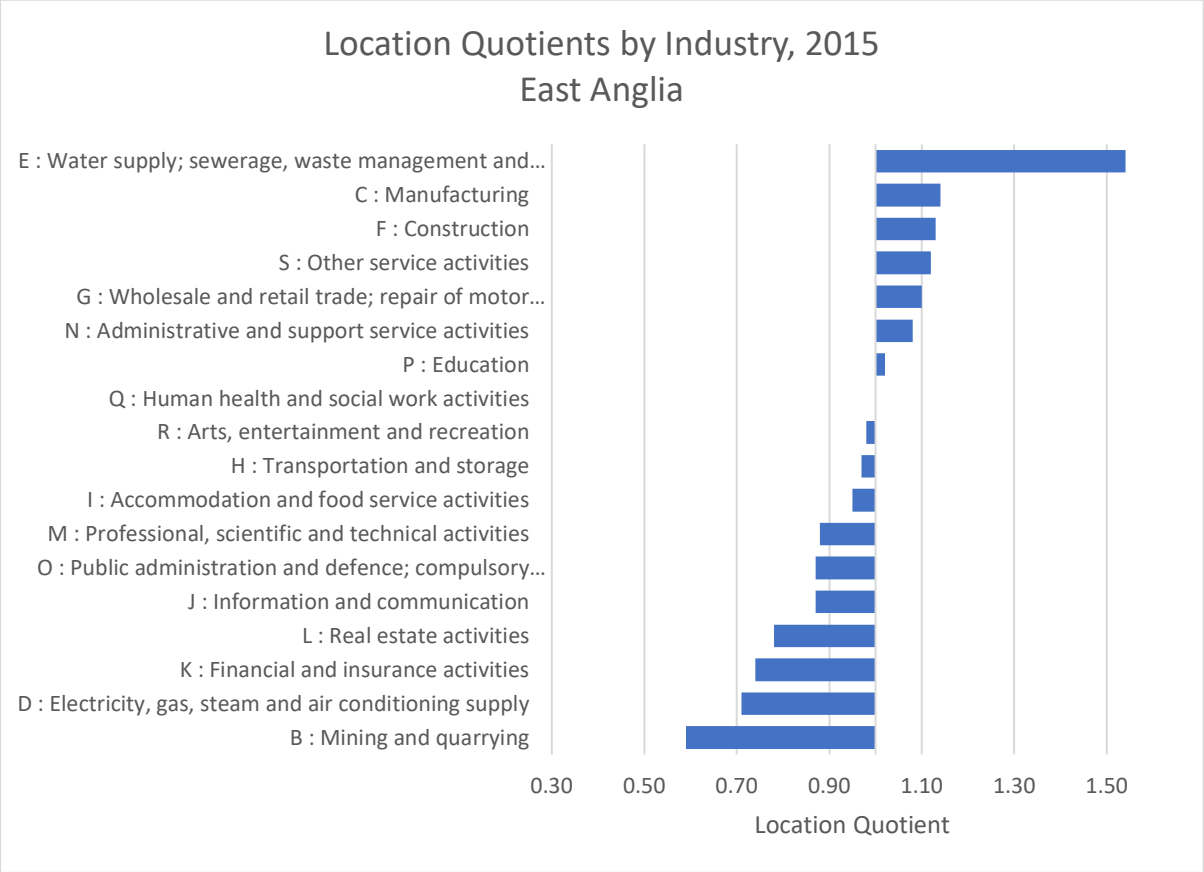
East Anglia is home to just over 100,000 businesses.[22] The majority (88.7 per cent) have ten or less employees. Only 0.4 per cent of the business base has more than 250 employees.

Industrial strengths

An area's industrial strengths can be understood by calculating its location quotients which analyse the concentration of employment in defined geographic areas across a range of industries. An industry's location quotient in a given area is calculated as the ratio of the industry's share of employment in that location to its share of employment nationally. One can assume that a location quotient greater than one (which indicates that the areas employment share in that industry is greater than the national average) conveys that the area has some degree of competitive strength in that industry.

The following chart shows the location quotients for industrial sectors in East Anglia in 2015.[23]

Figure 16: Location Quotients by Industry, East Anglia, 2015



Source: ONS (2017), Location quotient data and geographic concentration for NUTS 1, NUTS 2 and local authorities, 28 March.

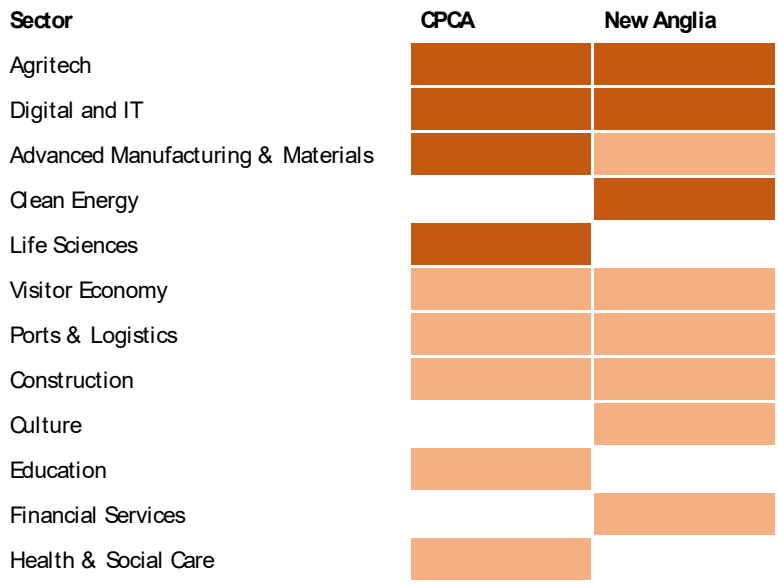
This shows that compared to the rest of the country, East Anglia is relatively strong in a number of sectors, including water, manufacturing and construction, and weaker in others such as real estate activities and financial and insurance activities.

By looking in more detail at Standard Industrial Classification (SIC) codes, the top five divisions show that East Anglia has a comparative strength in:

- Scientific research and development (LQ = 3.63)
- Sewerage (LQ = 2.65)
- Water collection, treatment and supply (LQ = 2.12)
- Manufacture of machinery and equipment n.e.c (LQ = 1.86)
- Manufacture of beverages (LQ = 1.71)

For the purposes of the two Local Industrial Strategies covering East Anglia (Cambridgeshire and Peterborough Combined Authority and New Anglia Local Enterprise Partnership covering Norfolk and Suffolk), the priorities and key sectors in the east and west of the region have been identified. Bringing these together shows the five key sectors in East Anglia that have been identified as strategically important through the Local Industrial Strategy process.

Figure 17: Key Sectors identified through East Anglia's Local Industrial Strategies

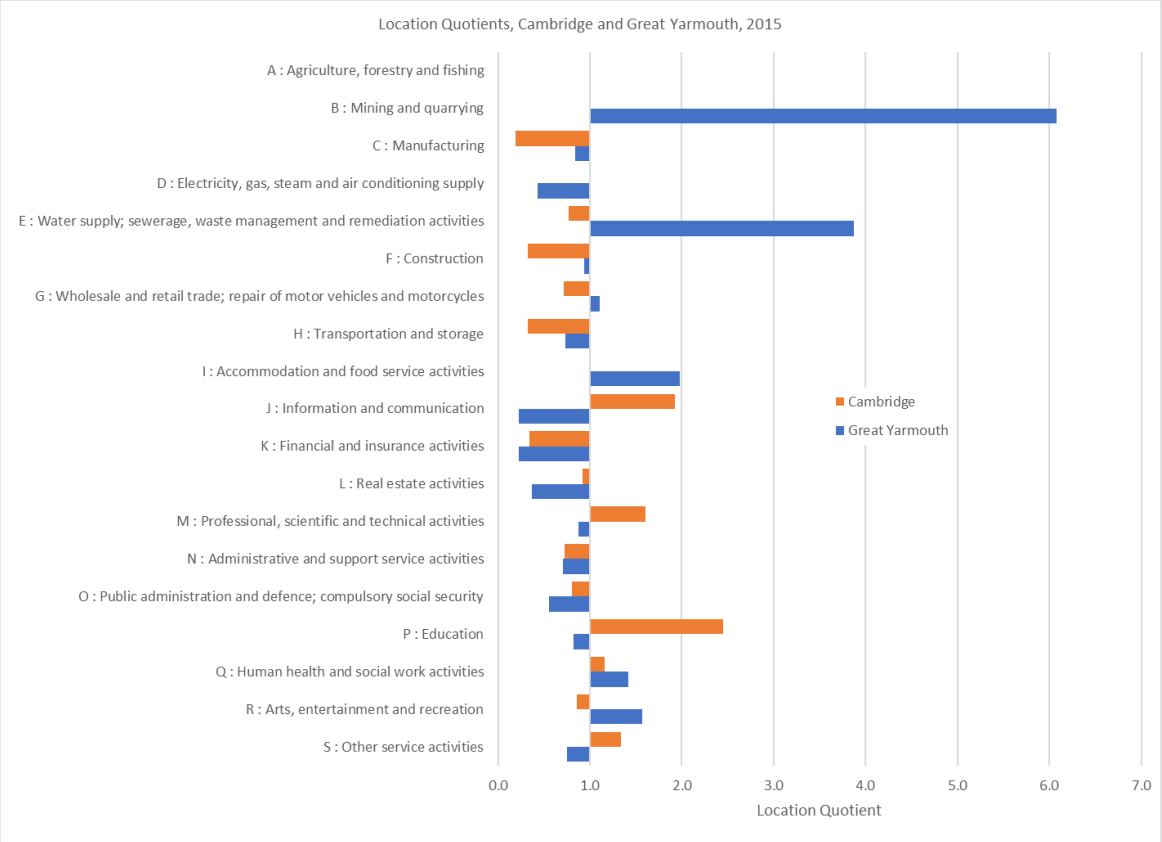


Source: Author's own

In the wake of the Coronavirus pandemic it is likely that all sectors of East Anglia's economy will require different types of support to recover. For example, the Cambridgeshire and Peterborough COVID Recovery Strategy notes that "[we] *will embrace additional sectors as a priority upon which to focus the interventions we design and develop to drive recovery and support regrowth. Post Covid-19 there may be new and emerging sectors and we need to be able to rapidly respond to these as and when they materialise.*"

Of course, the picture also varies at a sub-regional level. For example, a comparison of Cambridge and Great Yarmouth shows that whilst Cambridge has specific strengths in Education, Information and Communication, Professional, and Scientific and Technical activities, the relative strengths of Great Yarmouth include Mining and quarrying, water supply, sewerage, waste management and remediation activities, and accommodation and food service activities (Figure 18).

Figure 18: Location Quotients, Cambridge and Great Yarmouth, 2015



Source: ONS (2017), Location quotient data and geographic concentration for NUTS 1, NUTS 2 and local authorities, 28 March

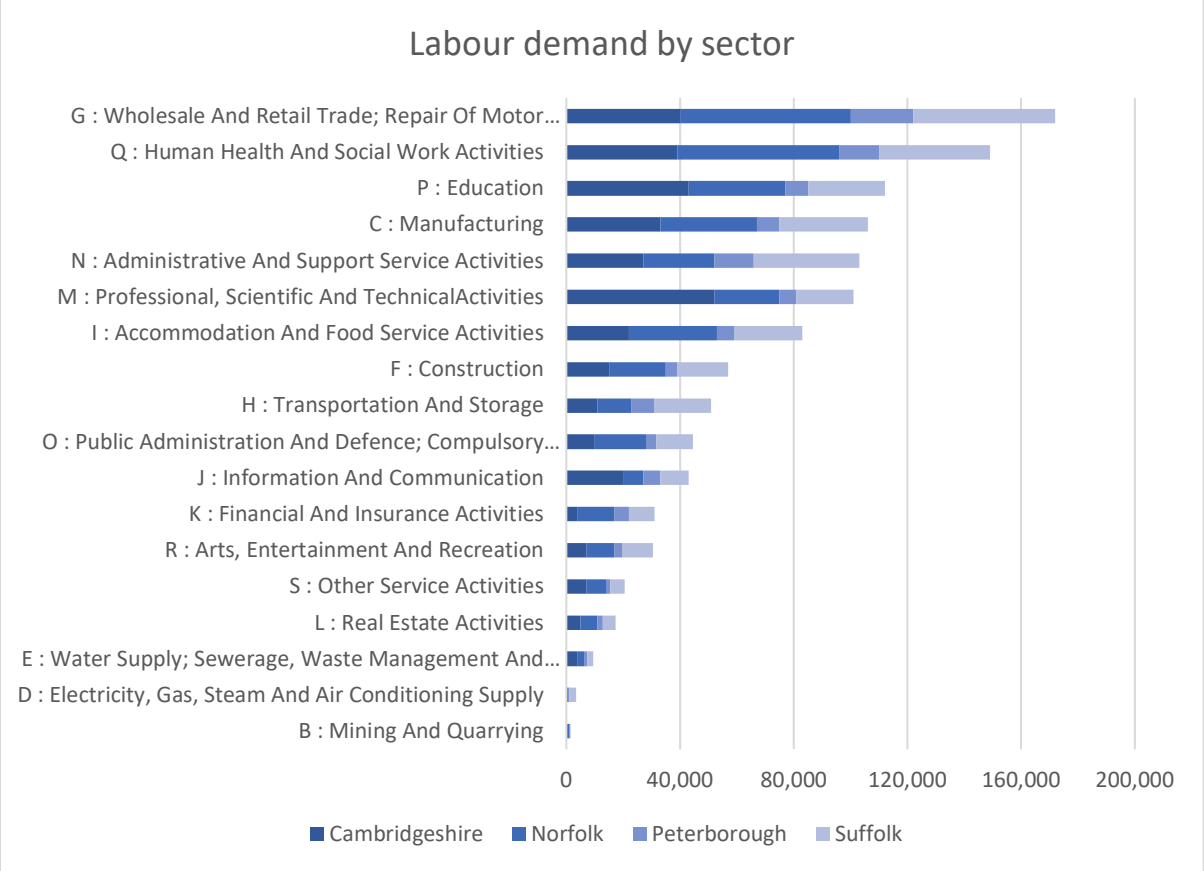
Labour demand

Figure 19 uses NOMIS data to show the labour demand by sector for East Anglia.[24] At a sub-regional level there are a number of noticeable differences.

- Cambridgeshire has a much higher percentage of people employed in Professional, Scientific, and Technical activities (15.3 per cent) than the East Anglian average of 8.9 per cent. Equally, as may be expected, Education (12.7 per cent) forms a larger part of labour demand in Cambridgeshire than in East Anglia as a whole (9.9 per cent).
- Wholesale and Retail Trade, Repair of Motor Vehicles and Motorcycles (19.7 per cent), Human Health and Social Work Activities (12.6 per cent), and Administrative and Support Service Activities (12.6 per cent) account for nearly half of the labour demand in Peterborough.
- Norfolk and Suffolk are the two counties that most closely match the labour demand for the whole of East Anglia.

Whilst these figures do not include demand for agricultural labour, the National Farmers' Union notes that "*agriculture is a significant employer in East Anglia. 40,600 people work directly in the farming sector and it supports many other jobs in areas such as engineering, livestock feed manufacture, transport, the veterinary profession and agricultural research and development.*"[25]

Figure 22: Labour demand by sector, 2020

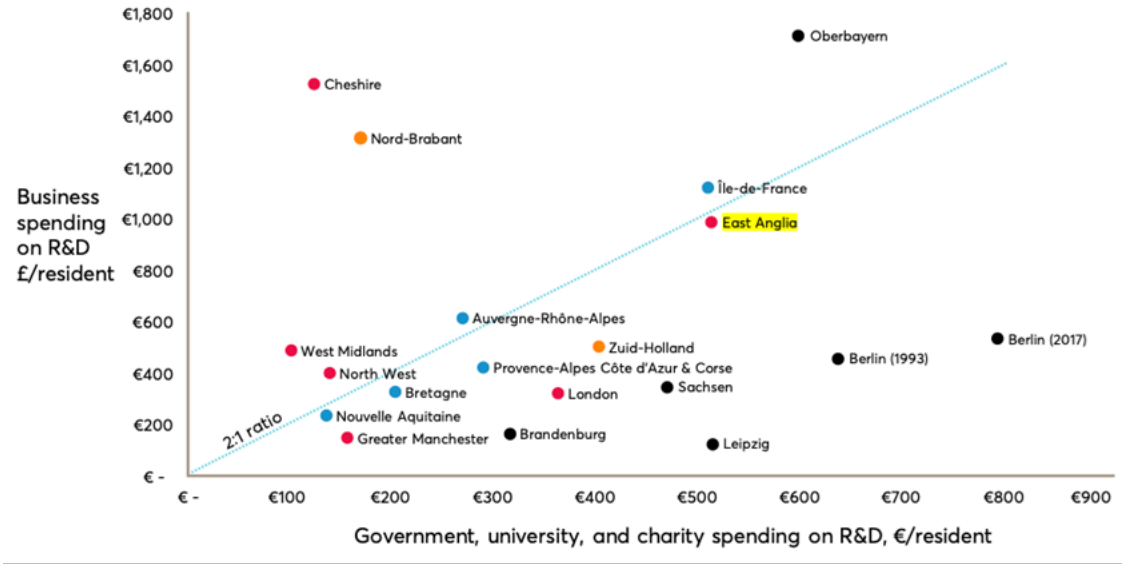


Source: NOMIS, https://www.nomisweb.co.uk/

Research and Development

Public and private investment in Research and Development is a particular key feature of East Anglia. Whilst Cambridge is one endpoint of the R&D 'Golden Triangle' along with London and Oxford, the whole of East Anglia's ratio of private to public R&D investment compares to Île-de France.[26] This dual investment makes East Anglia stand out compared to other UK regions which tend to mostly receive either public *or* private investment.

Figure 23: Spending on R&D by selected UK regions, France, Germany, and The Netherlands



Spending on R&D by selected regions within the UK, France, Germany and The Netherlands (split by market-led (business) and non-market-led (government, university and charity))

Source: Forth and Jones (2020), The Missing £4 Billion. Making R&D work for the whole UK, NESTA.

Infrastructure and Connectivity

Good infrastructure leads to connectivity, which increases dependence and specialisation and therefore creates room for broad-based productivity growth. Infrastructure and connectivity are also widely seen as a way to reduce geographical inequalities and could therefore also play a role in the levelling up agenda and regional development more widely.[27]

From the perspective of road infrastructure, the region is not well served. The only motorway within the region is the M11 joining London to Cambridge before turning into the A1(M) Great North Road. The main cities in the region are connected by a network of A-Roads – the A14, A47, A11, and A12 – all of which are subject to congestion. The A14 has recently seen an upgrade of 21 miles of its length between Cambridge and Huntingdon to tackle some of the issues of congestion.[28]

All four major urban areas have good passenger rail connections with London, but relatively poor connections between them. It is often as quick to travel from one of the urban centres to London as it is to travel between them. For example, whilst it takes between 50 and 90 minutes to travel from Cambridge to Peterborough, it is possible to reach the capital from both places in 50 minutes.

Figure 21: East Anglia [29]

Figure 22: Journey times (minutes) between East Anglia's urban centres – road and rail[30]

	Cambridge	Ipswich	Norwich	Peterborough	
Cambridge		71	86	51	
Ipswich	75 - 85		75	101	Road
Norwich	79 - 100	41		114	
Peterborough	49 - 98	98 - 172	88 - 133		
London	*49 - 85*	*73 - 83*	*115*	*56 - 95*	

Rail

East Anglia is also crossed by a number of important rail freight routes. Up to 333 freight trains travel in and out of Felixstowe port every week[31] with freight operators calling for increased capacity.[32] The development of the East West Rail link[33] between Cambridge and Oxford could also support freight traffic travelling from the East Anglian coast to the midlands and the north.[34] For example, Felixstowe is currently the Northern Powerhouse's main container port, with over 50 per cent of the traffic being moved by rail.[35]

From King's Lynn in the north to Felixstowe in the south, the coast of East Anglia is home to a number of working ports.[36] The diverse nature of the ports in Norfolk and Suffolk means that they serve different markets, and all play an important part in the import and export of freight for the UK. Great Yarmouth and Lowestoft ports play a key role in serving the construction and operations and maintenance of offshore wind projects in the Southern North Sea. The port of King's Lynn is the preferred Norfolk port for forest products, agribulk, manufacturing and recyclables sectors and the port of Ipswich is the UK's leading grain export port and handles a range of other products such as fertiliser, cement and aggregates.

In the 2021 Budget, the Chancellor of the Exchequer announced Freeport East[37] – made up of the neighbouring ports of Felixstowe and Harwich – as one of the UK's new freeports.

3. A Research Agenda on Productivity in East Anglia

In 2021, the Productivity Institute's Regional Productivity Forum for East Anglia was established to collectively provide an agenda for productivity research and the development of solutions to the productivity problems in the region. Membership of the Forum of around 20 representatives was drawn from across the area and from the private, public and voluntary sectors, as well as representation from the academic institutions in the area.[e]

The Regional Productivity Forum for East Anglia met for the first time in March 2021. As part of the discussion, attendees identified a number of themes that they felt were important in relation to issues of productivity of East Anglia and could serve as the key pillars for a research and engagement agenda of the Productivity Institute in the region.

One of the key elements from the conversations at the first meeting of the Forum was the cross-cutting nature of the issues around productivity. The Covid-19 pandemic accentuated the point that social and economic issues are deeply interconnected. Rather than seeing productivity as a closely defined economic issue, members of the Forum saw the importance of ensuring that their work on productivity was embedded in the 'real life' issues faced by people and communities across East Anglia.

Set out below are some of the themes that were identified as well as some possible areas of research interest. Identifying these themes also enables us to start to see how we can weave the Productivity Institute's eight research themes into the work of the Forum. Different combinations of research themes will be relevant to each of the distinctive insights that has been identified by the Forum. This approach will provide the Forum with a rich research base on the basis of which it can engage on solutions for the key issues related to productivity facing East Anglia. The themes are as follows:

- The future of the Fens
- Capacity for the Coast
- The role of Greater Cambridge
- The Oxford to Cambridge Arc
- Leading-edge activities and the foundational economy
- Governance of the region

The future of the Fens

The Fens is a key national asset. Although it accounts for less than four per cent of England's farmland, the Fens produces over seven per cent of England's total agricultural production, worth £1.23 billion.[38] The geology of the Fens is highly productive and conducive to agriculture: the Fens account for around half of England's Grade 1 agricultural land[39] and it produces a third of England's vegetables.[40] The

[e] See Appendix A for the membership of the forum.

agricultural sector supports many other jobs including food and drink manufacturing, worth around £1.7 billion.[41]

The Fens faces significant challenges due to a combination of climate change, low productivity, and high levels of socioeconomic deprivation. Climate change threatens not just the environment, but the Fens' productivity too due to a loss of natural capital (including depleted soil quality), and flood damage and drought risk.

Soil is an important issue for the Fens, due to its role in both climate change mitigation and agricultural productivity. Soil is a key natural capital resource and provides many essential ecosystem services. It holds three times as much carbon as the atmosphere, it reduces flooding risk, it is a wildlife habitat, and delivers 95 per cent of global food supplies. Some parts of the country including Fenland peatland soils could be only 30 or 60 years away from the fundamental eradication of soil fertility, meaning less productive agriculture and a degraded ecosystem (Environment Agency, 2019).

Some of the leading agricultural research bodies are in Cambridge, such as NIAB[42] and the Cambridge Sainsbury Laboratory[43], and Norwich, such as the John Innes Centre[44], and the Norwich Sainsbury Laboratory.[45] The Fens lie between the two cities and act as a living laboratory with many field-scale trials happening there.

The proposal to award the Fens a biosphere status (awarded by UNESCO to a unique and valuable landscape) would allow environmental protection of the Fens. Habitat restoration through The Great Fen project[46] offers an opportunity to progress towards Net Zero through carbon sequestration while supporting threatened Fen wildlife and reducing flood risk to villages and towns. However, land use is contested in the Fens. Drainage and farming have historically damaged biodiversity, but some have concerns[47] that deliberately flooding some areas may compromise building foundations of nearby villages.

A long-term strategy is needed for the area as a whole, encompassing land management, economic opportunity, environmental protection, and climate change resilience. Anglian Water's Six Capitals approach[48] is valuable here in recognising the links between the economy, society and the environment. Looking forward, this approach is crucial for planning and decision-making as it considers the impacts on people, communities, and natural resources holistically.

Productivity is key to both improving economic opportunity and the environment. The Fens fare poorly on health and wellbeing measures. Low productivity – and therefore low wages – mean health indicators including life expectancy for men, obesity levels among children, and levels of adult smoking[49] are all significantly worse than the England average. An integrated solution that recognises the complex interlinkages between productivity, the environment, and economic opportunity and well-being is needed.

Possible Areas of Research Interest
• East Anglia is the breadbasket of Britain and is home to some of the most innovative agricultural research in the country. Does this research excellence drive productivity sufficiently across the whole agri-food sector?

Capacity for the Coast

The East Anglian coastline is already a significant asset providing renewable energy, and there is further scope for the east to become a world leader addressing climate change. There are currently close to 1,000 wind turbines off England's east coast with a total potential power capacity of up to 3.8GW.[50] An additional investment of £50 billion over the next ten years will deliver more than another 1,000 turbines. Research & Innovation on the Sustainable Energy Coast is led by EQA, with its headquarters in Lowestoft. It offers a wide range of servicing facilities for North Sea oil and gas, and offshore wind farms and extensive marine leisure facilities.

The proposed Sizewell C nuclear power station could generate up to seven per cent of the UK's energy needs, using low carbon electricity. However, some are alarmed as the east coast shoreline is eroding and the low-lying land makes the coast particularly vulnerable to rises in sea levels. East Suffolk Council and Suffolk County Council have already objected to EDF's plan as they fear the proposed sea defences for Sizewell C will be inadequate.[51]

The Port of Felixstowe is the UK's largest container port, handling 40 per cent of national container traffic. It is undergoing significant investment and expansion, with capacity expected to grow by an additional million containers by 2025. It is Britain's biggest and busiest container port and one of the largest in Europe. Despite challenges regarding the road network, the unrivalled rail links connecting the port to distribution hubs in Midlands and elsewhere in the UK, underline Felixstowe's pivotal role in keeping the UK's trade moving.[52] The port of Ipswich[53] is the UK's largest agricultural exporter, offering roll-on and roll-off capabilities, potential renewable and offshore facilities, rail connections and marine leisure facilities. King's Lynn[54] is a regional hub for agricultural products offering extensive handling and storage facilities.

More broadly, the east coast ports' contribution to the economy was £540m in GVA and 6,300 jobs in 2015 (nine per cent and eight per cent respectively).[55] Congestion is a barrier to connectivity though. Roads are generally reported to be more important than rail for the ports in this area, with congestion and the reliance on single carriageway roads identified as issues.[56]

Possible Areas of Research Interest
• What has been the impact of Brexit on the export potential of East Anglian businesses? • Approximately 40 per cent of UK container traffic passes through Felixstowe. Are the opportunities this presents maximised, particularly given Freeport status?

The role of Greater Cambridge

Greater Cambridge – the city of Cambridge and its surrounding area – is one of the country's fastest growing city regions.

Greater Cambridge is of international importance and is comparable along various dimension with the European cities of Groningen, Enschede and Haarlem in the Netherlands, Oviedo in Spain, and Heidelberg in Germany.[57] The area is a high performer with a high number of patents, and the most highly skilled population among all of the European cities analysed by the Centre for Cities. However, while it ranks third in its group for GVA per worker, it is on average or below with regard to size of the economy, the number of businesses and jobs, and skills of the population.

Much of the success of Greater Cambridge is due to the 'Cambridge Phenomenon' – "*the incredible explosion of technology, life sciences and service companies that has occurred in the city since 1960.*"[58]

Set against the backdrop of the University of Cambridge – the seventh highest ranking university in the QS World University Rankings[59] – there are over 26,000 companies in the Cambridge Cluster with a combined turnover of £48 billion and employing over a quarter of a million people, although these numbers are at lower end compared to comparable cities.[60]

The success of Greater Cambridge is not without its challenges. The supporting infrastructure, such as roads, housing and water supply are struggling to keep pace with the area's growth. There is a risk that the city will reach "'*peak Cambridge' in the mid-2020s and growth will take a downturn as employers struggle to find people who will put up with long commutes or high rents for small, shared living spaces.*"[61]

To address this, included within the recent Cambridgeshire and Peterborough Independent Economic Review (CPIER, 2018), is a recommendation calling for priority attention to be given to "*a package of transport and other infrastructure projects to alleviate the growing pains of Greater Cambridge."* The CPIER also calls for the UK government to adopt a "*'Cambridge or overseas' mentality towards knowledge intensive (KI) business in the area."*

Possible Areas of Research Interest
AstraZeneca's HQ in Cambridge, and the biomedical campus, provides an opportunity for continued leadership in response to future pandemics. The present of both research and manufacturing there and in hubs around the region can provide a further boost to the Greater Cambridge Cluster and its positive impact on productivity within and beyond the region. What barriers are there to making this opportunity a reality? How do we spread the Cambridge success to relatively close but 'poor' areas like the Fens and the Brecks?

The Oxford to Cambridge Arc

The Oxford to Cambridge Arc is a notional arc of agricultural and urban land at a radius of about 80 kilometres (50 miles) from London running between the two university cities of Oxford and Cambridge. The Arc is a globally significant area, supporting over two million jobs, adding over £110 billion to the economy every year and housing one of the fastest growing economies in England.

The development of the Arc has four areas of focus (Ministry of Housing, Communities & Local Government, 2021):

- **Productivity and jobs** - The Arc currently generates over £110 billion to the UK economy every year.
- **Placemaking** – "*With a strategic approach to planning for growth, we can enhance the area's natural environment and biodiversity, ensure communities and businesses have access to the infrastructure they need, and ensure new development is more affordable and beautiful so that it enhances places across the Arc.*"
- **Infrastructure and Connectivity** - "*Improving connectivity across the Arc with a new rail line between Oxford, Milton Keynes and Cambridge will link communities with employment and leisure opportunities.*

  While integrating sustainable and accessible transport options will support our ambition for the Arc and ensure homes and employment sites are situated in the right places."
- **Environment** - "*Encouraging clean growth and the creation of sustainable communities will support us in improving the quality of life for those that live and work in the Arc. While also helping us future-proof its businesses and communities against the effects of climate change.*"

The Government sees the Arc as having "*the potential to become a world-leading and globally renowned centre for business, innovation and investment in a variety of industries, including AI (Artificial Intelligence), advanced manufacturing and life sciences.*" (Ministry of Housing, Communities & Local Government, 2021)

For East Anglia, the Arc represents both an opportunity and a challenge: how can the area make the most of its strategic links to the Arc and benefit from the increased productivity and connectivity that the Arc will bring, whilst also not losing businesses and people to the Arc? This will be particularly felt in those corridors within East Anglia – like the Cambridge-Norwich Tech Corridor[62] – that currently connect with Greater Cambridge. Greater Cambridge itself will feel pulled in two directions but could benefit from the connectivity towards Ipswich and Norwich. There are already strong relationships in both directions and strong infrastructure inks through road (A14/A11) and rail.

Possible Areas of Research Interest
• What interventions are needed to ensure that the Ox-Cam Arc delivers sustainable growth and productivity gains throughout East Anglia, whilst contributing to wider UK productivity improvements? • What are the connectivity issues: a) across East Anglia and b) within and around the main urban areas that affect its levels of productivity?

Leading-edge Activities and the Foundational Economy

Leading-edge activities taking place in East Anglia include life sciences, ICT (Information & Communications Technology) and Digital, agri-food, and clean energy. However, the vital role that essential sectors such as health and social care play in the economy also needs to be recognised. Their importance has been particularly highlighted through the course of the pandemic.

Life sciences: The Cambridge Cluster is of national and international significance, home to world-leading science, technology, and life science companies. Cambridge is Europe's largest technology cluster.[63] The collaboration between the University and the wider business community has been key to the 'Cambridge phenomenon' (Cambridge Econometrics, 2019). For example, the relocation of AstraZeneca from Cheshire to Cambridge was made attractive because of Cambridge's recognition in the life sciences.[64]

- **Food, Genomics and Health***:* Norwich Research Park is one of the largest single-site concentrations of research in food, genomics and health in Europe, bringing together four independent internationally-renowned research institutes: John Innes Centre, Quadram Institute, Earlham Institute and The Sainsbury Laboratory; with University of East Anglia (UEA) and Norfolk and Norwich University Hospitals NHS Foundation Trust (NNUH), supported and funded by The John Innes Foundation and UKRI Biotechnology and Biological Sciences Research Council (BBSRC).

- **ICT and Digital**: Suffolk is home to BT's Adastral Park. BT's innovation labs and Innovation Martlesham (IM) is a growing cluster of nearly 150 high-tech ICT/Digital companies. Cambridge is also home to Microsoft's first lab outside the US, as well as Google, Amazon, and Apple. Cambridge is making rapid progress in artificial intelligence (AI), robotics, cybersecurity, and augmented reality (AR).[65] There is a big opportunity for Greater Cambridge to lead the world with technologies of tomorrow, but stronger infrastructure is needed. Investment in underlying infrastructure that supports innovation is also needed, particularly in digital and transport connectivity.[66]

- **Agri-food**: Norfolk and Suffolk have the innovation and expertise to develop, pioneer and apply new approaches to sustainable agriculture utilising clean energy and innovative water management, and increase value-added processing and exports through the application of new technologies and systems. Norfolk and Suffolk have the largest agri-food sector in the UK and world-leading research into plant and soil technology and agricultural systems

(Norfolk and Suffolk Unlimited, 2020b). The wider East of England's importance for the future of agri-food is underlined by the fact it accounted for 35 per cent of UK Research Council Funding in plant and crop science, 24 per cent in agri-environmental science, and 16 per cent in food science and nutrition from 2004 to 2016.[67] The Fens is both essential to agricultural research and production in the UK. It is the pre-existing expertise and value of the Norfolk and Suffolk farming system that attracted research institutions such as the JIC and The Morley Agricultural Foundation to locate in the area. And so, East Anglia has a major role to play in the future of high-quality, ethical, and sustainable food (Norfolk and Suffolk Unlimited, 2020a).

- **Clean energy**: Norfolk and Suffolk are well placed to be a global exemplar for clean, low carbon energy production, exporting services and skills globally, whilst increasing the availability of affordable sustainable energy for local communities and businesses. As well as being the world's leader in offshore wind energy, East Anglia is a leader of low carbon nuclear energy. The Sizewell B power station on the Suffolk coast is the UK's only pressurised water reactor. In 2020 it generated low carbon electricity for over two million homes avoiding three million tonnes of CO2 emissions, which is the equivalent of taking 1.3 million cars off the UK roads for a year.[68]

But how much do leading-edge activities benefit the rest of the economy? Notably, while Cambridge is crucial to the national economy, it is highly unequal spatially. Greater Cambridge is prosperous and attracts international businesses, but deprivation levels are high in Peterborough, and those residing in agricultural areas do not receive the benefits of growth in Cambridge (Cambridgeshire and Peterborough Independent Economic Commission (CPIER, 2018). Meanwhile, in Norfolk and Suffolk there are strong innovation assets, but these are concentrated in a small number of firms and there is a long tail of less innovative businesses.

The pandemic has highlighted the importance of the *foundational economy*, particularly the health and social care sector. The foundational economy, which also includes other activities found everywhere such as retail and personal services, makes up a significant part of the economy with an estimated 102,700 jobs across Norfolk and Suffolk[69] – making it the largest sector by employment in New Anglia – and almost 30,000 staff in Cambridgeshire and Peterborough[70]. The Cambridgeshire and Peterborough Combined Authority recognise the importance of health and social care to its economy, and to R&D, as it benefits everyone to keep staff well.[71] Norfolk and Suffolk have placed the visitor economy at the heart of its recovery from the Coronavirus pandemic.[72]

Supporting leading-edge activities in East Anglia needs to go hand in hand with recognising the importance of the foundational economy in providing the basic services we depend on for wellbeing and growth and being employment generating sectors in their own right. Raising productivity in these activities will require a virtuous circle of raising skills and job quality. This raises complex yet interesting questions around the balance of focus on leading-edge versus foundational activities, and whether to support the already productive sectors or the less productive ones.

Possible Areas of Research Interest
• Do leading-edge activities benefit East Anglia as much as they can? • How does the interplay between health and productivity play out across the economies of East Anglia? • How can East Anglia make the most out of Health and Social Care as economic growth sectors in their own right? • How can centres of excellence within East Anglia link up better to share and diffuse knowledge?

Governance of the Region

Like other areas of the UK, the governance arrangements for East Anglia have developed in a piecemeal fashion over the last few decades (Westwood et al, 2021). Different governments have taken different approaches to regional policy which has led to a combination of well-rooted structures like local government being joined by newer developments such as Local Enterprise Partnerships and Combined Authorities.

The local governance of East Anglia – shaped by previous local government reforms, as well as the collapse of the devolution deal for East Anglia in 2016 – is multi-layered and complicated.

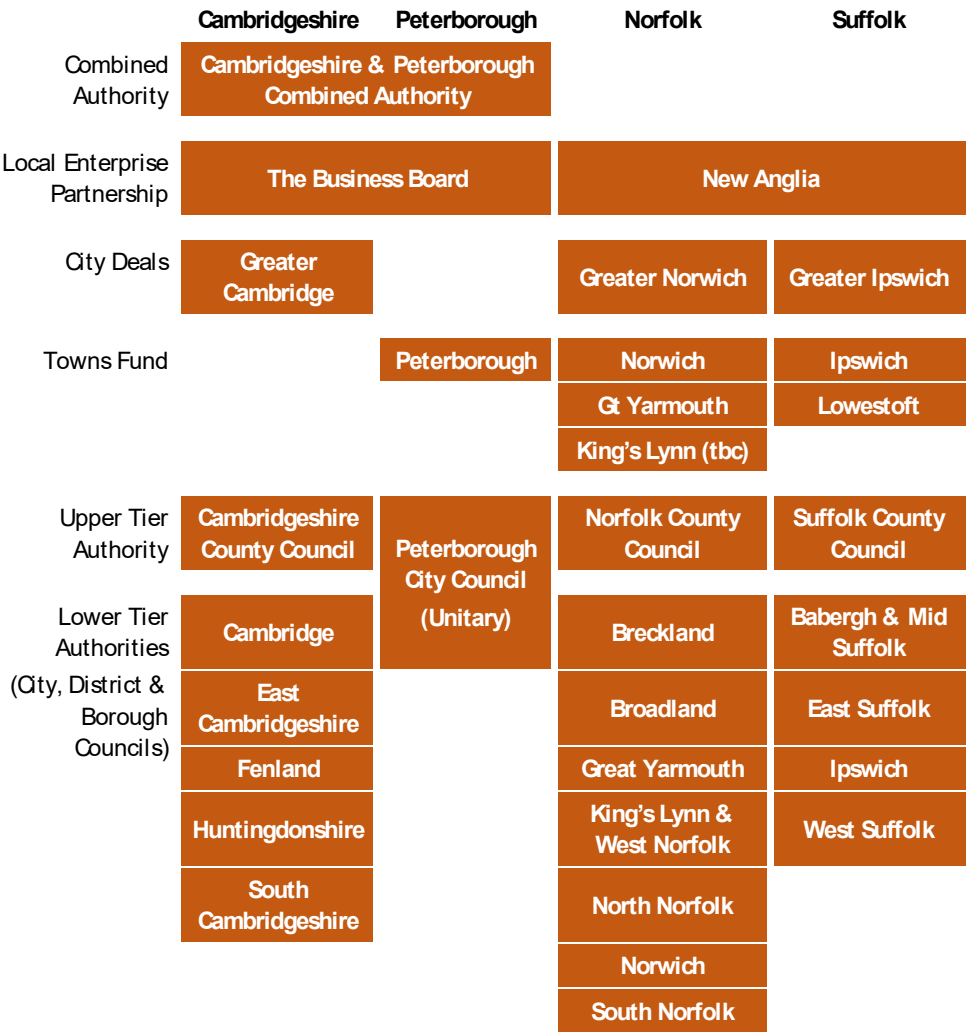
Initially, the government considered a Combined Authority covering the entire East Anglia region. However, the proposal was rejected by both Cambridge City and Cambridgeshire County Councils in March 2016, amid concerns about the mayoral structure and the affordable housing plans in the deal (Paun and Campbell, 2017). A revised geographic scope was taken forward instead, with the Cambridgeshire and Peterborough Combined Authority (CPCA) being established in 2017, covering the county of Cambridgeshire and the unitary authority of Peterborough. Subsequent plans for a Combined Authority for Norfolk and Suffolk were abandoned when the devolution deal collapsed.

There are two Local Enterprise Partnerships covering East Anglia. The Business Board – part of the Cambridgeshire and Peterborough Combined Authority – covering Cambridgeshire and Peterborough, and New Anglia covering Norfolk and Suffolk.

The government's 'deal making' approach is also evident in the creation of a number of different City Deals and Towns Fund bids. Behind each of these sits a web of different partnerships involving the public sector, the private sector, and the voluntary and community sector.

The region is waiting on the publication of the government's White Paper on Local Government reform. There has been some local government reform recently in Suffolk with the creation of new single councils across what was previously two districts. This means that the previous structure of seven lower-tier authorities in Suffolk has been changed so that there are now five authorities in 2019.

Figure 23: Layers of governance across East Anglia



One of the concerns that emerges is around the most appropriate geographical scale for decision-making, with some decisions being taken at national and local levels with the only common element being the use of administrative boundaries to define areas. As an organising principle this does not fully captures the complex relationship between East Anglia's urban centres and their surrounding areas, the urban / rural divide, the importance of the coastline, and East Anglia's broader connectivity with the rest of the country and the continent.

There is a real risk that these complicated governance structures can be a drag on productivity and could impact on business confidence about when and how decisions that may affect them are being made.

Possible Areas of Research Interest
• Do the local governance arrangements across East Anglia act as a barrier to productivity? • How can public sector productivity be measured and improved?

Appendices

Appendix A: The Productivity Institute – Research Themes

The Productivity Institute's research covers eight themes and draws on expertise from social sciences, engineering, physics, political science, business management, innovation research, and data science.

Research Themes	
	***Human capital*** Explores which skills and abilities are important for productivity and well-being, and how these can best be developed and deployed in a rapidly changing digital economy.
	***Knowledge capital*** Understanding and measuring the impact knowledge capital and other types of intangible capital created by the public and private sectors on productivity, particularly in high technology and high value-added areas.
	***Organisational capital*** As the UK seeks to develop a more activist industrial strategy, key questions arise on barriers to entry, obstacles to innovation in SMEs, and the resilience of supply chains.
	***Institutions & governance*** Explores how the UK can boost productivity by changing overcentralised, top-down, short-term, and siloed decision-making and fostering an effective joined-up government.
	***Macroeconomic trends & policy*** Explores how productivity issues are reflected by economy-wide failures, from private finance to public investment, and how the Treasury can adapt the fiscal regime and its accounting frameworks.
	***Measurement & methods*** Looks at how new techniques and novel data sources can help to gain deep understanding of regional, national and firm-level productivity drivers and help tackle tricky measurement issues.
	***Geography & place*** Investigating the causes of disparities in productivity levels within UK regions and the effectiveness of local economic development, education, and social strategies.
	***Social, environmental & technological transitions*** Digital transformation and green growth offer both opportunities and risks for productivity and will need transformative changes in business models, skills, infrastructure, regulatory policies, and markets.

Figure Two: Productivity Institute Research Themes

Appendix B: Membership of the East Anglia Regional Productivity Forum

Alex Plant, Director of Strategy and Regulation, Anglian Water (Chair)

Andrew Harston, Regional Director, Association of British Ports

Andy Williams, Vice President – Cambridge Programme & Strategy, AstraZeneca

Belinda Clarke, Director, Agritech-E

C-J Green, Chair, New Anglia Local Enterprise Partnership

Claire Ruskin, Executive Director, Cambridge Network

Dan Thorp, Director of Policy & Programmes, Cambridge Ahead

David Richardson, Vice Chancellor, University of East Anglia

Fiona McDiarmid, Chair, Norse Group for Norfolk County Council

Henry Shropshire, Managing Director, Barway Services Ltd

Joanne Lancaster, Managing Director, Huntingdonshire District Council

Johnathan Reynolds, Chief Executive Officer, Opergy

Mark Dorsett, Global HR Director, Caterpillar

Nikos Savvas, Principal, West Suffolk College

Paul Raynes, Strategy Director, Cambridgeshire and Peterborough Combined Authority

Rachel Stopard, Chief Executive, Greater Cambridge Partnership

Steve Baker, Chief Executive Officer, East Suffolk Council

Tim Whitley, MD Research and Innovation, BT

Tina Barsby, Chief Executive Officer, NIAB

Tom Hennessy, Chief Executive Officer, Opportunity Peterborough

Tony Jones, Chief Executive Officer, One Nucleus

Appendix C: A note on measuring productivity

Measuring productivity consistently across different firms, sectors, geographies, and time periods is challenging and, by necessity, reductive. It is generally calculated by taking a measure of output (typically Gross Value Added, GVA, at the sub-national level) and dividing it by a measure of inputs (usually a measure for labour inputs or a combination of labour and capital inputs).

Which measure is chosen matters. For the purposes of this paper, GVA per hour worked has been used as the preferred measure of productivity for a number of reasons:

- It is available, as a national statistic, at a sub-regional level across the whole of the European Union allowing for UK and international comparisons.
- It is available at a detailed sectoral level with a long (15 year) time series.
- Unlike GVA per resident it is not affected by changes in the composition of the population or labour market, or commuting effects.
- Unlike GVA per job it is not affected by changes in hours worked (under this measure 'productivity' could increase by individuals simply increasing their working hours).
- Measures of capital inputs, which would allow an analysis of total factor productivity which would be preferable, are not available at a sub-national level.

As such, GVA per hour worked is thought to be the best measure available. It does have important limitations, however, including that it does not capture changes to the volume of economic activity that is undertaken. It would be possible for GVA per hour to rise while total GVA collapsed and unemployment skyrocketed, which is not an outcome anyone would want.

Where an alternative measure has been used, we have explained why.

More broadly, there are important concerns about the adequacy of GVA as a measure of output. These include criticisms that GVA does not accurately capture the value of services, particularly of public services, of unpaid work, or the importance of the free information inputs to activities enabled by new technologies. It also fails to distinguish between wealth-creating and wealth-extracting activities (Coyle, 2014). At a regional level, differences in prices for non-traded outputs and costs of living may overstate differences in both GVA and GVA hour worked.

These concerns suggest that we should not rely exclusively on GVA or GVA per hour worked as a measure of positive economic progress. The Measurements and Methods research theme in The Productivity Institute is exploring how new measures can be developed that overcome these limitations at the national and sub-national level.

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