

2 Productivity in London

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2.1 Introduction

Increasing productivity is widely seen as a key enabler for improving living standards in the long term and as a necessary condition for sustainable economic growth. At the same time, productivity growth on its own is not sufficient for economic growth to be inclusive⁷⁵. Job quality and inequalities between firms and workers will, for example, shape how broadly the gains of growth are shared.

In this chapter we begin by looking at recent productivity trends in London's economy. We go on to identify aspects of productivity performance that the public sector could usefully target in sustaining economic growth and ensuring that growth is inclusive.

We first present evidence on the relationship between productivity and living standards, highlighting the importance of raising productivity for achieving inclusive growth. We then turn to key statistics on productivity trends, drawing attention to the sharp slowdown in productivity growth in the capital in recent years. We examine a number of comparisons of productivity by geography and sector. Finally, we summarise different perspectives on London's productivity performance, issues and solutions.

⁷⁵ See, for example: IPPR Scotland (2019), '[How productivity could deliver inclusive growth in Scotland](#)'.

2.2 The two-way relationship between a more inclusive economy and higher productivity

Obstacles standing in the way of broader productivity gains also contribute to wider inequality while high inequality levels can limit productivity growth. Identifying win-win policies is therefore key for inclusive growth.

- In the long run raising productivity is key to economic growth and increasing pay and living standards⁷⁶. The ONS, for example, estimates that market sector wages would now be £5,000 higher for the average worker if productivity had grown in-line with its long-term trend since 2008 (assuming wages as a share of income had remained constant)⁷⁷.
- There is little evidence of an overall employment-productivity growth trade-off over time⁷⁸. Nevertheless, traditional measures to boost productivity can have adverse impacts on inequalities. The link between productivity and wages is also more complex than often thought, with relative pay growth tending to lead productivity growth at the sector level⁷⁹.
- At the same time, there is increasing recognition that high levels of inequality can undermine the development of human capital and productivity growth – by, for example, limiting the ability of individuals and firms to access finance or invest in education and skills.
- On this basis the OECD has advocated a focus on 'win-win' policies that can both reduce inequalities and support productivity growth⁸⁰. The emphasis is on measures to widen access to economic opportunity such as improving education and adult skills, tackling labour market discrimination, and reducing the productivity dispersion between firms⁸¹. A recent IMF report also underlines the economic benefits of closing gender gaps⁸².

⁷⁶ This follows from the fact that economic output can only rise sustainably by increasing the volume of inputs used in production or by using inputs more efficiently.

⁷⁷ ONS (2019), '[Productivity economic commentary: January to March 2019](#)'.

⁷⁸ Rather, in the long run, productivity and employment have tended to 'grow hand-in-hand at the aggregate level', but with local / sectoral variations. Source: McKinsey Global Institute (2019), '[Tech for Good: Smoothing disruption, improving well-being](#)'.

⁷⁹ For example, see: Tuckett, A. (2017), '[Does productivity drive wages? Evidence from sectoral data](#)'.

⁸⁰ OECD (2018), '[The productivity and equality nexus](#)'.

⁸¹ OECD (2018), '[Opportunities for All: A Framework for Policy Action on Inclusive Growth](#)'.

⁸² IMF (2019), 'Economic Gains from Gender Inclusion: New Mechanisms, New Evidence'.

2.3 Overall average labour productivity in London and trends over time

In economic terms London as a whole is by far the most productive place in the UK and one of the most productive in Europe. Although the UK displays large regional disparities in productivity, this is partly driven by structural changes (e.g. the rise of a 'knowledge-based' economy) common to many advanced economies.

- London has the highest level of labour productivity of any UK region: gross value-added (GVA) per hour worked was one third above the UK average in 2017, with a relatively large gap to the rest of the country. Excluding imputed rental incomes, such as rents capturing the wider value of housing services, only makes a small difference⁸³.
- The capital's strong relative performance holds for a range of different comparisons:
 - London also has the highest level of labour productivity among 38 local enterprise partnership (LEP) areas – 11% above the next productive LEP, Thames Valley Berkshire.
 - Looking more widely, London is one of the most productive places in Europe. Only Île-de-France (which includes the city of Paris) has a higher level of GDP per worker than London among 52 regions in Western Europe (see Figure 2.1)⁸⁴.
 - Comparing urban areas alone, London would be the fifth most productive metropolitan area in selected Western European countries according to OECD data⁸⁵. Note, however, this definition is based on economic functions rather than administrative boundaries.
- The UK is not unique in having a large gap between the performance of its first and second most productive regions. Spatial disparities in productivity are partly driven by structural changes common to many advanced economies, including the economic benefits accruing to large cities due to the rise of a knowledge-based economy⁸⁶.

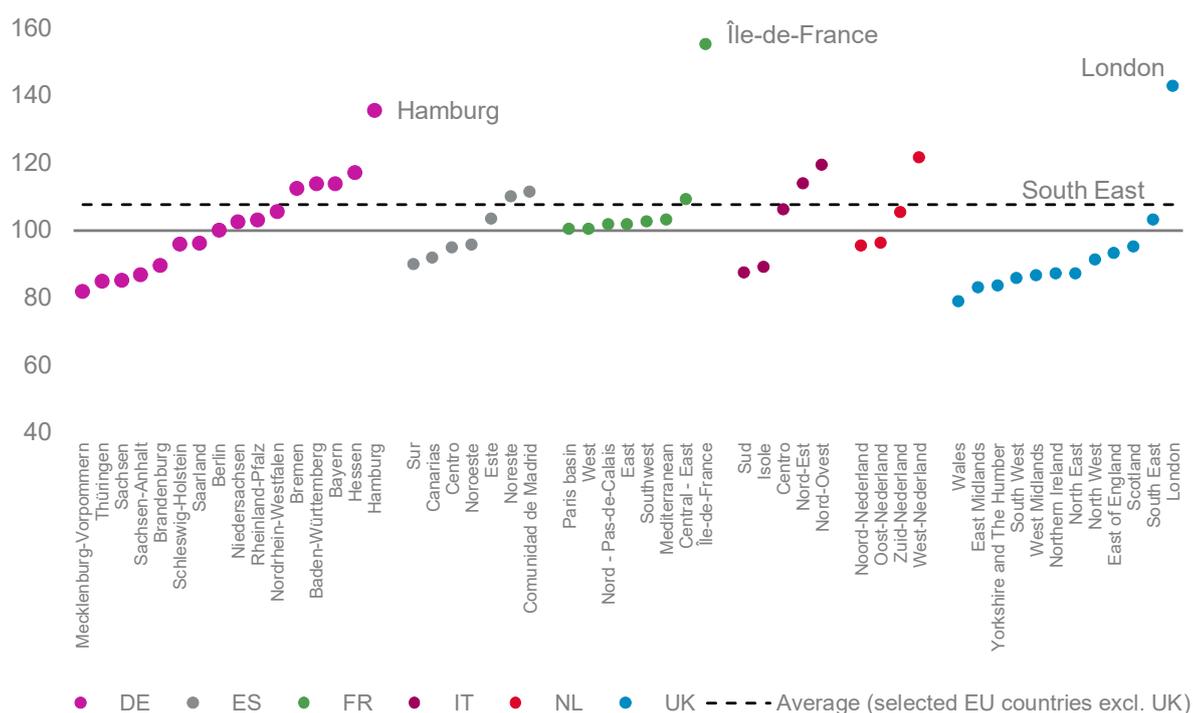
⁸³ ONS (2019), 'Regional and sub-regional productivity in the UK: February 2019'.

⁸⁴ This analysis compares UK regions with regional productivity levels in France, Germany, Italy, Netherlands and Spain. Source: ONS (2018), '[Regional and subregional productivity comparisons, UK and selected EU countries: 2014](#)'.

⁸⁵ OECD.Stat [accessed 19/06/2019]. 'Metropolitan areas' are urban agglomerations with more than half a million inhabitants. Consistent with previous ONS analysis this covers urban areas in Germany, Spain, France, Italy, the Netherlands and the UK.

⁸⁶ This profile of productivity performance between places looks even less unique when focusing on metropolitan areas alone. See: OECD (2018), '[Reducing regional disparities in productivity in the United Kingdom](#)'.

Figure 2.1: GDP per worker by region, UK and selected EU countries, 2017 (Index UK=100)



Source: GLA Economics analysis of Eurostat data. Note: indexed data where the level of GDP per worker in the UK equals 100. Following an approach previously adopted by the ONS⁸⁷, each marker represents one of 52 regions in Germany, Spain, France, Italy, the Netherlands and the UK.

As in the rest of the country, productivity growth in London has remained weak in the aftermath of the 2007/08 financial crisis, partly down to recent weakness in business investment.

- Running at just 0.3% per year on average, real productivity growth in London between 2010 and 2017 was in-line with (low) productivity growth in the UK overall (Figure 2.2). Over the same period real wage growth in London has also been significantly lower – averaging 1.0% per year from 2010-2017, down from 2.2% per year from 1998-2007⁸⁸.
- Overall, labour productivity in London is now about 24% below where it would have been had pre-crisis trends continued, compared to 17% below for the UK as whole. Although productivity growth has diverged from trend before, the recent deviation is more significant than in any period since 1971 (the earliest year where data is available)⁸⁹.
- As for most UK regions, growth in economic output has mirrored a similar growth in hours worked recently, resulting in only small changes in labour productivity. Although London is unusual insofar as growth in both GVA and hours have been higher than elsewhere in the UK – increasing by 27% (real GVA) and 24% (hours worked) between 2010 and 2017.
- At a national level business investment fell sharply during the financial crisis and has stalled again recently, largely attributed to Brexit-related uncertainties⁹⁰. Investment in ICT equipment and other machinery has been particularly weak, while trends in gross-fixed capital formation appear similar in London and other parts of the country⁹¹.

⁸⁷ ONS (2018), 'Regional and subregional productivity comparisons, UK and selected EU countries: 2014'.

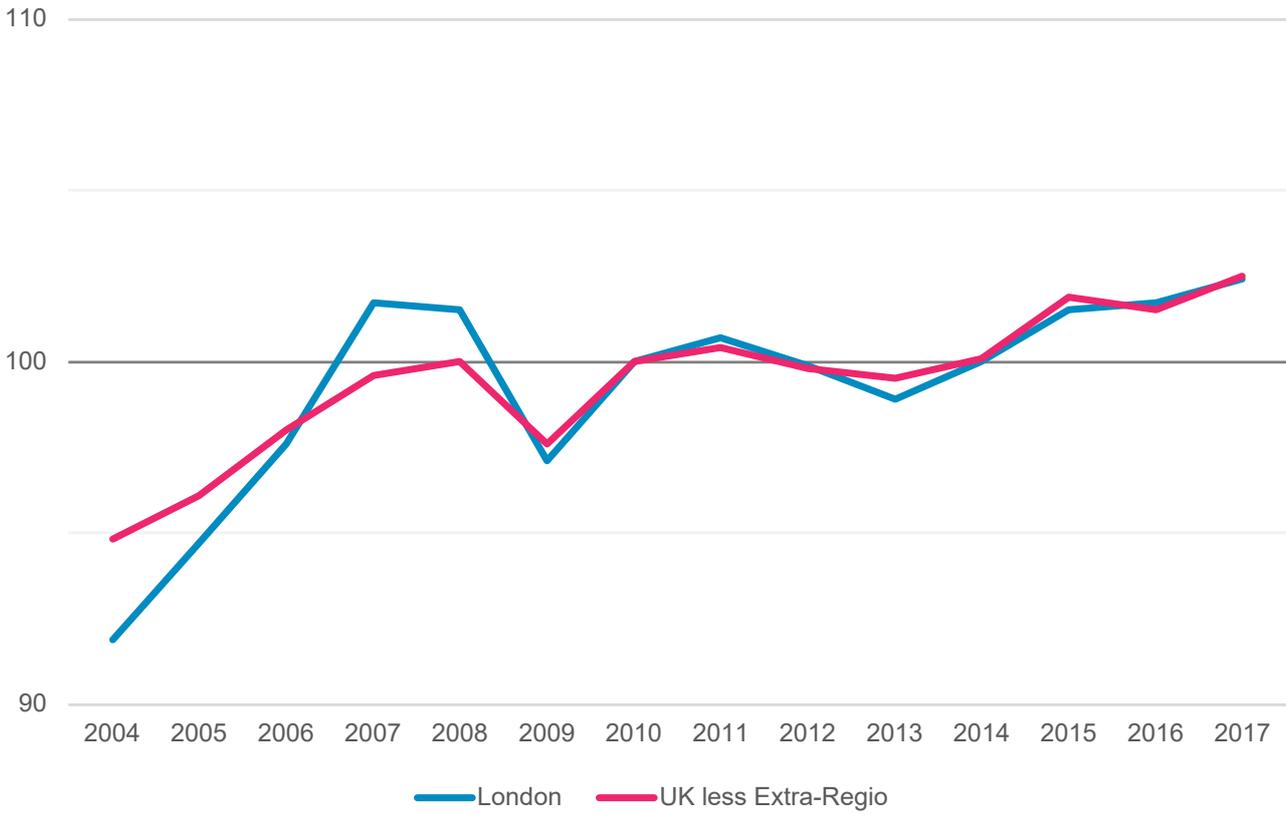
⁸⁸ Median full-time weekly pay adjusted for CPI inflation. Source: ONS (2019), 'Annual Survey of Hours and Earnings'.

⁸⁹ GLA Economics (2017), 'London labour market projections 2017' – see Box 1 for long-term productivity trends.

⁹⁰ Bank of England (2019), 'Inflation Report: February 2019'.

⁹¹ ONS (2017), 'Regional Gross Fixed Capital Formation, NUTS1 and NUTS2, 2000 to 2016'. Note this is not official UK statistics and should only be regarded as estimates.

Figure 2.2: Real GVA per hour worked, London and UK, 2004 to 2017 (Index 2010=100)



Source: Office for National Statistics. Note: UK excludes the small amount of UK economic activity that cannot be attributed to a region (e.g. offshore oil and gas and activities of UK embassies): so-called extra-regio GVA.

2.4 Productivity across sectors and compared to sector-level productivity in the rest of the UK

London's relatively high level of productivity is not just about having more firms in certain industries. While the capital is more specialised in more productive service industries, a productivity premium is evident across *most* sectors of the economy.

- London's industry structure appears to play a relatively small role in productivity differences with other parts of the country⁹². Firms in London have higher median levels of productivity in most industries when compared to other regions (Figure 2.3). It is these 'within-sector' differences that are more important for explaining London's current high level of labour productivity, as well as its relatively strong long-term performance⁹³.
- Median GVA per worker in London's knowledge-intensive services sectors is 24% higher than the next most productive region in Great Britain; this compares to 10% higher than the next region in less knowledge-intensive services⁹⁴. Although average productivity in manufacturing and construction firms is not particularly high in London, these sectors account for a smaller share of economic activity in the capital, which is comparatively orientated towards knowledge-intensive activities (see Chapter 3 for more detail)⁹⁵.
- These differences are in-line with evidence linking firm-level productivity with economic mass and positive agglomeration effects. Knowledge-intensive sectors like 'Finance and insurance' and 'Professional services' are thought to benefit more from agglomeration economies and large local markets, highlighting the need for spatially-focused policies⁹⁶.

⁹² See, for example: ONS (2018), '[Regional firm-level productivity analysis for the non-financial business economy, Great Britain: April 2018](#)'. It should be noted that this analysis uses a special version of the Annual Business Survey (ABS) that apportions firms' output to their various sites (also known as local units) across geographic locations where the economic activities take place. Where statistical techniques, such as apportionment, are used to help derive regional estimates there is an increased risk that the methods used will introduce sampling error or modelling imprecision to the data, with the possibility of producing misleading results. For more detail, see: ONS (2018), '[Analysis of the extent of modelling and estimation in regional GVA](#)'.

⁹³ Martin et al. (2018), '[The city dimension of the productivity growth puzzle: the relative role of structural change and within-sector slowdown](#)'.

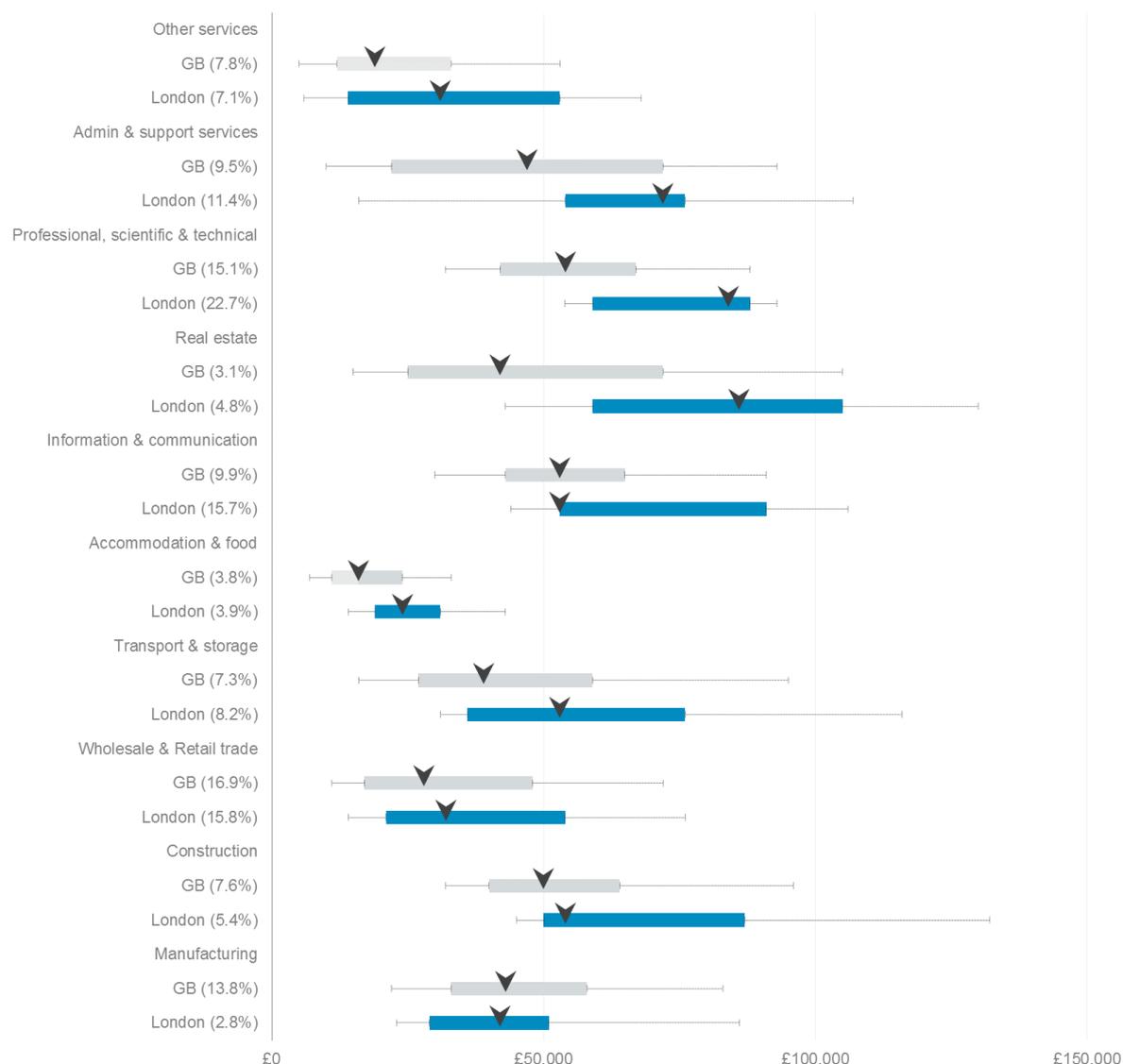
⁹⁴ Services are mainly aggregated into knowledge-intensive services (KIS) and less knowledge-intensive services (LKIS) based on their share of tertiary educated workers at detailed industrial level. KIS sectors include telecommunication or information service activities; market services such as architectural and engineering or legal and accounting activities; and other services such as veterinary activities. LKIS sectors include accommodation and food services or wholesale and retail trade. For further information, see: ONS (2018), 'Regional firm-level productivity analysis for the non-financial business economy, Great Britain: April 2018'.

⁹⁵ [Recent analysis](#) by the ONS using the Krugman Specialisation Index indicates London was the region that had the most dissimilar industrial structure to Great Britain as a whole. Also see: ONS (2018), '[Regional firm-level productivity analysis for the non-financial business economy, Great Britain: April 2018](#)'.

⁹⁶ OECD (2018), '[Reducing regional disparities in productivity in the United Kingdom](#)'.

Figure 2.3: Median productivity levels within most industries are substantially higher for London firms compared to the Great Britain average, especially in services sectors

Distribution of local plant GVA per worker in selected industries, London and Great Britain, 2014. Key: arrow (▼) = median; bars (■) = interquartile range; lines (|—|) = 10th and 90th deciles.



Source: Annual Business Survey, Office for National Statistics. Note: each local plant is assigned to a single SIC 2007 group, corresponding to the plant's principal activity. 'Mining & utilities' is excluded for readability.

Nonetheless there is considerable variation in productivity performance between firms in the same industries in London.

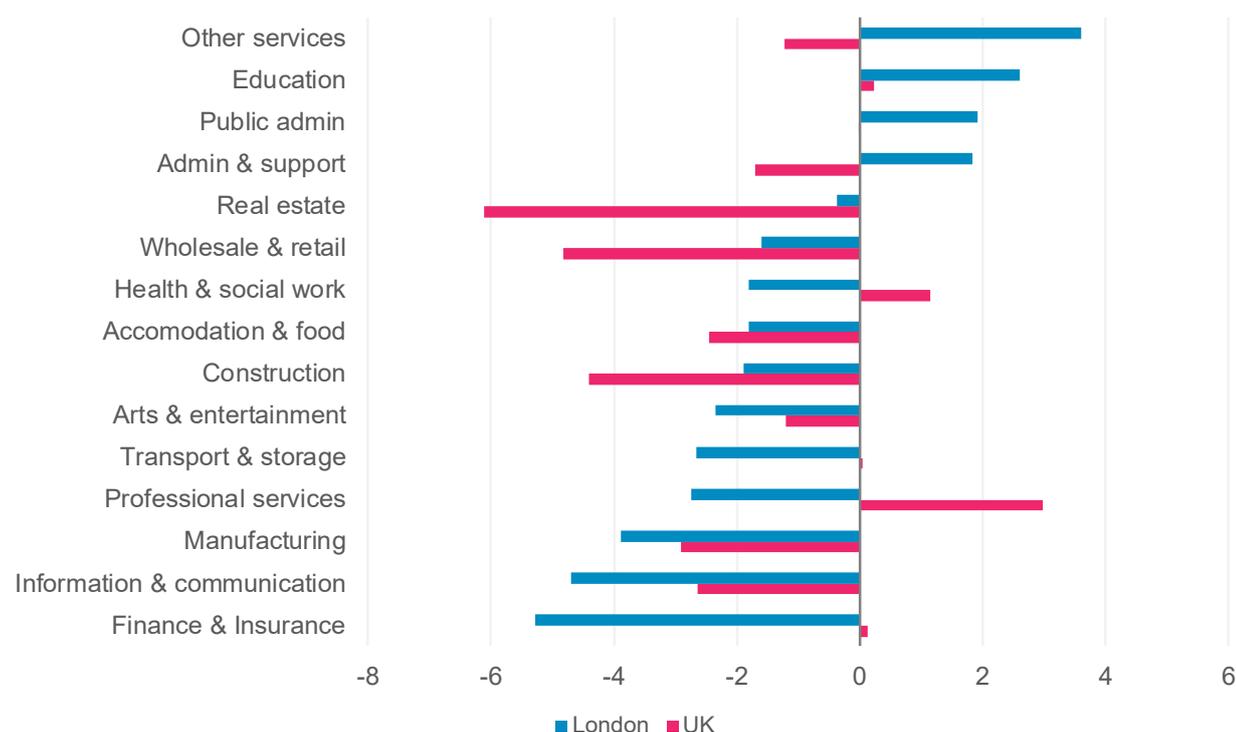
- Looking at the distribution of firm-level productivity (Figure 2.3) the top 10% of local plants in terms of GVA per worker in London are at least 2-3 times more productive than the bottom 10% in each industry group. In some cases, such as 'Administrative and support services' and 'Other services', the gap between the highest and lowest performing plants is even wider.
- Local plants in less knowledge-intensive services account for the vast majority (91%) of firms in the bottom fifth of London's productivity distribution (in the non-financial business economy); while the top end is dominated by local plants in knowledge-intensive sectors (73% of the top fifth)⁹⁷.

⁹⁷ ONS (2018), 'Regional firm-level productivity analysis for the non-financial business economy, Great Britain April 2018'.

Despite these disparities between sectors, GLA Economics research confirms that London's productivity slowdown has not been confined to specific sectors.

- London's post-financial crisis productivity slowdown does not seem to be caused by changes in the sectoral composition of employment:
 - Most industry groups in London have seen productivity growth fall in the period from 2010-2017 compared to the pre-crisis period of 1998-2007 (Figure 2.4).
 - The slowdown is especially pronounced in previously high-performing business services sectors – consistent with evidence that the post-crisis productivity puzzle (in aggregate productivity growth) is driven by *more* productive firms⁹⁸.
 - Holding the sectoral composition of hours worked constant between 2010 and 2017 would only make a small difference to London's productivity shortfall⁹⁹.
- The sharp slowdown in the 'Finance and insurance' sector is worth highlighting. The (direct) impact of the financial boom/bust cycle was more significant for London than other parts of the country. This has been attributed to deleveraging following unsustainable growth pre-crisis and this helps to explain the depth of London's productivity puzzle (see Section 2.7)¹⁰⁰.

Figure 2.4: Change in productivity growth by selected industry group, London and UK, 2010-2017 - 1998-2007 (percentage points)



Source: Office for National Statistics.

⁹⁸ Schneider, P. (2018), '[Decomposing differences in productivity distributions](#)'. Bank of England: Staff Working Paper No. 740. Note, however, 2004 to 2007 may have been a period of unusually strong growth at the top of the GB labour productivity distribution. See also: ONS (2019), '[Firm-level labour productivity measures from the Annual Business Survey, Great Britain: 2017](#)'.

⁹⁹ GLA Economics (2019), '[Productivity trends in London](#)'.

¹⁰⁰ Deleveraging includes repayment of bank debt and increased retention of earnings. It is likely to be linked to slower growth in loan volumes in recent years. See, for example: McKinsey Global Institute (2018), '[Solving the United Kingdom's productivity puzzle in the digital age](#)'. Mismeasurement of financial services output may also have contributed to the measured slowdown, by overemphasising the effects of higher leverage pre-crisis and the subsequent effects of deleveraging. Source: Bank of England (2019), '[Inflation Report: February 2019](#)'.

2.5 Productivity and firm characteristics

There are several firm-level characteristics associated with higher performing firms, including exposure to international trade and foreign-ownership.

- The success of the local export base is a key determinant of productivity performance. London as a whole accounts for a high share of international trade, including almost half (47%) of Great Britain's service exports¹⁰¹. Firms that export benefit from scale economies, competition and integration into global supply chains and typically show higher levels of productivity than domestically-oriented firms, on average by a third^{102,103}.
- But trading behaviour is also unequally distributed. Only a minority of firms trade internationally, and the largest traders are responsible for the bulk of trade¹⁰⁴.
 - In-line with these findings the value of service exports is highly concentrated in London's economy. Two NUTS3 areas – 'Camden and City of London' and 'Westminster' – contributed half of the capital's service exports in 2016¹⁰⁵.
 - There are signs that world trade has slowed in recent years, with further risks on the horizon (e.g. relating to Brexit and the broader geopolitical climate). Given the considerable productivity benefits linked to external openness it is important to encourage exports, particularly in light of Brexit¹⁰⁶.
 - It is, however, unlikely that any firm can simply become an exporter to increase its productivity. More likely is that the movement of already efficient, highly productive firms into the export market explains more of the productivity differences observed between exporting and non-exporting firms¹⁰⁷.
- Keeping other relevant factors constant, firms with inward foreign direct investment (FDI) are also 74% more productive than non-FDI firms¹⁰⁸. Among the benefits associated with receipt of FDI are access to cheaper inputs, more structured management practices and access to more advanced technologies. However, the productivity premia of FDI firms is not homogeneous across industries and is more pronounced in a few capital-intensive industries¹⁰⁹. For more on FDI see Chapter 3.
- Firm ownership is another factor linked to productivity performance, with foreign-owned firms found to have been 18% more productive (on average) than equivalent domestically-owned businesses from 2006 to 2017¹¹⁰. These firms may invest more in research and development or be more likely to promote the diffusion of ideas. At 2.6%, the proportion of foreign-owned firms in London is double the UK average¹¹¹.

¹⁰¹ ONS (2019), '[International exports of services from subnational areas of Great Britain: 2016](#)'.

¹⁰² Haldane, A. (2018), '[The UK's Productivity Problem: Hub No Spokes](#)'.

¹⁰³ Controlling for size, industry and ownership status, firms which report goods exports or imports are 21% and 20% more productive than non-traders; more productive firms also export more products and import from more destinations. Source: ONS (2018), '[UK trade in goods and productivity: new findings](#)'.

¹⁰⁴ ONS (2018), '[UK trade in goods and productivity: new findings](#)'.

¹⁰⁵ ONS (2019), '[International exports of services from subnational areas of Great Britain: 2016](#)'.

¹⁰⁶ OECD (2018), '[Reducing regional disparities in productivity in the United Kingdom](#)'.

¹⁰⁷ 'Meanwhile, less-productive firms are more likely to remain only operating in the domestic market'. Source: ONS (2019), '[Understanding spatial labour productivity in the UK](#)'.

¹⁰⁸ ONS (2017), '[Foreign direct investment and labour productivity, a micro-data perspective: 2012 to 2015](#)'.

¹⁰⁹ ONS (2019), '[Firm-level labour productivity measures from the Annual Business Survey, Great Britain: 2017](#)'.

¹¹⁰ ONS (2019), '[Firm-level labour productivity measures from the Annual Business Survey, Great Britain: 2017](#)'.

¹¹¹ ONS (2019), '[Analysis of enterprises in the UK by region and UK and foreign ownership](#)'.

Although there is some correlation between firm size and productivity, this is not a major factor behind regional differences in productivity

- Enterprises in London that are older and larger – in employment terms – have relatively high levels of average productivity compared to younger and smaller firms (see Chapter 3, Section 3.4). This is consistent with the expectation that such firms have more scope to benefit from specialisation of functions and economies of scope and scale¹¹².
- Yet according to ONS research the role of these factors in explaining the productivity of the firm is ‘at best partial’¹¹³. Neither firm age nor size appears to have large effects on spatial differences in aggregate average productivity between UK regions, with the distribution of local plants by these characteristics being similar between geographies.
- On the other hand, there is a significant relationship between management practices and labour productivity, with an increase in management score of 0.1 associated with a 9.6% increase in productivity¹¹⁴. Structured management practices are more prevalent among firms which are larger, foreign-owned and that employ better-educated workers than among firms that are domestically-owned, family-owned and employing less-educated workers.
- While these firms may be relatively well represented in London, the Business, Energy and Industrial Strategy Committee has also noted that: ‘poor management is a problem for far too many SMEs’, which often lack the resource or inclination to invest in training, while ‘others do not have the capacity to take advantage of new digital technologies’¹¹⁵.

¹¹² Albeit local plants belonging to the same enterprise can have very diverse characteristics and productivity levels. Source: ONS (2018), [‘Regional firm-level productivity analysis for the non-financial business economy: April 2018’](#).

¹¹³ ONS (2018), [‘Regional firm-level productivity analysis for the non-financial business economy: April 2018’](#).

¹¹⁴ ONS (2018), [‘Management practices and productivity in British production and services industries – initial results from the Management and Expectations Survey: 2016’](#).

¹¹⁵ Business, Energy and Industrial Strategy Committee (2018), [‘Small businesses and productivity’](#).

2.6 Labour productivity across London

Headline statistics mask significant disparities in performance across the capital. Labour productivity trends have been weak in most parts of London in the last five years, with outer London and inner east London witnessing a decline in productivity.

- ‘Inner London-West’ had the highest labour productivity in 2017 when the UK is broken down into 41 (NUTS2) subregions, at 50% above the UK average (Figure 2.5). Excluding imputed rental income only 2 out of the 21 NUTS3 areas in the London region displayed productivity levels below the UK average in 2017¹¹⁶.
- Nonetheless there is also large variation in productivity performance between places within the capital. Comparing the NUTS3 geographies with the highest and lowest levels of productivity within London shows that aggregate labour productivity in Tower Hamlets (which includes Canary Wharf) is around 1.9 times higher than in Croydon¹¹⁷.
 - These disparities are partly influenced by differences in industry mix. Inner London areas have long-standing relative specialisations in knowledge-intensive and high-tech services and have benefitted from the strong growth in these sectors. By comparison, outer London areas tend to be relatively specialised in real estate activities¹¹⁸.
 - Even then, variations in productivity at the sub-regional level continue to be led more by differences in firm productivity within sectors (as compared to industry mix).¹¹⁹ This firm-productivity advantage is more pronounced in inner than outer London and could reflect the relative impact of agglomerations or other location-related factors.
- That said (and as mentioned in Chapter 1), there are a number of London NUTS2 areas (‘Outer London – South’, ‘Outer London – East and North East’ and ‘Inner London – East’) that have seen a reduction in productivity levels between 2010 and 2017 (Figure 2.6).
 - In the case of ‘Inner London – East’ this is partly caused by a marked fall in output growth in financial services. This downturn has been attributed to a process of deleveraging following unsustainable growth in the years preceding 2007/08.
 - More broadly, Sensier & Devine find that sub-regions with greater specialisation in knowledge-intensive services, higher rates of investment and higher skill levels have tended to recover more quickly in the post-financial crisis period¹²⁰.

¹¹⁶ ‘Croydon’ and ‘Merton; Kingston upon Thames; Sutton’ had productivity levels around 5% below the average for the UK and 28% below the London average in 2017. Source: ONS (2019), [‘Regional and sub-regional productivity in the UK: February 2019’](#). As noted earlier: where statistical techniques, such as apportionment, are used to help derive regional estimates, there is an increased risk that the methods used will introduce sampling error or modelling imprecision to the data, with the possibility of producing misleading results.

¹¹⁷ Excluding imputed rental income. Source: ONS (2019), [‘Regional and sub-regional productivity in the UK: February 2019’](#).

¹¹⁸ ONS (2018), [‘Examining regional gross value added growth in the UK: 1998 to 2016’](#).

¹¹⁹ ONS (2018), [‘Regional firm-level productivity analysis for the non-financial business economy, Great Britain: April 2018’](#).

¹²⁰ Sensier, M. and Devine, F. (2019), [‘Understanding regional economic performance and resilience in the UK: trends since the Global Financial Crisis’](#).

Figure 2.5: Gross value added per hour worked by NUTS2 sub-regions in London, current prices, 2017 (index UK =100)



Source: ONS (2017) Regional and sub-regional productivity in the UK: February 2019.

Figure 2.6: Scatter plot of total growth in real gross value added compared with total growth in hours worked for NUTS2 sub-regions of the UK, 2010 to 2017



Source: ONS (2017) Regional and sub-regional productivity in the UK: February 2019.

2.7 Perspectives on London's productivity performance, issues and solutions

A range of factors are likely to have influenced London's poor productivity performance in recent years. Exposure to slower global trade growth and weaker financial sector performance compared to pre-financial crisis years are among them.

- The openness of the London economy and the size of its financial sector mean that global developments, such as slower world trade growth and financial sector deleveraging, are likely to have been particularly important in driving the slowdown in productivity growth.
 - The McKinsey Global Institute previously found that a fifth of the UK's productivity growth slowdown could be attributed to the financial sector¹²¹. Analysis of ONS data suggests this is even higher in London – with around a quarter of the capital's productivity shortfall accounted for by Finance and insurance alone¹²².
 - Although the sector's performance should improve as deleveraging 'runs its course', productivity growth is unlikely to return to pre-crisis rates given that those were supported by excessive risk-taking¹²³. Other sectors would have to make-up for this shortfall to recover London's pre-crisis labour productivity growth rates¹²⁴.

At the same time, it is unlikely that the sectoral composition and trade specialisation of London's economy can fully explain its productivity puzzle. The combination of strong employment growth and weak investment growth in the recovery years have been another major factor.

- As shown in Section 2.4, productivity growth has slowed in most industries over recent years, suggesting that wider factors operating across sectors must be at play. Several relevant factors – such as business formation (Chapter 3), skills attainment and job quality (Chapter 4), diseconomies of scale (Chapter 5) and innovation adoption (Chapter 6) – are discussed in more detail later in this report.
- What is generally noteworthy is that since 2010 London firms have hired labour nearly as fast as economic output has increased.¹²⁵ This is despite output growing at a faster rate in London than in other parts of the country (see Table 2.1 and Appendix to Chapter 2 (Table A.1) for comparisons).
 - Rapid labour expansion has been partly attributed to the UK's flexible labour market facilitating a fall in real wages, alongside a ready supply of potential workers – including from the rest of the European Economic Area (see Chapter 4)¹²⁶.
 - It has also been linked to the high degree of economic uncertainty in the UK post-crisis – related to austerity, the Eurozone crisis and especially Brexit – which may have led firms to opt for labour recruitment over investments in new plant and machinery (since, with the UK's flexible labour market, hiring is usually more reversible than investment¹²⁷).

¹²¹ McKinsey Global Institute (2018), '[Solving the United Kingdom's productivity puzzle in the digital age](#)'.

¹²² GLA Economics (2019), '[Productivity trends in London](#)'.

¹²³ Tenyero, S. (2018), '[The fall in productivity growth: causes and implications](#)'.

¹²⁴ McKinsey Global Institute (2018), '[Solving the United Kingdom's productivity puzzle in the digital age](#)'.

¹²⁵ In most broad industry groups in London the annual average growth rate in hours worked in the period 2010-2017 was higher than in period 1998-2007. Source: GLA Economics (2019), '[Productivity trends in London](#)'.

¹²⁶ See, for example: Pessoa, J. P. and Van Reenen, J. (2014), '[The UK Productivity and Jobs Puzzle: Does the Answer Lie in Wage Flexibility?](#)'

¹²⁷ Saunders, M. (2019), '[Shifting balance of risks](#)'. Speech given at Barnsley & Rotherham Chamber of Commerce & Institute of Chartered Accountants.

Table 2.1: Growth in real gross value added, productivity hours and labour productivity by NUTS1 region, 2010 to 2017

| Region | Real GVA | Productivity Hours | Labour Productivity |
|--------------------------|----------|--------------------|---------------------|
| UK (less extra regio) | 15% | 12% | 2% |
| North East | 7% | 2% | 4% |
| North West | 11% | 9% | 2% |
| Yorkshire and The Humber | 9% | 8% | 1% |
| East Midlands | 13% | 11% | 2% |
| West Midlands | 18% | 13% | 5% |
| East of England | 16% | 16% | 0% |
| London | 27% | 24% | 2% |
| South East | 13% | 13% | 0% |
| South West | 10% | 9% | 1% |
| Wales | 13% | 8% | 5% |
| Scotland | 12% | 8% | 3% |
| Northern Ireland | 13% | 7% | 5% |

Source: Office for National Statistics¹²⁸. Note: UK excludes the small amount of UK economic activity that cannot be attributed to a region (e.g. offshore oil and gas and activities of UK embassies): so-called extra-regio GVA.

In other words, as firms have expanded through increased hiring, investment has become increasingly subdued due to a combination of lower aggregate demand and persistent uncertainty. This has created an unusually job-rich, investment-poor recovery (Figure 2.7).

- According to Bloom et al. the Brexit process has reduced UK investment levels by around 11% over the three years since the referendum¹²⁹. Internationally orientated firms (which are prominent in London) are especially exposed to Brexit-related uncertainties¹³⁰.
- The resulting weakness in the growth of capital used per hour worked ('capital deepening') has been widespread across sectors¹³¹ and, according to one estimate, can account for over half of the overall productivity slowdown at the UK-level¹³².
- The types of investment also matter for productivity. OECD analysis suggests that raising the level of capital intensity in knowledge-intensive services sectors such as Information and communication would deliver the largest productivity boost in the capital¹³³.

¹²⁸ ONS (2019), 'Regional and sub-regional productivity in the UK: February 2019'.

¹²⁹ Bloom, N., et al. (2019), '[The impact of Brexit on UK firms](#)'. Bank of England Staff Working Paper No. 818.

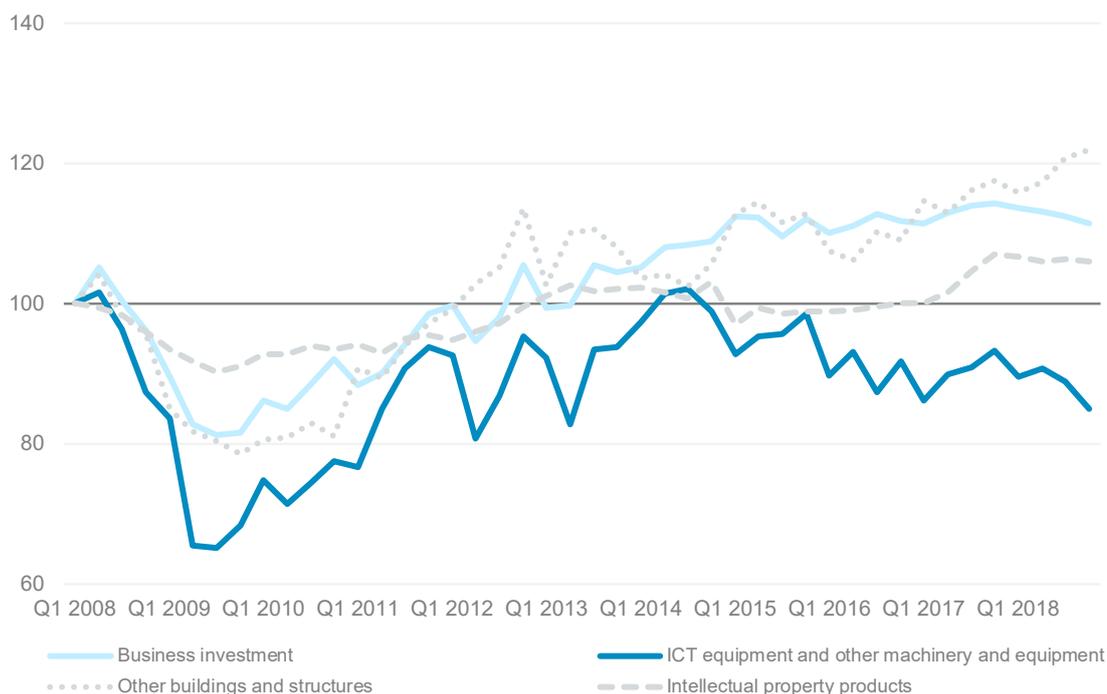
¹³⁰ Going forward, the London economy could follow very different paths depending on Brexit developments. There is considerable potential for Brexit-related uncertainties to remain elevated in the nearterm, with implications for business investment and productivity. See, for example: Saunders, M. (2019), '[Shifting balance of risks](#)'.

¹³¹ Ramsden (2018), '[The UK's productivity growth challenge](#)'.

¹³² Tenreyro, S. (2018), '[The fall in productivity growth: causes and implications](#)'.

¹³³ Kierzenkowski, R., P. Gal & G. Fulop (2017), '[Where to get the best bang for the buck in the United Kingdom? Industrial strategy, investment and lagging regions](#)'. OECD Economics Department Working Papers, No. 1426.

Figure 2.7: Total business investment levels and selected components, chained volume measure, seasonally adjusted, UK, Q1 2008 =100



Source: Office for National Statistics¹³⁴.

Although the post-crisis productivity slowdown has been most pronounced at the top tail of the distribution – among the highest-productivity ‘frontier’ businesses – there are also long-term concerns about slow productivity growth in other firms.

- Even though London has a larger share of firms with higher levels of productivity than other UK regions, there is still a substantial proportion of firms where productivity is clustered at lower (or negative) levels. Section 2.4 of this Chapter highlighted the wide disparities in firm-level productivity performance observed even within sectors in London.
- While it is unlikely that the post-financial crisis productivity puzzle can be attributed to this gap between high and low productivity firms, there are concerns about the lower rate of productivity growth for firms outside of the leading few: on average over the ten years to 2014, the top 1% of firms in London experienced annual productivity growth of 8% per year, while the other 99% saw productivity grow by only 2% per annum on average¹³⁵.
- One possibility is that technology diffusion has slowed, with the UK now ranking 38th on one global measure of knowledge diffusion, down from 18th in 2013¹³⁶. OECD research has also cited the ‘uneven’ uptake of digital technologies as a key measure to improving productivity performance, recommending a range of measures to stimulate efficient digital adoption and diffusion¹³⁷. Chapter 6 takes a closer look at innovation in London.

In the next chapters of this report we examine in turn each of the five foundations of productivity highlighted in the Industrial Strategy White Paper (business environment, people, infrastructure, ideas and places), looking at London's current performance and future outlook through the lens of inclusive growth.

¹³⁴ ONS (2019), ‘[Business investment in the UK: analysis by asset](#)’.

¹³⁵ Haldane, A. (2018), ‘[The UK's Productivity Problem: Hub No Spokes](#)’.

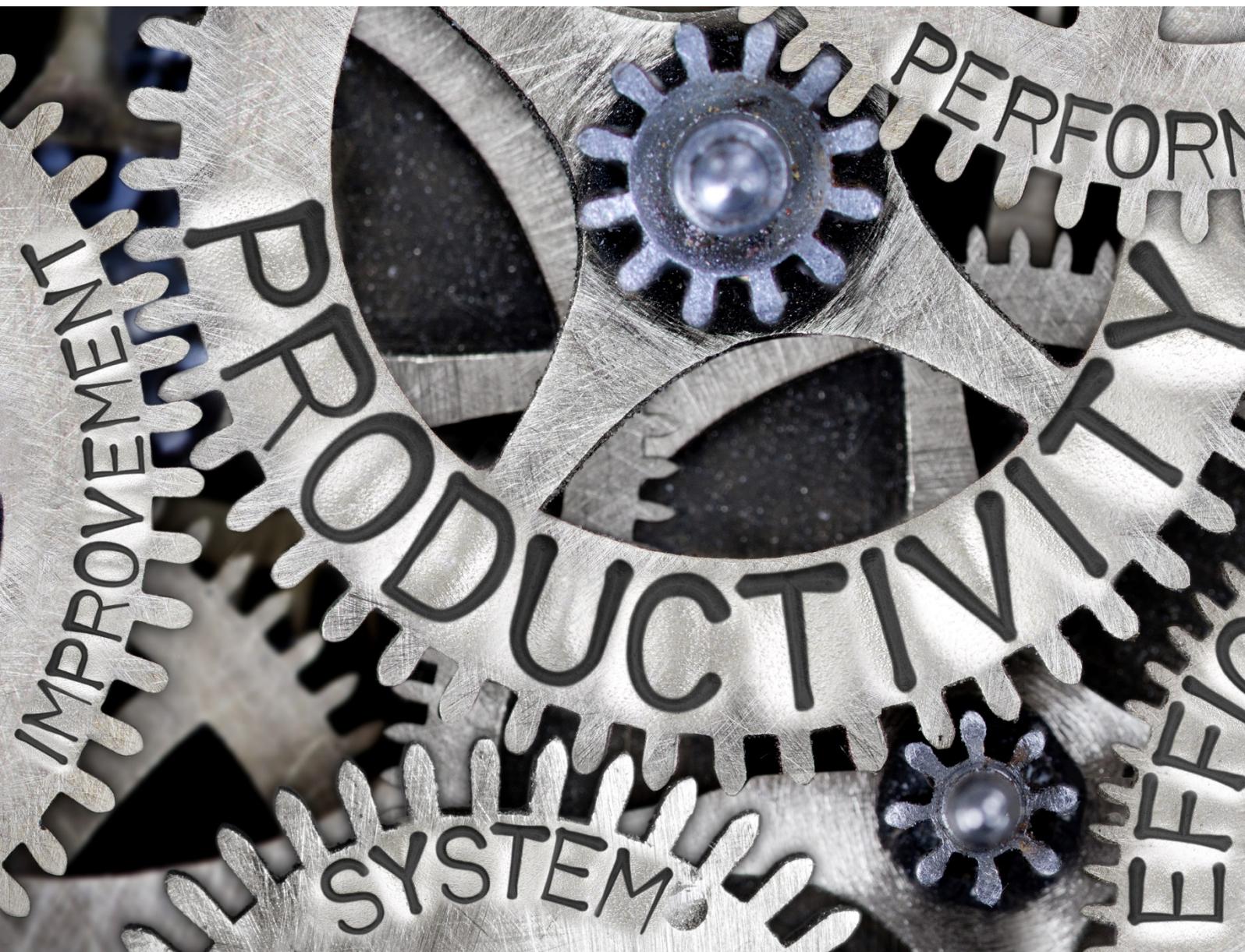
¹³⁶ Cornell University, INSEAD and WIPO (2017), ‘[The Global Innovation Index 2017](#)’.

¹³⁷ For example, see: Sorbe, S., et al. (2019), ‘[Digital Dividend: Policies to Harness the Productivity Potential of Digital Technologies](#)’. OECD.

Productivity levers in London: A literature review to inform the Local Industrial Strategy evidence base

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1 Introduction

Productivity in its broadest sense can be defined as the efficiency with which production inputs (e.g. labour and capital) are being utilised to produce a given level of economic output. Increasing productivity is widely seen as a key enabler for improving living standards in the long term and as a necessary (but not in itself sufficient) condition for inclusive economic growth. It is therefore a key topic in any industrial strategy, including the Local Industrial Strategy (LIS) for London. This is particularly pertinent at a time when productivity in London has been growing at historically low rates, in line with the UK 'productivity puzzle' – the very slow growth in productivity since the financial crisis of 2008-09.

This paper summarises the findings of a rapid literature review on the effectiveness of policy levers to enhance productivity at a regional level, with a particular focus on levers which can be influenced by the public sector and on UK (and where possibly, London) evidence.

Section 2 of this paper provides an overview of the framework that the review has adopted to organise the discussion of productivity levers, enablers and of the cross-cutting driver of agglomeration economies, linking them to high-level factors affecting regional productivity as well as with the foundations of productivity in the UK Industrial Strategy White Paper. Section 3 summarises the key findings of the review, while Section 4 examines each lever by setting out the hypothesis on how it may affect productivity, a summary of key evidence and slightly expanded conclusions. A detailed bibliography completes the paper.

2 The framework and approach for the rapid literature review

In an OECD paper examining the structural determinants of regional productivity, Gal and Egeland (2018) identify Knowledge Base Capital (intangible assets), Physical Capital (investments by business and by the public sector) and Human Capital (education and skills) as the high-level factors that productivity levers can target and to which different levers and policies can ultimately be associated with.

This rapid review takes a strategic overview approach and focuses on higher-level 'levers' that can contribute to augment these stocks of capital as well as to facilitate economic and social conditions that increase productivity across all these forms of capital (the so-called multi-factor productivity). Levers are defined at a higher level than specific policies. For example, the review considers the evidence of the impacts of migration on productivity rather than the evidence on the implications of alternative migration regimes. At the same time, it not only looks at whether certain levers can affect productivity, but also at the extent to which those levers can be affected by public sector intervention to achieve the desired effects on productivity.

The levers themselves can also be broadly matched with four out of five foundations of productivity in the Industrial Strategy White Paper (BEIS, 2017): Business Environment; People; Infrastructure; and Ideas. For example, the levers of skills, labour migration and diversity all relate to the People foundation. The exception is Place, which is by definition a cross-cutting foundation and is reflected in the focus of this paper on effectiveness of regional levers. On the other hand, levers such as devolution and access to finance are cross-cutting 'enablers' that do not directly align with a specific productivity foundation.

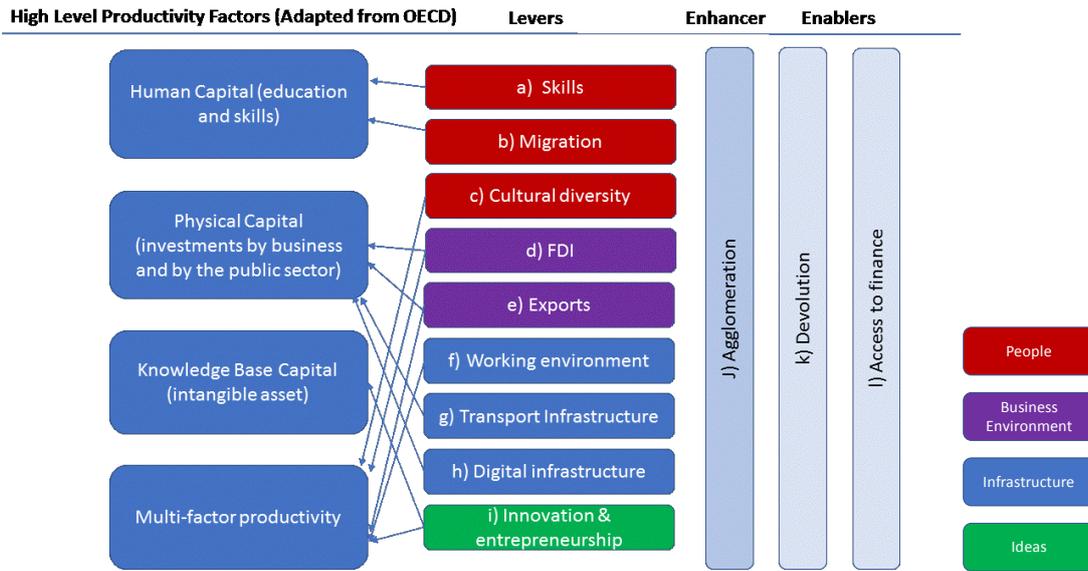
The paper also includes evidence on agglomeration economies. While not a lever in themselves, agglomeration economies are typically identified as a key factor in boosting cities' productivity and as they are the result of different levers such as infrastructure, knowledge, skills, etc. combining at a specific location. Agglomeration is therefore included in the framework as a cross-cutting 'enhancer'.

The focus on public sector levers means that the topic of business investment in physical capital (e.g. equipment, plant and machinery) is not specifically covered in this paper other than in terms of foreign direct investment and export (where we argue there is a role for the public sector), innovation diffusion and access to finance as a cross-cutting enabler. This is not to say that this is not a key driver of productivity at both a regional and national level. As we highlight in Chapter 2 of the LIS evidence base interim report, UK business investment in the UK and in London fell sharply during the recession and has stalled again recently, largely related to Brexit-related uncertainties, and it is thought to account for about half of the UK productivity puzzle.

Figure 1 summarises the framework that the rapid literature review has followed to organise the material and the relationship between high level productivity factors, levers and foundations of productivity.

Finally, in selecting literature on the various elements of the framework the review has prioritised evaluation evidence, including the high-quality evaluation evidence assessed by the What Work Centre for Local Economic Growth (WWCLEG) in their Evidence Reviews. Having said that the paper looks at a broader range of evidence, including for example government and independent reports, consultancy reports, literature reviews, economic statistics and business cases and appraisal evidence.

Figure 1: The framework for the rapid literature review



Source: GLA Economics

3 Key findings

The evidence of the impacts of the various levers on the UK & London economy differs considerably and hence consensus is not always clearly established. Where widespread consensus has been reached the availability of evidence is more widespread and more focused. With this in mind, the findings of the quick review for each lever (grouped by relevant foundation of productivity, agglomeration and enablers) are as follows:

People

- There is strong evidence linking increased **skills** and education to higher economic growth and productivity and it is widely accepted that investment in skills and human capital is a key driver of improved productivity at a city and national level.
- Overall, the balance of recent research indicates beneficial impacts of **migration** (especially high-skilled migration) on productivity in the UK, pointing towards higher labour resource utilisation and productivity gains. For a city like London, preserving the ability to attract talent from all over the world is likely to remain a key driver of productivity.
- Recent studies have found that **cultural diversity** being linked to improved economic outcomes, particularly in innovation and greater market access. This is an area that would deserve further UK-specific research but which is of particular interest for London.

Business Environment

- The impact of **foreign direct investment** (FDI) on productivity and growth is thought to be largely positive. Evidence on the impacts of investment promotion agencies in supporting FDI is still limited although recent evidence indicates that national and especially regional agencies can have positive impacts in attracting investment, particularly when following best practices.
- **Exporting activities** are also positively correlated with productivity at a firm and sectoral level and can be increased through export promotion and export credit agencies, although causality is likely to run both ways (i.e. more productive firms are more likely to export) and it is not clear that productivity gains persist in the long term.
- Several studies indicate that the **working environment** (defined as availability and quality of workspace and working conditions) has an impact on the productivity and growth of the local economy. Research on the impact of the physical and the social environment is more limited but also suggests positive links.

Infrastructure

- There is a well-established economic theory that points to **transport infrastructure** investments facilitating agglomeration effects and therefore leading to increases in local productivity, although the empirical levels on the strengths of these links is more mixed and suggests these are likely to be investment and location-specific. Historical evidence, business case evidence and the current and predicted severity of congestion on the London transport network suggest that transport investment in the capital will continue to be key to maintain agglomeration economies, manage congestion and other externalities and unlock new homes.
- There is broad consensus that **digital infrastructure** can play an important role in supporting city productivity. The presence of large gaps in the provision of advanced digital infrastructure in London and the presence of barriers and market failure limiting speed of take-up suggest that this is a promising area for public sector intervention

Ideas

- Overall, the empirical literature confirms the insight from economic theory that **innovation and entrepreneurship** have a positive impact on productivity and economic growth. The evidence on the extent to which regional policies can positively affect innovation trajectories and boost productivity by promoting innovation and entrepreneurship is more mixed. Policy intervention is also regarded as necessary to support technology transitions and ensure inclusive innovation outcomes.

Agglomeration

- Overall, the evidence suggests that strong and positive **agglomeration economies** operate to further enhance London's productivity, so preserving and enhancing these economies remains an important driver of productivity growth in the capital.

Enablers

- Greater research is still required to fully understand the impacts of **devolution** (or decentralisation) on economic growth and productivity. In a UK context, the London Finance Commission, the OECD and a number of academics recognise this research deficit while also highlighting that the UK government is heavily centralised compared to its international peers. They therefore maintain that fiscal decentralisation will lead to greater effectiveness in local and regional governments in supporting growth, as well as having positive impacts on accountability, business mobility, resilience, fairness and efficiency.
- While in London tech businesses have a clear advantage in terms of **access to finance** compared to businesses in the rest of the UK, data from the UK Innovation Survey still point to finance being one of the most common barriers to innovation investment in London. Direct and indirect access to finance measures are widespread, although there is a lack of robust evaluation of their impact on performance outcomes such as firm productivity.

Finally, although this is outside of the scope of this paper it is worth mentioning that uncertainty about the post-Brexit framework for Britain is a contextual factor that could have the sharpest impact on London's future economic prospects of any of the levers in isolation, while potentially significantly affecting a number of them (e.g., migration and investment). Most published research suggests depressed growth and productivity, albeit with different views about London's relative resilience.

4 Levers to support economic growth and productivity

4.1 Skills (People)

Hypothesis

Employment training seeks to raise productivity through improving worker skills. It can be achieved through training programs, apprenticeships, internships, career guidance and accredited qualifications. This increases human capital formation, enhances positive spill over effects on the productivity of other workers as well as driving innovation and investment (Leitch, 2006).

Evidence

There is a vast international literature on the returns to investment in education and on the impacts of skills on productivity. In the UK, the Department for Business, Energy, and Industrial Strategy (BEIS) and its predecessors have done substantial research in recent years on the impacts of skills on productivity:

- BIS (2013) estimated that at least one-third of the 34% increase in labour productivity in the UK between 1994 and 2005 was due to the accumulation of graduate skills in the workforce. They also found that a 1% increase in the share of the workforce with a university degree raises the level of long-run productivity by 0.2-0.5%.
- BIS (2015) calculated that 20% of overall labour productivity growth in the UK in the run-up to the recession (between 2002 and 2007) was due to an increase in the level of skills. The high-skilled group accounted for the largest contribution. They also found growth would have been significantly lower in the aftermath of the recession had it not been for improvements in labour composition.
- BIS (2015) found that having a higher proportion of higher-skilled employees is associated with higher productivity outcomes. It found that at an industry level, raising overall training intensity by 1 percentage point raises productivity by about 0.74%. A caveat to this finding is that employer-provided training is typically undertaken by more highly-skilled workers, with less focus on improving training for lower-skilled workers.
- The UK Innovation Survey 2017 (BEIS, 2018) also found a correlation between the innovativeness of firms and the level of education of their staff. Amongst innovative businesses, 14% of employees had a science or engineering qualification while 17% had a qualification in a non-science subject. The corresponding figures for non-innovators were 5% and 10% respectively.

There is also a broader body of academic and other research looking specifically at the impacts of skills provision in the UK:

- The What Works Centre for Local Economic Growth (WWCLEG, 2015c) found some evidence that apprentices experience higher productivity; however, more impact evaluations are required. Similarly, employment training was found to have a positive impact on participants' earnings, indicating productivity gains (WWCLEG, 2016a). This was most relevant for shorter programmes (less than six months) and on-the job training, as opposed to classroom training.
- Using wages as a proxy for productivity, Dorsett, Lui & Weale (2010, 2011) found evidence that when an individual acquires a higher educational qualification after the age of 25 it raises an individual's wage by 9% for men and 18% for women.
- Dearden, Reed and Van Reenen (2005) calculated that an increase in the proportion of trained employees by one percentage point improves productivity by 0.6%.
- Mason et al. (2014) found considerable evidence of a positive relationship between upper-immediate vocational skills and relative labour productivity performance. This relationship is strengthened when vocational skills include uncertified skills acquired through employer-provided training. Additionally, positive impacts are experienced when high-level academic skills and lower-intermediate general skills

are combined with ICT. This suggests that to increase the returns to ICT investments it is necessary to invest in additional assets such as a highly-qualified workforce.

- Examining management practices and their impacts, Bloom et al. (2017) found that UK firms are on average worse managed than those in the US and Germany. Further, the authors calculated that around 55% of the total factor productivity gap between the UK and the US is due to substandard oversight by managers.
- Recent management practices and productivity analysis by the ONS (2019) found that there is a statistically significant correlation between management practices and labour productivity, with an increase in management score of 0.1 associated with a 9.6% increase in productivity.
- In a recent evidence review for the Productivity Insights Network, Abreu (2018) noted that in the context of a very extensive micro and macro literature on returns to education there are some remaining gaps in our understanding of the relationship between levels of skills and productivity performance, specifically in relation to UK regional disparities in educational outcomes and skills.
- Specifically, Abreu highlighted that there remain gaps in measurement of training; that the causes and effects of variations in non-cognitive (e.g. softer, interpersonal) skills are not well understood; several areas relating to adult skills are under-researched (especially in relation to older and self-employed workers); and that there is comparatively little research about how demand-side and supply-side of skills interact.

Summary assessment

Overall, there is strong evidence linking increased skills and education to higher economic growth and productivity and it is widely accepted that investment in skills and human capital is a key driver of improved productivity at a city and national level.

Some gaps in our knowledge in terms of skills policy development have been highlighted in a recent review by Abreu (2018). There remain gaps in the measurement of training; causes and effects of variations in non-cognitive skills are not well understood; several areas relating to adult skills are under-researched (e.g., older and self-employed workers); and there is comparatively little research about the demand-side for skills.

4.2 Labour Migration (People)

Hypothesis

Labour migration may promote productivity gains in several ways. This includes: within-firm complementarities where immigrants increase the productivity of natives in the same firm; within-sector spillovers because of economies of scale, clustering impacts and/or increased income; geographical impacts; and incentive effects and investment.

Evidence:

Several studies have looked at the overall impact of UK migrations on productivity:

- Rocks (2018) found that EEA workers make an especially pronounced contribution to the London economy. The number of jobs held by EEA workers in London has increased significantly since 2004 with almost one-third of all EEA workers based in the capital. EEA workers tend to be younger and better qualified compared to those born in the UK or non-EEA countries. In London, they make a particularly strong contribution in construction, accommodation and food services sectors.
- Analysing the UK services sector, Ottaviano, Peri and Wright (2018) found that a 1% increase in immigration in the firm's locality is linked to improvements in firm labour productivity.

- Using the same sources, Rolfe et al. (2013) found that higher labour productivity is linked to immigrant share. The authors use substantial qualitative evidence to analyse the complementarity relationship between domestic and foreign workers as well as the existence of migrants' positive impacts on the skills shortage.
- Campo, Forte & Portes (2018) recognise the difficulties of identifying the economic impact of migration as levels of migrant workers can interact with other drivers of productivity (e.g., prevalence of international firms, which also tend to have greater worker diversity). However, they suggest that the overall impact of immigration on productivity is "positive, substantial and significant". They argue that the positive impacts are driven largely by immigrants with higher skill levels (measured by their level of education or occupation).
- Overall, the Migration Advisory Committee (MAC, 2018) found that "immigration has a positive impact on productivity, but the results are subject to significant uncertainty". They suggested that high-skilled immigration makes a positive contribution to innovation and training. Analysing training, they found no evidence that migration has reduced the training of UK-born workers.

It is worth noting that in the debate about the UK's productivity puzzle, migration of low-skilled workers (especially from EU countries) has sometimes been identified as one of the factors explaining slow productivity growth since the recession. This is based on the observation that low-paying industries with relatively low levels of productivity — e.g., accommodation and food, leisure and cleaning — were able to grow taking advantage of a plentiful supply of willing labour, with repercussions on average wages and productivity in the economy¹. This, on the other hand, does not seem to be supported by econometric analyses, with Campo, Forte and Portes (2018) concluding that "Fears that immigration is responsible, in whole or in part, for the UK's dismal productivity performance appear unfounded".

Analysing training and complementary labour force impacts, the following UK and OECD evidence is available:

- If migrant skills are complementary to other factors of production, Boubtane, Dumont and Rault (2016) found that the relatively high skill levels of migrants contribute noticeably to greater economic output. They found that in the OECD, yearly GDP per worker increases by 0.32% in the short term and 2.23% in the long term in response to a short-term increase of 50% in net migration (as a proportion of working-age population).
- Geay, McNally and Telhaj (2013) found slight positive spillover impacts from non-native English speakers on school performance among natives.
- George et al. (2012) found evidence of complementarities between high-skilled immigrants and domestic workers, with no supporting evidence indicating reduced training outcomes for natives from immigration.
- Campo, Forte & Portes (2018) suggest that higher-skilled and better-educated migrants may be linked to increases in native workers' training. For example, an increase in more educated immigrants is associated with a 0.4 percentage point increase in training for native workers.
- Additionally, their results show consistently positive and generally (but not always) significant impacts of migration on the training of native workers. For example, at a local authority level a 1 percentage point increase in the migrant share is associated with a 10.1 percentage point increase in native workers' training.
- The MAC (2018) suggested that high-skilled immigration makes a positive contribution to innovation and training. Analysing training, they found no evidence that migration has reduced the training of UK-born workers.

¹ See for example Holman and Pike (2016)

The Migration Advisory Committee report on EEA migration

In September 2018, the Migrant Advisory Committee (MAC) published their evidence base, detailing the impacts of EEA migration. It discusses a wide range of impacts including wages, unemployment, productivity, training, consumer prices, house prices, public finances, allocation of public resources, public services, crime and subjective well-being. This evidence base is being used to design a new migration system after the end of the implementation period of the UK's exit from the EU, currently scheduled for 1st of January 2021.

Summary assessment

Overall, the balance of recent research indicates beneficial impacts of migration on productivity in the UK, pointing towards higher labour resource utilisation and productivity gains. Most research specifically points towards positive impacts from high-skilled migration, with evidence indicating positive impacts on productivity and innovation in the receiving country. For a city like London, preserving the ability to attract talent from all over the world is likely to remain a key driver of productivity.

4.3 Cultural Diversity (People)

Hypothesis

Increases in cultural diversity can drive economic development through production complementarities, knowledge spillovers, increased access to global markets and more conducive entrepreneurial conditions (Nathan & Lee, 2013). Additionally, diversity-performance impacts may be amplified in an urban context where populations are more diverse and firms benefit from agglomeration economies.

Evidence

There is a small but interesting literature that has looked at the impacts of cultural diversity on productivity. A sample of studies from Europe and the UK include:

- In a study covering more than 500 regions in 7 European countries (including the UK) Boschma & Fritsch (2009) found that more open and tolerant cities and regions grow faster reflecting the attraction of both conventional human capital and a greater presence of the creative class. Additionally, more diverse skillsets aid skill development and foster knowledge spillovers.
- Examining London firms, Nathan & Lee (2013) reported “a small but significant diversity bonus across innovation, market orientation and entrepreneurship”. They found that a diverse management team is more likely to drive new product development and introduce major process innovations. Additionally, diversity-innovation impacts are felt in both knowledge-intensive and manufacturing industries. Migrant status also has robust associations with proactive entrepreneurial behaviour through the formation of firms and the capitalisation of new market opportunities.
- Both personality and cultural traits have been found by a number of studies to influence innovation, entrepreneurship and economic growth (Huggins and Thompson, 2016; Obschonka et al., 2015; Lee, 2016).

Summary assessment

Interconnected with migration, a small but growing body of research has emerged to reveal some evidence of positive links between cultural diversity and the economic factors of productivity, innovation and entrepreneurship. This is an area that deserves further UK-specific research and which is of particular interest for London.

4.4 Foreign Direct Investment (Business Environment)

Hypothesis

As well as increasing the level of capital, Foreign Direct Investment (FDI) triggers technology spillovers, assists human capital formation, enhances enterprise development, increases competition and contributes to international trade integration. The public sector (including regional governments) can therefore increase productivity by creating positive conditions for FDI and by proactively assisting would-be investors, reducing their barriers and information costs.

Evidence

There are several UK studies that have looked at the benefits of FDI:

- Graham and Krugman (1993), and Girma et al. (2001) showed that firms undertaking FDI tend to be more productive than domestic firms either through competitive pressures or demonstrative impacts.
- Barrell and Pain (1997) estimated that 30% of productivity growth in UK manufacturing between 1985 and 1995 occurred because of FDI.
- Analysis by the Department for International Trade (DIT, 2018) showed that a 1% increase in FDI leads on average to a 0.0407% increase in labour productivity. They found mixed impacts of FDI on R&D in the UK. For every £1 million of FDI, domestic firms increase R&D expenditure by approximately £1,700 on average.
- Analysis by the DIT (2018) also calculated that the indirect effects of FDI in Great Britain leads to a net creation of GVA of around £69,000 for every £1 million of FDI.
- Over the last 10 years, the UK has attracted one in four FDI projects in Europe representing 34% of total European capital expenditure. London was the greatest recipient of global FDI by number of projects over this time recording double the number of FDI of the next city, Paris (London & Partners, 2017).
- Examining the wider UK impact from London FDI from 2003 to 2015, London & Partners (2017) found that 12.1% of FDI projects in the UK resulted from an investment in London contributing £7.6 billion to the UK economy and creating 38,000 jobs. The largest impacts were felt in Hotels & Tourism, Textiles and Financial Services sectors.
- The ONS (2019) found that foreign-owned businesses were around 18% more productive than equivalent, domestically-owned businesses, on average between 2006 and 2017. In explaining this they assume that foreign-owned businesses may have access to cheaper inputs, more structured management practices or access to more advanced technologies or processes, which allow them to be more productive.
- On the other hand, a recent evidence review by Harris (2018) for the Productivity Insights Network highlighted the limitations of available studies on the causal links of productivity spillover benefits for pre-existing UK firms. These are due to the lack of primary data identifying the nature of interactions between domestic and foreign-owned firms, and therefore the nature and strengths of potential spillovers.

Despite the proliferation of Investment Promotion Agencies (IPAs), sound evidence on their effectiveness is still limited (Harding & Javorcik 2012). Some research from a U.K context includes:

- Based on a review of high-quality evaluation evidence, the WWLEG (2017a) found that that IPAs may increase FDI inflows although in some cases support provided through IPAs has no effect.
- Crescenzi, Di Cataldo & Giua (2018) found that both regional and national IPA strategies are effective in attracting more FDI in targeted sectors, as well as non-targeted region-sectors. Additionally, evidence suggests that selective interventions targeting specific sectors are more effective, rather than broader IPA support.

- More recently, the same authors appear to have reached a more positive conclusion on the effectiveness of regional promotional agencies (where the evidence seems clearer compared to national agencies). They conclude that these agencies work regardless of the characteristics of the region in which they are located in terms of bringing more foreign companies, more investment and more local jobs, especially when they target key sectors of the local economy².
- The World Bank (2018) found a strong and significant correlation between quality of promotion activities and FDI inflows. Using this comparison, the World Bank finds that Great Britain registers in the top echelon of 156 countries. Additionally, the organisation finds that the traits of more successful IPAs include those who target competitive markets, actively generate public attention, provide investors services and take an active role in advocating for policy reform.

Summary assessment

Increasing FDI can have a beneficial effect on an economy's GVA and productivity. Evidence of the impact of Investment Promotion Agencies (IPAs) is still thin but recent evidence indicates that national and especially regional IPAs have positive impacts in attracting FDI, particularly when following best practices and targeting specific sectors. This is consistent with evaluation evidence of the impacts of London's own promotional agency London & Partners.

4.5 Exports (Business Environment)

Hypothesis

Engagement in export activities is thought to help improve productivity of exporting businesses through economies of scale, learning and competition effects. The public sector (including regional governments) can therefore increase productivity by providing support to firms that want to engage in export activities for the first-time, reducing the barriers, information asymmetries and risks that they face.

Evidence

There is a broad international literature that has looked at the potential impacts on productivity of starting to engage in exporting activities. Examples include the following:

- Wagner (2007) undertook a review of 54 microeconomic studies with data from 34 countries that were published between 1995 and 2006. The study found exporters to be more productive than non-exporters, although this was largely attributed to the more productive firms self-selecting into export markets rather than to a positive impact of exporting on firm productivity.
- Looking at UK data Greenaway and Kneller (2004) found evidence of self-selection, with larger and more productive firms entering export markets and having to increase their productivity in order to do so, but with no evidence of further productivity improvement after entry when using a matched sample. This led them to recommend that export promotion should focus on addressing information asymmetries and supporting the development of clusters instead of directly subsidising firms that self-select into exporting.
- In its Cities Outlook 2017 the Centre for Cities (2017) highlighted a link between exporting industries and productivity at the national level but went on to observe that the impact that exporting has on productivity at the city level is much less clear-cut and strong for services than for manufacturing. The proposed explanation was that a higher share of value added for the services sector is likely to accrue to the location from which export takes place. They therefore concluded that place-based export promotion policies should therefore consider the value added and not just the volume of exports.

² See: <https://blogs.lse.ac.uk/gild/2019/02/21/what-policies-work-for-fdi/>

- Recent analysis by the ONS (2018b) using a new dataset linking business-level financial data with administrative trade data found that companies reporting goods exports or imports are around 21% and 20% more productive respectively than businesses which do not trade (after controlling for size, industry and ownership status). It further found that among traders, more productive businesses export more products and import from more destinations than less productive traders.
- The effects estimated by the ONS appear to differ between the EU and non-EU markets: the productivity premia associated with trading with the latter appear to be considerably larger. This suggests a degree of self-selection whereby the exporters with relatively lower productivity find it easier to export to the EU.
- According to the evaluation evidence surveyed by the WWCLEG (2017b, 2017c), both Export Credit Agencies and Export Promotion agencies can have a positive impact on an economy's level of exports, although the former tend to represent a cheaper and more cost-effective form of support.

Summary assessment

Exporting activities are positively correlated with productivity at a firm and sectoral level although self-selection effects (i.e. the fact that more productive firms are more likely to export) mean that causality is likely to run both ways and it is not clear that productivity gains associated with engaging in exporting activities continue in the long term.

The literature suggests that exporting activities can be increased through Export Promotion focussing on addressing asymmetric information issues and Export Credit Agencies (a particular form of support). This is once again consistent with the impact evaluation of London & Partner's activities.

4.6 Working Environment (Infrastructure)

Hypothesis

Higher cost of office space increases costs to business and curbs the impact of agglomeration economies. Additionally, the quality of working conditions which takes into account the environment, employee comfort and workplace design can be important determinants of productivity.

Evidence

There are several London and UK studies that have examined the impact of availability and quality of the working environment on productivity:

- Cheshire and Hilber (2008) examined the impact of planning regulations on the cost of office space. They found that from 1999–2005 the City of London had regulatory tax rates (the measure of the gross cost of land use regulations for occupiers of commercial property) of 4.31%, larger than most comparable European cities – Frankfurt (3.31%), Paris (3.75%) and Brussels (0.84%).
- Rogers (2017) found that as a place to live and work, London is faced with several challenges. Air quality regularly breaches EU targets, energy and water infrastructure is under stress and many people lack access to green space. London is also considered to be vulnerable to heat rises, more so than any other UK region.
- A trial study by Chadburn, Smith and Milan (2016) showed that personal productivity is dependent on the physical and the social/behavioural environment. It found that comfort, convenience, IT connectivity, good design and working to a specific time scale are strong drivers of personal productivity.
- Research by the Chartered Institute of Personnel and Development (2012) explored the benefits from flexible working. Key findings include:

- One-third of employees experienced less stress from flexible working
- 35% reported that it improved their productivity
- Employers view flexible working conditions as important drivers of employee engagement and well-being.
- The Confederation of British Industry (CBI) (cited in London Assembly, 2015) has claimed that 63% of employers believe that working flexibly has positive impacts on recruitment and retention.

Summary assessment

Several studies indicate that the availability and quality of workspace and working conditions has an impact on the productivity and growth of the local economy. Research on the impact of the physical and the social environment is more limited but also suggests positive links. It is clear that London faces a number of challenges – from costs and availability of business space to poor air quality levels. The London Plan and other London policies like the Mayor’s Transport Strategy recognise and seek to address these challenges and could therefore help improve London’s productivity performance.

4.7 Transport Infrastructure (Infrastructure)

Hypothesis

Transport investment supports the economy through reducing transport costs and increasing accessibility for firms and businesses. For example, it improves a firm’s ability to provide goods and services, enables people to access education and employment as well as reducing travel times and vehicle operating costs. These objectives can be achieved by expanding or improving infrastructure, enhancing services or improving resource efficiencies.

Evidence

There is a well established economic theory that points to increased connectivity facilitating concentration of economic activity and ‘agglomeration effects’ (see section j below) , in turn leading to increases in local productivity.

- As explained in by Graham and Gibbons (2018), transport improvements reduce the costs of interaction, between workers, between workers and firms and between firms and consumers. In addition to these benefits (‘static agglomeration’), they can also lead to land use change and increased concentration of economic activities (‘dynamic agglomeration’).
- As part of their review of the impacts of transport infrastructure on economic performance for the Department for Transport (DfT), Venables, Laird & Overman (2014) also considered the relationship between transport and productivity. Overall, they concluded that the intense economic interactions fostered by transport links could increase productivity, both within narrowly defined areas and in terms of linking different areas. Additionally, they highlighted that these impacts are very location and project-specific.

Quantitative analyses of the strengths of this relationship in UK and international literature have tended to generate more mixed results:

- Gibbons et al. (2012) looked at the impacts of road improvements on firm-level employment and productivity using longitudinal data from Britain. They found that the construction or improvement to major roads over the period 1998 to 2007 has led to a 0.4% uplift in GVA per worker in the local areas affected (corresponding to an elasticity of 0.5 with respect to accessibility) as well as a 0.2% uplift in wages.

- Analysing business and trade volumes, Duranton, Morrow & Turner (2014) found that for every 1% reduction in travel distances between trading partners the value of trade increased 1.4% and the volume of trade increased 1.9%.
- The WWCLEG (2015b) concluded in a recent review of high-quality ex-post evaluations that there is limited and mixed evidence on the economic impacts of transport infrastructure. This points to the need to improve the quality of ex-post evaluation evidence in this area.
- Assessing the impact on economic growth of different types of road infrastructure in the regions of the European Union, Crescenzi and Rodriguez-Pose (2016) highlighted that quality of regional government can be a significant driver of differences in the economic returns from investment in secondary roads. Failure to take this factor into account could help explain why a number of academic studies have failed to find a strong relationship between economic growth and infrastructure. On the other hand, they also found that investment in motorways does not provide good returns even in regions with good governance.
- In a recent, large meta-analysis of studies of the relationship between infrastructure investment and economic growth, Holmgren and Merkel (2017) found a production elasticity range of -0.06 to 0.52. They also found that as the estimations of productivity enhancements due to infrastructure investments become more precise, they approach zero.
- Reviewing the literature (including several of the studies cited here) in a recent paper for the Productivity Insights Network, Docherty and Waite (2018) highlighted how the literature on the long-standing debate on the links between transport infrastructure and the economy once a mature transport system is in place remains inconclusive, with different studies reaching different conclusions.

There are a number of reasons that suggest that in London the relationship between investment in infrastructure, productivity and economic growth is particularly strong. Specifically:

- The economic history of London points to the importance of investment in radial transport connections to enable agglomeration effects and city growth. In a recent study, Hebllich et al. (2018) developed a quantitative urban model to assess the impact of steam railways on the growth of London between 1801 and 1921. They found that a counterfactual without the entire railway network would reduce total population and rateable value of Greater London in 1921 by 30% and 22% respectively. Finally, they noted that the introduction of agglomeration economies (which were enabled by the railways through separation of workplace and residence) would magnify these effects.
- London experiences higher congestion costs than anywhere else in the UK. London commuter zone drivers wasted an average of 96 hours in traffic during 2014, above the UK average of 30 hours. Londoners also spent more time idling in traffic than their European city counterparts. At the same time, the level of rail overcrowding in London (measured by percentage of Passengers in Excess Capacity) is almost three times the level experienced in other UK cities (Wingham, 2017a).
- More people and jobs in London mean that travel demand across all modes is expected to increase to around 32 million trips on an average day in 2041, five million more than today. Without adequate investments in transport infrastructure to boost capacity in London and in the Wider South East, congestion risks bringing the London network to a halt. In their Evidence Base for the Mayor's Transport Strategy, TfL (2017) highlighted the importance of future investment in London's transport infrastructure to unlock homes and jobs and to support agglomeration economies. Specifically, they highlighted how as a result of population growth and improved rail and bus services 7.6 million people will live within 45 minutes of central London, 2.3 million more than today.
- Several economic appraisals and evaluations of infrastructure investments in London and also suggest a positive and significant economic return. It should be noted these studies typically look beyond economic growth and productivity outcomes by including a broader range of social costs and benefits. For example:

- The Eddington Transport Study (2006) claimed that targeted new transport infrastructure in the UK can yield returns of £5-10 for every pound invested (this includes a high-share of non-business user benefits). Eddington argued that falling transport costs since 1960 have raised UK GDP by 2.5-4.4%. Eddington also cites the benefits of transport in supporting clusters and agglomeration of economic activity in large, high-productive urban areas of the UK. He cited London as the most significant example, arguing that some transport schemes induce a time savings benefit of over 30%.
- UCL (2014) examined the impacts of the Jubilee Line Extension completed in 1999. It was initially approved with a benefit cost ratio (BCR) of 0.95:1 based on the assumption that there existed significant unquantified benefits of site regenerations and jobs growth. More recent analysis shows that the JLE delivers a BCR of 1.75:1 despite experiencing cost over-runs.
- Buchanan (2018) reviewed the evolution of Crossrail appraisals since its inception in the 1970s. In 1996, London Transport and the DfT reported a BCR of 1.7:1 for Crossrail, citing good economic fundamentals, but significant construction cost risk. Additionally, the business case presented to parliament in 2003 showed a BCR of 1.99:1, revised down to 1.8:1 in 2004 due to project amendments.
- The latest business case summary (Crossrail, 2010) pointed to a BCR range of 1.87:1 to 2:55:1 depending of whether standard value of time savings or TfL (London-specific) values were used, although subsequent delays in opening and increase in costs are likely to have eroded these somewhat.

Summary assessment

There is a well-established economic theory that points to connectivity facilitating agglomeration effects and therefore leading to increases in local productivity. At the same time, the strength of linkages between marginal transport infrastructure investments and economic performance has been the subject of a long-standing debate in the empirical literature and productivity effects are likely to be location and investment-specific.

Historical evidence, business case evidence (e.g. the impacts of major projects such as the Jubilee Line extension) and the current and predicted severity of congestion on the London transport network suggest that productivity impacts on London's transport network will continue to be particularly important to maintain agglomeration economies and manage congestion and other externalities. Transport infrastructure can also play a key role in addressing housing affordability (a key London concern) by unlocking land for development and increasing business and residential accessibility.

4.8 Digital Infrastructure (Infrastructure)

Hypothesis

Digital Infrastructure supports growth in productivity, efficiency and labour force participation. It enables new and more efficient business processes, greater access to new markets and supports flexible working arrangements.

Evidence

There is a body of recent UK and OECD evidence that has looked at the impacts of broadband and superfast broadband on productivity and which has found these to be significant and arguably large:

- The WWCLEG (2015a) found that broadband provision affects firm productivity and business activity at specific locations, however, these impacts are not always positive or necessarily large. Often, the impact is dependent on firms investing in complementary activities such as training.

- The Future Communications Challenge Group (2017) predicted that investment in 5G mobile networks in the UK enabled by core full fibre infrastructure will deliver £173bn in GDP growth between 2020 and 2030.
- The Department of Culture, Media and Sport (DCMS, 2018) found £690m in productivity gains from the Superfast Broadband programme. The study estimates that subsidised broadband coverage raise turnover per worker by 0.38%, equivalent to £1,390 in GVA per firm per annum.
- Koutroumpis (2018) estimated that new broadband services and technology has increased UK GDP by an average of 0.49% annually from 2002-2016. This growth was driven by improvements in broadband speed as well as greater levels of adoption. Examining OECD countries, the study finds higher levels of broadband adoption were witnessed in countries with higher levels of average education and R&D expenditure. Counter-intuitively, urbanisation has had a negative impact on broadband adoption.
- In another analysis of OECD countries, Strykowski (2012) found that a 10% increase in digital activity increases GDP growth from 0.2% to 1.6%.
- Docherty and Waite (2018) highlighted some methodological caveats to interpreting findings from the literature: measurement issues (where digital communications are difficult to measure per se and are typically proxied by digital capacity); rapidly changing nature of ICT use; questions about direction of causation between economic growth and digital activity; and the fact that adoption of new ICT can often happen alongside other organisational changes.

Nevertheless, the potential benefits associated with new digital infrastructure are often estimated to be large. Regeneris (2018) predicted that the total economic impact of deploying 'full fibre' broadband networks across 100 UK towns and cities could reach £120 billion over a 15-year period. This includes generating significant economic benefits for SMEs in terms of business productivity comprising of £2.3bn in innovation benefits; £2.3bn from new business start-ups and £1.9bn in flexible working benefits.

It is therefore a concern that penetration of the latest broadband and mobile technologies in London is relatively slow and patchy. Specifically, the London Assembly's Regeneration Committee (2017) has shown the extent to which London is lagging behind international competitors in terms of full fibre connections and is also lagging behind most UK cities in terms of 4G coverage (where it ranks in the bottom 5 UK cities with 73.6% of coverage) and high-speed broadband coverage (where it ranks 30th out of 63 cities across the UK).

Fibre To The Premises Broadband (FTTP) has clear natural monopoly characteristics. In theory, there should be incentives to invest for both new entrants (because they do not have a legacy network to defend) and for the incumbents (to protect their market shares). In practice, there are a number of sensible commercial considerations, regulatory incentives and barriers and other risks and uncertainties that can slow-down and limit the pace of investment – the so called 'hold-up problem'. This therefore points to a role for the public sector.

Frontier Economics (2018) compared and contrasted alternative policy scenarios against the current policy baseline: enhanced competition, national monopoly and regional franchises. They found that with the appropriate policy framework in place the percentage of premises in hold-up situations in the UK would reduce by a third, from around 15% to around 10%.

Summary assessment

Overall the evidence suggests that digital infrastructure plays an important role in promoting places' growth and productivity. Combined with analysis that suggest that there are large gaps in coverage in the provision of advanced digital infrastructure in London and that there is a case for public sector intervention to provide the right incentives for investment, this suggests that digital infrastructure could be an important lever to

augment productivity in London. As noted, by the WWCLEG this impact is often dependent on complementary activities such as training, knowledge and capacity.

4.9 Innovation and Entrepreneurship (Ideas)

Hypothesis

Innovation involves the invention, diffusion and exploitation of new ideas. Governments can support innovation through funding universities, providing firms with fiscal incentives, or by providing R&D funding through grants, loans and subsidies. Entrepreneurs act upon opportunities which translates to new products and new markets, which in turn drives growth and productivity in the economy. They also are a key plank of knowledge spill overs, acting as a conduit between people and ideas.

Evidence

There is a long-established and well-developed literature that links innovation with economic growth. This includes several studies that have looked at the impacts of innovation on productivity in a UK context:

- Hall (2011) concluded from her review of 25 studies that there is a positive relationship between innovation and firm-level productivity, acknowledging the significant difficulties associated with measuring innovation.
- BIS (2011) found a strong correlation between product innovation and labour productivity. It calculates that a 1% increase in a firm's innovation sales per employee in the UK is linked to a 0.55% increase in productivity.
- Econometric analysis for the Greater Manchester Independent Prosperity Review (2019) found that doubling the proportion of science and technology jobs in a local economy – a proxy for innovation – could increase productivity by up to 4%.
- Dal Borgo et. al. (2013) estimated that intangible assets (e.g. software and databases, innovative property, economic competences or organisational assets such as brand names, firm-specific human capital and management capabilities) accounts for just under one quarter (23%) of UK productivity growth over the period 2000–2008.
- Similarly, Corrado et al. (2012) found that intangible assets accounts for 24% of UK productivity growth from 1995–2007.

A number of studies have also pointed out that innovative local economies tend to be characterised by high levels of entrepreneurship.

- Audretsch, Kelibach & Lehman (2006) found evidence suggesting that entrepreneurship tends to be spatially located within close geographic proximity to the source producing knowledge and ideas. Their overall assessment is that by facilitating knowledge spillovers entrepreneurship is the key factor that links generation of knowledge with economic growth.
- Huggins et al. (2014) found that highly productive economies are likely to be associated with efficient innovation systems and knowledge filters resulting from high levels of entrepreneurship.
- Econometric analysis of English firms by Crescenzi and Gagliardi (2018) found that firms' innovative performance strongly depends on their internal assets and potential absorptive capacity – the ability of firms to benefit from spillovers and use knowledge from the external environment to improve productivity – rather than by being located in areas characterised by high mobility of talent (a specific manifestation of agglomeration economies).

- Harris and Yan (2017) found that London exhibits greater ‘absorptive capacity’ than other regional centres, with firms’ greater absorptive capacity translating into higher likelihood that they may innovate, export and conduct research and development.
- By contrast, a report on technology diffusion among UK business by the CBI (2017) highlighted lack of leadership and a conservative and inward-looking attitude (‘sticking to what they know’) as factors that prevent too many UK businesses from adopting existing technologies and management practices that could considerably boost their productivity.

In terms of policy effectiveness (especially at a regional level):

- Brandenburg, Gunther and Schneider (2007) found that innovation performance at a firm level is enhanced by a combination of skills and R&D investment.
- Well-established institutions can contribute to innovation through a shrewd combination of incentives, constraints and financing. Analysing the European Union, Rodríguez-Pose and Di Cataldo (2015) argued that innovative capacity is related to the quality of institutions governing a region.
- In a systematic review of the literature of the innovation ecosystem for the Greater Manchester Independent Prosperity Review, Marzocchi et al. (2019) examined how regional policies can help promote innovation. They conclude that an approach that builds from existing strengths while also allowing both new specialisms and diversification to emerge could be the best way forward.
- A review of high-quality evaluation literature by the WWCLEG (2015d) found evidence that R&D grants, loans and subsidies can positively impact productivity, employment or firm performance (profit, sales or turnover), although some of the evidence suggest that support is more likely to increase employment than productivity. However, the WWCLEG caution on the role of local innovation policy. This reflects our limited knowledge of whether or how increased R&D activity feeds through to greater innovation and productivity.
- The WCCLEG (2016b) also reviewed the evaluation evidence on the impacts of various forms of business advice helping individuals to set up businesses and helping businesses to grow. They found that business advice had a positive impact on at least one business outcome in 14 out of the 23 high-quality evaluations they surveyed, although results tended to be better for sales than for employment and productivity.
- Looking beyond just productivity impacts, a recent forward-looking analysis, McKinsey (2019) argued that the development and adoption of smart automation and artificial intelligence has the potential to improve well-being in several ways (e.g. by increasing health, longevity and leisure time).
- McKinsey also pointed to the importance of appropriate policy frameworks in maximising the benefits of new technologies while managing the likely disruption during technological transitions. These can be negative for specific sectors and locations even if the overall impacts are significant and positive.
- Finally, skills levers (which have been discussed above) are also important for fostering innovation and managing technological transitions. As highlighted by BEIS (2011) there is no specific mix of skills that is conducive to innovation but rather a combination of scientific and technical skills, organisational and management skills and basic competence in language, sciences, maths and information technology among the general workforce to help workers adapt to change.

Summary assessment

Overall, the empirical literature confirms the insight from economic theory that innovation and entrepreneurship have a positive impact on productivity and economic growth. The evidence on the extent to which regional policies can positively affect innovation trajectories and boost productivity by promoting innovation and entrepreneurship is more mixed. Appropriate policies are important to ensure that the benefits of new technologies such as AI are maximised while the disruption associated with technological transition are managed effectively. Local policies are also likely to be important to ensure that innovation outcomes are inclusive – the LIS Evidence Base interim report examines this issue in more detail.

4.10 Agglomeration Economies

Hypothesis

Agglomeration economies occur in cities or clusters of activity boosting the productivity of firms located within them. These positive spillovers are driven by key characteristics of cities including labour markets, finance and investments, physical infrastructure, housing, consumer amenities and social connectedness. Knowledge diffusion and innovation systems (the flow of technology and information among people and enterprises) are a major component of agglomeration benefits.

Evidence

Overall, there is strong evidence (including academic literature, consultancy reports and GLA studies) that illustrates agglomeration economies contributing to the exceptional level of productivity in London. For example:

- A study conducted by Volterra for GLA Economics (2006) found strong evidence of a positive non-linear relationship between earnings differentials and employment density indicating strong agglomeration impacts for London.
- Comparing London's high productivity to other UK regions, Overman, Gibbons and Tucci (2009) found that economic mass is clearly associated with higher productivity (even when accounting for differences in skills and transport accessibility between areas as well as for sectoral composition).
- GLA Economics' Economic Evidence Base for London (2016) highlighted the very high concentration of businesses in London's Central Activity Zone (CAZ) in spite of its high office costs as showing that businesses benefit from locating near to one another. Similar considerations also apply to a number of employment hubs in other parts of the capital.
- A Trends Business Research Ltd report (2016) undertaken during the production of the Economic Evidence Base for London also found that among the top ten co-locating sectors in London for 2013 there are a number of sectors where one would expect to see agglomeration economies at work, as firms benefit from labour market pooling and spillovers of ideas and innovation resulting from proximity (e.g., co-location of Information Service Activities with Activities of Head Offices & Management Consultancies). It also highlighted the role of urbanisation economies, where common infrastructure – such as property types – or a shared customer base drives co-location of firms with similar characteristics even if they are in different sectors (e.g. Retail Trade, Food & Beverage Services, and Other Personal Services).

Looking further afield, several other sources examine UK-wide evidence and include the following:

- The Manchester Independent Economic Review (2009) identified agglomeration economies as a key factor for understanding why firms in the Manchester region had higher productivity than firms elsewhere in the Northwest region. The same study did not find any strong evidence on the impact of industry clusters on productivity at the firm-level.
- Roberts and Setterfield (2010) analysed the diverging economic growth rates of UK regions. The authors argued that a region's growth rate is influenced by its ability to create conditions conducive to transmitting knowledge. For example, higher economic growth is realised through localisation benefits from spatial and economic diffusion of knowledge (Storper, 2009).
- These UK-wide findings are built upon by Sena & Higon (2014) who found that the impact of knowledge spillovers spreads beyond specific firms or industries. The study finds that the clustering of human capital facilitates the absorption of R&D spillovers. Additionally, they reported that the closer a firm is located to the technology frontier, the faster it absorbs R&D spillovers from other industries, with this leading to higher levels of productivity at the firm-level.

- In examining the wider economic impacts of agglomeration for transport appraisal, Graham and Gibbons (2018) observed that according to WebTAG estimates by Graham et al. (2009) service industries have a larger relative impact when compared to manufacturing industries, although the effects of agglomeration diminish more rapidly with distance for services. The finding that agglomeration effects are stronger for services is consistent with findings of a meta-analysis by Melo et al. (2009) which is summarised by Graham and Gibbons.
- The recent Greater Manchester Independent Prosperity Review (2019) examined recent evidence and concludes that the benefits of agglomeration are higher for higher-skills activities, while agglomeration effects are stronger in cities that have higher levels of skills.
- Martin et al. (2019) however challenged general conclusions about positive links between agglomeration and economic outcomes. They argued on the basis of long-term econometric analysis of economic performance that since the 1980s UK cities' size has no longer played a role in influencing their productivity growth, a key factor being instead the share of a city's employment in high skills occupations.
- Further, Martin et al. found that beyond London smaller and lower-density labour market areas in the south of England have grown skilled employment faster than larger and higher density areas. At the same time, they found that employment growth has been faster in both high and low-skill occupations in cities closer to London.
- Lastly, based on an econometric analysis of factors influencing British cities' resistance and recovery from four recessions (including the latest recession), Martin et al. also found that city size and agglomeration impacts no longer appear to influence city resilience (i.e. the ability of cities to absorb economic shocks and recover from them), although they found some evidence that distance from London may influence speed of recovery.

Summary assessment

Overall, the balance of evidence suggests that strong and positive agglomeration economies operate for London. The extent to which links between scale and performance apply more generally to UK cities has been recently questioned by a number of researchers, with some evidence emphasising instead factors such as the share of high skills occupations in the local labour market, local hinterlands accessibility, links with other cities and connections with London. In any event, planning and infrastructure policies aimed at maintaining London's high level of agglomeration economies (in the CAZ and Northern Isle of Dogs, but also in town centres and other employment hubs) are likely to be important in supporting London's productivity.

4.11 Devolution (Enabler)

Hypothesis

By giving regional government authorities greater power over their tax base and public services the region's leaders will be more incentivised to develop their economy and seek opportunities to reform public services. In turn, this will have a positive impact on regional productivity and economic growth.

Evidence

- Bartolini et al. (2016) observed that devolution creates stronger incentives to subnational authorities to increase their tax base. It therefore incentivises them to create a better business environment and use their resources more efficiency, thereby enhancing regional growth.
- In its call to evidence, the majority of submissions to the London Finance Commission (LFC) (2017) cited the following benefits of increased devolution: greater adaptability of regional and local governments to

address challenges and opportunities; an increase in government accountability; a promotion in innovation of service delivery and; an enhancement of responsiveness to changing local conditions.

- In an empirical study looking across OECD countries, Blöchliger et al., (2013) found that decentralisation, as measured by revenue or spending shares, is positively associated with GDP per capita levels (with the result found to be stronger for revenue decentralisation than for spending decentralisation). They also found that decentralisation is strongly and positively associated with educational outcomes and with investment in physical and human capital.
- Martin et al. (2016) mentioned that while the international evidence on the impacts of devolution on regional growth is mixed and contingent to the specific governance arrangements, fiscal capacity and powers are seen as critically important. In this context, they remarked the outlier nature of the UK among most OECD countries in terms of the share of tax revenue accruing to local and regional government as a percentage of total tax revenue. This stood at 4.9% in 2012, compared to 13.2% in France, 35.8% in the US and 39.8% in Germany.
- As part of the LFC report, GLA Economics (Wingham, 2017b) conducted a literature review on fiscal decentralisation, and its impact on economic growth. Based on a small sample of published studies (including the study by Blöchliger et al. mentioned above), it found some studies linking economic growth and the subnational government's share of total government revenue. However, the GLA economics study find that there remained inconsistencies among the studies surveyed in the terms of the strength of the relationship. Some rudimentary correlation and econometric analysis for the UK was also inconclusive.
- In a study of regional productivity disparity in the UK, Gal and Egeland (2018) argued that greater devolution of responsibilities to UK regions could improve public sector efficiency in education and health care and could also have beneficial spillovers on business sector productivity through enhanced human capital.

The London Finance Commission report on fiscal devolution

The LFC was recommissioned by the Mayor of London in 2016 to update their findings of 2013. At this time, it recommended the devolution of taxes and the control of resources to London, of which some progress has been made. In the subsequent report released in 2017, the Commission argues for "a more radical devolutionary settlement for London", creating greater incentives for economic development and opportunities for public services reform.

Summary assessment

Greater research is still required to fully understand the impacts of devolution (or decentralisation) on economic growth and productivity. Methodological difficulties in isolating underlying factors and establishing causation have so far limited research in this area, although there is OECD evidence pointing to a positive relationship between decentralisation and productivity levers relating to human capital, such as educational attainment and skills.

In a UK context, the LFC, the OECD and a number of academics recognise this research deficit while also highlighting that the UK government is heavily centralised compared to its international peers. They maintain that fiscal decentralisation will lead to greater effectiveness in local and regional governments in supporting growth, as well as having positive impacts on accountability, business mobility, resilience, fairness and efficiency.

4.12 Access to finance (Enabler)

Hypothesis

Any kind of investment in productivity levers (whether in knowledge-based capital, human capital or physical capital) will typically require access to finance to meet the associated upfront costs. By addressing barriers to access to finance for local businesses governments can therefore promote local economic growth.

Evidence

In looking at this enabler two questions appear to be relevant. The first is whether there is evidence of financial barriers limiting investments that can support innovation and therefore productivity and especially (from a London perspective) the extent to which this applies to London businesses. The second is what we know about the effectiveness of policies that sought to address those barriers.

In terms of evidence of financial barriers:

- There is evidence that high-tech, innovative businesses in London benefit from locating in one of the world's leading financial centres in terms of access to loan and equity finance for innovation. According to London & Partners and PitchBook (2018), London's tech companies received £1.8 billion in venture capital funding in 2018, 72% of the total raised by UK tech firms.
- In calling for an increase in the supply of patient capital across the UK, The HM Treasury-commissioned Patient Capital Review (2017) also observes that the majority of existing capital is concentrated within London and the South East, while businesses in other regions are the ones that face greater difficulties in accessing this kind of capital.
- At the same time, there is evidence that in the years following the financial crisis the changing nature of the UK banking system has increased the barriers for business and for SMEs, in particular in terms of access to different kinds of finance (House of Commons, 2016). This has exacerbated pre-existing concerns about potential financial barriers to establish new business, grow existing business and undertake productivity-enhancing investments.
- On the other hand, Brown and Lee (2017) observed that since 2008 there has been significant changes to the market for small business funding which has led to increased levels of new entrants coupled with the emergence of alternative forms of small business lending such as peer-to-peer lending and crowdfunding.
- According to the UK Innovation Survey (2017) the most commonly reported barriers to innovation investment for both UK and London-based companies related to the financing of innovation. The direct cost of innovation was cited by 13.7% of UK companies and 11.9% of London companies as a barrier, 13.5% and 12.8% respectively cited the cost of finance, while 13.3% and 14.9% were concerned about the availability of finance.

In terms of policy evaluation evidence, the WWCLEG (2016c) found very few high-quality evaluation studies that examined the impact of access to finance scheme schemes on ultimate performance outcomes for firms, including productivity. As a result, they found it difficult to assess whether access to finance interventions improve the wider economic outcomes and point to the need for better evaluations in this area.

Summary assessment

There is a case in principle that private funding for innovation activities that are high-risk and pay dividends in the long term may be sub-optimal from a social policy perspective. While London has a clear advantage compared to the rest of the UK (especially in terms of the ability of high-tech, innovative businesses to attract loan and equity finance for innovation), data from the UK Innovation Survey points to finance being one of the most common barriers to innovation investment in London. Direct and indirect access to finance measures are widespread, although there is a lack of robust evaluation of performance outcomes, including firm productivity.

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MAYOR OF LONDON

Productivity trends in London: An evidence review to inform the Local Industrial Strategy evidence base

Christopher Rocks

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1 Introduction

'Productivity isn't everything, but, in the long run, it is almost everything.'
Paul Krugman (1997)¹

This report reviews the latest evidence to understand why labour productivity is so high in London overall and why its growth has stalled recently. This is a critical issue because, in the long-run, increasing productivity is crucial for economic growth and improving living standards. Boosting productivity growth is unsurprisingly at the centre of the Local Industrial Strategy (LIS) for London.

Background

In economic terms London is by far the most productive place in the UK, and among the most productive in Europe. Although there are disparities within London's sectors and between sub-regions, the capital's headline performance in terms of its overall *level* of economic output (GVA) per hour worked remains relatively strong.

But, despite its high aggregate level of productivity, labour productivity *growth* in London has been unusually weak in the aftermath of the 2007/08 financial crisis. While the capital recorded the highest rate of growth in GVA per hour worked of any UK region from 1998 to 2007, it had a far lower rate of growth in the period from 2010 to 2017. On this measure productivity is now 24% below where it would have been had pre-crisis trends continued. Median employee earnings have also declined recently, with the productivity slowdown cited as a major factor.²

Economists remain puzzled by these trends, with a range of theories put forward to explain them.³ This report draws attention to some of the factors most relevant for London, including: a sharp downturn in the financial sector and slowing exports; rising employment offset by falling capital investment; and uneven diffusion of ideas. None is sufficient on its own to fully explain what's happened, while the UK's decision to leave the European Union (EU) is a key source of uncertainty.⁴

This report addresses the following research questions:

- What determines the high overall *level* of productivity in London compared to other parts of the UK?
- What explains the sharp slowdown in productivity *growth* in London in the post-financial crisis period?

An accompanying GLA Economics briefing reviews the potential levers for enhancing productivity growth in London. Together these papers complement and inform the London LIS Evidence Base.

Structure

This report continues as follows. The next section provides a summary of some key findings. Section 3 explains what productivity is and how it's measured. Section 4 reviews the main evidence about the overall (high) level of productivity in London, also highlighting wide disparities between sectors and sub-regions. Section 5 looks at how trends have changed over time, drawing attention to the capital's unusually jobs-rich but productivity-poor economic recovery. Section 6 concludes by discussing the main factors for the recent slowdown in labour productivity, briefly assessing the plausibility of each.

¹ Krugman, P. (1997) *The Age of Diminished Expectations*, MIT Press.

² See, for example: ONS (2019) [Productivity economic commentary: January to March 2019](#)

³ See, for example: Office for Budget Responsibility (2017) [Economic and fiscal outlook - December 2012 \(Box 3.2\)](#)

⁴ There are wider issues, such as mismeasurement, this report does not review in detail. While there is no settled consensus on the 'mismeasurement hypothesis', the balance of recent research suggests it is not a leading factor in the recent productivity slowdown. For a useful discussion, see: Syverson, C. (2017) [Challenges to Mismeasurement Explanations for the US Productivity Slowdown](#)

2 Summary of key findings

- In economic terms London is by far the most productive place in the UK, and one of the most productive in Europe. Although the UK displays large regional disparities in productivity levels, this is partly driven by structural changes (e.g. the rise of a ‘knowledge-based’ economy) common to many advanced economies.
- Differences *within* industries are the main factor in explaining the capital’s strong overall productivity performance. London’s high level of aggregate productivity is not just about having more firms in certain industries; while the capital is relatively specialised in knowledge-intensive services, a productivity premium is evident across most sectors of the economy.
- At the same time, headline statistics mask significant disparities in performance across London. Despite strong aggregate productivity levels, there are both high and low productivity firms to be found in every sector in the capital, as well as significant spatial disparities. For example, labour productivity in Tower Hamlets is around 1.9 times higher than in Croydon.⁵
- Moreover, productivity *growth* in London has remained unusually weak in the aftermath of the 2007/08 financial crisis. Labour productivity (GVA per hour worked) is now about 24% below where it would have been had pre-crisis trends continued, with the capital recording the largest slowdown in annual productivity growth of any UK region or country since 2010.
- ‘Finance & insurance’ alone accounts for about a quarter of this fall in the productivity growth. Other previously high-performing and high-exporting sectors – including ‘Manufacturing’ and ‘Information & communication’ – also show sharp drops compared to pre-crisis growth rates.
- Sectoral shifts have made only a limited contribution to stalling productivity in the capital, with three-quarters of sector groups recording a lower rate of productivity growth in the post-crisis period. Several other factors are likely to have weakened productivity performance, including:
 - A slowdown in global trade activity – Office for National Statistics (ONS) estimates indicate that London had a lower rate of growth in service exports than most UK regions in the five years to 2016.
 - A backdrop of economic uncertainty and low wage growth – which seems to have encouraged investment in labour over capital, to the detriment of productivity growth.
 - Unequal diffusion of technology and working practices – Bank of England analysis points towards large disparities in productivity performance between frontier firms and the rest.

⁵ GVA per hour worked excluding rental income.

3 What is labour productivity?

Defining productivity

Productivity is about how efficiently a set of production inputs, such as labour or capital, are employed to produce a given level of economic output. Single-factor productivity measures are often used to give an input-output ratio.⁶ Thus, in most of what follows, ‘labour productivity’ is the main indicator presented – that is, the ratio of goods and services produced per unit of labour input:

$$\text{Labour Productivity} = \frac{\text{Economic output (GVA / GDP)}}{\text{Labour input (workers / jobs / hour worked)}}$$

There are several ways to measure these variables. In this report economic output is based on Gross Domestic Product (GDP) for international comparisons and Gross Valued Added (GVA) for regional analysis.⁷ The balanced GVA approach provides estimates in nominal and ‘real’ terms (chained volume measures, with the effect of inflation removed), with the latter useful for analysing trends over time.⁸ Labour input is based on the number of workers, jobs or hours worked. Where possible, GVA per hour worked is preferred since it most accurately accounts for variations in working patterns.

Variations in productivity

Changes in either output or inputs can impact productivity performance. For example, if economic output rises but the number of hours worked remains unchanged, then productivity will increase. But if economic output is fixed and the amount of labour used in the production process increases (e.g. hours worked goes up), the result would be a fall in labour productivity, since more labour was used to produce the same quantity of goods and services.⁹ In the past UK productivity growth has generally been pro-cyclical – tending to rise in periods of economic expansion and fall in recessions.¹⁰

How other factors of production are used or combined can also influence labour productivity levels. More intensive use of machinery or better technology can, for example, increase the amount of output produced for the same labour input. This means that two producers can have quite different levels of labour productivity if one happens to use capital inputs more efficiently than the other.¹¹ The quantity or quality of capital (e.g. ICT equipment) that employees work with is therefore an important matter, as is the quality of workplace management – points which are discussed further in Section 6.

Data uncertainty

This paper draws on a wide range of data produced by the ONS. However, constructing productivity measures isn’t without challenges. Issues can arise when it comes to estimating hours worked or economic output over time, as well as defining and measuring the economic performance of regions in a comparable way.¹² There are also concerns that standard measures of economic output – such as GDP and GVA – don’t account for unpaid work or fully capture the emergence of digital technologies. The analysis in this report is subject to these (and other) sources of uncertainty and should be treated with some caution.

⁶ Due to limited data availability at a sub-national level we do not focus on Total Factor Productivity, which controls for how different factors of production are used in the production process.

⁷ GVA is an estimate of the total amount of goods and services produced less the value of intermediate inputs. It is preferable to GDP at the regional level because it excludes taxes and subsidies on products that are difficult to attribute to local units.

⁸ Note: the balanced measure of regional GVA was recently granted National Statistics status. For more information see: ONS (2018) [Regional economic activity by gross value added \(balanced\), UK: 1998 to 2017](#)

⁹ House of Commons Library (2018) [Productivity in the UK](#)

¹⁰ Bhaumik, S (2011) [Productivity and the Economic Cycle](#). BIS Economics Paper No.12.

¹¹ Syverson, C. (2011) [What Determines Productivity?](#)

¹² There is a risk of comparing areas which are not alike; a lack of regional price levels can also amplify regional productivity disparities. For more information, see: OECD (2019) [Reducing regional disparities in productivity in the United Kingdom](#) (Box 1)

4 The level of productivity in London

This section compares productivity performance in London with the rest of the UK. It highlights the main factors for London’s relatively high level of aggregate productivity, before drawing attention to the wide disparities in productivity performance within the capital – both by sector and sub-region.

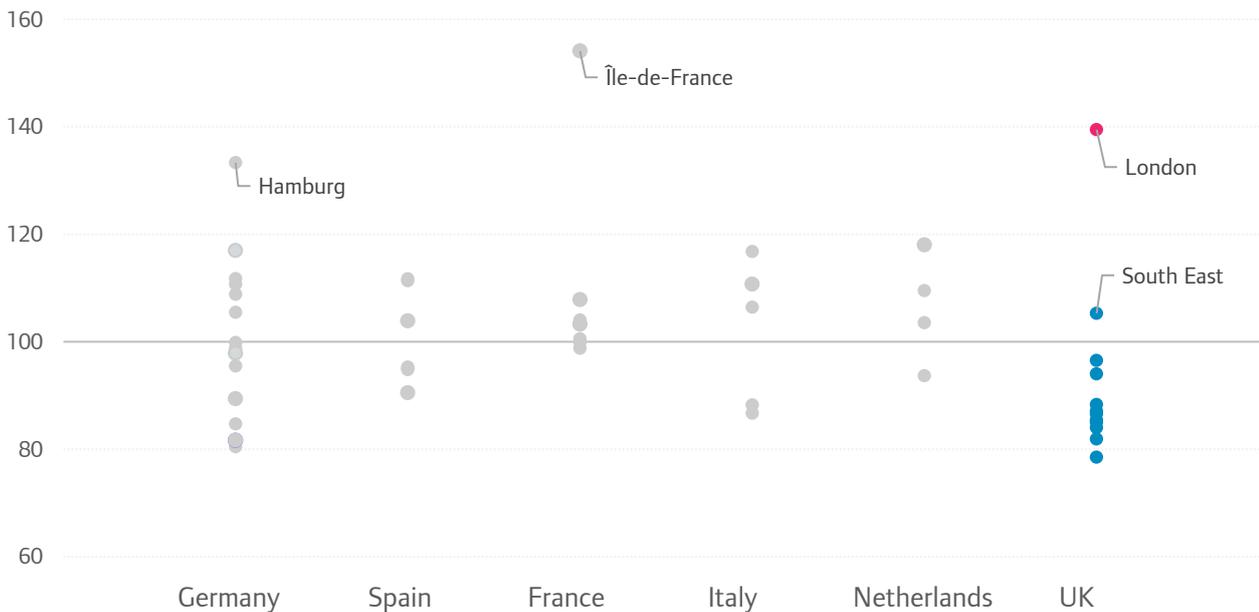
Unlike most parts of the UK, London is among the most productive regions in Europe

There is a long-running gap between the level of productivity in the UK and in many other advanced economies. Indeed, it has often been claimed that workers in Germany and France will ‘by the end of Thursday afternoon’ have produced what takes the UK worker an entire week.¹³ More recent OECD analysis suggests that measuring labour inputs in a more consistent way across countries would narrow this underperformance.¹⁴ Even then, the UK still trails its international peers in productivity terms.

London, on the other hand, is one of the most productive places in Europe. GVA per hour worked was one third above the UK average in 2017, with a relatively large gap to the rest of the country. This strong performance holds for different productivity measures and when accounting for firm characteristics.¹⁵ Looking more widely, as Figure 1 indicates, only Île-de-France (which includes the city of Paris) had a higher level of GDP per worker among 52 NUTS1 areas in Western Europe in 2014; whereas the South East was the only other UK region with a level of productivity above the UK average.¹⁶

Figure 1: London is one of the most productive place in Western Europe

GDP per worker by NUTS1 regions, UK and selected European countries, 2014 (Index UK=100)



Source: Office for National Statistics. Note: indexed data where the level of GDP per worker in the UK equals 100. Each marker represents one of 52 NUTS1 regions in Germany, Spain, France, Italy, the Netherlands and the UK.

Yet the UK is not alone in having a large disparity in productivity between leading regions. France, for example, also shows a large gap in GDP per worker between its capital and next highest-ranking NUTS1

¹³ See, for example: Full Fact (2015) [Are British workers less productive than Germans and French?](#)

¹⁴ OECD (2018) [International productivity gaps: Are labour input measures comparable?](#)

¹⁵ For example, London’s overall productivity advantage is only marginally reduced if imputed rental incomes are excluded from GVA. For more on firm characteristics, also see: ONS (2019) [Understanding spatial labour productivity in the UK](#)

¹⁶ This stands for Nomenclature of Territorial Units for Statistics. For more detail see Appendix B and [Eurostat](#).

area. These trends are likely to be influenced – in part – by structural changes common to many advanced economies; specifically, the economic benefits accruing to large cities linked to the rise of knowledge-based activities.¹⁷ The key issue is that other areas in France are clustered close to the UK average for GDP per worker, while several UK regions are among the least productive in Western Europe, alongside parts of southern Italy and eastern Germany.¹⁸

Of course the choice of geography also matters when making comparisons between places and London is not necessarily directly comparable to other UK regions (Box 1). That said, a broadly similar picture of spatial disparities persists if we focus on metropolitan areas alone (see Appendix A.1).

Box 1: Choosing comparable geographies to measure productivity

The guidance for NUTS1 areas suggests that, among other factors, they should follow a population range from 3 to 7 million people, making them broadly comparable in terms of population size. But NUTS1 areas can still differ in terms of other socio-economic characteristics and/or in terms of their economic functions. Recent work by the ONS, for example, highlights a large gap in productivity performance between urban and rural areas.¹⁹ Because London is more highly urbanised than other UK regions, this can make direct comparisons somewhat problematic.

It's also possible to base analysis of this kind on the OECD / Eurostat defined 'Metropolitan areas'. According to this definition an urban area is a functional economic unit characterised by a densely inhabited 'city core' and 'commuting zone' whose labour market is highly integrated with the core.²⁰ Using this data Appendix A.1 replicates Figure 1 for metropolitan areas for the same set of countries. It offers a broadly similar picture, albeit London ranks more closely with some other UK cities (mainly those in the South East of England). Note, however, these metropolitan geographies include commuting zones and can deviate from a local area's usual administrative boundaries.

Productivity differences *within* sectors explain London's advantage

What explains London's strong productivity performance? Variations in average labour productivity between places generally arise from differences in either the firm characteristics or industry composition of an area. As the ONS puts it:

- areas can have a different industry mix; and/or
- within the same industries, the firm productivities in one area can differ from those in the same industry in other areas.²¹

Table 1 sets out the contribution of each of these factors based on analysis undertaken by the ONS on the non-financial business economy. It shows that London's high level of productivity is less about having more firms in certain industries, although this plays a part too. Rather, it mainly reflects the fact that the average London firm displays a higher level of labour productivity than its counterparts elsewhere. In other words, firms in London outperform their peers *within* industries – and this is the main factor in explaining the

¹⁷ See, for example: OECD (2019) [Reducing regional disparities in productivity in the United Kingdom](#)

¹⁸ 8 of the UK's 12 regions are among the 14 lowest ranked regions alongside regions of eastern Germany and southern Italy.

¹⁹ ONS (2017) [Exploring labour productivity in rural and urban areas in Great Britain: 2014](#)

²⁰ For more information, see: <https://stats.oecd.org/Index.aspx?DataSetCode=CITIES>

²¹ ONS (2019) [Understanding spatial labour productivity in the UK](#)

capital's strong overall productivity performance.²² However, this analysis does not include the financial sector which could understate the industry effect in London.²³

Table 1: It's mainly differences within industries that explain London's aggregate productivity advantage

Sources of aggregate GVA per worker 2015 in Great Britain NUTS1 regions (Index, GB = 100)

| | Aggregate Labour Productivity Index | Firm Productivity Index | Industry Composition Index |
|--------------------------|-------------------------------------|-------------------------|----------------------------|
| North East | 85 | 85 | 99 |
| North West | 91 | 91 | 99 |
| Yorkshire and The Humber | 84 | 85 | 97 |
| East Midlands | 78 | 80 | 100 |
| West Midlands | 91 | 89 | 99 |
| East of England | 91 | 91 | 100 |
| London | 143 | 136 | 102 |
| South East | 107 | 105 | 101 |
| South West | 82 | 83 | 98 |
| Wales | 74 | 75 | 98 |
| Scotland | 99 | 93 | 103 |

Source: ONS Annual Business Survey. Notes: (i) analysis excludes the finance, agriculture and public sectors; (ii) the table has also left out the residual covariance index for readability.²⁴

In fact, the level of productivity in London is relatively high in most industry groups. This point can be seen more clearly in Figure 2. It compares firm-level GVA per worker in the non-financial business economy for London and Great Britain as a whole; indicating the median level of GVA per worker (the arrow), the interquartile range (bars) and the 10th and 90th deciles (lines). It indicates that:

- median GVA per worker is higher for London firms in all industries, with the exception of the 'Manufacturing' sector (as well as 'Mining & utilities' which is not shown below); although,
- median productivity gaps are especially marked in services sectors such as 'Professional, scientific & technical activities', 'Real estate' and 'Administrative & support services'.

So, while differences *within* sectors are generally more responsible for London's strong productivity performance, better productivity among service sector firms plays a particularly important role. Moreover,

²² Specifically, the table shows that in London's non-financial business economy:

- The 'Industry Composition Index' equals 102 (i.e. 2 percentage points above the GB average) – this is the productivity that would exist if we kept the London industry structure but applied Great Britain levels of productivity within industries.
- The 'Firm Productivity Index' equals 136 (i.e. 36 percentage points the GB average) – this is the productivity that would exist if London had a Great Britain industry structure whilst maintaining local industry productivities.

²³ This analysis only covers the non-financial business economy. It excludes the public sector as well as the agriculture and financial sectors of the economy, with the latter particularly relevant at the London-level. Other studies suggest a larger industry mix effect in the capital. See, for example: Beatty, C. & Fothergill, S. (2019) [Local Productivity: The real differences across UK cities and regions](#).

²⁴ ONS (2018) [Regional firm-level productivity analysis for the non-financial business economy, Great Britain: April 2018](#)

while London does have a high percentage of firms at the national productivity frontier²⁵, it's not simply that the capital is home to a small number of 'superstar firms', higher levels of productivity are also evident in typical (median) London firms. Several factors are likely to influence this finding, including the extent of local markets and propensity for international trade (see Box 2).

It's also important to note that productivity indicators depend on pricing.²⁶ The regional productivity analysis reported here is based on nominal GVA and does not take account of any regional price differences or different factor prices faced by firms. Higher income areas, such as London, tend to have higher prices which in turn leads to higher measured productivity. This is especially relevant to productivity in non-tradeable sectors (e.g. 'Other services') where goods and services are produced and consumed locally.²⁷

There is still a large proportion of London firms with low levels of productivity

But despite strong *average* productivity levels, there are still high and low productivity plants to be found in every sector. Looking at the distribution of firm-level productivity (Figure 2) more closely suggests that local plants at the 90th decile in terms of GVA per worker in London (i.e. the top 10% of local plants) are at least 2-3 times more productive than those at the 10th decile (the bottom 10%) in each industry group. In some cases, including in 'Administrative & support services' and 'Other services', the gap between the highest and lowest performing plants is even more pronounced.²⁸

²⁵ i.e. top 5% in terms of productivity, see: Kierzenkowski, R., P. Gal & G. Fulop (2017) [Where to get the best bang for the buck in the United Kingdom? Industrial strategy, investment and lagging regions](#). OECD Economics Department Working Papers, No. 1426.

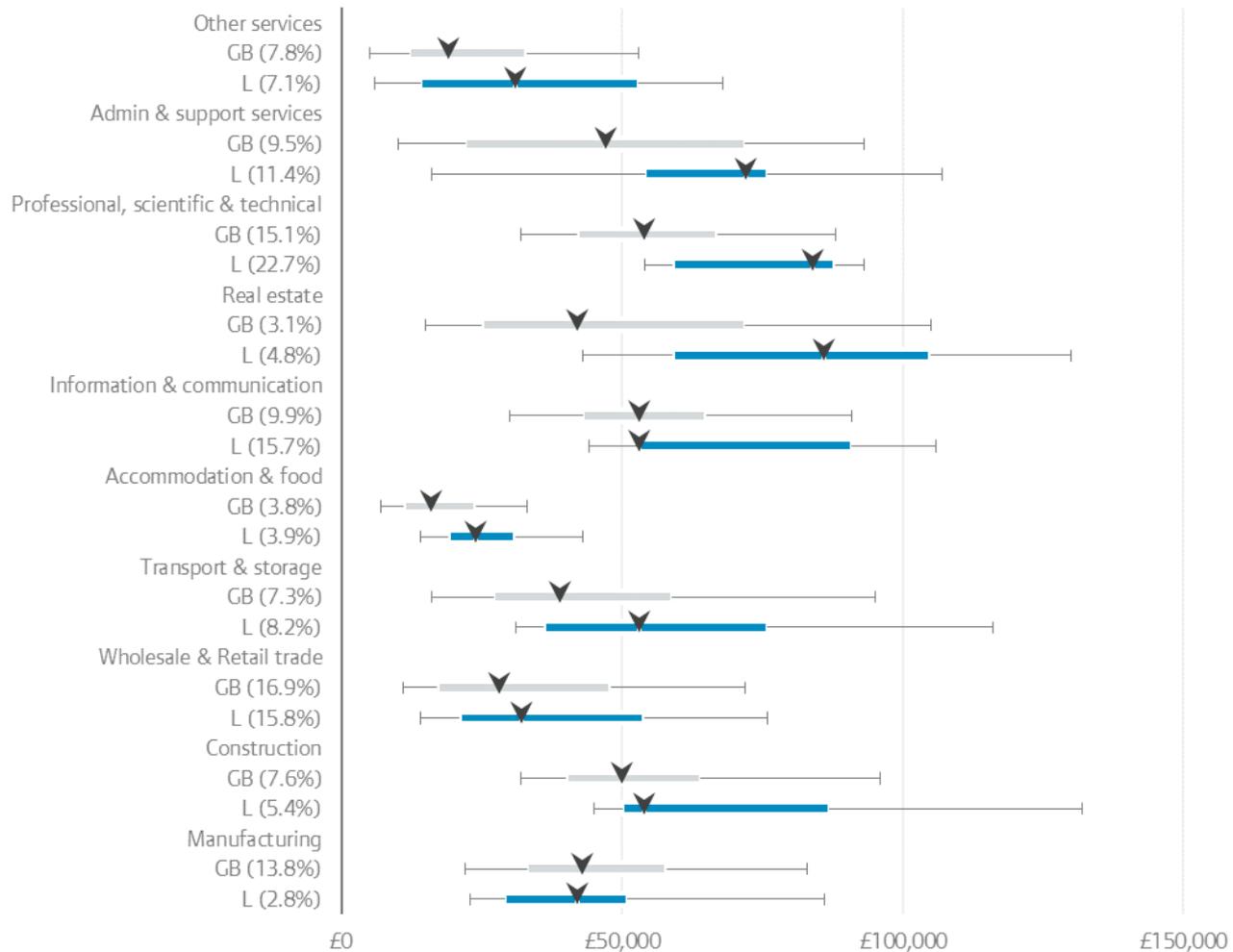
²⁶ ONS (2018) [Regional firm-level productivity analysis for the non-financial business economy, Great Britain: April 2018](#)

²⁷ Although, as the OECD points out, insofar as local price differences reflect strong market segmentation across regions, they 'induce similar policy challenges to those that aim to reduce productivity differences'. See: OECD (2019) [Reducing regional disparities in productivity in the United Kingdom](#)

²⁸ Note: this data is expressed in nominal terms, i.e. *without* controlling for the effects of price differences. The existence of firm heterogeneity within sectors is, however, widely cited in the economics literature; as Syverson summarises it: 'some producers seem to have figured out their businesses, while others are woefully lacking'. Source: Syverson, C. (2011) [What Determines Productivity?](#)

Figure 2: Median productivity levels within most industries are substantially higher for London firms compared to the Great Britain average, especially in services sectors

Distribution of local plant GVA per worker in selected industries, London and Great Britain, 2015.
Key: arrow (▼) = median; bars (■) = interquartile range; lines (|—|) = 10th and 90th deciles.

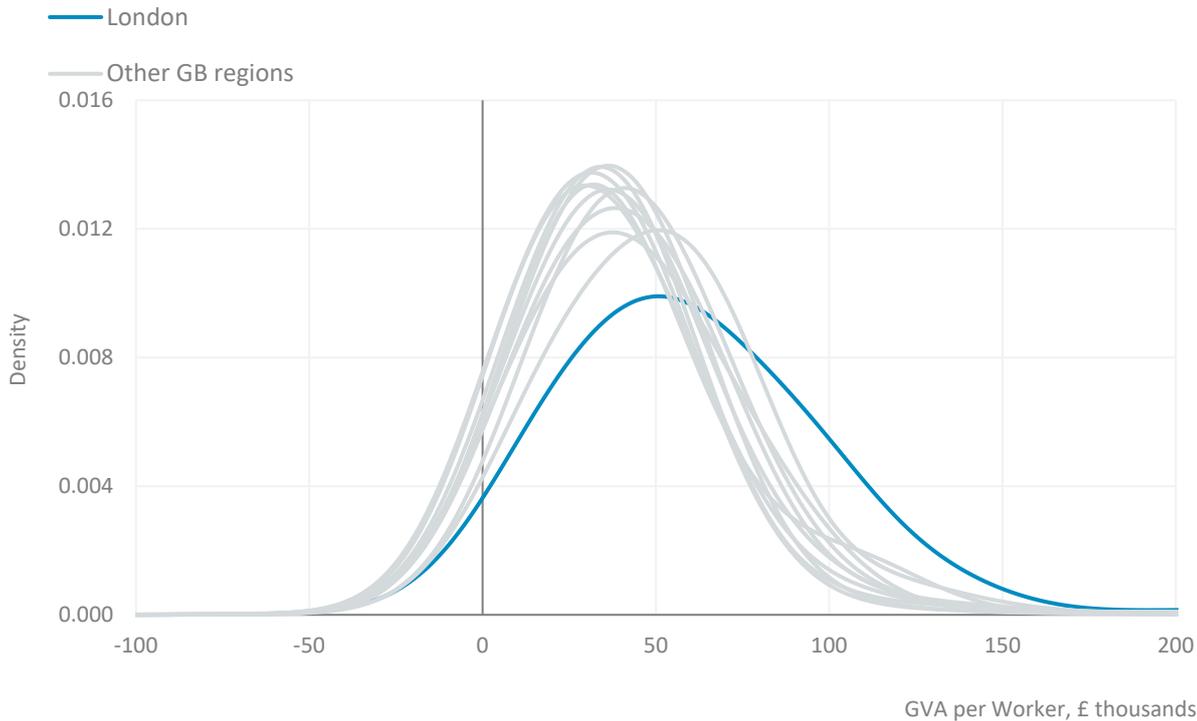


Source: ONS Annual Business Survey. Notes: (i) excludes the finance, agriculture and public sectors; (ii) each local plant is assigned to a single SIC 2007 group; (iii) 'Mining & utilities' has been left out of the chart for readability.

To further illustrate this point Figure 3 sets out the distribution of local plants across all sectors of the non-financial business economy by their level of GVA per worker in 2015. It reinforces the fact that London has a relatively large share of firms with higher levels of productivity – as indicated by the less skewed distribution compared to other regions. However, it also highlights the still substantial proportion of firms in London where productivity is clustered at lower (or negative) levels.

Figure 3: Every region has both high and low productivity plants, including London

Distribution of firm-level GVA per worker, Great Britain regions and countries, 2015



Source: ONS Annual Business Survey. Notes: (i) excludes finance, agriculture and the public sectors; (ii) Kernel Density, Bandwidth size equals 20; (iii) firms can have negative levels of GVA per worker when they report larger values of purchases than their total turnover.

Recent ONS analysis takes a closer look at the characteristics of firms in the bottom end of the labour productivity distribution for the non-financial business economy in 2015.²⁹ The results suggest that the vast majority of local units in the bottom fifth of London firms by productivity level are in less knowledge-intensive services (such as ‘Accommodation & food’ or ‘Wholesale & retail trade’).³⁰ Most of these firms are attached to micro enterprises (1 to 9 employees) and a high proportion are attached to younger (less than five years old) enterprises. However, there are also a large share of high productivity firms in these categories while less productive firms are disproportionately attached to enterprises that are larger (over 250 employees) and older (over 20 years old) (see Appendix A.2).

Still, some caution is needed in interpreting the latter results. For example, median GVA per worker also tends to rise with the size and age of firms in the capital, suggesting that very high productivity plants also exist within the top of the productivity distribution for these groups, possibly reflecting the benefits of economies of scale and scope.³¹ Nor are these characteristics unique to London; they appear to have only limited influence on the variations in overall productivity performance between regions.³²

²⁹ Source: ONS (2018) [Regional firm-level productivity analysis for the non-financial business economy, Great Britain: April 2018](#). More specifically, for London’s non-financial business economy, this work finds that:

- Most lower productivity firms are in less knowledge-intensive services. This broad group accounted for 91% of local units in the bottom fifth of firms by productivity level in 2015, double its share of the business population.
- Local plants associated with the largest enterprises (250+ employment) accounted for a disproportionate share of lower productivity firms, making-up 18% of firms in the bottom fifth of the distribution, despite accounting for just 7% of local units.
- One in three local plants in the bottom fifth of the productivity distribution were categorised in the older age group (20 years or older), despite making-up only a fifth of all firms.

³⁰ For more detailed information, please see the [Eurostat website](#).

³¹ ONS (2019) [Firm-level labour productivity measures from the Annual Business Survey, Great Britain: 2017](#)

³² ONS (2018) [Regional firm-level productivity analysis for the non-financial business economy, Great Britain: April 2018](#)

On the face of it, there should be scope to raise performance within less productive firms – by promoting wider adoption of high-performance working practices or take-up of ICT technologies, for example. Yet relative productivity performance between sectors has changed very little over time.³³ Spatial disparities in productivity levels among firms will also, to some extent, reflect the underlying supply and demand conditions that businesses encounter within different localities – including variations in spending power, accessibility (and quality) of transport links and so on. In some cases, the public sector’s ability to influence these can be ‘relatively constrained’ (see Box 2).³⁴

Box 2: Potential factors linked to higher productivity within London’s service economy

A range of factors have been associated with variations in productivity levels for firms in the same industries in different parts of the UK and London. The following draws attention to a few key factors based on work by the ONS and others. For a more detailed discussion, including on the role of public policy, see the accompanying [GLA Economics paper on productivity levers in London](#).

Internal factors are those which operate directly within the plant or firm: they are the ‘levers that management or others can potentially use to impact the productivity of their business’.³⁵ They include things like management practices, the adoption of ICT and other innovative technologies, ownership and firm structure as well as trading behaviour. London, for example, features a relatively high proportion of firms that trade internationally (Appendix A.3); this can enhance firm-level productivity through increased scale economies and integration into global supply chains. Exporting firms have, on average, levels of productivity around one-third higher than their non-exporting counterparts.³⁶

External factors relate to producers’ wider operating environment.³⁷ They tend to be more influenced by government policies but can be difficult to change in the short term. Examples include local labour market conditions, transport connections, levels of consumer spending and agglomeration economies – that is, the proximity of high-skilled workers and businesses which is a prominent feature of the London economy and is thought to foster productivity through specialisation and knowledge spillovers.³⁸ While the extent of agglomeration benefits (and costs) is disputed, there is empirical support that some productivity gains exist, especially in service sectors.³⁹

Several of these factors appear to be closely correlated with productivity performance (see Appendix A.3 to A.6). However, causal links are more difficult to identify, with causality often running in more than one direction. There is, for example, evidence that the self-selection of relatively productive plants into international markets is the main source of gains associated with exporting.⁴⁰ Similarly, more productive places are often able to attract skilled workers from elsewhere (given higher pay levels), rather than the productivity of that region being caused by, say, specific investments in the local skills system. However, this does not rule-out the existence of unproductive ‘market failures’.

³³ ONS (2019) [Firm-level labour productivity measures from the Annual Business Survey, Great Britain: 2017](#)

³⁴ Although improvements in transport accessibility, IT infrastructure and local skills may be possible, while most areas stand to benefit from improvements in firm-level factors. Source: ONS (2019) [Understanding spatial labour productivity in the UK](#)

³⁵ Syverson, C. (2011) [What Determines Productivity?](#)

³⁶ Haldane, A. (2018) [The UK’s Productivity Problem: Hub No Spokes](#)

³⁷ Syverson, C. (2011) [What Determines Productivity?](#)

³⁸ OECD (2019) [Reducing regional disparities in productivity in the United Kingdom](#)

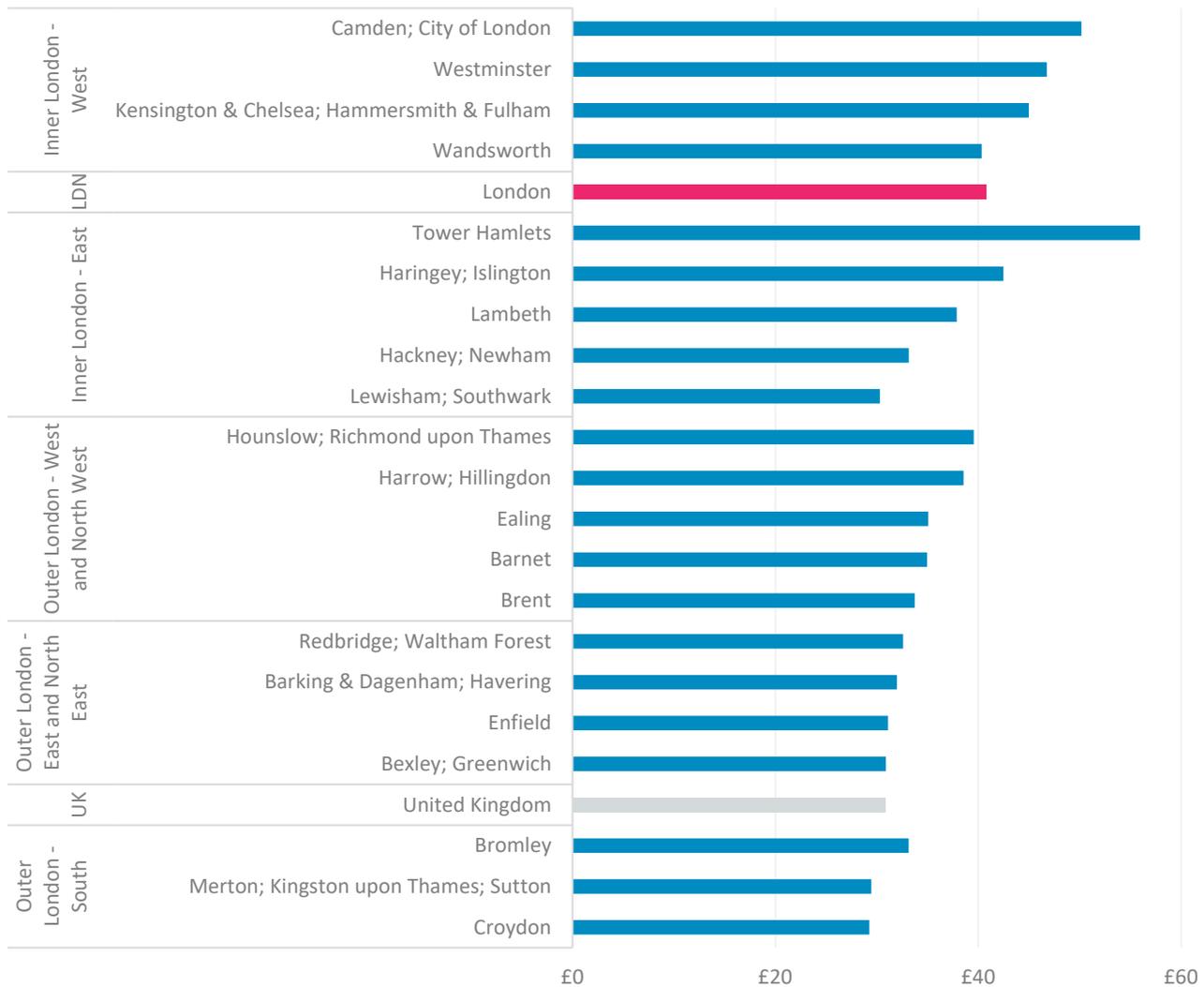
³⁹ For example, when firms collaborate or workers move between firms, bringing tacit knowledge with them. See: Gibbon, S. (2018) [Quantifying Wider Economic Impacts of Agglomeration for Transport Appraisal: Existing Evidence and Future Directions](#)

⁴⁰ Whereas less-productive firms will often struggle to compete in international markets and, for that reason, are more likely to remain operating in domestic markets. See: ONS (2019) [Understanding spatial labour productivity in the UK](#)

And considerable variation in local areas' productivity performance within the capital

To investigate the influence of location-related factors we can examine productivity levels for NUTS3 sub-regions within London.⁴¹ As Figure 4 shows, excluding rental income, it's Tower Hamlets which has the highest level of GVA per hour worked in the capital – 81% above the UK average and 37% above the London average in 2017.⁴² But while several other parts of inner London – Camden; City of London and Westminster in particular – also have relatively high productivity levels, the capital's worst performing NUTS3 areas – Croydon and Merton; Kingston upon Thames; Sutton – have productivity levels around 5% below the average for the UK and 28% below the London average.

Figure 4: London's productivity levels are particularly high in central areas but vary widely
GVA per hour worked by London NUTS3 subregion, 2017 (smoothed; excluding rental income)



Source: ONS Regional and Subregional Productivity. Note: data is sorted by productivity at the NUTS2 level.

⁴¹ See Appendix B for a breakdown of NUTS areas to London administrative geographies.

⁴² GVA per hour worked excluding rental income is used here because rental incomes significantly influence estimates at the NUTS3 level, particularly in Wandsworth, Redbridge and Waltham Forest and Bromley. Excluding rental incomes, such as imputed rental values capturing the value of housing services, provide a measure of output more closely related to the measurable labour input.

Comparing the NUTS3 areas with the highest and lowest levels of productivity suggests that aggregate labour productivity in Tower Hamlets (which includes Canary Wharf) is around 1.9 times higher than in Croydon. Clearly these areas differ on a range of economic and social characteristics, so this is not exactly a like-for-like comparison. Tower Hamlets, for example, had the second highest level of service exports per local unit in the country in 2016, reflecting its unique cluster of finance and business services firms.⁴³ At the same time, they both have a similar proportion of working age residents with NVQ4+ qualifications (both 47% compared to 52% for London overall) – a sign of the high degree of mobility exhibited by skilled workers, who often work and live in different places.⁴⁴

These sub-regional productivity disparities are also partly influenced by differences in sectoral mix. For example, the strong performance in 'Inner London – West' and 'Inner London – East' areas is supported by their high degree of relative specialisation in knowledge-intensive services sectors.⁴⁵ By comparison, in the cases of 'Outer London – East & North East' and 'Outer London – South', location quotients indicate a lower degree of specialisation in knowledge-intensive services and a relatively strong presence of (lower productivity) less-knowledge intensive services as well as real estate (see Appendix A.7).

Even then, differences in firm productivity *within* sectors continues to play the greater role in explaining variations in productivity at the sub-regional level (Appendix A.8).⁴⁶ It is also worth remarking that London's spatial productivity disparities have been persistent over several years. Figure 5 shows the coefficient of variation of average GVA per hour worked for NUTS3 areas in London between 2004 and 2017.⁴⁷ On this basis productivity differences were stable from 2004 to 2012 but have increased slightly over the last five years. This is the result of slower productivity growth in already worse performing areas in recent years (as discussed in Section 5).⁴⁸

⁴³ ONS (2019) [Regionalised estimates of Great Britain service exports by NUTS3, NUTS2 and joint authority](#)

⁴⁴ Highly skilled people who work in London tend to have higher geographic mobility than less skilled workers and often live and work in different boroughs, or even in local authorities outside London. Note, also, that the 'Finance & insurance' sector had the highest proportion of workers commuting into work from local authorities outside of the capital at the time of the 2011 census. Source: GLA Economics (2016) [Economic Evidence Base for London 2016 – Chapter 8](#)

⁴⁵ Relative to the national average, they had the highest shares of output in this broad industry group among all 40 NUTS2 regions in the UK in 2016. Source: ONS (2018) [Examining regional gross value added growth in the UK: 1998 to 2016](#)

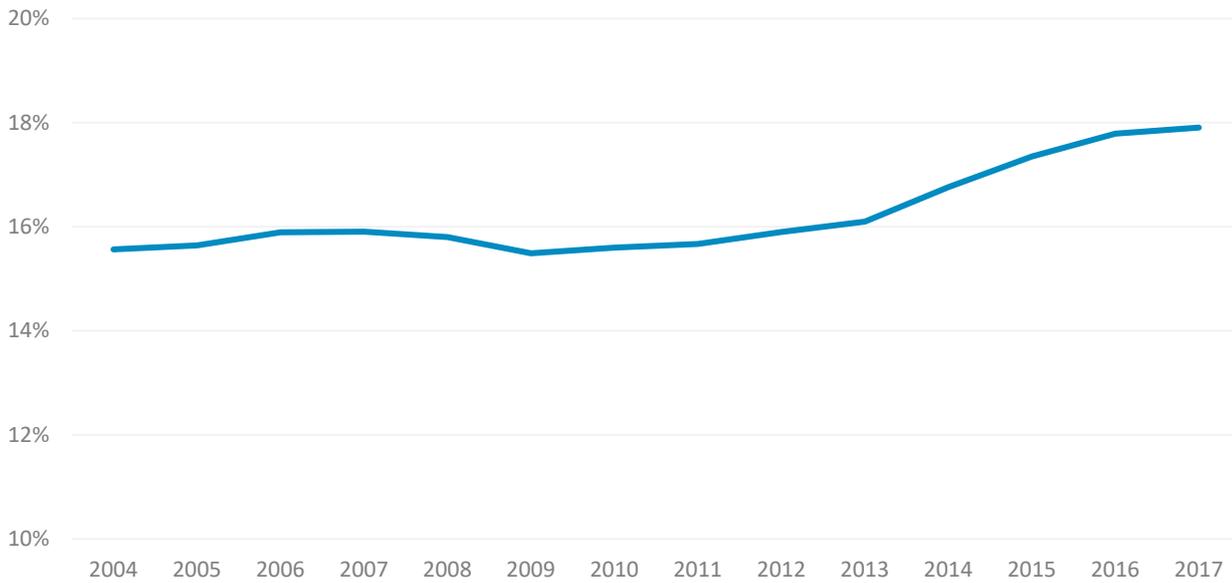
⁴⁶ There is only a one NUTS2 area in London – 'Outer London – East & North East' – where industry structure appears to play a greater role in explaining aggregate productivity in the non-financial business economy than firm productivities.

⁴⁷ This is a commonly used standardised measure of dispersion of a distribution (expressed as a percentage).

⁴⁸ By 2017, the top eight NUTS3 areas in terms of productivity levels in London were made-up of from the same eight as in 2004. At the same time, looking across the UK as a whole, spatial productivity differences at NUTS3 level have decreased slightly due mainly to lower productivity growth rates in the high-productivity areas of London. See next section.

Figure 5: Sub-regional productivity disparities have increased slightly over the last 5 years

Coefficient of Variation, GVA per hour worked (smoothed; excluding rental income), NUTS3 areas in London, 2004 to 2017



Source: ONS Regional and Subregional Productivity. Note: the coefficient of variance is the standard deviation of GVA divided by the mean, computed across the 21 NUTS3 areas in London.

5 Recent trends in productivity in London

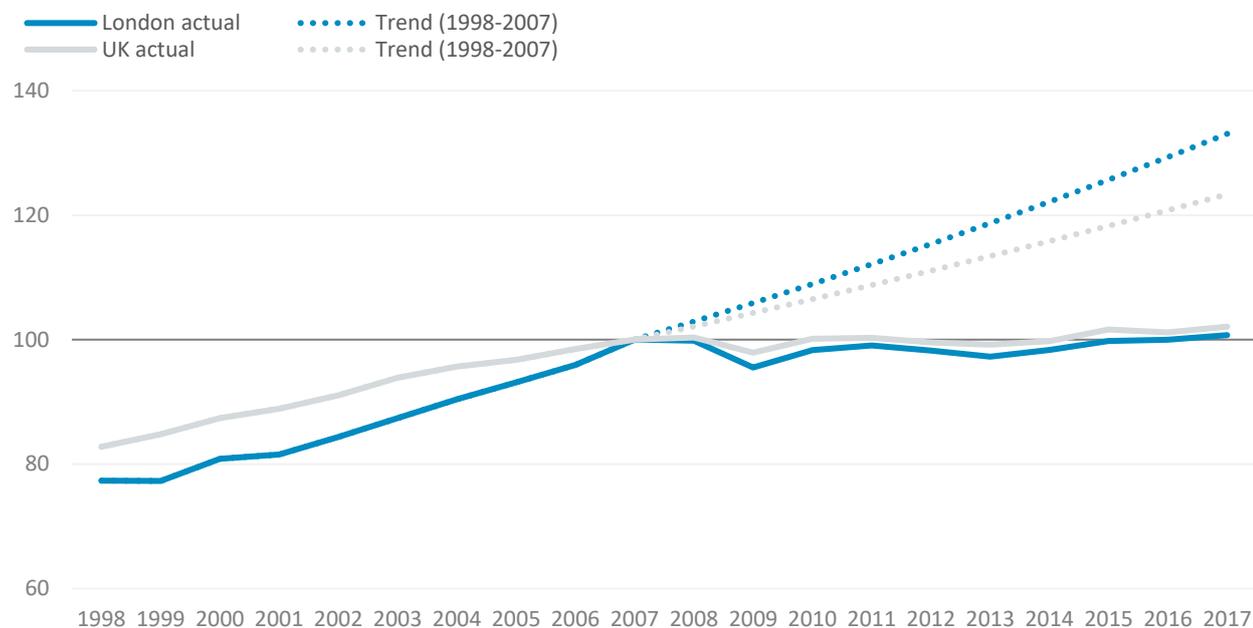
While there are productivity disparities across different parts of the capital's economy – both within sectors and between sub-regions – it's clear from the previous section that London doesn't have a problem with its overall *level* of productivity. So what is it that's so puzzling? To further understand the productivity challenges facing London, this section reviews recent trends in productivity *growth*.

London rate of productivity growth rate has fallen behind the UK average

Figure 6 plots an index of real GVA per hour worked for London and the UK as a whole between 1998 and 2017 (with 2007 being equal to 100). It indicates that from 1998-2007 labour productivity was rising for both geographies – at a rate of 2.9% per year on average in the capital and 2.1% nationally. It's no surprise that productivity took a hit after the 2007/08 financial crisis, given the (negative) shock to economic output. What's less clear is the picture thereafter: from 2010-2017 labour productivity flatlined in London and across the UK, rising by just 0.3% a year (on average) in both cases.

Figure 6: Productivity has flatlined in London and the UK post financial-crisis

Index of real GVA per hour worked, London and UK, 1998-2017, constant prices (2007=100)



Source: ONS Region by industry labour productivity

The result of this divergence is that – accounting for inflation – the level of labour productivity in London is now 24% below where it would have been had its pre-crisis (1998-2007) growth rate continued, compared to 17% lower nationally. Moreover, as Table 2 shows, London has seen the largest slowdown in real productivity growth of any UK region or country during this time, having recorded the fastest rate of productivity growth in 1998-2007 but only sixth fastest in 2010-2017.

It could be that productivity growth in the run up to the financial crisis was unusually (and unsustainably) strong, particularly the contribution made by the financial sector, which we return to later. If so, extrapolating based on pre-crisis trends might overstate the productivity shortfall.⁴⁹ On the other hand GLA Economics' London labour market projections 2017 also looks at the rate of productivity growth in the

⁴⁹ See, for example: Office for Budget Responsibility (2012) [Economic and fiscal outlook - December 2012](#)

capital over a longer timeframe.⁵⁰ That work shows that productivity growth (based on output per job) has remained relatively close to its longer-term historic trend in most years since 1971. Although growth has tended to fluctuate with the economic cycle, the recent divergence still looks significant when set against several decades of economic data.⁵¹

Table 2: London's recent productivity slowdown is more severe than in other regions

Compound annual growth rate in real GVA per hour worked (%) by UK NUTS1 region

| | 1998-2007 | 2010-2017 | Difference (pps) |
|--------------------------|-------------|-------------|------------------|
| North East | 2.3% | 0.6% | -1.7 |
| North West | 2.5% | 0.2% | -2.3 |
| Yorkshire and the Humber | 2.5% | 0.1% | -2.4 |
| East Midlands | 1.7% | 0.3% | -1.4 |
| West Midlands | 1.8% | 0.7% | -1.2 |
| East of England | 2.1% | 0.0% | -2.1 |
| London | 2.9% | 0.3% | -2.6 |
| South East | 1.9% | 0.1% | -1.9 |
| South West | 1.8% | 0.1% | -1.7 |
| Scotland | 2.1% | 0.5% | -1.6 |
| Wales | 1.6% | 0.7% | -1.0 |
| Northern Ireland | 1.9% | 0.8% | -1.1 |
| UK | 2.1% | 0.3% | -1.8 |

Source: ONS Region by industry labour productivity

This is a major issue, not least because productivity growth has historically supported income growth.⁵² Indeed, while growth in median real earnings for full-time employees in London rose by 2.0% per year on average from 1998-2007, in the period from 2010-2017 median earnings fell by 0.9% per year (adjusted for CPIH inflation). This has left median earnings for full-time employees 6.3% lower in 2017 than in 2010, compared to 3.9% lower for the UK as a whole. This fall in wages is prevalent across most industry groups in the capital with the productivity slowdown often cited as a major factor.⁵³

⁵⁰ GLA Economics (2017) [London labour market projections 2017](#) – see [Box 1](#) for long-term productivity trends.

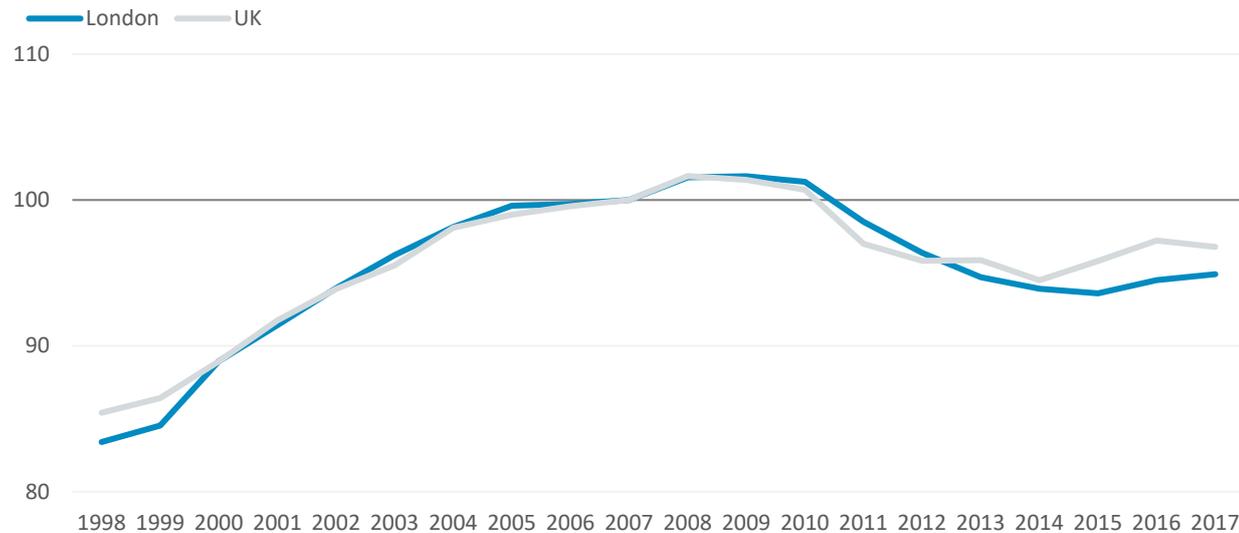
⁵¹ Albeit over a very long sweep of history the past decade isn't quite so unusual for the UK. That 'could be a good-news or a bad-news story'. For a discussion, see: Tenreyro, S. (2018) [The fall in productivity growth: causes and implications](#)

⁵² Haldane, A. (2018) [Productivity puzzles](#)

⁵³ For example, the ONS estimates that market sector wages would now be £5,000 higher for the average UK worker if productivity had grown in-line with its long-term trend since 2008 (assuming wages as a share of income had remained constant). Source: ONS (2019) [Productivity economic commentary: January to March 2019](#)

Figure 7: The productivity slowdown has coincided with a sharp drop in employee earnings

Index of median real employee earnings, London and UK, 1998-2017 (full-time gross weekly, 2007=100)



Source: ONS Annual Survey of Hours and Earnings. Note: data is adjusted for CPIH inflation.

London’s productivity slowdown is linked to strong growth in hours worked

To investigate London’s productivity slowdown further we can recall (from Section 3) that variations in labour productivity over time can be attributed to changes in either the: (i) amount of economic output produced (i.e. GVA) or (ii) quantity of labour inputs used in production (i.e. hours worked).

Table 3 disaggregates the changes in each of these variables for London and the UK for both the pre-financial crisis (1998-2007) and post-crisis (2010-2017) periods. It shows that London’s productivity growth slowdown is less about a fall in the rate of output growth, albeit the annual rate of real GVA growth was moderately lower in 2010-2017 than in 1998-2007 (down 0.6 percentage points). Instead, it’s the expansion in hours worked that stands out when it comes to explaining London’s productivity puzzle. Despite slower output growth, the annual rate of growth in hours worked more than doubled in 2010-2017 compared to 1998-2007 (rising by 1.9 percentage points)

Table 3: Annual productivity growth fell 2.6 percentage points in London, with an increase in employment (hours worked) playing a large role in the slowdown

Compound annual growth rate in productivity, real GVA, and hours worked (%), London and UK

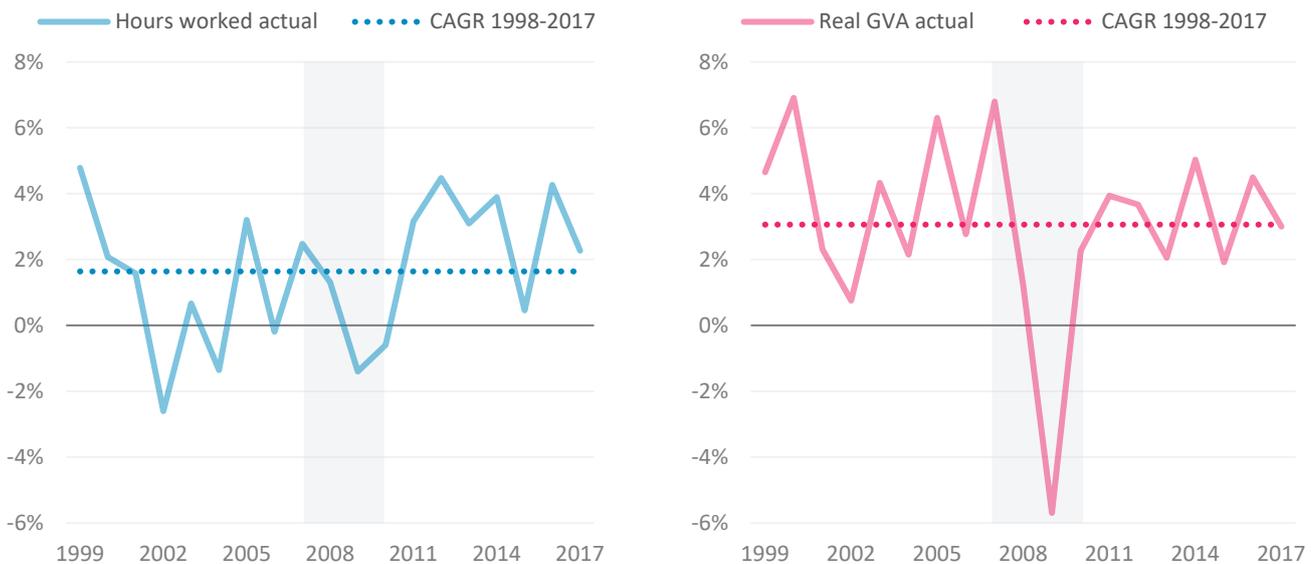
| | | London | UK |
|--------------------------|------------------------|--------|------|
| Productivity | CAGR 1998-2007 | 2.9% | 2.1% |
| | CAGR 2010-2017 | 0.3% | 0.3% |
| | Change in growth (pps) | -2.6 | -1.8 |
| Output (real GVA) | CAGR 1998-2007 | 4.1% | 2.8% |
| | CAGR 2010-2017 | 3.4% | 2.0% |
| | Change in growth (pps) | -0.6 | -0.8 |
| Hours worked | CAGR 1998-2007 | 1.2% | 0.7% |
| | CAGR 2010-2017 | 3.1% | 1.7% |
| | Change in growth (pps) | 1.9 | 1.0 |

Source: ONS Region by industry labour productivity

This means that, as aggregate demand has picked-up following the financial crisis, employers in London have been increasing labour inputs nearly as fast as economic output has risen, resulting in only small changes in labour productivity.⁵⁴ Focusing on the seven years to 2017 alone the annual growth in total hours worked exceeded its 1998–2017 average in all but one year (2014), while real GVA growth has remained close to its longer-term average (Figure 8).⁵⁵ This is almost entirely down to an increase in jobs in the capital – up by around 945,000 from 2010 to 2017⁵⁶ – rather than a change in average hours worked, which is only marginally above pre-crisis levels.⁵⁷

Figure 8: Growth in hours worked has generally been stronger in the post-crisis period, while real GVA growth has been close to its average for the last two decades

Compound annual growth rate in hours worked (LHS) and real GVA (RHS), London



Source: ONS Region by industry labour productivity

A similar link between hours worked and real GVA growth is evident for most UK regions during this time, albeit the rate of growth in both hours and output has been higher in the capital than elsewhere since 2010.⁵⁸ What is puzzling, then, is that London's overall productivity slowdown cannot be down to lower output growth alone.⁵⁹ As noted earlier, evidence about the cyclical nature of productivity at the aggregate level had suggested that growth tends to be 'pro-cyclical'.⁶⁰ Yet, while productivity levels in London did decline during the 2007/08 downturn (falling by 4.5% in total between 2007 and 2009), productivity growth has remained persistently weak even as real GVA growth has recovered.

Changes in sectoral composition only explain a small part of the slowdown

One reason often presented for these trends is a change in the sectoral composition of the London economy. Specifically, a shift in employment from higher productivity to lower productivity sectors in the

⁵⁴ During this time real GVA increased by 3.4% per year on average in London, compared to hours worked growth of 3.1% per year.

⁵⁵ Exceeding it in four out of seven years. Note: these longer-term averages are, of course, influenced in part by the sharp decline in hours worked and GVA around the financial crisis.

⁵⁶ Based on 'productivity jobs'. Source: ONS (2019) [Region by industry labour productivity](#).

⁵⁷ The average number of hours worked for all workers in London was 33.9 hours per week in London in the 12 months to March 2019. This is the joint-highest level since 2004, although in the 12 months to September 2007 it reached 33.7 hours per week. Source: ONS (2019) [Regional labour market statistics in the UK: July 2019](#).

⁵⁸ ONS (2019) [Regional and sub-regional productivity in the UK: February 2019](#)

⁵⁹ Equally, the sustained stagnation in labour productivity itself may have restricted output growth in the post-crisis period.

⁶⁰ See, for example: Bhaumik, S (2011) [Productivity and the Economic Cycle](#). BIS Economics Paper No.12.

years following the financial crisis. As Section 4 (Figure 2) pointed out there are large variations in productivity levels between industries in the capital, with firms in less knowledge-intensive services (e.g. 'Accommodation & food', 'Wholesale & retail trade') often exhibiting lower levels of economic output per hour worked compared with firms in other sectors. All else equal, employment growth in these lower productivity sectors would tend to reduce the aggregate level of productivity in London.

On this basis Table 4 shows the proportion of jobs in London split by industry for various years between 1998 and 2017. Industry groups are ranked by their average level of GVA per hour worked for 1998-2017 and highlighted if they are in the top (green) or bottom (red) quarter for the change in the proportion of jobs over each of the selected time periods. This reveals an ongoing shift in the proportion of employment away from *some* higher productivity sectors over the last two decades (1998-2017), particularly notable in the case of 'Manufacturing' and 'Finance & insurance'. There has also been an increase in the share of jobs in less productive services (e.g. 'Accommodation & food' and 'Administrative & support services'). However, several further points are worth noting:

- There has been an ongoing decline in the proportion of jobs accounted for by some less productive sectors as well, including in 'Wholesale & retail trade' and 'Transport & storage'.
- Jobs growth has also been relatively strong in some higher productivity service sectors, for example in 'Information & communication' and 'Professional, scientific & technical' services.
- Finally, changes in sectoral composition have not been especially marked in the years between 2010 and 2017, with recent changes generally consistent with longer-term trends that were also apparent in the period of stronger productivity growth (1998-2007).

Table 4: There is little sign of a step-change in London's sectoral composition in the post-crisis period, suggesting a minimal role for 'between industry' changes Proportion of jobs and change in proportion of jobs by industry group, London, 1998-2017. Note: industry groups are ranked based on their average level of GVA per hour worked (low to high).

| Industry group (low to high GVA per hour worked, avg. 1998-2017) | Proportion of 'productivity' jobs (percentage of total) | | | | Change in proportion of jobs (percentage points) | | |
|---|--|-------|-------|-------|---|-----------|-----------|
| | 1998 | 2007 | 2010 | 2017 | 1998-2007 | 2010-2017 | 1998-2017 |
| Accommodation & food | 5.4% | 6.5% | 6.7% | 7.0% | 1.1 | 0.3 | 1.6 |
| Admin & support services | 8.0% | 9.4% | 9.7% | 10.4% | 1.4 | 0.7 | 2.3 |
| Health & social work | 8.8% | 8.3% | 9.7% | 10.1% | -0.5 | 0.3 | 1.3 |
| Construction | 4.8% | 5.6% | 4.9% | 5.9% | 0.7 | 1.0 | 1.0 |
| Arts, entertainment & rec. | 3.1% | 3.3% | 3.2% | 3.4% | 0.2 | 0.2 | 0.2 |
| Wholesale & retail trade | 14.1% | 13.2% | 12.5% | 11.6% | -0.9 | -0.8 | -2.5 |
| Public admin & defence | 5.7% | 5.0% | 5.1% | 3.9% | -0.6 | -1.2 | -1.8 |
| Other services | 2.5% | 3.2% | 3.1% | 3.1% | 0.7 | 0.0 | 0.6 |
| Professional services | 10.6% | 12.1% | 12.2% | 13.0% | 1.5 | 0.8 | 2.4 |
| Manufacturing | 6.4% | 3.6% | 2.7% | 2.3% | -2.9 | -0.4 | -4.1 |
| Transport & storage | 6.2% | 5.5% | 5.2% | 4.8% | -0.7 | -0.3 | -1.4 |
| Education | 5.8% | 6.5% | 7.6% | 7.0% | 0.7 | -0.6 | 1.2 |
| Information & comms. | 7.9% | 7.6% | 7.3% | 8.1% | -0.3 | 0.8 | 0.2 |
| Non-Manufacturing Prod. | 0.7% | 0.6% | 0.6% | 0.5% | 0.0 | 0.0 | -0.1 |
| Finance & Insurance | 8.3% | 7.6% | 7.4% | 6.8% | -0.8 | -0.7 | -1.6 |
| Real estate | 1.6% | 1.8% | 2.3% | 2.2% | 0.3 | -0.1 | 0.6 |

Source: ONS Region by industry labour productivity. Note: highlighted cells are in the top (green) and bottom (red) quarter of industries for change in the proportion of jobs over the time periods selected.

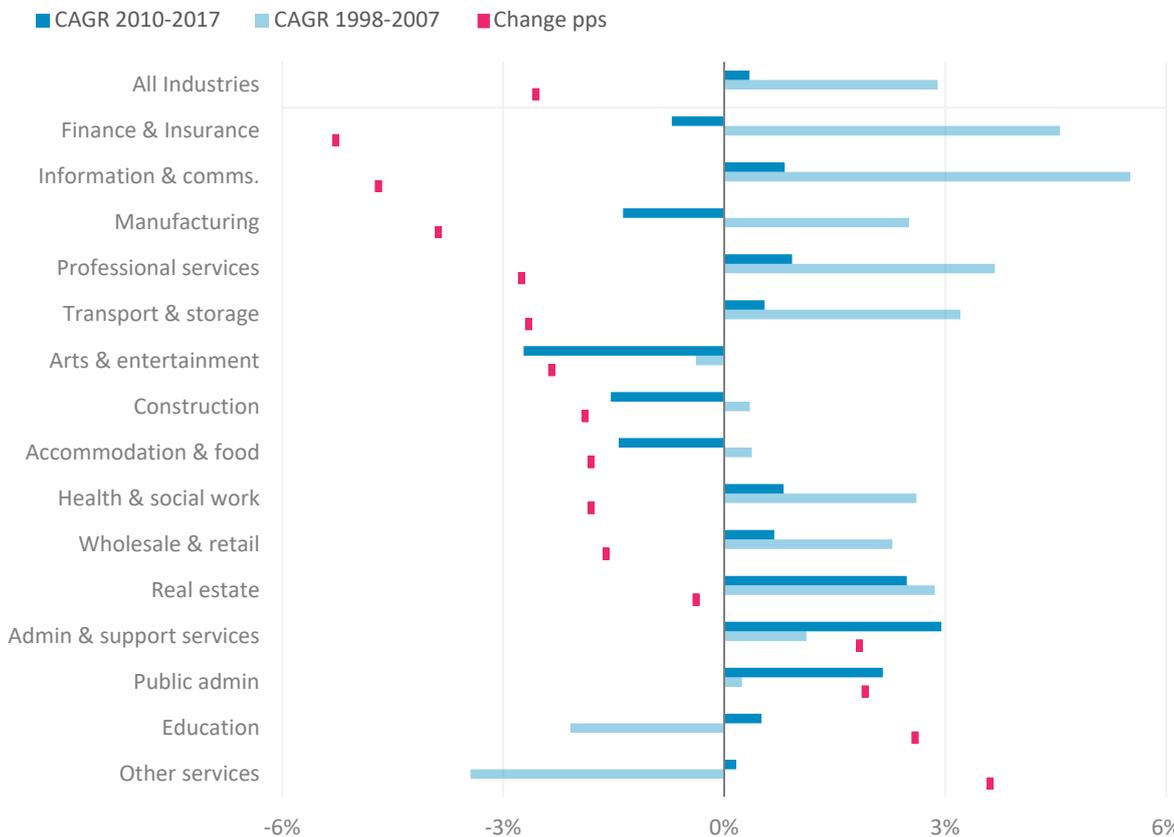
It therefore seems unlikely that sectoral shifts could fully explain the *recent* slowdown in productivity growth observed in the capital.⁶¹ Indeed, holding the proportion of hours worked constant across sectors from 2010 onwards would make only a small difference to London’s overall productivity performance during this time – accounting for around a seventh of the shortfall with pre-crisis trends by 2017.⁶² This suggests that, consistent with the evidence on the spatial drivers of productivity between regions, the main determinant of the productivity growth slowdown in London relates to wider developments *within* sectors and not changes in industrial composition.⁶³

Most sectors have recorded lower productivity growth post-crisis

The ‘within sector’ component of London’s productivity puzzle can be seen more clearly if we compare the rate of labour productivity growth for our two pre-crisis (1998-2007) and post-crisis (2010-2017) periods by individual industry groups in the capital – as illustrated in Figure 9.

Figure 9: Three-quarters of industry groups have experienced a labour productivity slowdown post-crisis, particularly those with higher rates of growth pre-crisis

Compound annual growth rate in real GVA per hour worked by industry, London, 1998-2007 and 2010-2017. Note: industry groups are ranked by the extent of their productivity slowdown.



Source: ONS Region by industry labour productivity. Note: excludes ‘Non-Manufacturing Production’ for readability – this industry group also saw a very sharp decline in productivity growth rates between 1998-2007 and 2010-2017 (falling by 9.1 pps).

⁶¹ There is some evidence that longer-term performance could be more affected by between industry developments. Source: Martin et al. (2018) [The city dimension of the productivity puzzle: the relative role of structural change and within-sector slowdown](#).

⁶² In other words, if the sectoral composition of hours worked had remained unchanged from 2010 to 2017. So, for example, if the proportion of total hours worked in industry group X was 10% in 2010 we keep that figure constant in the years to 2017. This allows us to isolate the impacts of changes in composition ‘between sectors’ on overall productivity performance.

⁶³ ONS (2019) [Understanding spatial labour productivity in the UK](#)

This shows that, out of 16 industry groups, three-quarters recorded a lower average rate of productivity growth in 2010-2017 than in 1998-2007 – including six sectors where productivity actually shrunk between 2010 and 2017 (‘Non-manufacturing production’ is not included above).⁶⁴

What’s more, it’s those sectors which showed the highest rates of labour productivity growth in the pre-crisis period that subsequently experienced the most pronounced slowdowns in 2010-2017. For instance in ‘Finance & insurance’ (-5.3 percentage points), ‘Information & communication’ (-4.7 pps) and ‘Manufacturing’ (-3.9 pps). This fits with evidence suggesting that the UK’s productivity puzzle has mainly been driven by *more* productive firms not keeping pace with their previous performance.⁶⁵

At the same time, only four out of 16 industry groups in London recorded higher productivity growth in the post-crisis period compared to 1998-2007. As per Figure 9, two of these – ‘Education’ and ‘Other services’ – are sectors that had shrinking productivity (negative growth) on average in the years from 1998-2007; the other two had relatively slow productivity growth in the years pre-crisis.

GVA growth has been matched by increases in hours worked in most sectors

Sector-specific factors will play a part in these productivity trends. It is notable that half of industry groups in London recorded a lower rate of real GVA growth in the post-crisis period compared to 1998-2007⁶⁶, and all but one of these sectors saw a slowdown in measured productivity growth.⁶⁷ The sharp downturn in output growth in ‘Finance & insurance’ is especially marked (see Box 3).

Still, as with our earlier analysis, lower productivity growth at the sector-level is also associated with a relatively high rate of growth in labour inputs post-crisis. As Figure 10 shows, the majority (10) of industry groups in London exhibited a higher rate of growth in hours worked in 2010-2017 than in 1998-2017. Some of those with sharper productivity slowdowns – including ‘Finance & insurance’ – combined this with lower real GVA growth. There were also five sectors where the rate of output growth increased post-crisis, but at a lower rate than hours worked (top-right quadrant). On the other hand, in each of the sectors with a faster rate of productivity growth in 2010-2017, growth in hours worked fell.

⁶⁴ Namely: ‘Arts & entertainment’; ‘Construction’, ‘Accommodation & food’, ‘Manufacturing’; and ‘Finance & insurance’.

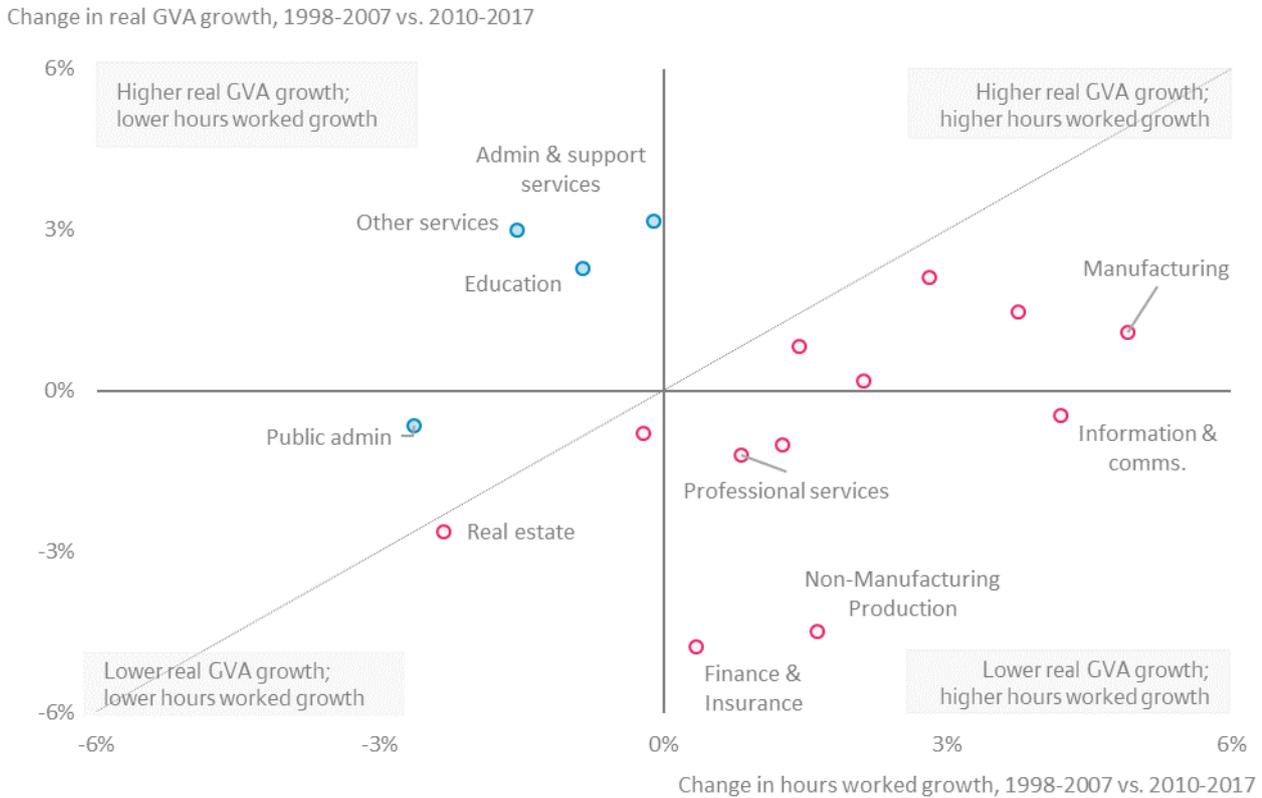
⁶⁵ See, for example: Schneider, P. (2018) [Decomposing differences in productivity distributions](#). Bank of England: Staff Working Paper No. 740. Note, however, 2004 to 2007 may have been a period of unusually strong growth at the top of the productivity distribution. See also: ONS (2019) [Firm-level labour productivity measures from the Annual Business Survey, Great Britain: 2017](#)

⁶⁶ ONS (2018) [Regional gross value added \(balanced\) reference tables](#). NUTS1 and UK chained volume measures in 2016 pounds.

⁶⁷ In ‘Public administration and defence’ annual productivity growth rose by 2.2% per year in 2010-2017 compared with 0.2% per year in 1998-2017. This increase in productivity growth occurred despite lower real GVA growth. The reason being a particularly sharp drop in hours worked which fell by 1.4% per year in the post-crisis period, having increased by 1.3% per year pre-crisis.

Figure 10: Most sectors have seen the rate of growth in labour inputs increase in the post-crisis period, while only half have seen an increase in output growth

Change in CAGR in real GVA and hours worked growth, 1998-2007 vs 2010-2017. Blue circles (o) = higher productivity growth post-crisis; red circles (o) = lower productivity growth post-crisis.



Source: ONS Region by industry labour productivity. Note: the 45-degree line represents equal change in GVA growth and hours worked growth in 2010-2017 compared to 1998-2007. Any points above this line represent an increase in productivity growth post-crisis, while points below represent a slowdown in the rate of productivity growth.

Box 3: Focus on London's 'Finance & insurance' sector

The fall in productivity growth in London's financial sector is particularly striking. It had one of the highest rates of labour productivity growth in the run-up to the crisis: rising by 4.6% per year from 1998-2007. Yet from 2010-2017 labour productivity actually declined by 0.7% per year. This was previously singled-out by the ONS as the largest industry-region contribution to the productivity slowdown across the UK (albeit that analysis used slightly different time periods than we do here).⁶⁸

Behind this productivity slowdown is a marked fall in output growth. From 1998-2017 'Finance & insurance' had the fourth highest rate of real GVA growth in the capital (rising by 5.4% per year); but by 2010-2017 this dropped to 0.7% per year, the third lowest. This downturn has been attributed to a process of deleveraging following unsustainable growth in the years preceding 2007/08 (supported by underpricing of risk). Mismeasurement of financial sector output is another possible factor.

The sharp finance productivity slowdown can, in turn, help to explain the depth of London's productivity puzzle. Based on our estimates 'Finance & insurance' alone accounts for a quarter of the slowdown in the capital's aggregate productivity growth compared to pre-crisis trends. Without its contribution the productivity shortfall identified in Figure 6 would fall from a 24% gap to 18% – still large, but notably lower. This is because, without the financial sector, London's productivity growth would have been both slower in the years leading up to the crisis and faster after 2010.⁶⁹

Table 5: 'Finance & insurance' accounts for a quarter of London's productivity shortfall

Annual average real GVA per hour worked growth in London, 1998-2007 vs. 2010-2017

| | All industries | Finance & insurance (only) | All industries excl. Finance & insurance |
|---------------------------|----------------|----------------------------|--|
| CAGR 1998-2007 | 2.9% | 4.6% | 2.4% |
| CAGR 2010-2017 | 0.3% | -0.7% | 0.7% |
| Gap with pre-crisis trend | -24% | -42% | -18% |

Source: GLA Economics calculations / ONS Region by industry labour productivity

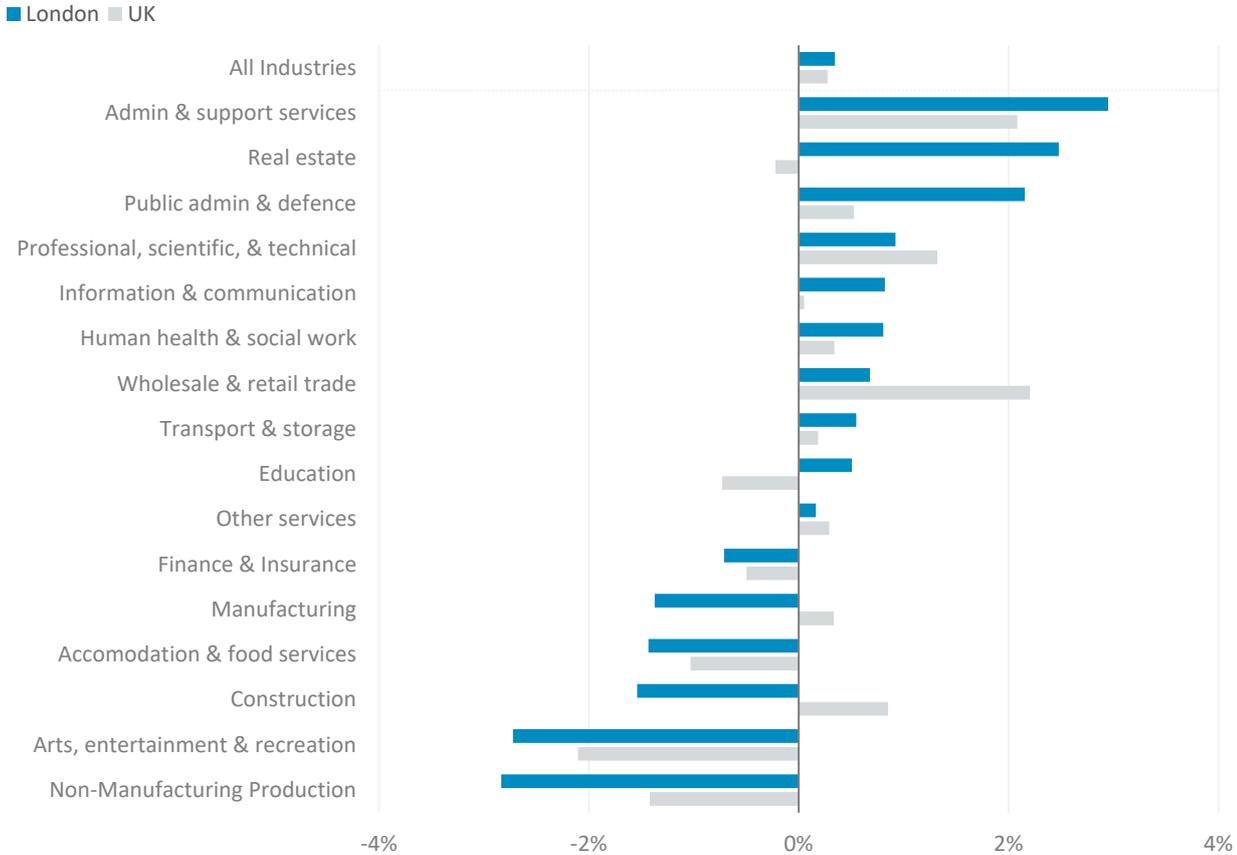
Sector trends at the London-level are also reasonably aligned with national performance (Figure 11). Annual average growth rates in GVA per hour worked were within 1 percentage points of the UK rate for most sectors in 2010-2017. Both geographies had the same number of sectors (6) with negative productivity growth during this time, with some degree of overlap. The most significant divergences were in 'Real estate' – where GVA per hour worked grew relatively strongly in the capital but fell across the UK as a whole – and in 'Manufacturing' and 'Construction' – where the opposite applies (i.e. productivity declined in London since 2010 while increasing slightly across the UK overall).

⁶⁸ ONS (2018) [Industry by region estimates of Labour Productivity: 2016](#)

⁶⁹Note: this only considers direct impacts and there may be indirect 'spillover effects' for other complementary industries.

Figure 11: In most sectors post-crisis productivity growth is in-step with UK trends

Compound annual growth rate in real GVA per hour worked by industry, London and UK, 2010-2017. Note: industry groups are ranked based on highest to lowest growth in London.



Source: ONS Region by industry labour productivity

There is also sub-regional variation within London since 2010

Further to variations at the sector-level, there are also major differences in post-crisis productivity trends at a sub-regional level. Figure 12 shows the total growth in real GVA and hours worked between 2010 and 2017 for 41 UK NUTS2 areas, with those in London highlighted depending on whether productivity has increased (blue) or decreased (red). It shows that:

- In terms of real GVA growth (the vertical axis), the three NUTS2 areas with the fastest growth were all in London.⁷⁰ In London, only ‘Outer London – South’ was in the bottom half of areas for this measure.
- In terms of hours worked growth (the horizontal axis), London also had the leading two NUTS2 areas, with all five areas in the capital featuring among the top ten NUTS2 geographies in the UK for growth in hours worked.

⁷⁰ ‘Inner London – West’, ‘Outer London – West and North West’, and ‘Inner London – East’, with real GVA growth of 33%, 32% and 23% respectively between 2010 and 2017.

Figure 12: There have been significant differences in productivity trends between different parts of the capital

Scatter plot of total growth in real GVA and total growth in hours worked for NUTS2 sub-regions of the UK, 2010 to 2017



Source: ONS (2019) *Regional and sub-regional productivity in the UK*. Note: the 45-degree line represents equal GVA growth and hours worked growth in 2010-2017. For instance, a 5% GVA growth corresponding to a 5% hours growth results in a 0% change in productivity. Any points above this line represent an increase in productivity, while points below represent a decrease.

The result of these trends is that, out of 5 NUTS2 areas in the capital, only two recorded an increase in labour productivity in the post-crisis period. ‘Inner London – West’ and ‘Outer London – West and North West’ both recorded a rise in the level of GVA per hour worked between 2010 and 2017. The remaining three areas – ‘Outer London – South’, ‘Outer London – East & North East’ and Inner London – East’ – all saw productivity levels fall during this time, as hours worked growth exceeded output growth.

Looking more closely at sub-regional trends, the parts of the capital with the lowest rates of productivity growth in the post-crisis period include several identified as lower performing at the end of the previous section. For example, NUTS3 areas in outer London such as Croydon and Barking & Dagenham; Havering were among those with the lowest rates of annual growth in real GVA per hour worked between 2010 and 2017.⁷¹ Whereas Westminster had the fastest rate of productivity growth, followed by Hounslow; Richmond upon Thames (both areas that exhibit higher levels of labour productivity).

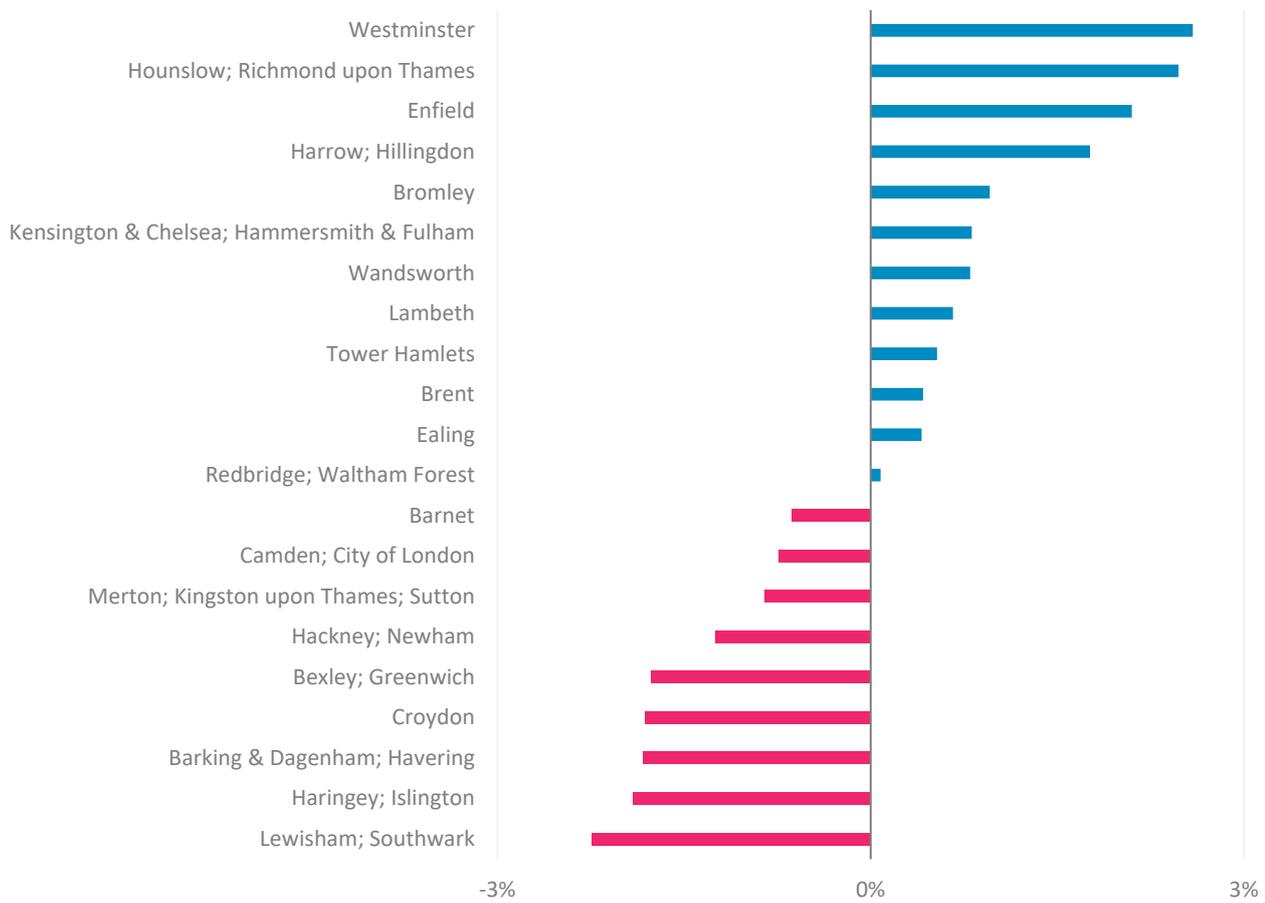
Yet other parts of the capital have not followed this pattern. Figure 13 further illustrates the extent of variation in productivity trends since 2010. It shows that just under half (9 out of 21) of the capital’s NUTS3 areas saw productivity fall between 2010 and 2017. This includes some of London’s higher-productivity areas – most notably Camden; City of London, which may reflect the sharp downturn in the ‘Finance and insurance’ sector. At the same time, estimated productivity growth in Enfield, which had one of the lowest levels of GVA per hour worked in London in 2010, has been relatively strong recently.⁷²

⁷¹ ONS (2019) [Subregional productivity: labour productivity indices by UK NUTS2 and NUTS3 subregions](#)

⁷² Enfield had the lowest GVA per hour worked (smoothed) excluding rental income in 2010. Source: ONS (2019) [Subregional productivity: labour productivity indices by UK NUTS2 and NUTS3 subregions](#)

Figure 13: There is even more variation in productivity trends at a NUTS3 level, with 9 out of 21 areas seeing productivity fall in real terms between 2010 and 2017

Compound annual growth rate in real GVA per hour worked, London NUTS3 areas, 2010-2017



Source: ONS Subregional productivity

6 Explaining London’s productivity puzzle

Explaining the recent slowdown in productivity growth has been a significant challenge for academics and policy-makers alike. Several factors are likely to have influenced London’s stalling productivity performance. Exposure to slower global trade growth and weaker financial sector performance compared to pre-financial crisis years are among them. An explanation to the puzzle must also explain the increase in the growth of labour inputs post-crisis; while there are further concerns that the rate of diffusion of ideas and technologies may have been declining recently.

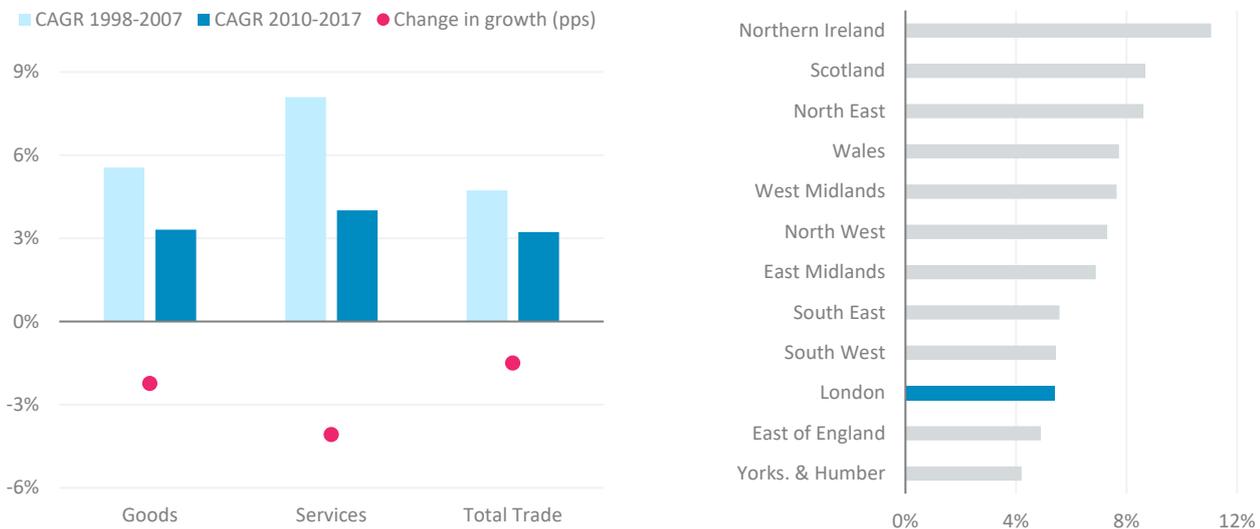
A general slowdown in trade and finance

The openness of the London economy and the size of its financial sector mean that global developments, such as slower world trade growth and financial sector deleveraging, are likely to have had a particular impact in the capital. Indeed, while Section 5 pointed towards a recovery in economic growth in the capital since 2010, London’s annual rate of output growth has moderated in the post-crisis period, down (on average) by 0.6 percentage points per year compared with 1998–2007.⁷³

This is partly linked to a slowdown in world trade. Overall trade has been on a downward trend relative to global GDP since 2011.⁷⁴ Focusing on the UK alone indicates that services exports have been especially affected (Figure 14): from 2010 to 2017 the annual average rate of growth in UK service exports was half that recorded in the pre-crisis period (4.0% a year, down from 8.1%). While data on international trade is more limited at a sub-national level, ONS estimates show that London had a lower rate of growth in service exports than most UK regions in the five years to 2016.⁷⁵ This is largely down to sluggish growth in London’s financial service exports, which only marginally increased in value from 2011 to 2016 (in nominal terms).

Figure 14: UK export growth has slowed in the post-crisis period, including a sharp slowdown in services trade in London

Compound annual growth rate in UK exports (LHS) and London service exports 2010–2017 (RHS)



Source: ONS UK trade time series / Regionalised estimates of Great Britain service exports by NUTS3, NUTS2 and joint authority

⁷³ Real gross values added (GVA) rose by 3.4% per year on average from 2010–2017, down from 4.1% per year from 1998–2007.

⁷⁴ Song Shin, H. (2019) [What is behind the recent slowdown?](#) Presentation at the ‘Public Finance Dialogue’ workshop arranged by German Federal Ministry of Finance and Centre for European Economic Research (ZEW).

⁷⁵ London accounts for 46% of UK service exports in current prices. See: ONS (2019) [Regionalised estimates of UK service exports](#)

A high proportion of the UK exporters is based in the capital and, as observed in Section 4, these firms tend to be more productive than their domestic-facing counterparts. Recent analysis by the European Central Bank further supports this positive link between trade growth and labour productivity over the medium term.⁷⁶ Along these lines it is striking that the industries in London that have seen the biggest fall in productivity growth have been high exporting sectors that are more dependent on global demand (e.g. 'Finance & insurance', 'Information & communication' and 'Manufacturing' – see Figure 9).⁷⁷

The economic outlook is also highly uncertain (see below). As discussed in Section 5 around a quarter of the capital's productivity slowdown can be credited to the boom and bust in the 'Finance & insurance' sector alone – a finding consistent with previous research.⁷⁸ Although that sector's performance should improve as deleveraging runs its course, productivity growth is unlikely to return fully to pre-crisis rates.⁷⁹ The UK's exit from the European Union (EU) could also create new challenges. There is evidence that an increase in trade barriers associated with Brexit would have more adverse economic impacts on areas specialised in business activities and financial intermediation.⁸⁰ Recent OECD research also points to a negative economic impact of regulatory restrictions on services trade, especially for smaller firms.⁸¹

Falling real wages and a ready supply of workers

Yet, as shown in Section 5, productivity growth fell in most industries in London over recent years, suggesting that wider factors operating across sectors must be at play. What is generally noteworthy is that since 2010 London firms have hired labour nearly as fast as economic output has increased. In fact, almost three-quarters of industry groups saw the rate of growth in hours worked increase in the post-crisis period, despite more subdued growth in economic output.

This has been partly attributed to a flexible labour market facilitating a fall in real wages. Pessoa & Van Reenen (2014), for example, point towards an unusually 'dramatic' fall in real wages in the post-crisis period as an explanation for low labour productivity growth (linked to weaker union power and welfare reforms).⁸² The sharp decline in median earnings in London (Figure 7) has also been associated with changes in the composition of the employed labour force, including an increase in migrant workers and non-standard forms of employment.⁸³ The capital's recent pay squeeze has been especially pronounced for those entering employment for the first time (i.e. from unemployment or leaving education).⁸⁴

In this context, it's possible that a combination of low wage growth and high labour supply may have reduced the incentive for firms to invest in measures to improve labour productivity, i.e. if employers have been able to hire labour at a relatively low cost recently. If so, that could reverse as the labour market tightens and wage growth recovers.⁸⁵ When considering this potential explanation it's worth keeping in mind that low productivity is itself cited as a key factor in low wage growth. However, there is growing body of evidence that the relationship could go both ways.⁸⁶ Increases in labour costs could, for example, spur managers into organisational improvements and in turn better productivity.⁸⁷

⁷⁶ European Central Bank (2017) [ECB Economic Bulletin, Issue 7](#)

⁷⁷ Also see: Riley, R., Rincon-Aznar, A., & Samek, L. (2018) [Below the Aggregate: A Sectoral Account of the UK Productivity Puzzle](#)

⁷⁸ McKinsey Global Institute (2018) [Solving the United Kingdom's productivity puzzle in a digital age](#)

⁷⁹ Since those were supported by excessive risk-taking. See: Tenreyro, S. (2018) [The fall in productivity growth: causes and implications](#)

⁸⁰ Dhingra, S., Machin, S., & Overman, H. (2017). [Local economic effects of Brexit](#). National Institute Economic Review.

⁸¹ Rouzet, D, Benz, S. & Spinelli, R. (2017) [Trading firms and trading costs in services: Firm-level analysis](#). OECD Trade Policy Papers.

⁸² Pessoa, J. P. & Van Reenen, J. (2014) [The UK Productivity and Jobs Puzzle: Does the Answer Lie in Wage Flexibility?](#)

⁸³ Note, however, the balance of recent research points towards beneficial impacts of migration (especially high-skilled migration) on UK productivity and the skills of the workforce have improved in recent years.

⁸⁴ Resolution Foundation (2018) [London Stalling: Half a century of living standards in London](#)

⁸⁵ Bank Underground (2018) [Tight labour markets and self-service beer: is the productivity slowdown about to reverse?](#)

⁸⁶ See, for example: Tuckett, A. (2017) [Does productivity drive wages? Evidence from sectoral data](#)

⁸⁷ Riley, R. & Rosazza Bondibene, C. (2015) [Raising the standard: Minimum wages and firm productivity](#)

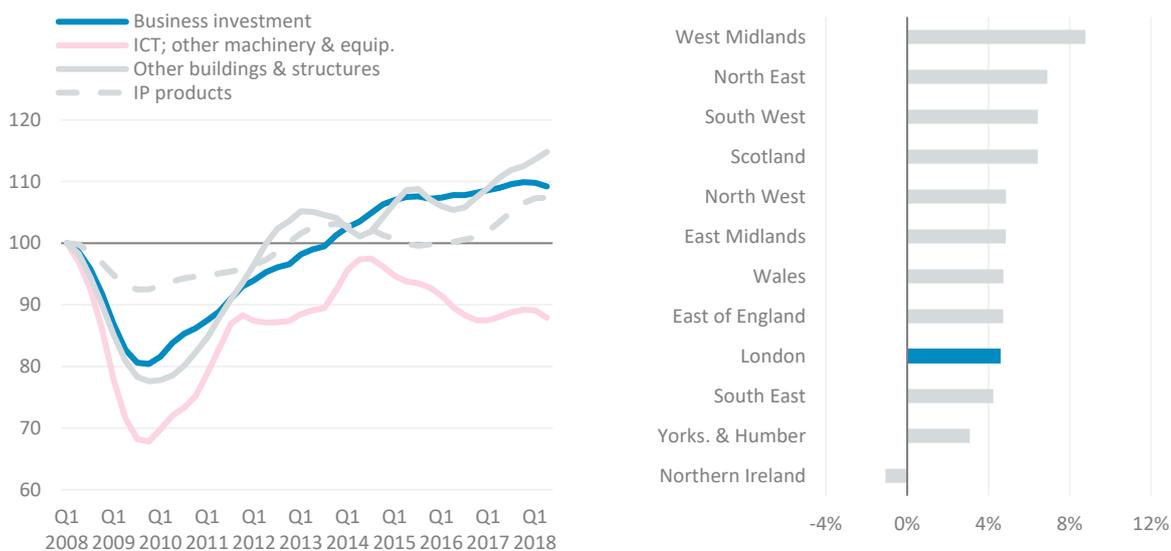
Low business investment and persistent economic uncertainty

The other side of the jobs-rich recovery is that, as firms have expanded through increased hiring, investment has become increasingly subdued due to a combination of lower aggregate demand and persistent economic uncertainty. In other words, according to the McKinsey Global Institute, ‘[l]ow wage growth reinforced hiring ahead of capital investment’.⁸⁸ The resulting weakness in the growth of capital relative to labour – known as ‘capital deepening’ – has been widespread across sectors and has been estimated to account for over half of the overall UK productivity slowdown.⁸⁹

As Figure 15 shows UK business investment fell sharply in 2008/09. While it recovered to pre-crisis levels by 2013, investment has stalled again recently, falling in each of the four quarters of 2018 (the most sustained downturn since 2008).⁹⁰ The volume of investment in ICT equipment and other machinery has remained particularly weak in the post-crisis period. This is despite earlier research identifying a key role for ICT capital in boosting labour productivity growth in the UK, highlighting its positive impacts on innovation and management at the firm-level.⁹¹ There are, along these lines, substantial productivity gains associated with the adoption of new digital technologies.⁹²

Figure 15: Business investment has stalled recently, while investment in ICT equipment has been declining since 2014

Moving averages of UK business investment and selected components (Index 2008=100) (LHS) and compound annual growth rate in Regional Gross Fixed Capital Formation, 2010-2016 (RHS)



Source: Office for National Statistics.⁹³ Note: UK Business Investment is a two-term by four-term moving average (chained volume measure, seasonally adjusted); Regional GFCF are not official UK statistics and should only be regarded as estimates.

⁸⁸ McKinsey Global Institute (2018) [Solving the United Kingdom’s Productivity Puzzle in a Digital Age](#)

⁸⁹ Tenreyro, S. (2018) [The fall in productivity growth: causes and implications](#). Also note: lack of capital investment has become an increasingly important factor since 2012. For a discussion, see also: New Economics Foundation (2019) [Time for Demand](#)

⁹⁰ ONS (2019) [Business investment in the UK: analysis by asset](#)

⁹¹ Bhaumik, S (2011) [Productivity and the Economic Cycle](#). BIS Economics Paper No.12.

⁹² Sorbe, S., et al. (2019) [Digital Dividend: Policies to Harness the Productivity Potential of Digital Technologies](#). OECD.

⁹³ ONS (2019) [Business investment in the UK: analysis by asset](#) / ONS (2017) [Regional Gross Fixed Capital Formation, NUTS1 and NUTS2, 2000 to 2016](#)

Like productivity, aggregate business investment tends to be pro-cyclical, particularly for small and medium-sized enterprises.⁹⁴ In that respect it's not surprising that it fell following the financial crisis. Again, the main puzzle lies in the sluggish recovery and recent flatlining of investment growth.

- Bonciani and Oh (2019) argue that macroeconomic uncertainty can have negative long-run effects on investment in physical capital and R&D (and thus productivity).⁹⁵
- There are signs that Brexit has become a particularly important source of uncertainty in recent years, with firms 'putting new capital investment on hold' until there is 'greater clarity'.⁹⁶ Bloom et al. (2019) recently estimated that the Brexit process has gradually reduced UK investment levels by approximately 11% over the three years since the referendum.⁹⁷
- At the same time, Coyle and Nugen (2019) suggest that the rise of certain digital technologies, such as cloud computing as a general-purpose technology, may not be fully captured in economic statistics but could lead to reduced investment in other hardware and software.⁹⁸

Detailed estimates of business investment are not available below the national level. However, data of regional gross-fixed capital formation suggest that headline trends in London have not been out-of-step with most other parts of the country since 2010 (Figure 14). There is also some evidence that more internationally orientated firms (which are relatively prominent in London) are more exposed to Brexit-related uncertainties. That said, the overall distribution of investment between regions does not appear to be a main explanation for productivity disparities; the specific types of investment also matter.⁹⁹ According to OECD analysis raising the level of capital intensity in knowledge-intensive services sectors – such as 'Information & communication' – would deliver the largest productivity boost in the capital.

Unequal diffusion of technology and working practices

Finally, while the post-crisis productivity slowdown has been more pronounced at the top tail of the distribution – among higher-productivity businesses – there are growing concerns about the continued low rate of productivity growth in many other firms. As Section 4 highlighted levels of labour productivity vary widely across businesses. London as a whole has a relatively large proportion of businesses that exhibit higher levels of productivity, but there is still a substantial proportion where productivity is clustered at lower (or negative) levels.

Evidence shows that these firms have made only a limited contribution to productivity growth, both before and after the financial crisis. Nationally, the level of aggregate labour productivity growth for firms in the bottom 90% of the productivity distribution was still below pre-crisis levels in 2017 (in constant prices), while productivity in the top 10% of firms had increased.¹⁰⁰ Bank of England analysis suggests that this finding is unlikely to be confined to a particular region.¹⁰¹ As Figure 16 shows, far lower productivity growth rates among firms in the bottom 99% of the productivity distribution also seem to be a feature of the London economy, if less pronounced than elsewhere.

⁹⁴ Bhaumik, S (2011) [Productivity and the Economic Cycle](#). BIS Economics Paper No.12

⁹⁵ Bonciani, D. & Jason Oh, J. (2019) [The long-run effects of uncertainty shocks](#). Bank of England Staff Working Paper No. 802

⁹⁶ Bank of England (2018) [Agents' summary of business conditions - 2018 Q4](#)

⁹⁷ Bloom, N., et al. (2019) [The impact of Brexit on UK firms](#). Bank of England Staff Working Paper No. 818

⁹⁸ Coyle, D. & Nguyen, D. (2019) [Cloud Computing, Cross-Border Data Flows and New Challenges for Measurement in Economics](#)

⁹⁹ Kierzenkowski, R., P. Gal & G. Fulop (2017) [Where to get the best bang for the buck in the United Kingdom? Industrial strategy, investment and lagging regions](#). OECD Economics Department Working Papers, No. 1426.

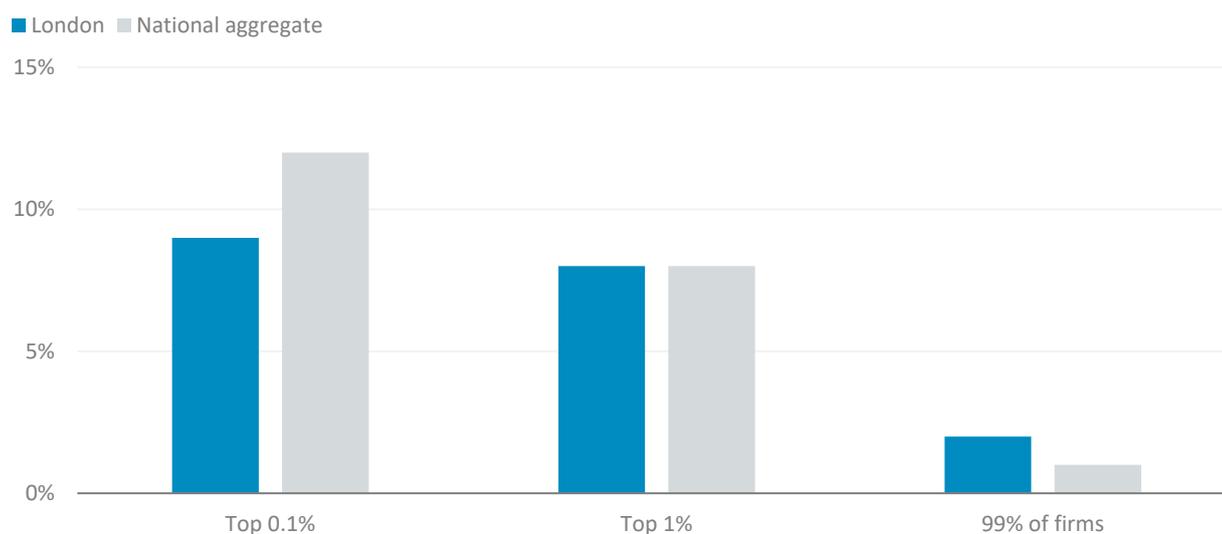
¹⁰⁰ ONS (2019) [Firm-level labour productivity measures from the Annual Business Survey, Great Britain: 2017](#)

¹⁰¹ Haldane, A. (2018) [The UK's Productivity Problem: Hub No Spokes](#)

Several factors have been linked to this variation in business-level productivity growth. There are, for example, growing concerns about rising market power in digital intensive industries and subdued rates of labour market churn in the UK.¹⁰² A related possibility is that technology diffusion has slowed, with the UK overall now ranking 38th on one global measure of knowledge diffusion, down from 18th in 2013.¹⁰³ Consistent with this line of argument, recent OECD research cites the ‘uneven’ uptake of digital technologies as an important barrier to broad-based productivity growth, pointing towards a range of measures to stimulate efficient digital adoption and diffusion.¹⁰⁴

Figure 16: There is wide variation in labour productivity growth between businesses

Annualised growth in aggregate firm productivity between 2004 and 2014 (by productivity distribution)



Source: ONS Research Database and Bank of England calculations. Note: data refers to the non-financial business sector. Calculations over the ten-year period are only possible for firms that exist for entire period and sampled throughout; these are likely to be larger firms.

Access to ICT-related skills is highlighted as a key factor to enable the diffusion of digital technologies and maximise their productivity impact. There is also a strong link between management practice scores and labour productivity.¹⁰⁵ According to one ONS study a firm that improves its management score from the 25th percentile to the median could see productivity rise by almost a fifth.¹⁰⁶ Yet only 9% of London organisations were regarded as high performance employers in the 2017 Employers Skills Survey, suggesting that there is scope to support greater take-up of these practices.¹⁰⁷

The outlook for productivity growth remains unclear

Given the complex mix of factors weighing on London’s productivity performance, the outlook for future productivity growth remains highly uncertainty. Some of the issues which have been mentioned here are likely to ease in the short to medium term. Particularly as deleveraging in the financial sector runs its course, or as workers become more confident in a tightening labour market. Yet other influences, such as the UK’s expected departure from the EU and the ongoing emergence of digital technologies, are likely to affect

¹⁰² For a useful discussion, see: Haldane, A. (2018) [The UK’s Productivity Problem: Hub No Spokes](#)

¹⁰³ Cornell University, INSEAD and WIPO (2017) [The Global Innovation Index 2017](#)

¹⁰⁴ For example, see: Sorbe, S., et al. (2019) [Digital Dividend: Policies to Harness the Productivity Potential of Digital Technologies](#). OECD.

¹⁰⁵ Byson, A. & Forth, J. (2018) [The Impact of Management Practices on SME Performance](#). NIESR Discussion Paper No. 488.

¹⁰⁶ ONS (2018) [Management practices and productivity in British production and services industries - initial results from the Management and Expectations Survey: 2016](#)

¹⁰⁷ Defined as adopting at least 14 of the 21 High Performance Working practices covered in the Employers Skills Survey. Source: Department for Education (2018) [Employer Skills Survey 2017](#)

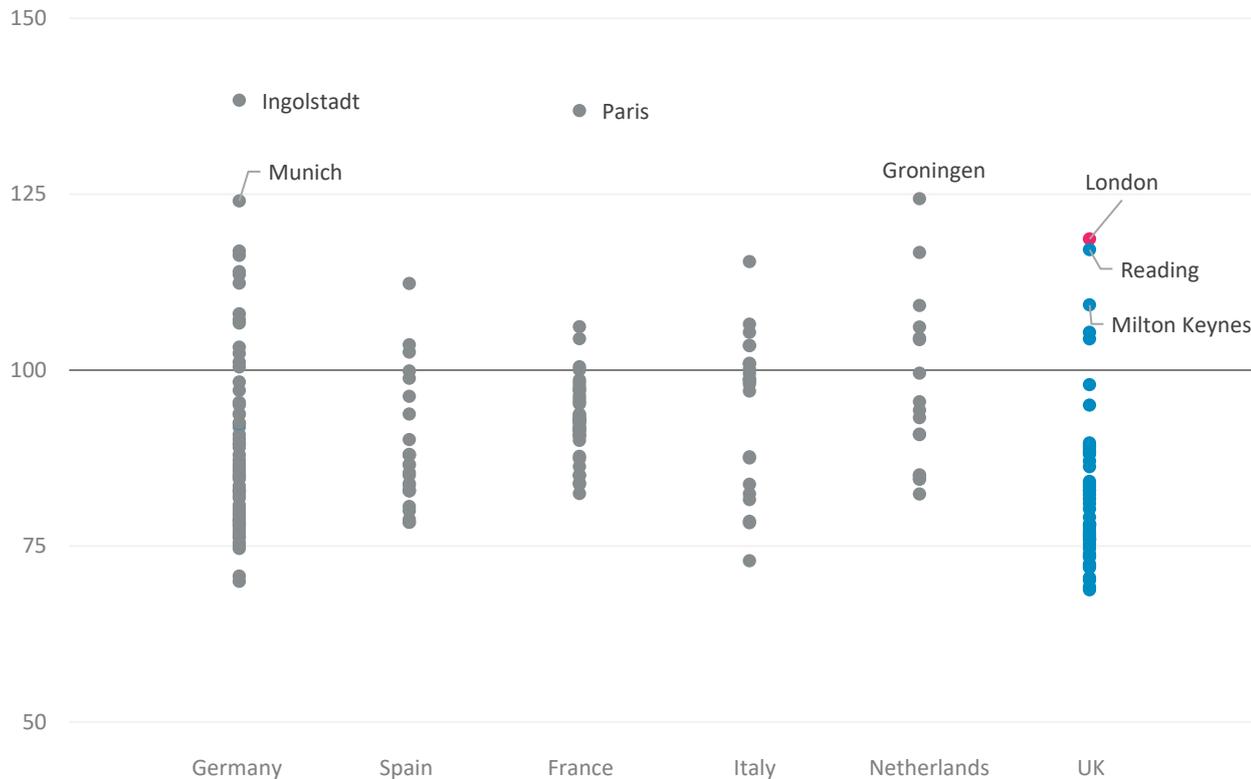
productivity in ways that are harder to foresee. Early signs of rising investment in labour-saving technologies¹⁰⁸, for example, would need to be weighed against the ongoing Brexit-related uncertainties; both the impact on current investment decisions, and the potential negative impacts of lower future sales growth and reduced economic openness in terms of trade or migration.¹⁰⁹

¹⁰⁸ Bank of England (2018) [Tight labour markets and self-service beer: is the productivity slowdown about to reverse?](#)

¹⁰⁹ Bank of England (2017) [Tracking the views of British businesses: evidence from the Decision Maker Panel](#)

Appendix A: Supporting data

A.1: GDP per worker, UK and selected European countries, 2015 (Index, UK = 100)



Source: OECD. Note: GDP divided by employment (place of work) expressed in US\$ constant prices (base year 2010)

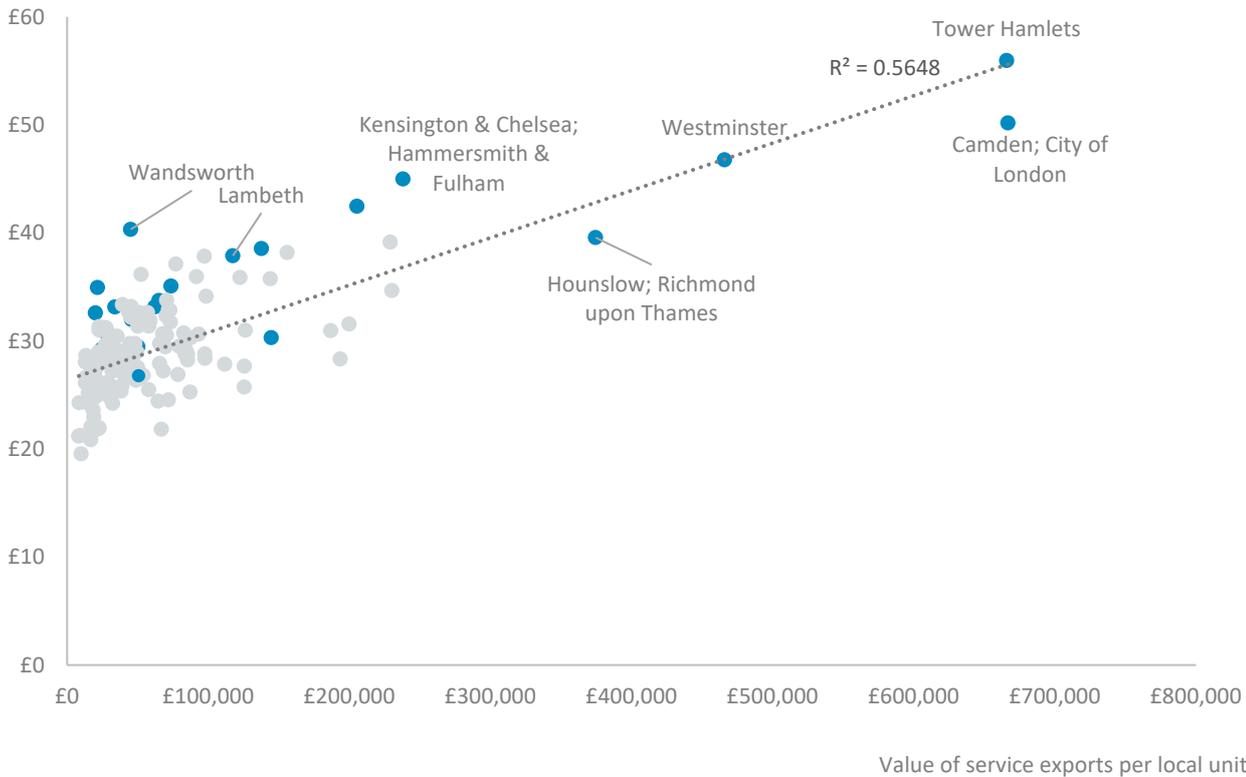
A.2: Industry/size/age composition of local plants in the population and in the top 20% and bottom 20% of the productivity distribution, London, 2015

| | Less Knowledge Intensive Services | Knowledge Intensive Services | Low-Medium Tech Manufacturing | Medium-High Tech Manufacturing | Other |
|---------------------|-----------------------------------|------------------------------|-------------------------------|--------------------------------|---------------------|
| Industry | | | | | |
| All - London | 45% | 38% | 2% | 0% | 15% |
| Top 20% - London | 11% | 73% | 0% | 0% | 15% |
| Bottom 20% - London | 91% | 2% | 2% | 0% | 5% |
| Size | 1 to 9 | 10 to 49 | 50 to 99 | 100 to 249 | 250 and over |
| All - London | 82% | 8% | 1% | 1% | 7% |
| Top 20% - London | 87% | 6% | 1% | 1% | 6% |
| Bottom 20% - London | 65% | 12% | 2% | 3% | 18% |
| Age | Under 1 | 1 to 5 | 11 to 15 | 16 to 20 | 20 and over |
| All - London | 15% | 47% | 11% | 7% | 20% |
| Top 20% - London | 16% | 50% | 11% | 7% | 16% |
| Bottom 20% - London | 11% | 37% | 11% | 8% | 33% |

Source: ONS Annual Business Survey and Inter-Departmental Business Register. Notes: (i) data refers to the non-financial business economy only; (ii) knowledge-intensive services includes knowledge-intensive: high-tech services, market services and other services; medium-high tech manufacturing includes medium-high tech manufacturing and high-tech manufacturing; low-medium tech manufacturing includes low-tech manufacturing and medium-low tech manufacturing; other includes Construction, Real estate and Non-manufacturing production.

A.3: Exports and productivity by UK NUTS3 area

GVA per hour worked (2017)



Source: ONS Subregional productivity / Regionalised estimates of Great Britain service exports by NUTS3. Note: Labour productivity is based on nominal GVA (B) (excluding rental income) per hour worked: smoothed levels (£).

A.4: Household income and productivity by UK NUTS3 area

GVA per hour worked (2017)



Source: ONS Subregional productivity / Regional gross disposable household income. Note: Labour productivity is based on nominal GVA (B) (excluding rental income) per hour worked: smoothed levels (£).

A.5: Residents qualifications and productivity by UK NUTS3 area

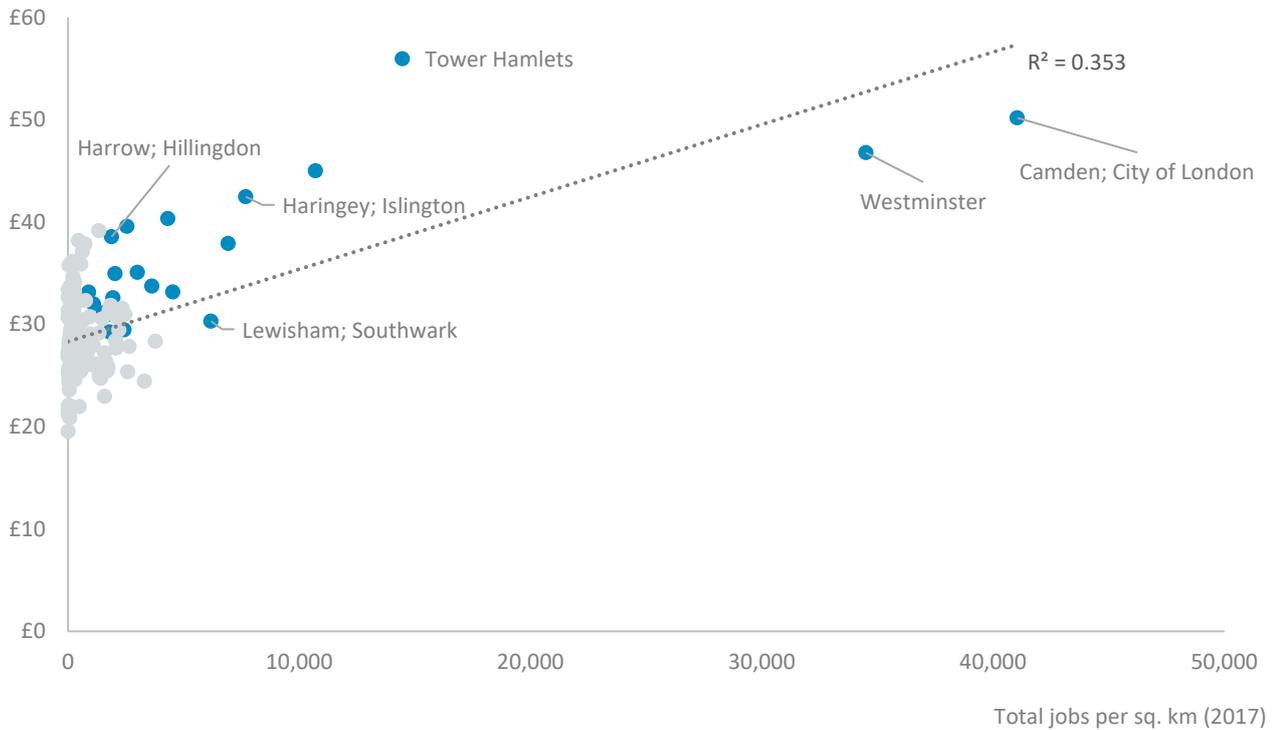
GVA per hour worked (2017)



Source: ONS Subregional productivity / Annual Population Survey. Note: Labour productivity is based on nominal GVA (B) (excluding rental income) per hour worked: smoothed levels (£).

A.6: Jobs density and productivity by UK NUTS3 area

GVA per hour worked (2017)



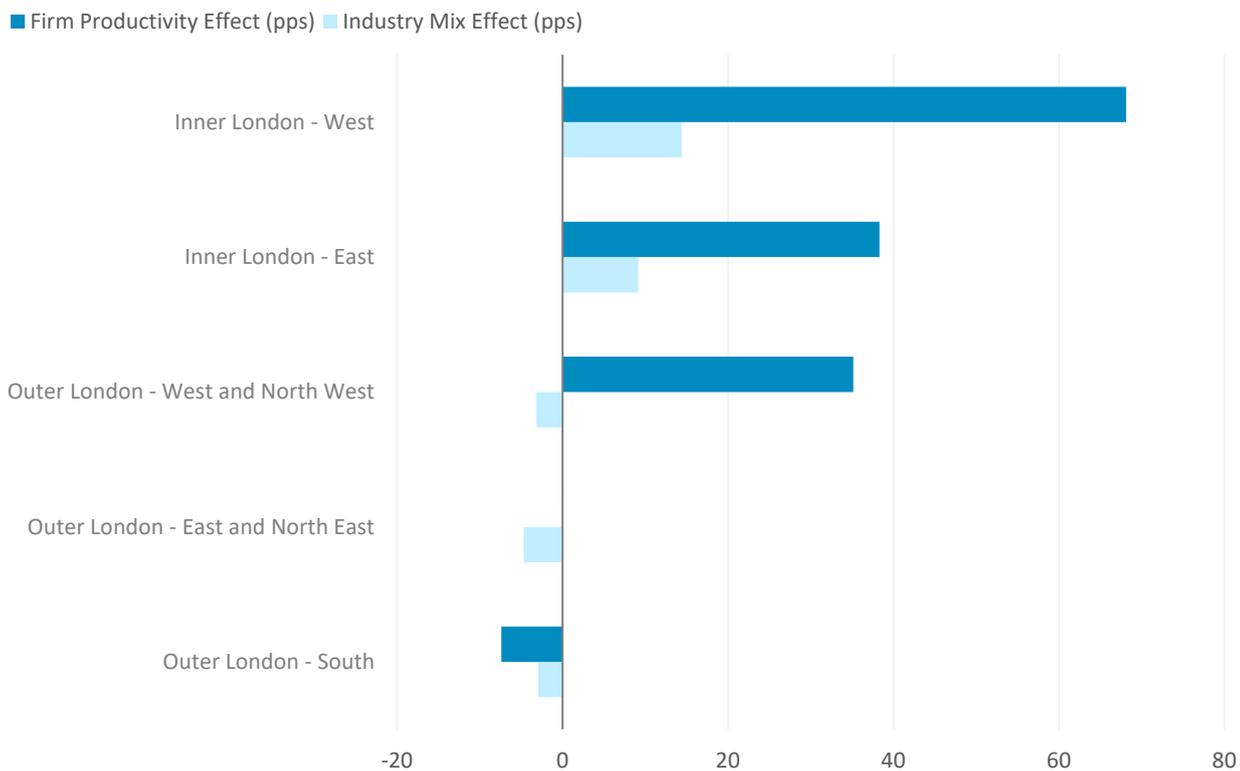
Source: ONS Subregional productivity / GLA Economics analysis of ONS Jobs Density. Note: Labour productivity is based on nominal GVA (B) (excluding rental income) per hour worked: smoothed levels (£).

A.7: Location quotients by broad industry groups, London NUTS2 areas, 2016

| | Knowledge Intensive Services | Less Knowledge Intensive Services & Other KIS | Low-Medium Tech Manuf. | Medium-High Tech Manuf. | Other Production | Real Estate |
|----------------------------------|------------------------------|---|------------------------|-------------------------|------------------|-------------|
| Inner London - West | 2.30 | 0.74 | 0.09 | 0.03 | 0.40 | 0.87 |
| Inner London - East | 1.87 | 0.87 | 0.20 | 0.04 | 0.58 | 0.97 |
| Outer London - West & North West | 1.25 | 0.90 | 0.58 | 0.19 | 0.83 | 1.48 |
| Outer London - East & North East | 0.52 | 0.96 | 0.62 | 0.98 | 1.30 | 1.84 |
| Outer London - South | 0.81 | 1.00 | 0.26 | 0.12 | 0.87 | 1.96 |

Source: Office for National Statistics. Note: A location quotient greater than 1.25 indicates a high level of relative specialisation of subregion (j) in industry (i), and location quotients below 0.75 indicate a low level of specialisation.¹¹⁰

A.8: Firm productivity and industry mix effects on aggregate average productivity, London NUTS2 regions, 2015



Source: ONS Annual Business Survey.¹¹¹ Note: (i) analysis excludes the finance, agriculture and public sector sectors.

¹¹⁰ ONS (2018) [Examining regional gross value added growth in the UK: 1998 to 2016](#)

¹¹¹ ONS (2018) [Regional firm-level productivity analysis for the non-financial business economy, Great Britain: April 2018](#)

Appendix B: Relationship of NUTS areas to London administrative geographies

The Nomenclature of Territorial Units for Statistics (NUTS) is a hierarchical classification of administrative areas, used across the European Union (EU) for statistical purposes. London is one of 12 NUTS 1 areas in the UK. It is broken down into the following categories:

B.1: NUTS areas in London

| | |
|--|---|
| NUTS2 areas within London: | |
| Inner London – West | |
| Inner London – East | |
| Outer London – East and North East | |
| Outer London – South | |
| Outer London – West and North West | |
| These NUTS2 areas are divided into the following NUTS3 areas: | |
| Inner London - East | Haringey and Islington Hackney and Newham Lambeth Lewisham and Southwark Tower Hamlets |
| Inner London - West | Camden and City of London Kensington & Chelsea and Hammersmith & Fulham Wandsworth Westminster |
| Outer London – East and North East | Barking & Dagenham and Havering Bexley and Greenwich Enfield Redbridge and Waltham Forest |
| Outer London - South | Bromley Croydon Merton, Kingston upon Thames and Sutton |
| Outer London - West and North West | Barnet Brent Ealing Harrow and Hillingdon Hounslow and Richmond upon Thames |
| These NUTS 3 areas are divided into the following local authority areas: | |
| Haringey and Islington | Islington Haringey |
| Hackney and Newham | Hackney Newham |
| Lambeth | Lambeth |
| Lewisham and Southwark | Lewisham Southwark |
| Tower Hamlets | Tower Hamlets |
| Camden and City of London | Camden City of London |
| Kensington & Chelsea and Hammersmith & Fulham | Hammersmith and Fulham Kensington and Chelsea |

| | |
|---|--|
| Wandsworth | Wandsworth |
| Westminster | Westminster |
| Barking & Dagenham and Havering | Barking and Dagenham Havering |
| Bexley and Greenwich | Bexley Greenwich |
| Enfield | Enfield |
| Redbridge and Waltham Forest | Redbridge Waltham Forest |
| Bromley | Bromley |
| Croydon | Croydon |
| Merton, Kingston upon Thames and Sutton | Kingston upon Thames Merton Sutton |
| Barnet | Barnet |
| Brent | Brent |
| Ealing | Ealing |
| Harrow and Hillingdon | Harrow Hillingdon |
| Hounslow and Richmond upon Thames | Hounslow Richmond upon Thames |

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