

6: The outlook and risks for London's economy

6.1 Key points

- The number of jobs in London is projected to increase from 5.5 million in 2015 to 6.7 million in 2041, equivalent to just over 45,000 net additional jobs per annum. These projections are consistent with the view that London's economy will perform strongly in future years but they are dependent on a range of underlying assumptions, not least future productivity trends. While productivity as measured by GVA per worker is considerably higher in London (£66,638) than the UK average (£48,703), concerns have been raised about weak productivity growth in London (and the UK) since the recession.
- In terms of the future structure of London's economy, GLA Economics' projections suggest that London will continue to specialise in services. Just over a third of all the projected employment is expected to come from the 'Professional, real estate, scientific and technical activities' sector. 'Information and communication', 'Administrative and support services', and 'Accommodation and food' service activities are also expected to see large increases in employment. This suggests a continuation of London's specialisation in these areas while 'Education and health' activities are also expected to grow as London's population grows.
- There are upside and downside risks to these projections which could mean London follows a different growth trajectory. In the near term, risks to global economic growth which could impact on London include the ongoing Eurozone crisis, a slowdown in the Chinese economy and other emerging markets, or geopolitical events. Similarly, London's economy could be affected by events in the UK, most immediately the impact of the decision to leave the European Union (EU) and in the medium-long term, any significant change in monetary policy, reductions in government spending or significant changes in the nature of the UK's trading relationship with the EU.

- Looking longer term, the agglomeration benefits currently enjoyed by firms in London may be tempered by the diseconomies of agglomeration (or so-called ‘congestion costs’) that are the consequence of a mass of businesses and people competing over scarce resources. If the costs of agglomeration begin to exceed the benefits then future growth and/or wellbeing in London could be undermined. Issues covered in this chapter include:
 - The cost of business accommodation - office occupancy costs in prime central markets are higher than many other competing global cities.
 - The cost of living and its impact on labour supply – there are high vacancy rates in some lower paid sectors such as health and social care.
 - Pressures on the transport network - Londoners spend more time idling in traffic than their European city counterparts; many parts of the tube and rail network suffer from significant crowding at morning peak, and London has limited airport capacity.
 - Pressures on infrastructure - the scale of growth expected in London will mean an estimated 20 per cent increase in overall energy demand by 2050. Moreover, without intervention it is predicted that London will have a deficit in water supply of half a billion litres over this period.

6.2 Introduction

London's dynamic economy attracts businesses and skilled workers on a scale like no other city in the UK. The employment projections in this chapter show that there are good prospects for continued growth in London over the next 20 years. In 2015, there were 5.538 million jobs in London and this is projected to reach 6.748 million by 2041, equivalent to just over 45,000 net additional jobs per annum¹.

However, there are both upside and downside risks to this projection which mean London's economy could follow a different growth trajectory. There are global, or 'exogenous', threats to London's growth such as the Eurozone crisis, climate change, or geo-political events that could disrupt world trade. As one of the UK's most open economies, London is arguably more exposed to any slowdown in the global economy, or diminished trading relationships, than other cities in the UK. These global risks are by their nature difficult for policymakers to predict or control.

There are also more localised, 'endogenous', risks to London's growth, many of which are a consequence of its attractiveness as a place to do business and to live. The agglomeration benefits of being based in London are a key feature of its success. Proximity to other firms and access to deep labour markets help to reduce transaction costs, foster collaboration and competition, and support the development of formal and informal networks. This in turn leads to knowledge spillovers, higher productivity and growth. However, there are also costs associated with agglomeration. A growing concentration of businesses and people raises demand for factor inputs which in turn raises prices in these markets. Moreover, population growth places additional demands on local services and transport which may increase the costs and/or affect the quality of service provision. These costs associated with higher densities are the diseconomies of agglomeration or congestion costs.

Businesses make informed decisions about whether the benefits of operating in London (e.g. higher profits) outweigh the costs (e.g. higher rents). Similarly, workers make decisions about whether the benefits of working in London (e.g. higher wages or better career opportunities) are sufficient to compensate for the costs (e.g. higher cost of living or longer commuter journeys). However, the 'hidden' external costs (e.g. air pollution) or benefits (e.g. positive spillovers from agglomeration) of locating in London may not be part of the decision-making process.

Given London's impressive growth performance it would appear that, on aggregate, the agglomeration benefits continue to outweigh the costs – as London's business base continues to grow (see the evidence on firm migration in Chapter 2²). But for how long can this be sustained? Growth cannot be taken for granted. It is easy to forget that for much of the period after the Second World War through to the 1980s, London's population was in decline – a consequence of de-industrialisation, suburbanisation and population dispersal policies³. If firms find that it becomes more costly to do business due to skills shortages, high rents, transport costs, or barriers to trade, then they may reconsider their location in London and look to alternative cities. For firms operating in international markets this is likely to mean relocating to a global city outside the UK.

From a public policy perspective, the full costs and benefits to society of London's growth need to be considered not just those to private firms and individuals. For example, if workers are forced to make longer and busier commutes, there may be negative impacts on wellbeing or the environment⁴. There are also important equity considerations for policy makers such as the distribution of wealth created by London's growth (see Chapter 10 for more on social inequalities in London).

The degree to which London's competitiveness is eroded by rising costs and/or the quality of life of its citizens deteriorates depends to a large extent on London's capacity to accommodate additional growth. In this respect, the public sector has an important enabling role to play through investment in infrastructure, public services, via the planning system and through other policy interventions. London's success needs to be carefully managed if the capital is to remain internationally competitive, if growth is to be sustained, and if all residents are to benefit from London's growth.

6.3 The outlook for London's economy

GLA Economics prepares medium-term forecasts of output (GVA) and employment for the London economy which are published every six months in 'London's Economic Outlook'⁵. These forecasts are informed by close monitoring of London's economy using a range of indicators, including among others: the claimant count, house prices, stock market performance, the exchange rate, consumer confidence indices, the Purchasing Managers' Index and various business surveys. Following the outcome of the Referendum on Britain's membership of the European Union (EU), there is considerable uncertainty over the forecasts for economic growth in the UK and London. At the time of writing it is too early to tell what that impact of the Brexit vote will be and so the forecasts have not been revised. GLA Economics will continue to closely monitor London's economy, providing a monthly barometer of performance in London's Economy Today⁶, and revise the forecasts if necessary as more official data emerges.

As well as this short- to medium- term perspective, GLA Economics prepares long-run employment projections for London (broken down by sector and London borough) to inform the London Plan, Mayor's Transport Strategy and the Mayor's Economic Development Strategy. The projections are based on historical trends in the share of employment in different sectors extrapolated forwards, the main headlines of which are summarised below. It should be noted that this analysis was undertaken prior to the Referendum result and will be subject to review; a revised set of projections are due to be published in 2017.

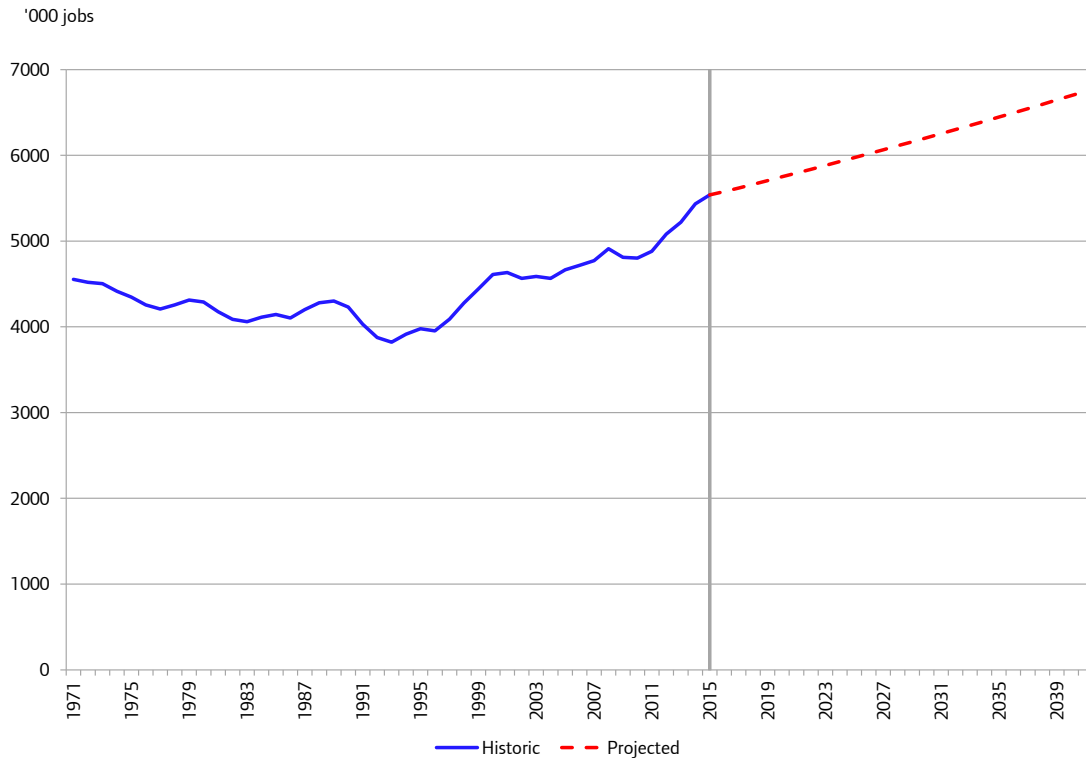
6.3.1 Long-run projections of employment in London to 2041

Chapter 1 examined the change in London's industrial structure over time, showing that London has become increasingly specialised in services. 'Financial and insurance activities' accounted for the largest share of economic output in London in 2014, around 19.0 per cent, and 'Professional, real estate, scientific and technical activities' provided the largest number of jobs. Between 1971 and 2015, the total number of jobs in London increased by almost 1 million. The number of jobs in 'Manufacturing' fell by 85 per cent, whilst jobs in 'Professional, real estate, scientific and technical activities' more than tripled over the same period .

Since the 2008/09 recession, output growth has been sluggish by historical post-recession standards. However, employment growth has been unexpectedly strong. Following a fall in jobs in 2009/10, jobs growth in the capital has strengthened significantly. In 2015, there were around 5.6 million jobs⁷, a 2 per cent increase on 2014, and 12 per cent higher than the pre-recession peak.

Looking ahead, the rate of job creation is expected to slow although employment growth will remain strong over the long term. Projections by GLA Economics indicate that employment will grow by just over 45,000 jobs per year and result in over 1,200,000 more jobs in London by 2041⁸ (Figure 6.1).

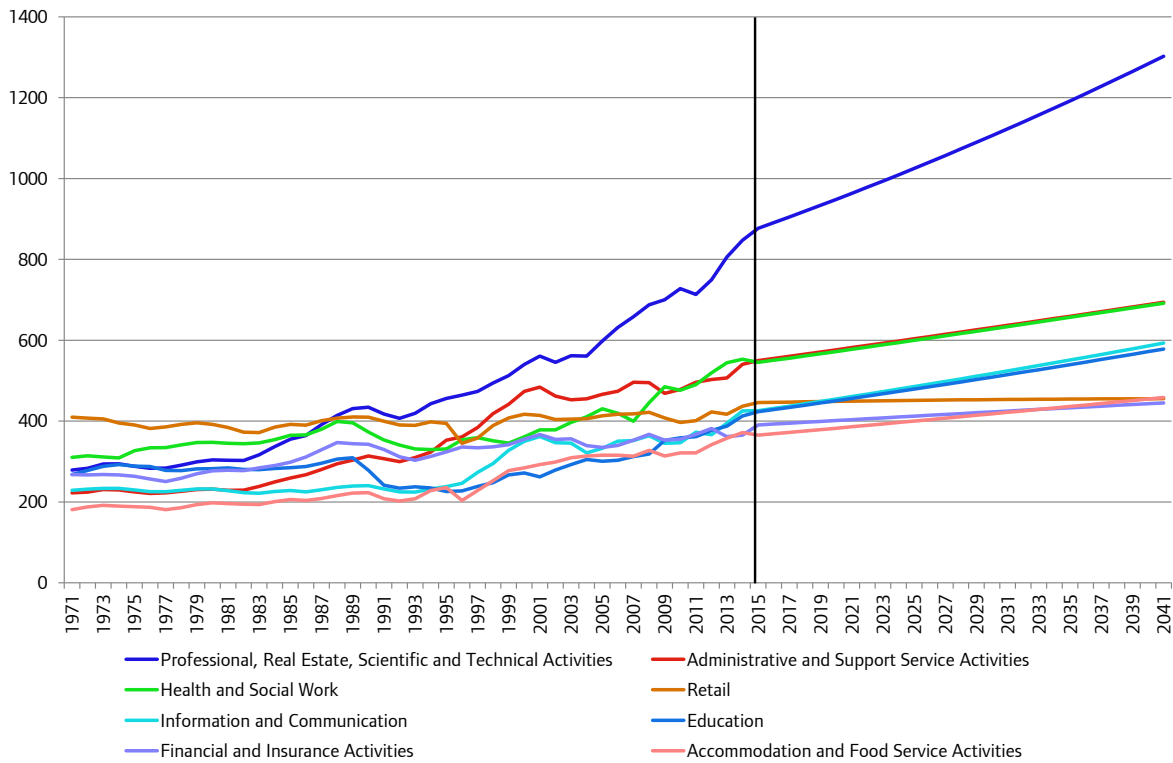
Figure 6.1: GLA Economics long-run employment projection to 2041



Source: GLA Economics

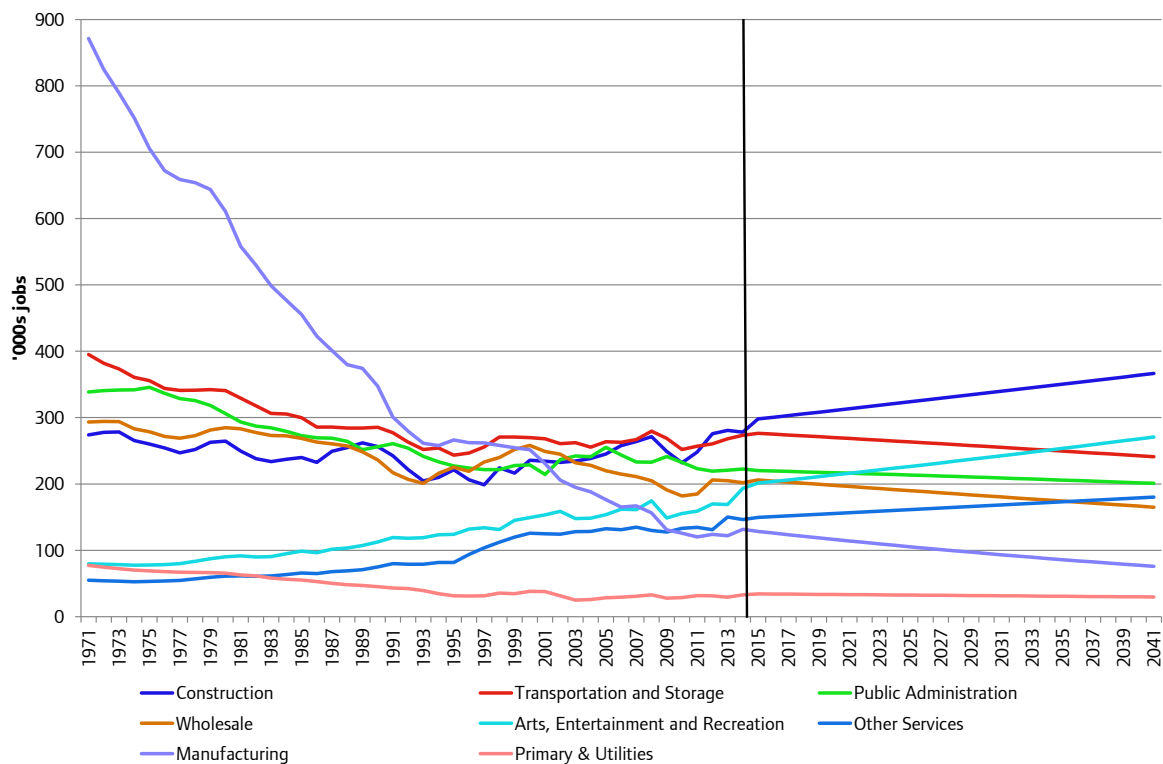
There are large differences in projected employment for different sectors, ranging from 1.5 per cent year-on-year growth in ‘Professional, real estate, scientific and technical activities’ to a 2.0 per cent year-on-year decline in ‘Manufacturing’. Figures 6.2 and 6.3 also show how projected employment numbers differ across sectors. ‘Professional, real estate, scientific and technical activities’ are projected to see an increase of 425,000 jobs by 2041. This accounts for a third of all the employment increase expected in London. ‘Information and communication’, ‘Education’, ‘Health and social work’, and ‘Administrative and support service activities’ are also expected to see large increases in employment.

Figure 6.2 Employment projections for London’s larger sectors



Source: GLA Economics

Figure 6.3: Employment projections for London’s smaller sectors



Source: GLA Economics

Box 6.1: Recent productivity performance in London and the UK

The employment projections discussed above rely on assumptions about the historic and future relationship between output and employment in London's economy, in other words, productivity. Historically, the relationship has been relatively stable but following the 2008 financial crisis there is evidence of a divergence from trend with exceptionally strong employment growth but weak output growth. This poses a dilemma for forecasters in deciding whether to weight in favour of recent years of data or the longer-term trend when projecting forward⁹. Or put another way, whether recent low rates of productivity growth should be deemed a temporary or more permanent phenomenon¹⁰.

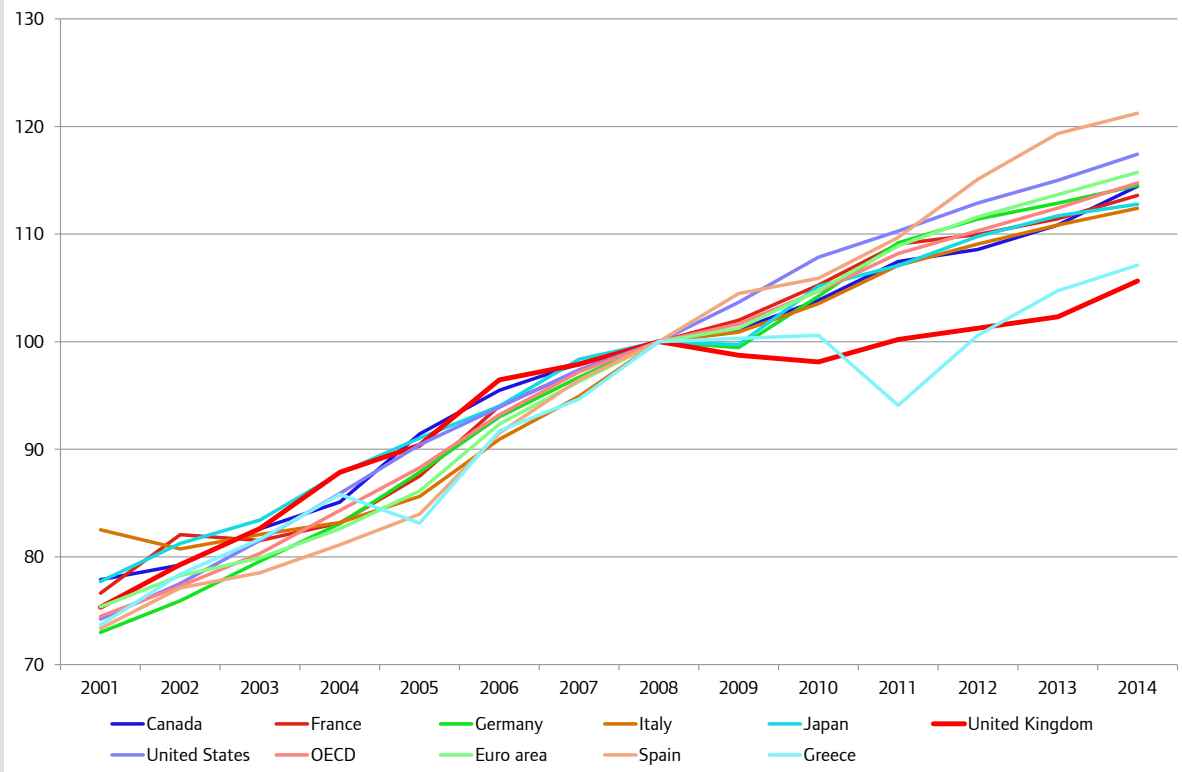
Labour productivity often falls in the initial stages of a recession as declining output may not be accompanied by an immediate fall in employment. However, companies then typically shed labour if activity is expected to remain weak thereby boosting productivity. Weak labour productivity several years post-crisis is therefore unusual and has become known in the UK as the 'productivity puzzle'. A number of different explanations have been put forward to try to explain the UK's productivity puzzle, which can broadly be split into two main (not necessarily mutually exclusive) hypotheses¹¹.

The first hypothesis is that the weakness in productivity is cyclical reflecting lower factor utilisation due to weak demand conditions and is therefore likely to be temporary in nature. One explanation for this is that there was considerable labour hoarding, as firms preferred to hold on to employees rather than make redundancies, aided by more flexible labour markets and falling real wages¹². Another cyclical explanation is that firms may have diverted resources to less tangible 'business development' activities or R&D which would not necessarily have registered in the National Accounts¹³.

The second hypothesis is that more persistent factors are at work affecting the capacity of the economy to supply goods and services. Investment in the physical capital stock was subdued in the aftermath of the crisis, which may have encouraged businesses to switch to more labour-intensive forms of production and reduced the proportion of capital available to each unit of labour¹⁴. Another structural explanation is that resource allocation has been impaired due to a dysfunctional financial system and high levels of uncertainty in the economy¹⁵. This includes the observation that there have been higher firm survival rates than would have been expected perhaps due to banks and HMRC relaxing their conditions leading to fewer liquidations and more loss-marking firms (so-called 'zombies').

The UK experienced especially poor productivity growth relative to other developed economies in the OECD (see Figure 6.4). Between 2000 and 2008, UK GDP per hour worked increased on an average annual basis of around 4.2 per cent, virtually identical to the OECD average of 4.3 per cent. However, between 2008 and 2014 the UK's average annual increase in output per hour worked was 0.9 per cent compared to an OECD average of 2.3 per cent. Thus, although productivity declined in both the UK and the OECD the decline was greater in the UK in the post-recession period.

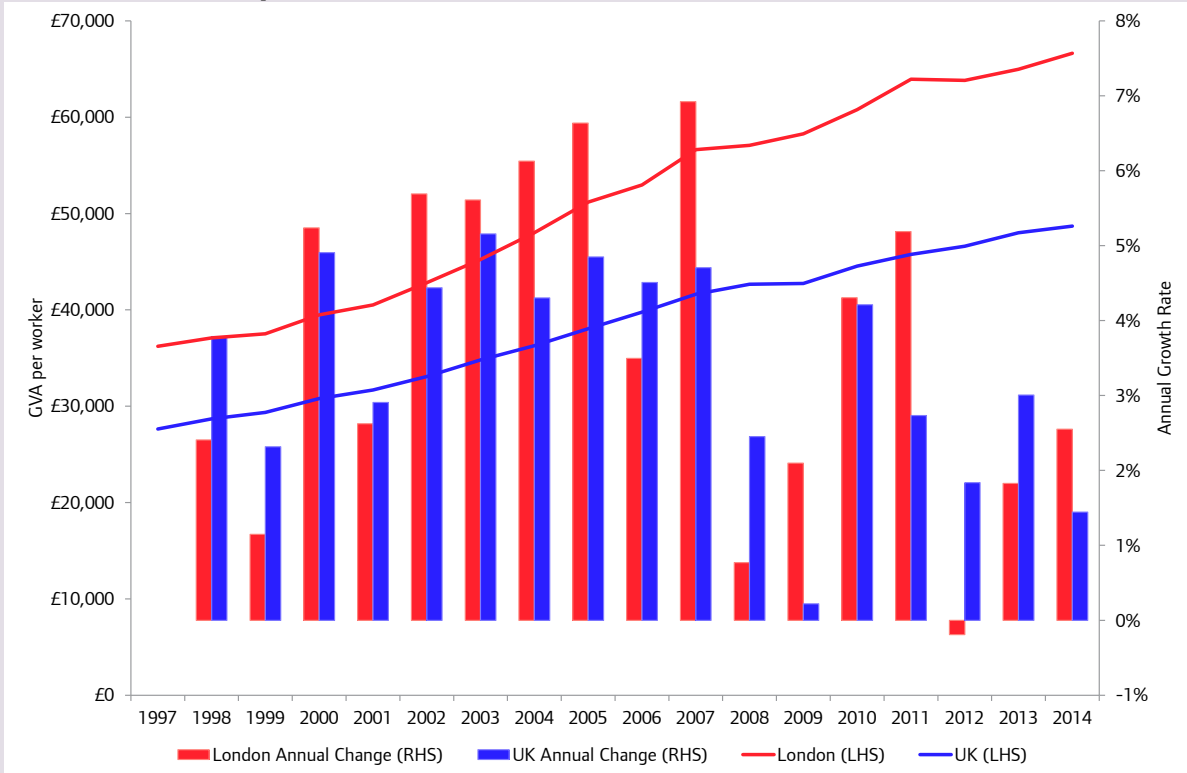
This has exacerbated the longer-term productivity problem facing the UK relative to other developed nations. The ONS has observed that output per hour worked in the UK was 20 percentage points below the average for the rest of the major G7 advanced economies in 2014; the widest productivity gap since comparable estimates began in 1991. On an output per worker basis, UK productivity was also 20 percentage points below the average for the rest of the G7 in 2014¹⁶.

Figure 6.4: GDP per hour worked in selected countries, 2001 to 2014 (index 2008=100)

Source: OECD

Like the rest of the UK, London has suffered from relatively weak productivity growth since the recession. Before the financial crisis, in the period 1997 to 2008 London's GVA per worker (in nominal terms) grew at an average annualised rate of 4.2 per cent compared to a rate of 4.0 per cent for the UK. However, in the years 2008 to 2014, GVA per worker in London grew at an annualised rate of 2.6 per cent compared to a rate of 2.2 per cent for the UK as a whole. It should be noted that differences in inflation between London and the UK mean the discrepancies in economic performance shown by nominal data should be treated with caution.

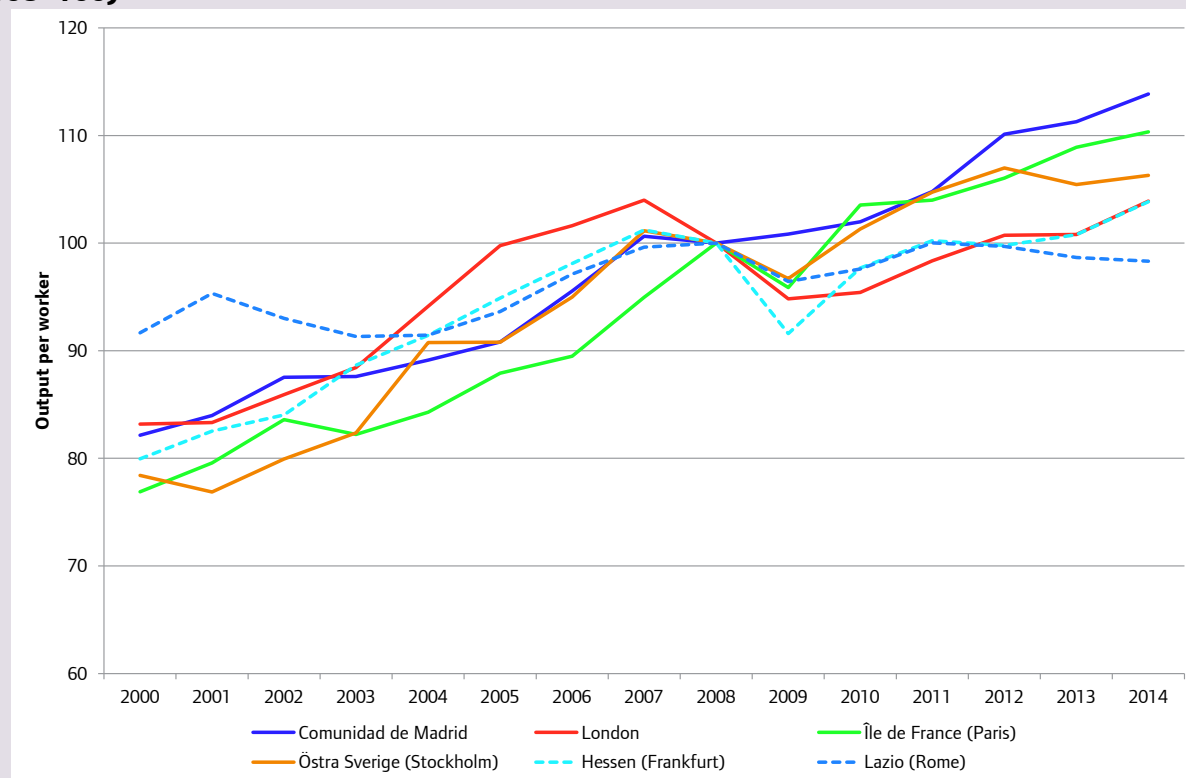
Figure 6.5: Headline GVA per worker and annual percentage change for London and UK 1997-2014¹⁷, current prices



Source: Regional Accounts, ONS, Nomis and GLA Economics calculations

GVA per worker (in nominal terms) in London was £66,638 in 2014 compared to £48,703 for the UK as a whole¹⁸. In the most recent year of data (2014), nominal GVA per worker grew by 2.5 per cent in London compared to 1.4 per cent for the UK¹⁹ (Figure 6.5).

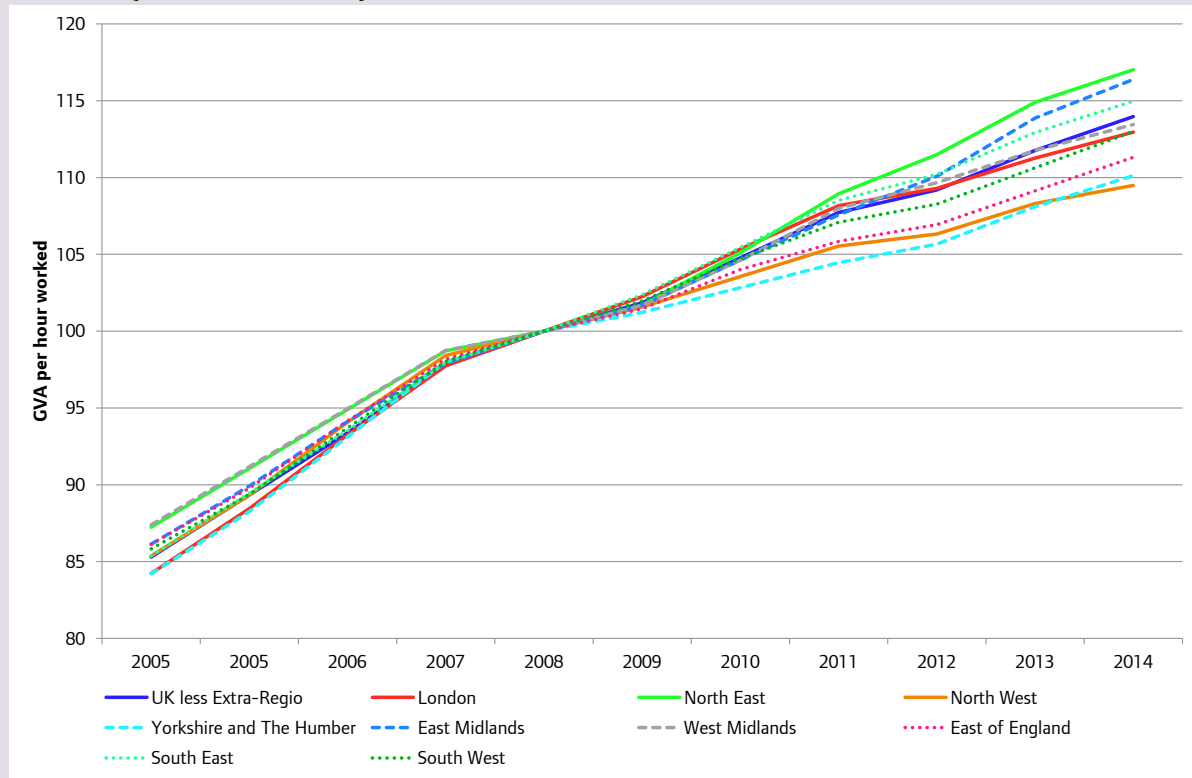
Figure 6.6 shows the change in output per worker in London since 2008 compared to selected European NUTS1 regions. As can be observed, London's output per worker has grown more slowly since the recession compared to other regions such as Paris, Madrid and Stockholm²⁰. However, it should be noted that while growth has been sluggish, the level of output per worker remains considerably higher in London than these European regions²¹.

Figure 6.6: Output per worker in selected NUTS1 European regions, 2000 to 2014 (index 2008=100)

Source: Eurostat and GLA Economics calculations²².

London's growth in (nominal) GVA per hour worked has been slower than a number of other regions of the UK over this period (Figure 6.7). Indexed to 2008, the North East, East Midlands, South East and the West Midlands all saw slightly higher growth in GVA per hour worked compared to London. However, the level of GVA per hour worked in London remains considerably higher than these regions; in 2014 it was £40 per hour compared to £27.50 in the North East, £28 in the East Midlands, £34 in the South East and £27 in the West Midlands. A large part of the fall in the UK's aggregate productivity was in the business services sector²³ and given the concentration of firms in this sector in the capital (see Chapter 1) it may explain why London has performed poorly on this measure.

Figure 6.7: Nominal (smoothed) GVA per hour worked in London, the UK and its regions 2004-2014 (index 2008=100)



Source: ONS²⁴ and GLA Economics calculations

Differences in performance by sector, both in terms of jobs and productivity growth since the financial crisis, are highlighted in Table 6.1. Sector level productivity estimates based on GLA Economics’ GVA per workforce jobs estimates adjusted for CPI inflation²⁵, suggest that productivity performance across most sectors of the London economy was weak between 2009 and 2012. Five out of 17 sectors of the economy saw productivity growth over the period. In the ‘Other service activities’ sector, productivity increased by around 20 per cent between 2009 and 2012, while in both ‘Construction’ and ‘Public administration and defence’ productivity grew by nine per cent over the same period.

Table 6.1: Changes in sector level performance in London

Industrial sector	Number of London jobs in 2015 (thousands)	London jobs contribution in 2015 (ranked: 1=highest, 17=lowest)	Percentage growth in jobs 1996 to 2015	Percentage growth in jobs 2008 to 2015	Percentage growth in jobs 2010 to 2015	Percentage change in real wages of employees 2009 to 2015	Percentage change in productivity 2009-12
Primary and utilities	34	17	6	6	21	#	-14
Manufacturing	129	15	-51	-18	2	-13	-1
Construction	298	9	45	10	28	-14	9
Wholesale and motor trades	206	12	-6	0	13	#	-7
Retail	446	4	29	6	12	-3	-10
Transportation and storage	276	10	12	-1	10	-4	0
Accommodation and food service activities	365	8	79	11	13	-3	-4
Information and communication	426	5	73	17	23	-12	-3
Financial and insurance activities	390	7	16	6	10	-0	-11
Real estate	122	16	77	31	13	-14	8
Professional, scientific & technical	755	1	91	27	22	-11	-3
Administrative and support service activities	550	2	52	11	15	-4	7
Public administration and defence, compulsory social security	220	11	-2	-6	-5	-8	9
Education	423	6	86	33	18	-9	-5
Human health and social work activities	545	3	54	22	14	-12	-9
Arts, entertainment and recreation	201	13	52	15	30	-6	-16
Other service activities	150	14	60	15	13	-16	20
ALL INDUSTRIES	5,538	n/a	40	13	15	-11	-3

Source: ONS: WFJ, APS, ASHE, CPI. GLA Economics: GVA per workforce job modelling. Cells marked “#” are where published data is not available.

6.4 Risks to London’s Economy

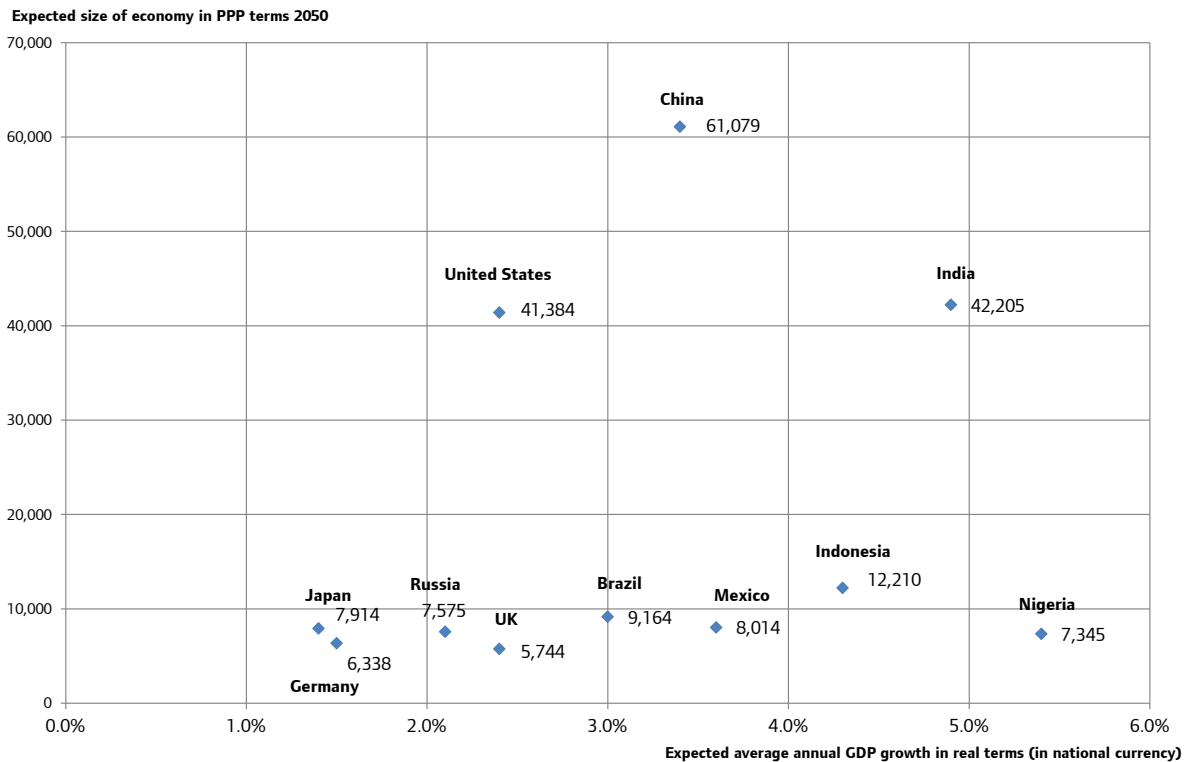
6.4.1 Exogenous risks

6.4.1.1 Globalisation and global competition

Globalisation has created vast opportunities for London’s businesses to trade with the rest of the world evidenced by the significant growth in exports (see Chapter 1). Not only does globalisation create trading opportunities, it exposes London’s businesses to international competition forcing them to be productive and competitive which in turn helps to drive economic growth. As developing countries become wealthier, new trading opportunities will emerge for London’s businesses. For example, opportunities may open up to provide financial services to upwardly mobile populations in emerging markets²⁶. Figure 6.8 shows the expected size of major global economies in 2050 together with expected average annual GDP growth.

China is expected to be the largest economy in 2050 in purchasing power parity terms (having overtaken the US in 2013/14). There could also be opportunities for London’s businesses in emerging economies such as Nigeria, India and Indonesia, which are forecast to experience high rates of annual GDP growth.

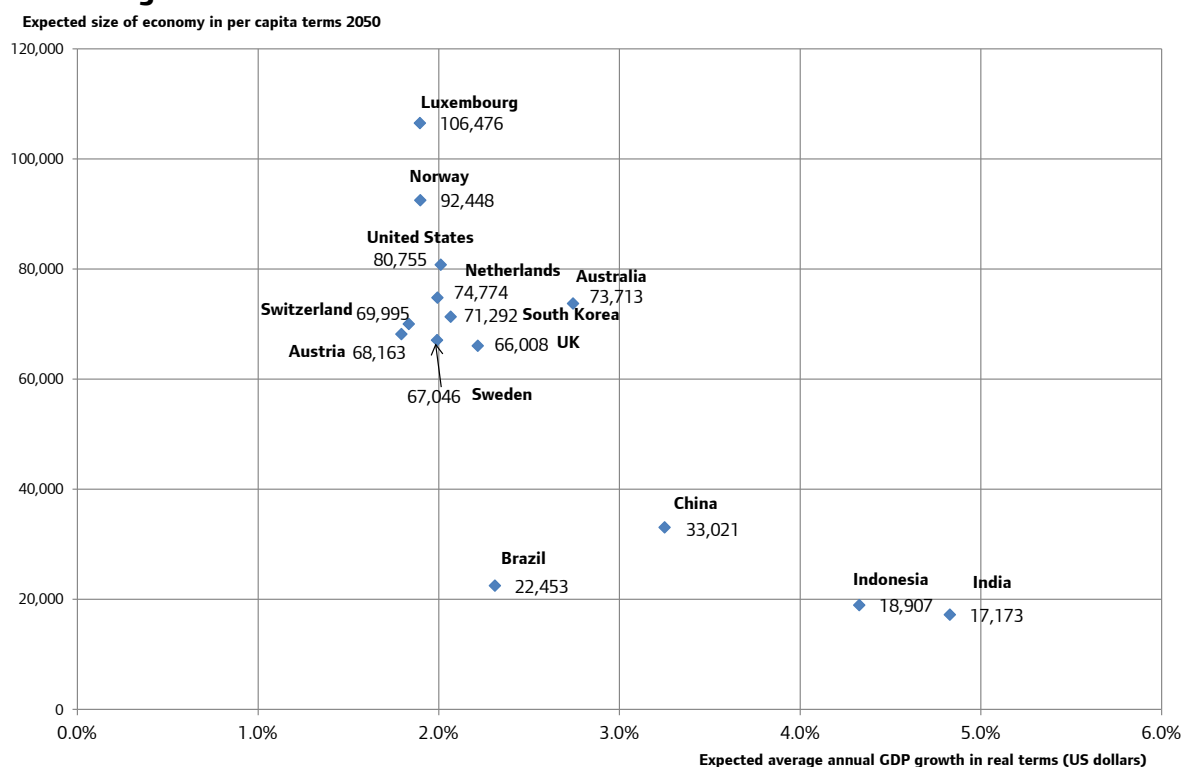
Figure 6.8: Expected size of global economies by 2050 and their expected average annual GDP growth



Source: PWC²⁷

While emerging economies will present new opportunities for London’s businesses, developed economies in Europe, Asia and the USA are expected to remain the capital’s key trading partners. Figure 6.9 shows that in per capita terms, these economies are expected to remain the largest despite the high rates of GDP growth forecast in developing economies.

Figure 6.9: Expected size of global economies by 2050 in per capita terms and average annual GDP growth



Source: OECD²⁸

The downside risk to London's economy is arguably that in markets where London's businesses have enjoyed a comparative advantage, competition will intensify. Firms in emerging economies that have historically competed on cost, specialising in lower skilled activities such as volume manufacturing or low value services, are likely to compete further up the value chain in higher value-added activities²⁹. London and New York are typically identified as the dominant global financial services centres³⁰. However, cities like Singapore, Hong Kong and Tokyo have similar aspirations. At the same time, rapid economic growth in China over the past three decades has led to Shanghai, Shenzhen and Beijing becoming important financial centres. These centres have moved up the rankings and could compete with London in future years. Following the vote to leave the EU and the uncertainty over the terms of the UK's departure, there is also the threat that London is overtaken by Paris, Frankfurt or another city as the major financial services hub within Europe.

City governments across the globe are aggressively targeting and incentivising businesses to relocate to their area. According to research by Deloitte³¹, the Hong Kong and Singapore governments spend significantly more than London does on activities to attract Foreign Direct Investment and on the promotion of tourism. Nevertheless, London is a very attractive proposition for international investors and major flows of foreign capital have helped to fund new investment in London's infrastructure as well as new housing and commercial property. In general, while this investment is to be welcomed it can be more speculative and volatile in nature and any significant withdrawal would represent a downside risk to London's economy.

6.4.1.2 The pace of global growth

There is a debate among economists about why growth in advanced economies has continued to stagnate since the financial crisis in 2008. While in the UK, growth rates have improved in recent periods, it is in a policy environment which is far from 'normal' with interest rates at historic lows, quantitative easing (injecting money into the economy) by the Bank of England still in operation, and an expansionary fiscal policy in place³². Similar policies are in place across the EU, the USA and in other advanced economies. The World Bank forecasts global growth to remain sluggish at 2.4 per cent

in 2016 rising to 2.8 per cent in 2017 and 3.0 per cent in 2018 identifying a wider range of risks which threaten to derail the recovery³³. Similarly, the IMF forecasts a relatively slow pickup in global activity, with global growth of 3.4 per cent in 2016 and 3.6 per cent in 2017³⁴.

Economists have debated whether current low growth rates (principally in developed economies) are a temporary phenomenon or reflective of a more fundamental shift towards lower long-run rates of economic growth. There are three broad pillars to this debate:³⁵

- *Diminished long-run growth potential* – this is the argument that the long-run growth potential of the economy has fallen due to a slowdown in the rate of technological progress and innovation relative to previous eras³⁶. Other supply side explanations such as the ageing population and fewer gains from education are also put forward to suggest that the gap between actual GDP and potential GDP is in fact narrow and reflects a downward shift in the long-run growth potential of the economy.
- *Persistent GDP gaps* – this is the view that the economy is operating below its long-run potential growth rate due to demand deficiencies, even with interest rates at close to zero (or negative in real terms)³⁷.
- *One off supply side damage* – the third pillar emphasises one off changes in the *level* of GDP growth and the damage they cause to the economy, for example, by workers becoming unemployed and human capital depreciating off the job³⁸. This argument is more relevant to the US economy than the UK where unemployment rates have remained low.

This debate is important because whether or not global growth (and particularly growth in the US) returns to pre-crisis levels will be an important determinant of London's long-run growth trajectory (see also the discussion on the UK's productivity puzzle in Box 6.1).

6.4.1.3 Britain's membership of the European Union

On 23rd June 2016, the British people voted to leave the EU by a margin of 51.9 per cent to 48.1 per cent. The outcome of the referendum has already had, and will continue to have, political and economic implications for the United Kingdom and for London. The nature and scale of the impact is unknown and will depend to a large extent on the trade deals that are negotiated with the EU and other non-EU countries. Key aspects of the negotiations with the EU will be around the extent to which the UK is able to access the European Single Market and its four 'freedoms' - the free movement of goods, services, capital and people. The decision to leave the EU could impact on London's economy and its development in a number of ways; the following provides a brief overview of some of the key areas of concern.

London is an open economy with strong trade, investment and labour market links to countries in the EU. The immediate aftermath of the Referendum result saw considerable volatility in financial markets; the value of Sterling fell against the dollar and shares in some banks and property firms fell amid uncertainty about future trading and investment conditions. While this short-term volatility demonstrates the market uncertainty generated by the vote, it is the longer-term impact on the real economy (i.e. jobs, consumption, investment and ultimately GDP) that is of greater importance. That said, an extended period of short-term political and economic uncertainty over Britain's relationship with the EU could impact negatively on the long-term outlook if investments are delayed or cancelled with potential longer-term impacts on growth³⁹.

Forecasts of the impact of Brexit on the economy

Prior to the vote, a number of different organisations attempted to assess the likely impact of a vote for Brexit on the UK economy under different scenarios. Whilst it is difficult to generalise, in broad terms, those organisations finding generally negative effects on the UK economy included: HM Treasury⁴⁰; HM Government (Department for Business, Innovation and Skills)⁴¹; the Bank of England⁴²; the OECD⁴³; the International Monetary Fund (IMF)⁴⁴; the London School of Economics Centre for Economic Performance⁴⁵; the Centre for European Reform⁴⁶, the Confederation of British Industry (analysis by PWC)⁴⁷; Oxford Economics⁴⁸; and the National Institute of Economic and Social Research⁴⁹. Organisations which suggested there may be benefits to the UK in certain scenarios included: The Institute of Economic Affairs⁵⁰; Open Europe⁵¹; and Economists for Brexit⁵². Within this literature there is significant debate over the magnitude of the short-term economic impact from the uncertainty created by leaving the EU, and the longer-term impacts that may or may not arise from changes in trade, foreign direct investment and migration patterns.

One of the main factors explaining the difference between those forecasts which present a negative outlook for the UK economy and those which show a positive outlook is the assumption made about the future productivity of the economy. This assumption is often linked to the forecasters' views on the potential for the UK to derive trade deals with other countries which are preferential (either in timing or content) to those that would be negotiated by the EU. That is, the more optimistic forecasts tend to place more weight on the potential positive impact of the UK deriving preferential trade deals with other countries. As all these forecasts make clear, the exact impact will depend on the precise nature of the deals negotiated with the EU and other nations.

Looking at the future trading relationship between the UK and the EU there are a number of potential scenarios which include:

- *Membership of the European Economic Area (EEA)* (like Norway) - leaving the EU and joining the EEA would maintain considerable access to the Single Market but most likely with customs borders reintroduced and the obligation to accept free movement of people, EU regulations and to make financial contributions.
- *A bilateral free trade agreement* (like Switzerland, Turkey or Canada) – this would depend on the agreement but most likely provide less access to the Single Market than the EEA with greater access afforded the more willingness there is to accept EU regulation, free movement of people and to make financial contributions.
- *World Trade Organisation (WTO) rules* – the default option with no free movement or financial contribution, no obligation to apply EU laws although traded goods would still have to meet EU standards. The average tariff rate World Trade Organization (WTO) members apply to imports of countries with which there is no preferential agreement is 9 per cent (although it should be noted there is no obligation to impose this tariff level)⁵³.

Whatever the scenario, the terms of negotiation are unlikely to be straightforward and the eventual relationship with the EU is uncertain. In a joint statement following the referendum the 27 member states said: "Any agreement...will have to be based on a balance of rights and obligations. Access to the Single Market requires acceptance of all four freedoms."⁵⁴ Until the negotiations are complete, which may take several years, the ramifications for firms in different markets will be unknown.

Broadly speaking these three alternative scenarios were considered for the UK's future relationship with the EU in analysis by HM Treasury⁵⁵: i) membership of the European Economic Area (EEA); ii) a negotiated bilateral agreement such as that between the EU and Switzerland, Turkey or Canada; and iii) World Trade Organization (WTO) membership without any specific agreement with the EU. In all three scenarios, the Treasury estimated that productivity and GDP per person would be lower and that the costs would substantially outweigh the benefits of leaving. According to the Treasury analysis the annual loss of GDP per household under the three alternatives after 15 years would range between £2,600 in the case of EEA membership; £4,300 in the case of a negotiated bilateral agreement; and £5,200 in the case of WTO membership. This relates to GDP being lower than a position of remaining in the EU in 15 years time by:

- 3.8 per cent or growing 0.25 per cent per annum slower over the next 15 years in the case of EEA membership.
- 6.2 per cent or growing 0.41 per cent per annum slower over the next 15 years in the case of a negotiated bilateral agreement.
- 7.2 per cent or growing 0.48 per cent per annum slower over the next 15 years in the case of WTO membership⁵⁶.

An assessment of the impact on the London economy of a vote to leave was undertaken in 2014 by Volterra for the Mayor of London⁵⁷. This suggested the outcome of leaving the EU for London might be little different from staying in if the right deal could be struck with the EU. The report considered four different scenarios for London's economy that could arise from a changing relationship with the EU: 1) Business as usual – the UK remains within an unreformed EU; 2) 'A brave new world' – the UK stays in the EU but there are substantial reforms; 3) 'One regime, two systems' – the UK withdraws but does so with goodwill on both sides and pursues a pro-growth reform agenda; and 4) 'Inward looking' – the UK leaves the EU and suffers and the relationship with Europe deteriorates. It found that remaining in the EU but with substantial reforms (scenario 2), or an amicable well-planned departure (scenario 3), generated more favourable economic growth outcomes, both of a similar order of magnitude. Some of the sector-specific risks and opportunities were considered in the Appendix to the report⁵⁸.

In terms of business sentiment, when firms in London were asked in 2014 about the likely impact on their business of leaving the EU (but not the Single Market), 64 per cent of business units expected the impact to be neither negative nor positive. However, of those that did expect an impact, around three quarters thought it would have a negative or very negative impact.⁵⁹

Free movement of goods and services

Free trade is generally considered by most economists to be beneficial for long-run economic growth⁶⁰. Countries find it easier to trade with nations that are close by and any barriers to that trade such as tariffs or quotas are likely to reduce volumes of trade. Openness to trade creates a larger market for firms to access, helps to increase competition and creates incentives for firms to innovate and adopt new technologies - there is good empirical evidence that more trade leads to higher productivity growth⁶¹.

According to ONS data, London's exports (both goods and services) were worth approximately £120 billion⁶² in 2014 (see Chapter 1) and analysis from the London Business Survey suggests London ran a significant trade surplus in the year to mid-2014⁶³. As discussed in Chapter 1, services exports are particularly important to London in terms of their contribution to economic output and to the UK's balance of payments position⁶⁴. London accounts for a far larger share of service exports than any other region, comprising 43 per cent of the UK total service exports (both EU and non-EU)⁶⁵. If Sterling remains low following the Brexit vote, other things being equal, it should make London's goods and services exports (and its tourism offer) cheaper and raise demand but this could be offset to some extent if there is diminished access to markets in the EU.

In relation to the Single Market, academic studies have found its creation has led to a significant increase in the number of foreign firms in the UK and that the competition induced by this has had a significant positive impact on productivity⁶⁶. The European Single Market removes tariffs and quotas between nations in the European Union and creates a customs union which reduces cross-border administrative costs. This is important for firms in London who account for a significant proportion of UK trade (see Chapter 1). Analysis from the London Business Survey (2014)⁶⁷ estimates around 115,000 business units in London exported to the rest of Europe in the 12 months to mid-2014, equivalent to 26 per cent of all London's business units. Around 85,000 (or 19 per cent) of London's business units imported from the rest of Europe.

The European Single Market aims to remove non-tariff barriers within the European Union in various ways, including: common regulatory standards (e.g. safety standards), tackling distortions to competition such as monopolies, and ensuring non-discriminatory access to markets. In other words it attempts to create a 'level playing field' for businesses to operate. Advocates of 'remain' generally considered these to have reduced transaction costs whereas advocates for 'leave' see some of the regulatory aspects as potentially burdensome to business.

Many of the large financial institutions have expressed concerns at the potential loss of the 'passporting' arrangements which enable financial services firms operating in one member state to operate in another without further authorisation⁶⁸. Whilst the future of 'passporting' arrangements is uncertain, one potential alleviating factor is whether the incoming Markets in Financial Instruments Regulation (Mifir) could mean many of the rights accorded to EU 'passporting' organisations under the current regime will be extended to non-EU countries. However, this new regulation does not cover all markets (e.g. insurance) and the UK would need to meet the eligibility criteria⁶⁹. This is just one of the issues facing businesses in London from the decision to leave the EU⁷⁰.

By virtue of being a customs union, the European Union imposes a common tariff on imports from the rest of the world. It could be argued that if leaving the EU led to a reduction in this tariff then it may increase trade with the rest of the world – potentially offsetting, to some extent at least, the negative impacts on trade with the EU.

Foreign direct investment

Various academic studies have found EU membership to have had a positive impact on Foreign Direct Investment (FDI) to the UK⁷¹. London has been one of the main beneficiaries, attracting the most Foreign Direct Investment of any city in Europe. In the five financial years to 2014/15, London was the destination for more than double the number of inward investment projects compared to any other European city⁷². Between 2010/11 and 2014/15, over 35 per cent of all inward investments to London originated from Europe, and over a quarter of FDI projects which originated from London went to the European Union⁷³. The UK and London have historically been attractive to investors because of the stable economic environment, good prospects for returns, and the access provided to wider EU markets.

The impact of Brexit on FDI is unknown and will vary depending on the type of investment and the investor's position. The picture will become clearer with time but most forecasters prior to Brexit assumed a decline in foreign direct investment. For example, a London School of Economics (LSE) Centre for Economic Performance (CEP) study predicted that, controlling for other factors, FDI would be about 22 per cent lower if the UK left the EU⁷⁴. This is consistent with the centre of the range of the HM Treasury estimates⁷⁵.

Labour market mobility

The success of London's economy draws in people from across the world for employment. London has a higher proportion of workers born in EU countries than the rest of the UK. Businesses have sought assurance on the status of current EU staff in London and UK staff in the EU. Moving forward, there is a concern that stricter immigration controls limiting the free movement of labour from the EU, which seem likely given the Referendum outcome, may restrict the supply of labour to the London economy. These issues are discussed later in this chapter.

EU funding for projects and programmes

London benefits from a number of different European funding streams for a variety of projects and programmes. For example, the London Enterprise Panel was allocated €745 million for the delivery of the European Structural and Investment Funds (ESIF) 2014-2020 which includes the European Social Fund (ESF) and the European Regional Development Fund (ERDF). The potential loss of these funds puts projects and programmes at risk unless alternative funding sources can be found. One such source could be the savings from UK contributions to the EU budget. The UK's gross contributions to the EU in 2014 were £19.1 billion but after the rebate and contributions to the public sector, the net contribution was £9.9 billion⁷⁶. When payments to non-public sector bodies (e.g. research payments to universities) are accounted for, the five year average net contribution to the EU from the UK was £7.1 billion⁷⁷.

6.4.1.4 The Eurozone crisis

The sovereign debt problems of a number of countries within the Eurozone, notably Greece, remain a downside risk to the economy. The level of risk has reduced compared to the start of 2015 following a series of bailout agreements with the Greek Government. However, there remain doubts over Greece's ability to pay back its debts in the long term and commentators have expressed concern that fundamental structural problems in Greece and the wider Eurozone still remain. In May 2016, the IMF sought reassurances that there was a "clear, detailed Greek debt restructuring plan" before it could approve a further bailout⁷⁸.

If Greece were to default on its debt obligations, there is a risk that it could be forced to leave the single currency, a situation narrowly avoided in July 2015. While Greece itself is a relatively small economy in the context of the Eurozone, the concern is that the disruption to financial markets could have contagious effects for other larger economies which would be harder to contain⁷⁹. Of note, the IMF has expressed concern about the fragile state of Italian banks and the Italian economy (the third largest in the Eurozone) which it said was "recovering gradually from a deep and protracted recession" that is likely to be "prolonged and subject to risks"⁸⁰. Unemployment in Italy was 11.6 per cent in April 2016 and youth unemployment was 36.9 per cent⁸¹.

The policy options to stimulate the economy are limited as Italy's debt to GDP ratio is the second highest in the Eurozone (after Greece) and interest rates are already close to their lower bound. The IMF expressed particular concern about the quality of assets held by Italian banks and both the Italian government and the European Commission have taken steps to address this issue⁸². Given the size of Italy's economy any bank rescue package, if required, would need to be on a much larger scale than seen so far in the Eurozone. If the Eurozone were to tip into recession for whatever reason then this would have negative implications for the UK and London in terms of trade and possibly also the financial system.

6.4.1.5 Slowdown in China and other emerging markets

For much of 2015 and into 2016, commentators have been predicting a slowdown in emerging markets⁸³. Of particular concern, given the size of its economy, is China. Large falls in the Chinese stock market, declining exports and weaker than expected factory output led Chinese authorities to reduce interest rates and devalue the currency in 2015. The slowdown has had knock-on impacts for the economies of those countries that are dependent on exports to China, such as Australia. If this feeds through to slower growth in the global economy then the UK and London would not be immune. The direct impacts on the UK and London may be more muted but any financial market contagion or withdrawal of Chinese investment from key infrastructure projects could potentially dampen economic growth⁸⁴. Conversely, if the slowdown is less severe than predicted and if growth in other countries remains steady or improves, this may act to improve global growth forecasts, feeding through to the UK and London.

6.4.1.6 Interest rate rises

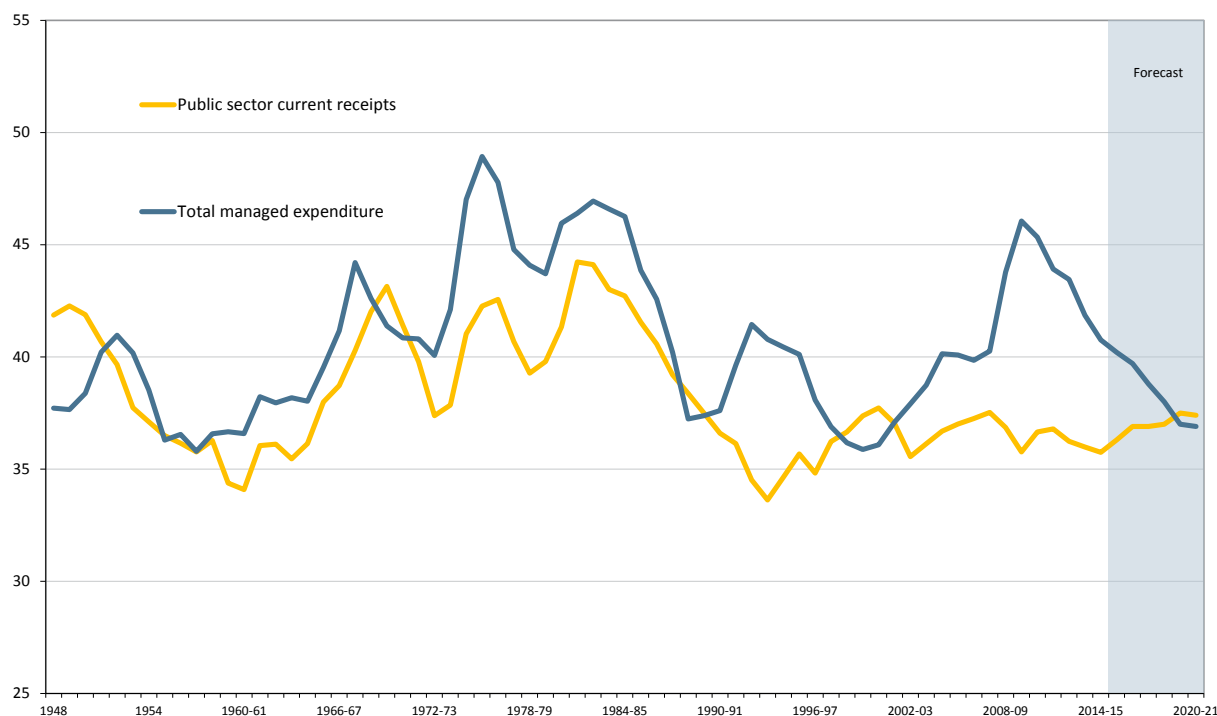
Interest rates in the UK remain at historically low levels; the Bank of England kept the base rate constant at 0.5 per cent from March 2009 to August 2016 and then reduced it to 0.25 per cent in response to the EU referendum result. At some point in the future this extremely accommodative monetary policy in the UK, EU and the USA will end, although based on current sentiment this may not be for some time. In December 2015 the Federal Reserve decided to raise the target range for the federal funds rate to 0.25 to 0.5 percent. Forecasters have continually pushed back their expectations about when the Bank of England will tighten monetary policy principally because inflation has remained low and latterly because of the anticipated economic shock of Brexit.

The risks of restoring monetary policy to more historically 'normal' levels arise from moving either too early or too late. Moving too early could risk undermining economic growth by pushing up the costs of borrowing, particularly as household debt remains high by historic standards. Conversely, normalising monetary policy too late and too gradually could also be a risk if ultra-loose monetary policy leads to a misallocation of resources such as allowing asset bubbles to develop.

6.4.1.7 Fiscal policy

The current government was elected with a mandate to reduce the budget deficit and set a target to eventually run a budget surplus by 2020. Following Britain's decision to leave the EU the target to run a surplus was dropped, however, the mandate to close the deficit in the longer term remains. Whilst the Government continues to run a budget deficit, the net impact on the economy will be expansionary.

Figure 6.10 shows how government spending as a percentage of GDP has fallen since its peak after the recession in 2009/10 of 45.7 per cent to 40.2 per cent in 2014/15 and on the basis of the Office for Budget Responsibility's (OBR) March 2016 'Economic and Fiscal Outlook' was forecast to fall to 36.9 per cent by 2020/21 – close to its lowest level since the Second World War⁸⁵.

Figure 6.10: Total managed expenditure and public receipts as a per cent of GDP over time

Source: OBR

If, in the longer term, the government sought to bring down public spending and run a surplus, it could threaten much needed investment in London's infrastructure and undermine economic performance depending on where the spending cuts fall.

Successive London Mayors have put forward the case for greater fiscal devolution in London. In 2013, the London Finance Commission⁸⁶ argued that London should gain control of the full suite of property taxes (including council tax, business rates, stamp duty land tax and capital gains tax) to help fund necessary infrastructure. Control over these taxes could give London greater borrowing powers and most importantly, greater autonomy over future investment decisions. Fiscal devolution could also potentially enable London to implement reforms to the current system of property taxation to make better use of land across the capital.

6.4.1.8 Geopolitical events and terrorism

Ongoing conflict and political uncertainties in parts of the world may have a negative impact on the global economy, which could feed through to the UK and London. Some of the main concerns at the time of writing include Russia's military intervention in the Ukraine, conflict in Syria and the attempted coup in Turkey. It is difficult to predict how and when these situations will be resolved and whether or not a worsening of them would impact on global economic growth and in turn, growth in the UK and London.

The attacks on Paris in 2015 and Nice in 2016 served as a reminder that major European cities like London are targets for terrorist activity. Terrorism is a risk to the safety and security of citizens and this in turn impacts on city economies. It imposes economic costs including: direct costs to human life, damage to property and disruption in the aftermath of the attacks; and indirect costs from changes in behaviour such as discouraged investors, visitors or workers⁸⁷. There are also budgetary costs to government from increased security and anti-terrorism activities. While the short-medium term costs can be substantial, cities such as New York, Madrid, Paris and London have shown their resilience over the long term and an innate ability to bounce back from such attacks.

6.4.1.9 Cyber crime

The rise of the digital economy brings new risks to individuals, businesses, and national security from cyber crime. According to the Government's FTSE 350 Cyber Governance Health Check Report 2015⁸⁸, 50 per cent of businesses in the FTSE 350 thought cyber crime was in the top group of risks facing their business, up from 30 per cent in the 2014 survey. The Government's Cyber Security Breaches Survey 2016 found that 65 per cent of firms had suffered a cyber security breach or attack in the last year⁸⁹.

Individuals and small and medium-sized enterprises (SMEs) are at particular risk due to a lack of awareness of the severity of the threat. According to research by PWC, 74 per cent of SMEs in the UK reported being attacked by an unauthorised outsider in 2014/15, and 16 per cent had their network attacked, losing both sensitive data and the ability to trade⁹⁰. The number of security breaches continues to rise and the average cost of an attack is between £1.46m – £3.14m for a large company and £75,000 – £311,000 for a small business.

6.4.1.10 Regulation of financial markets

London is a global hub for financial services which are exported around the world but regulation of the sector has tightened significantly since 2008 in response to the financial crisis. Well-planned and effective regulation is needed to enable London's financial sector to grow at a sustainable rate whilst remaining internationally competitive. However, if financial regulation became too onerous or excessive, this could damage the competitiveness of what is a critical sector to London's economy. The City of London Corporation has observed that the concentration of financial services activities in London means that regulation of the sector has a disproportionate impact on London's economy⁹¹.

The Bank Levy was raised to 0.21 per cent in April 2015 and while the Government announced in the Summer Budget 2015 that the Levy would be reduced from 2016 onwards to 0.1 per cent by 2021, they also announced the introduction of a supplementary tax of 8 per cent on banking sector profits from January 2016⁹². Alongside this, the Prudential Regulatory Authority (PRA) is implementing 'ring fencing' to separate the investment and retail sides of banking groups as well as imposing more stringent capital requirements to improve their resilience to shocks.⁹³

6.4.1.11 Climate change

The Stern Review estimated that without intervention, the overall costs and risks of climate change will be equivalent to losing at least 5 per cent of global GDP each year⁹⁴. If a wider range of risks and impacts are taken into account, the estimates of damage could rise to 20 per cent of GDP or more. Every five years the UK Government produces a climate change risk assessment with the next due in 2017. The last assessment identified flood risk and particularly heavy downpours as the key climate threats for the UK, alongside stresses on water resources, threats to biodiversity and natural habitats, and the impact on the UK from extreme weather events abroad⁹⁵. See Chapter 7 for more on the environmental risks in London.

6.4.1.12 The growth in robotics and the automation of work

Rapid advances in technology, including ever more powerful silicon chips, digital sensors and high bandwidth communications are leading to more sophisticated robots and technologies capable of automating more of the tasks currently performed by humans⁹⁶. Economists writing on the subject have emphasised the concept of 'skill-biased technical change', the notion that technological change is biased in favour of skilled workers over unskilled workers and that this can explain rising wage inequality⁹⁷ (see Chapter 9 for more on changes in the structure of London's labour market and Chapter 10 for more on income inequality).

An MIT paper by Autor, Levy and Mundane in 2003⁹⁸ argued that in fact technology was more likely to destroy middling jobs than high-end or low-end ones. Their hypothesis is that low end jobs that are non-routine (i.e. because they require personal interaction, hand eye coordination or more complex reasoning skills) are harder for machines to automate. The implication being that if machines do the routine middling jobs, there will be greater inequality among the jobs that remain. An LSE paper by Goose and Manning finds evidence to support this process of job polarisation in the UK labour market over the period 1975-1999⁹⁹.

Other commentators have suggested that high-end ‘knowledge’ jobs (for example, some surgical procedures) may also be at risk as software becomes ever more advanced¹⁰⁰. Reviewing the evidence, a Bank of England study suggested that across the spectrum of occupations as many as a third of occupations could be at risk of automation with administration, clerical and production tasks considered most under threat¹⁰¹. While these studies indicate that technology will almost certainly change the nature of the labour market in London and have short- to medium- term dynamic effects, there is little evidence to date to suggest technology will lead to lower employment. In the long run, the historical evidence suggests productivity savings from automation have not created mass unemployment but have enabled resources to be re-deployed elsewhere in the economy creating demand and in turn jobs.

6.4.2 Endogenous Risks

The following section considers some of the more localised ‘endogenous’ risks to London’s growth, which are largely a product of London’s success and the increasing demands on its resources. Risk factors considered include:

- **The supply and affordability of workspace** - including the office and industrial sectors and also affordable workspace.
- **Labour supply** - including skills shortages, controls on migration and the cost of living.
- **Infrastructure** - including congestion on the transport network, the capacity of the water, drainage and energy networks and superfast broadband ‘not spots’.

6.4.2.1 *The supply and affordability of workspace*

It is vital that London has a ready supply of sites and premises to accommodate business growth. A pipeline of different types of commercial floorspace, including offices, shops, industrial and warehousing premises (among others), is needed to keep rents at competitive levels. In the London Business Survey, 32 per cent of business units identified the availability of commercial premises as having a negative or very negative impact on their business¹⁰².

Office space

The employment projections discussed above indicate that the service sector will be the main driver of growth in London over the coming years and this will create significant demand for office space. Some of this growth can be accommodated by occupiers making more efficient use of space (see below) but a considerable quantum of new office space will be required. The current London Plan estimates demand for an additional 3.9 million square metres (net) of office floorspace to 2031¹⁰³ but the requirement could be as high as 7.5 million square metres depending on the underlying assumptions used regarding the scale of employment growth and occupation densities¹⁰⁴. Much of the growth is being driven by the professional, scientific and technology sectors.

New office hubs are emerging in London including King’s Cross, South Bank and Stratford and there is some evidence of renewed interest in Croydon¹⁰⁵. Old Oak presents a long-term office development opportunity capitalising on the Crossrail/HS2 interchange. However, according to the most recent London Employment Sites Database (LESD)¹⁰⁶, the longer-term employment projections by GLA Economics now exceed the currently identified employment capacity. In previous iterations of the LESD, capacity has always exceeded the projections. The reverse is thought to be

due to a combination of the employment projections being revised upwards following strong recent employment growth and the supply of employment space in London coming under increasing pressure from higher value residential development.

According to the LESD, there is “no immediate problem that suggests growth will be constrained in the short-medium term through lack of capacity, but this is something that policy makers may need to address for the longer term”¹⁰⁷. New sites are expected to emerge over the London Plan period in response to demand which will address any potential shortfall but equally some of the longer-term sites and aspirations identified in the current LESD capacity assessment may not come forward. The following considers some of the factors impacting on London’s office space requirements and the current position of the office sector relative to world cities.

Office employment densities

The office space requirement may be lower if new office floorspace can be occupied at higher densities and the existing stock is used more efficiently. Occupiers have sought to make cost savings by reducing their office footprint, reconfiguring their offices and implementing flexible working practices such as hot-desking and remote working. The overall trend is for offices to be occupied at higher densities and so floorspace per worker is falling¹⁰⁸. Countering this trend is that modern businesses often require ‘break out’ and communal space which is seen to be beneficial for the exchange of ideas. There is some evidence that the decline in floorspace per worker may be levelling off, which is understandable given the physical limitations of buildings¹⁰⁹.

According to a survey by the British Council of Offices (one of the few sources of data on this matter) the mean floorspace per worker in the UK is 10.9 square metres. The London ratio was found to be slightly higher at 11.3 square metres per worker. However, the sample includes older properties as well as new and for the purposes of predicting future floorspace requirements in London, consultants PBA recommended using the higher density figure of 10.9 square metres per worker in the London Office Policy Review Update. When a benchmark ratio of 1.2 workers per desk is applied, an overall ratio of 9.0 square metres per worker (Net Internal Area) is derived. This converts to a Gross Internal Area (GIA) figure of 11.3 square metres per worker, the figure adopted in the 2014 London Office Floorspace Projections and the 2016 London Employments Sites Database. This is an average density ratio with densities generally lower in older stock and higher in modern stock which is configured for current occupier requirements.

Table 6.2 shows how a range of different employment density assumptions impact on floorspace requirements. If new stock were occupied at 9 square metres per worker with an 8 per cent vacancy rate then this would require 5.6 million square metres. The requirement falls further if it is assumed that both new and existing stock can be occupied more efficiently. The London Office Policy Review (LOPR) Update modelled the effects of existing stock being occupied at a minimum of 15 square metres per worker and found the requirement could fall to 3.4 million square metres. The figures quoted will be revisited as part of the LOPR 2016 to take account of the most recent employment projections and other factors affecting the office sector.

Table 6.2: Office floorspace projections with higher stock efficiency

	12 sq.m per worker new stock	10.8 sq.m per worker new stock	9 sq.m per worker new stock	12 sq.m per worker new stock + 15 sq.m per worker existing stock	9 sq.m per worker new stock + 15 sq.m per worker existing stock
Office floorspace requirement 2011-2036	7.5 million sq.m	6.7 million sq.m	5.6 million sq.m	5.2 million sq.m	3.4 million sq.m

Source: PBA (2014).

Note: Assumes 8% vacancy rate.

Office rents

London has a large and mature office market with the majority of stock focused in the Central Activities Zone (CAZ) and the North Isle of Dogs (NIOD). The West End with its unique character and prestige remains the hub for head offices of financial and business services companies and this is evident in its high rental values.

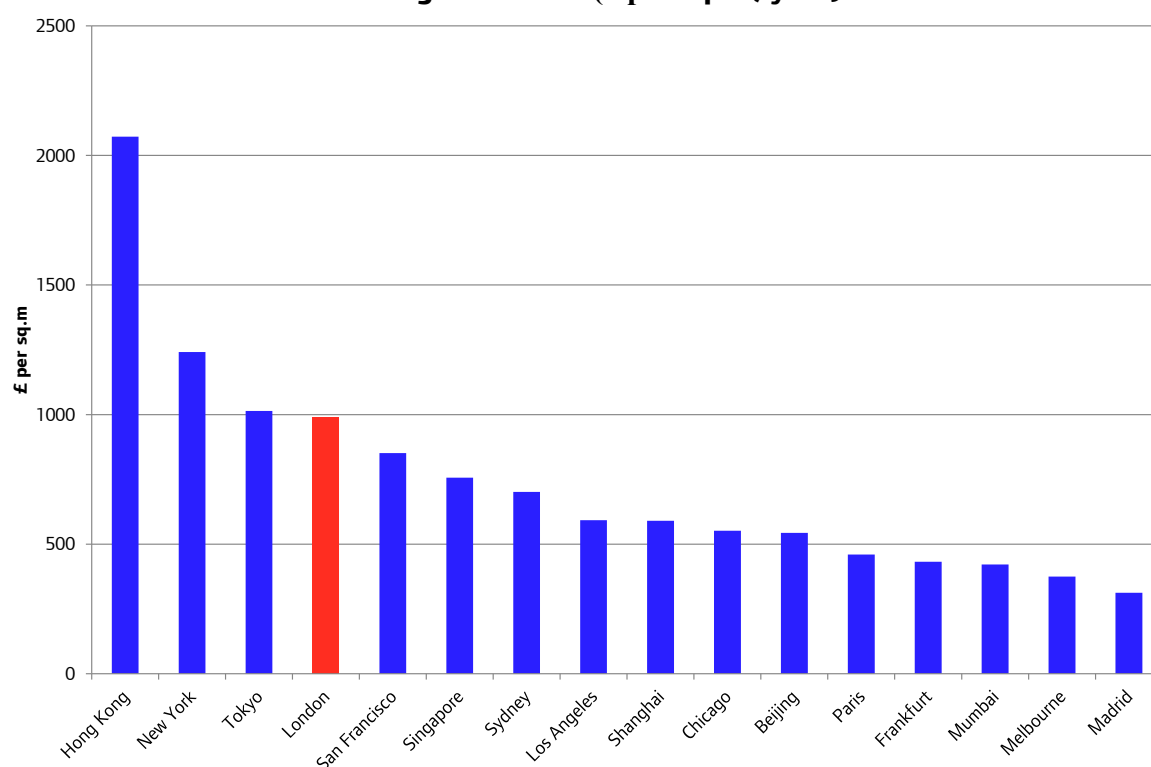
Office rental values are significantly higher in central London than the rest of the UK and in the most popular locations they are among the highest in the world. Chapter 4 shows rents and total occupancy costs (which includes business rates, service charges and other fees in addition to rent) in different office markets in London. Looking at how London compares internationally, Table 6.3 shows that the West End is the most expensive office location in the world in terms of total occupancy costs.

Table 6.3: Top 10 most expensive locations by country, 2015

Rank	Country	City	Location	Occupancy costs £/sq.m/yr
1	United Kingdom	London	West End	2211
2	Hong Kong	Hong Kong	CBD	2185
3	China	Beijing	Finance Street	1549
4	China	Beijing	CBD	1484
5	Hong Kong	Hong Kong	West Kowloon	1314
6	India	New Delhi	Connaught Place	1227
7	Japan	Tokyo	Marunouchi Otemachi	1209
8	United Kingdom	London	Central (City)	1206
9	China	Shanghai	Pudong	1094
10	United States	New York	Midtown Manhattan	1030

Source: CBRE¹¹⁰

Looking at average rents per annum in prime locations across different global cities, Figure 6.11 shows London is the fourth most expensive city to rent office space behind Hong Kong, Tokyo and New York.

Figure 6.11: Prime office rents in global cities (£ per sq.m /year)

Source: Knight Frank, 2016¹¹¹

Office vacancy rates

As the economic recovery has gathered pace, office vacancy rates in London have fallen and are now low by historical standards. Table 6.4 shows data on historic and forecast office vacancy rates for various global cities.

Table 6.4: Office Vacancy Rate, historic and forecast 2006 - 2019 (per cent of total built stock, ranked on 2013)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Shanghai	8.2	5.5	13.5	16.7	12.0	6.6	5.1	4.3	5.9	6.4	5.9	5.6	5.4	5.1
Hong Kong	7.7	8.9	8.4	10.3	8.0	6.5	6.0	4.9	5.2	5.3	5.0	4.8	4.6	4.5
San Francisco	9.3	8.1	11.6	14.8	14.3	9.3	7.4	6.0	5.9	5.8	5.7	5.5	5.5	5.7
Tokyo	2.7	2.0	3.6	7.2	8.0	7.8	8.4	6.8	5.8	5.0	4.2	4.0	4.0	3.9
London	6.5	6.2	8.2	10.2	8.1	7.3	7.2	7.0	6.1	5.4	5.3	4.6	4.6	4.4
Paris	4.9	4.3	4.9	7.3	7.0	6.9	7.0	8.1	8.1	7.0	6.1	6.1	5.9	5.9
New York	5.9	5.0	6.7	8.3	8.6	7.8	7.9	8.9	8.4	8.0	7.8	7.7	7.5	7.4
Sydney	7.9	3.7	5.4	8.2	8.3	9.7	7.2	9.0	8.8	10.1	12.3	11.9	11.5	11.1
Singapore	10.3	7.3	8.8	12.1	12.1	11.3	9.4	9.9	10.3	9.8	9.3	8.8	8.4	7.7
Madrid	11.2	7.0	8.7	10.3	10.5	11.0	11.3	11.4	11.3	10.9	10.6	9.7	8.5	8.4
Frankfurt	16.7	14.2	13.7	14.3	14.4	13.5	12.1	11.4	11.4	10.8	11.3	10.7	10.3	10.0
Houston	15.0	11.9	14.1	16.5	16.3	16.1	14.4	14.2	14.0	13.9	14.2	14.4	14.3	14.1
Mexico City	11.1	6.8	6.1	7.7	11.3	11.4	10.4	14.6	14.3	18.5	19.0	15.0	12.0	12.0
Washington	10.5	10.0	11.9	14.1	13.7	14.3	14.6	15.4	15.8	15.7	15.4	15.1	14.9	14.8
Mumbai	4.9	2.9	4.3	12.2	14.0	19.3	23.2	23.0	23.0	18.7	16.1	15.1	14.1	13.5

Source: Knight Frank¹¹²

These figures suggest that London's vacancy rate in 2015 (5.4 per cent) was relatively low by international standards and relative to the previous ten years. Moreover, vacancy rates are forecast to fall to the second lowest of these major cities by 2019. It is important that office supply in the capital responds to falling vacancy rates otherwise rents could become prohibitively high and businesses may look to other international cities.

Office supply

Following the 2008 recession, speculative activity in the office market slowed significantly and this has contributed to a relative shortage of supply and historically low vacancy rates. Supply in the office sector tends to lag the economic cycle and as the economic recovery has gathered momentum, supply has started to respond. The level of speculative activity is up on previous years with 800,000 square metres (8.6 million square feet) of floorspace under construction in central London as of Q4 2015¹¹³.

The longer-term question is the extent to which London's office supply can respond to the growing demand such that rents do not become excessive and erode the competitiveness of businesses. Inevitably some businesses will be priced out of central London markets where rents are highest and this is likely to increase demand in fringe locations (see Chapter 2 for trends in firm births and migration).

Permitted Development Rights

One important factor affecting London's office floorspace requirements is the impact of Permitted Development Rights legislation (PDR) legislation, which allows conversion of business premises for residential use without the need for the normal planning procedures, instead requiring a 'lighter touch' prior approval. PDR was introduced in May 2013 by the coalition Government with the intention of easing the process for bringing underused commercial space back into productive use for housing, in some cases addressing blight caused by vacant office space in town centres. Initially introduced for a fixed period to May 2016, in October 2015, the Government announced that the legislation would be made permanent.

The CAZ, the NIOD, Tech City and the Royal Docks Enterprise Zone have been exempt from the legislation but this exemption will end in May 2019, after which time the relevant authorities will need to have an Article 4 direction in place if they wish to remove the Permitted Development Rights. Article 4 directions are detailed policies to protect certain areas from change of use but the Government has indicated they should not cover the entire borough. This means there remains a risk that some viable and strategically significant office space could be lost.

The theory underpinning the policy is that in the absence of planning controls, there should be an incentive for owners to convert land and property from lower value to higher value uses. In this regard, the hypothesis is that planning restrictions on land use act as an impediment to the market's ability to allocate resources efficiently. The counter argument is that market failures are endemic in land markets, price signals may be distorted and so relaxing planning controls in this way leads to resources being misallocated. One such market failure is the positive externalities from the agglomeration of firms in London, which are not priced into the office rents that firms are willing to pay. These agglomeration benefits are a critical part of London's economic success and the potential loss of office space could undermine them (see Chapter 2 for more on the importance of agglomeration).

The concern in some parts of London is that otherwise viable office space is being lost due to an overheated housing market. In these cases, the retention of office premises and the associated employment floorspace is viewed as important for the long-term health of local economies, particularly where they offer affordable space for start-ups, SMEs and third sector organisations. There are other concerns with PDR in terms of equity; in the absence of the normal planning procedures, councils are unable to secure affordable housing units, Section 106 contributions and there are reports in some boroughs that the dwellings created through PDR can be poor quality¹¹⁴.

Chapter 4 presents data on the number of conversions showing that as of March 2015, a total of 1.1 million square metres had prior approval for conversion under PDR, of which 310,000 square metres was under construction or completed. If all space were implemented it would add 18,000 dwellings. Due to the 'light touch' nature of the planning requirements, comprehensive data on the details of the conversions being brought forward is unavailable. The only indicator of the likely viability is the occupancy levels of the existing buildings at the time the prior approval was sought. However, this is only one component of the viability equation and moreover, the landlord may have emptied the property in advance of the application. With these caveats, the occupancy status of 804 schemes was known as of March 2015: 307 were occupied (38 per cent); 144 were part occupied (18 per cent); and 353 were wholly vacant (44 per cent)

The extent to which Permitted Development Rights are a risk to London's economy from a strategic perspective is a matter of debate. On the one hand, if the policy is helping to bring underused office space into more productive use for housing and the necessary office space can be re-provided elsewhere in more desirable locations it may have a positive effect. If, on the other hand, viable office space – particularly in areas that benefit from agglomeration economies – is being permanently lost on a scale that potentially threatens long-term office supply and leads to higher rents, then it is a cause for concern. The GLA continues to monitor the impact of Permitted Development Rights and new data on prior approvals for the year 2015/16 will be published in due course.

Affordable workspace for start-ups and SMEs

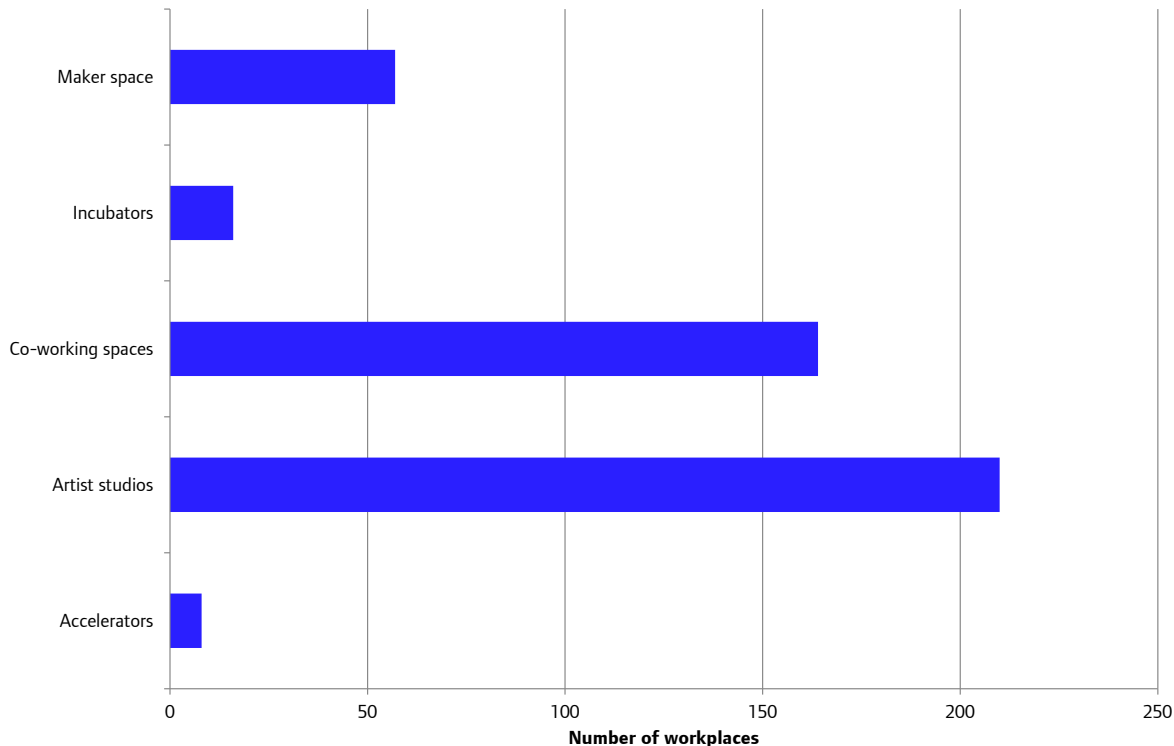
London has a high rate of business start-ups and also a high rate of business failures (see Chapter 5). This churn of new businesses starting up, some succeeding, others failing, is generally considered to be a characteristic of a healthy economy. New enterprises bring new ideas and technologies to the market replacing old ones, while unproductive firms are forced to either become more efficient or exit the market. This process of 'creative destruction'¹¹⁵ is considered to be a factor in productivity growth.

There is a concern that the cost of workspace in London is such that start-ups and small businesses may struggle to find suitable premises. As well as high rents, the lease terms of traditional commercial property may also be a barrier as landlords tend to prefer tenants that can sign longer leases and that offer good covenant strength – characteristics generally not associated with start-ups. In recent years, the market for flexible workspace in London has grown and caters for both the SME market and large corporates seeking flexible space (for projects or short-term expansion). This has helped to address some concerns about the lack of flexible workspace in more central parts of London¹¹⁶.

The London Enterprise Panel commissioned research to examine the supply of incubator, accelerator and co-working space (IACs) in London in 2015¹¹⁷. Incubator space is typically space designed to support the growth of start-ups or businesses in early stage development with associated business support facilities. Accelerator space tends to refer to space for start-ups or existing businesses with high growth potential with support services provided by investors who may then seek an equity stake or some other financial return. Co-working spaces provide a combination of workplace and support facilities at affordable rates on ad hoc or short-term bases with access to meeting rooms or other shared facilities. The research found there to be 132 incubator, accelerator and co-working spaces in London which accommodate upwards of 3,800 SMEs on a given working day. Over two thirds offered office space, around a quarter offered workshop space, and less than ten IACs providing laboratory space. Provision was found to be concentrated in the CAZ and CAZ fringe boroughs. Particular clusters were identified in the inner East London area in the boroughs of Islington and Hackney around Old Street roundabout and extending across the Shoreditch area to Farringdon. Clusters were also identified around Camden (around Bedford Square) and the City of Westminster (mainly around Soho).

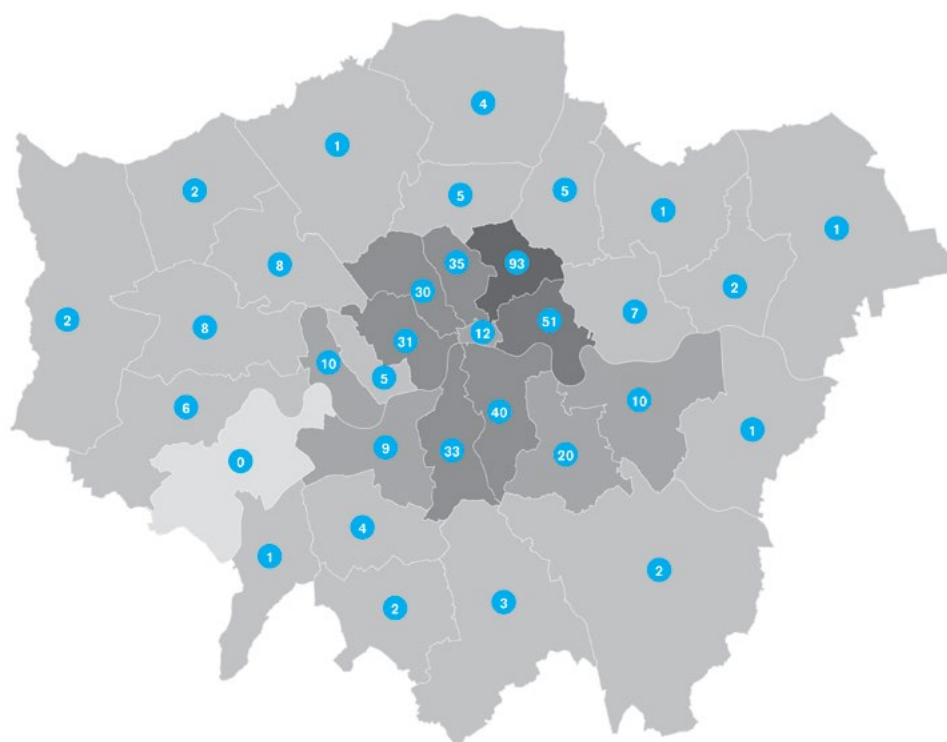
This research was subsequently updated and expanded in 2016 by the GLA to include artist studios and 'maker spaces' (workshops and studios that tend to have open access) as part of an ongoing effort to monitor and improve awareness of facilities for start-ups and SMEs¹¹⁸. Figure 6.12 shows the number of flexible workspaces in London by type of space, the locations of which are shown in Map 6.1.

Figure 6.12: Flexible workspace in London, 2016



Source: Greater London Authority

Map 6.1: Number of Incubators, Accelerators, Co-working Spaces, Artist Studios and 'Maker spaces' by borough, 2016



Source: Greater London Authority

The most popular locations tend to correlate with high concentrations of businesses in digital technology, communication, and creative sectors, which have a higher incidence of start-up activity. The concentration in central areas is evident while coverage in outer London is much thinner and tends to include facilities with a social focus operating in partnership with local authorities, charities or housing associations. In these locations there has been some limited success in delivering affordable workspace via the planning system through planning obligations¹¹⁹. The extent to which the lack of flexible workspace in outer London is a concern depends on whether there is latent demand from small businesses not being realised, which can be difficult to prove until the space has been built.

A further area of concern for some is the lack of commercial laboratory space for start-ups in medical and biological science. Many of these types of companies begin their lives based in university labs where their initial idea is conceived. However, as companies grow, they need to move on from these informal shared facilities. Some commentators have argued that the lack of laboratory start-up and grow-on space is a risk to growth of the science sector¹²⁰. Research by Creative Places found there was latent demand for laboratory space in London based on the volume of enquiries for accommodation received by London and Partners and Med City and the waiting lists at all of London's science innovation centres¹²¹.

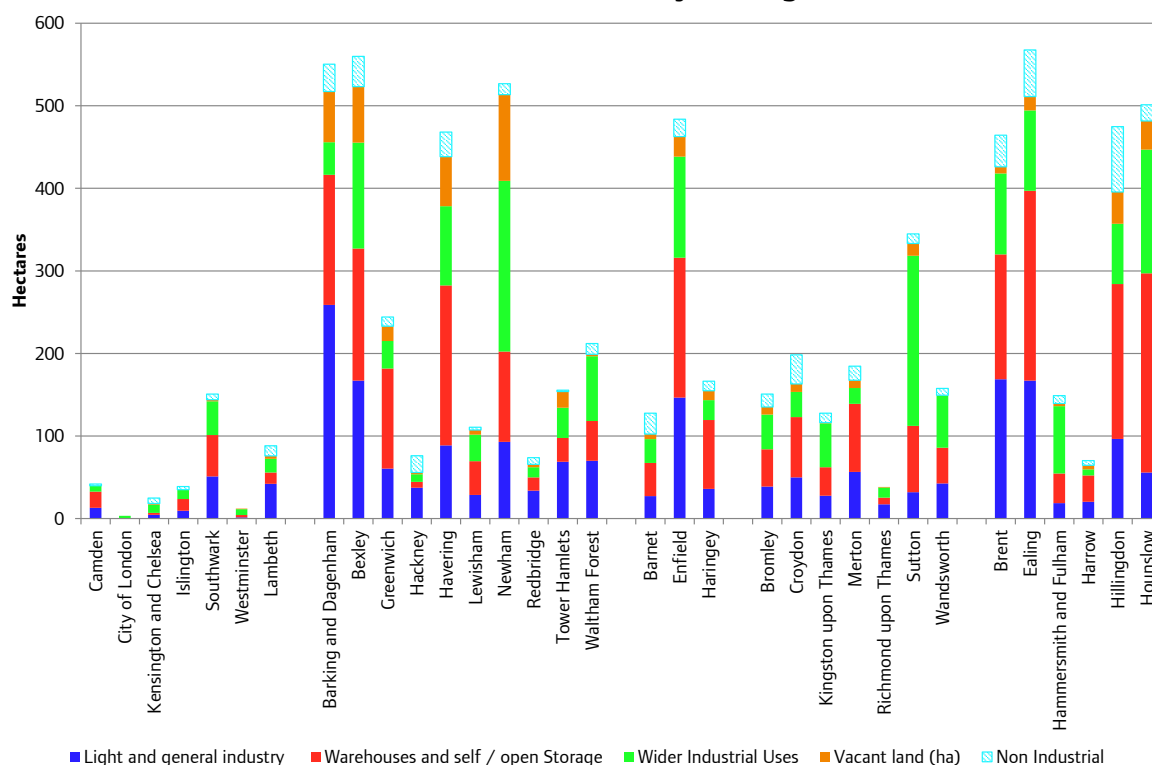
Industrial land supply

As the balance of employment in London has shifted to become less industrial and more service based, the requirement for industrial land has fallen. The trend decline in manufacturing employment, one of the principal industrial sectors, can be seen in Figure 1.12, Chapter 1. However, there is a concern that the pace at which industrial land supply is being lost is too fast and could risk damaging London's economy¹²².

Guidance on the pace of industrial land release is set out in the Land for Industrial and Transport Supplementary Planning Guidance (SPG)¹²³ and the benchmark will be reviewed as part of the next iteration of the London Plan. To inform the discussion, the GLA commissioned consultants to undertake the Industrial Land and Economy Study, an assessment of London’s industrial land supply¹²⁴. Some of the main findings of this study are summarised below. This will be supplemented by evidence in the forthcoming Industrial Land Demand Study.

There is an estimated 6,976ha of industrial land in London. The majority of this land (76 per cent) is in outer London with 547ha (9 per cent) recorded as vacant in 2015. Figure 6.13 shows the distribution of industrial land by borough and the different types of use.

Figure 6.13: Core, wider and vacant industrial land by borough



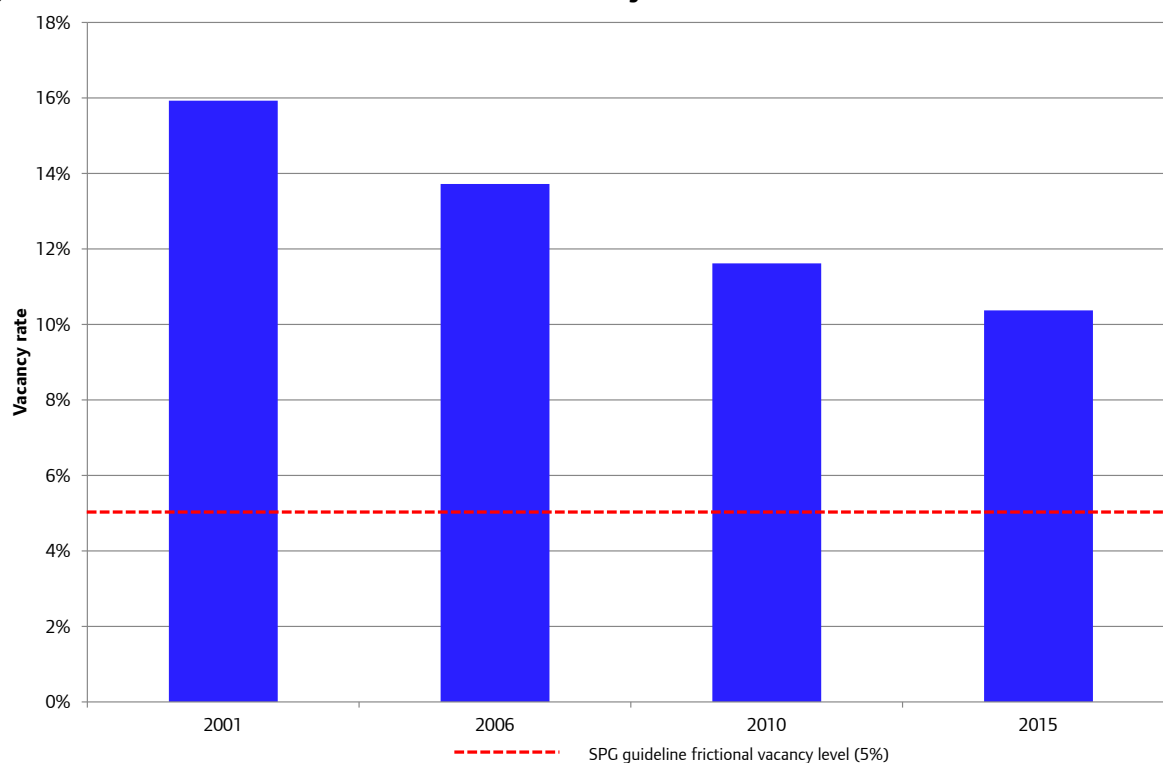
Source: AECOM, Cushman & Wakefield, in association with We Made That and Maddison Graphics, 2016

The stock of industrial land in London has declined steadily in recent decades. Looking at the last 15 years, it fell from 8,282ha in 2001 to 6,976ha in 2015. This is a 16 per cent contraction over the period 2001-2015 and a 7 per cent contraction since 2010. There has been a slight acceleration in the rate of losses from approximately 88ha per annum during the period 2001-2005 to 105ha per annum in the period 2010-2015.

In 2012, the Land for Industrial and Transport Supplementary Planning Guidance (SPG) set a benchmark for the managed release of industrial land at 37ha per annum¹²⁵. The Industrial Land and Economy Study found that the actual rate of release over the period 2010-2015 was 105ha per annum, 2.8 times the benchmark. The development pipeline and proposed future industrial land release in Opportunity Area Planning Frameworks (OAPFs), Local Plans and Housing Zones could result in further significant losses suggesting that recent London-wide trend rates of release will persist unless there is a significant change in policy and its implementation. If the London-wide trends continue then according to the research the total stock of industrial land in London will decline to around 4,700 ha in 2041, a 33 per cent fall over this period.

The London-wide industrial land vacancy rate has fallen from around 16 per cent in 2001 to under 11 per cent in 2015 (Figure 6.14). This vacancy rate is above the 5 per cent frictional vacancy rate identified as a benchmark in the SPG. However, there are significant variations by borough. The highest borough level vacancy rate is in Newham (20 per cent) while several boroughs are at or below 5 per cent vacancy rates, especially in central, south and west London.

Figure 6.14: London-wide industrial land vacancy rate



Source: AECOM, Cushman & Wakefield, in association with We Made That and Maddison Graphics, 2016

There is intense pressure on industrial land in many parts of London due to the demand for housing. High residential values mean that if planning permission can be secured for conversion to residential or mixed use, the land owner/developer benefits from a significant uplift in land value. Table 4.1 in Chapter 4 showed that on average, residential land values are 3.2 times higher than industrial land values in London with large variations by borough. These land value differentials are viewed by some as a clear price signal that more industrial land should be released for residential use. For others they are the product of high prices in the residential market which leads to property speculation and the erosion of industrial land.

Industrial areas have an important role to play servicing London's businesses and workers, for example as locations for storage and distribution purposes, waste management, repairs and maintenance, or food preparation. There is a strategic question to be debated as part of the London Plan process about the rate of industrial land release. Some commentators suggest industrial land should be retained as the activities above are important to London's economy and its communities. Others suggest the land could be used for other 'higher value' residential or mixed uses.

According to the Industrial Land and Employment Study, there may be potential for the adjacent South East region to accommodate overspill from London (demand transferring to the area as supply contracts in London). The extent to which businesses could relocate to locations further from the centre is uncertain. The additional transport costs and journey times could mean some business models become unviable or the costs to society become too great, if relocations mean longer journeys for goods vehicles and unacceptably high levels of pollution and congestion. Clearly, the costs and benefits of relocation will depend on the type of business in question and its operating model.

Those who advocate greater protection for London's industrial areas point to the diversity and vibrancy of industrial areas which are home to small businesses in a variety of sectors from the traditional ones like manufacturing, construction and logistics to those not generally associated with industrial areas like creative industries, certain business services and charities. These firms benefit from the relative affordability and flexibility of premises. There is evidence of this diversity in two recent case studies - The Park Royal Atlas¹²⁶ and the Old Kent Road Employment Study. These studies found that a large proportion of employment (approximately 20 per cent on Old Kent Road and 40 per cent on Park Royal) is in non-industrial activity such as professional services, education, retail, restaurants and cafes, and arts, culture and sport. Moreover, the Industrial Land and Employment Study finds that approximately 129,400 jobs in non-industrial activities are in designated industrial areas, contributing approximately 43 per cent of employment in these locations. The Central sub-region has the greatest concentration of non-industrial jobs, where a majority of employment in designated areas is in non-industrial activities.

The research carried out for the Industrial Land and Employment Study suggests that overall there is some flexibility in the industrial land market and industrial activities to respond to contractions in industrial land supply. Key mechanisms allowing this include potential for some industry to (continue to) relocate to the wider adjacent South East and probably to a lesser degree for some industrial activities to be intensified on existing land¹²⁷. Overall, however, the Study concludes that the "rates of release seen over the last five years appear to be excessive and a more cautious rate of release is probably more appropriate"¹²⁸.

High Streets and town centres

Town centres and high streets are focal points for the day-to-day lives of many Londoners. They serve as important centres of employment in sectors such as retail, leisure and many local services and play a vital community and civic role. London's town centres and high streets face similar challenges to those affecting regions across the UK. The growth of online retail and smartphone technology has enabled shoppers to compare prices and make purchases from national and international markets at an instant when previously they were confined to local stores. High street retailers continue to grapple with online competition and changing consumer demands and preferences. Alongside this, retailers face competition from large shopping malls which aim to offer shoppers a modern retail and leisure experience.

Growth in population and incomes means there is still a substantial requirement for new retail space. London could need an additional 0.4-1.6 million square metres of comparison floorspace to 2036¹²⁹, most of which is likely to be focused on the International, Metropolitan and stronger Major town centres. This requirement will be reviewed in the forthcoming Retail Needs Study. Some of the smaller and medium-sized town centres may face overall surpluses of retail space in the future – which presents both challenges and opportunities for restructuring and redevelopment for commercial, cultural, community and residential space.

Bricks-and-mortar retailing will still be important in London's town centres but probably as part of a wider retailing strategy where on-line and physical stores are complementary and respond to consumer preferences. In addition to changes in the use of shop space by retailers, there are also likely to be changes in the use of warehousing space. Insofar as stores begin to take on more of a 'showroom' function, holding very limited stock for display purposes and relying on stock held elsewhere to fulfil orders, this could increase demand for warehousing space¹³⁰.

The GLA supports town centre regeneration through various initiatives such as the Mayor's High Street Fund¹³¹ and through planning policy, most importantly through policies in the London Plan (Policy 4.7) and the Town Centres Supplementary Planning Guidance (SPG)¹³². These policies are designed to promote town centres as vibrant places to live, work and visit.

To conclude this section on workspace, there is significant competition for land in London which makes workspace of all types relatively expensive in the capital. Some of the main risks highlighted in this chapter include the cost of prime office space; the loss of potentially viable office space due to Permitted Development Rights legislation; and the erosion of industrial land at a pace above the benchmark in the London Plan. In terms of the overall impact this is having on businesses, the evidence on firm start-ups and migration¹³³ (see Chapter 2) suggests that despite these costs, London's business base continues to grow. While more firms migrate out of London than migrate in, this is offset by the high number of business 'births' which exceed the number of 'deaths' so that overall there has been a net gain in businesses.

6.4.2.2 Labour supply

London's ability to attract skilled workers is an important factor in its success but some businesses are concerned that the supply of skilled labour is a potential constraint to future growth. For example, a report for the City of London Corporation highlighted the lack of a suitably skilled workforce as one of the factors that could dampen the City's growth in coming years¹³⁴. Being able to meet the skills needs of London's businesses depends first on a world class education system which maximises the potential of young people; second, on upskilling the existing workforce through ongoing investment in education and training; and third, on being able to attract skilled workers from the UK or internationally.

The following considers evidence on the risks to labour supply in London including:

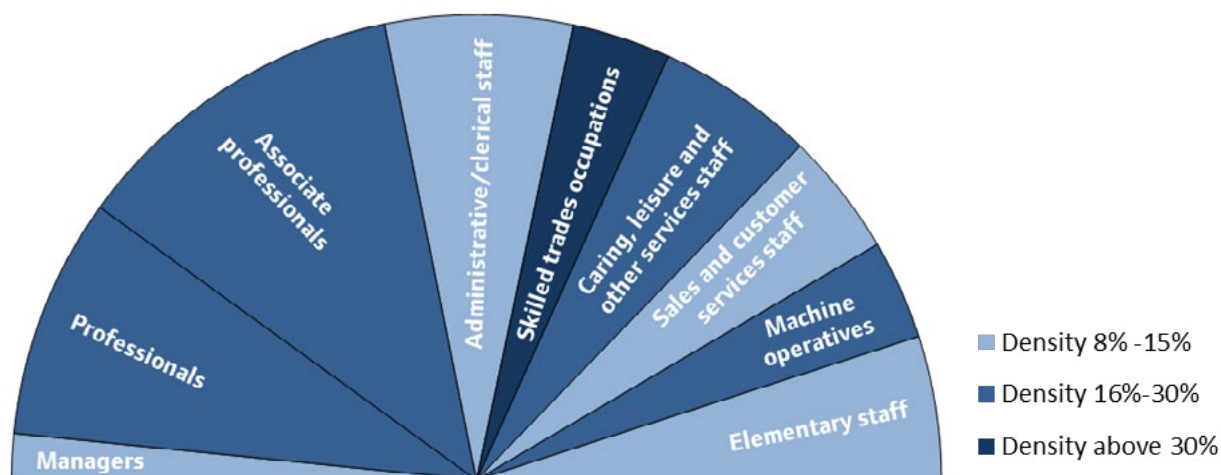
- skills shortages and gaps reported by employers;
- the relative performance of the education and training system;
- the cost of living including housing costs;
- restrictions to the supply of foreign labour; and
- the supply of public services workers.

A more detailed profile of London's labour market is provided in Chapter 9.

Skills shortages and gaps

According to the London Business Survey, 70 per cent of businesses in London rate the capital highly as a place to do business in terms of the availability of skilled staff, and only 5 per cent rate the capital poorly on this measure¹³⁵. There is some variation in perceptions by size of company with larger firms more positive than small ones; 32 per cent of SMEs (0 to 249 employees) rate London as either adequate or poor in terms of the availability of skills compared to 11 per cent of large firms.

Despite these generally positive perceptions of London's labour market, there is evidence of skills shortages, particularly at middle and high skill level occupations. The 2015 UKCES Employer Skills Survey reported just over 182,700 vacancies in London in 2015. As shown in Figure 6.15, the highest proportion of job vacancies were in 'associate professional' (24 per cent) and 'professional' occupations (17 per cent).

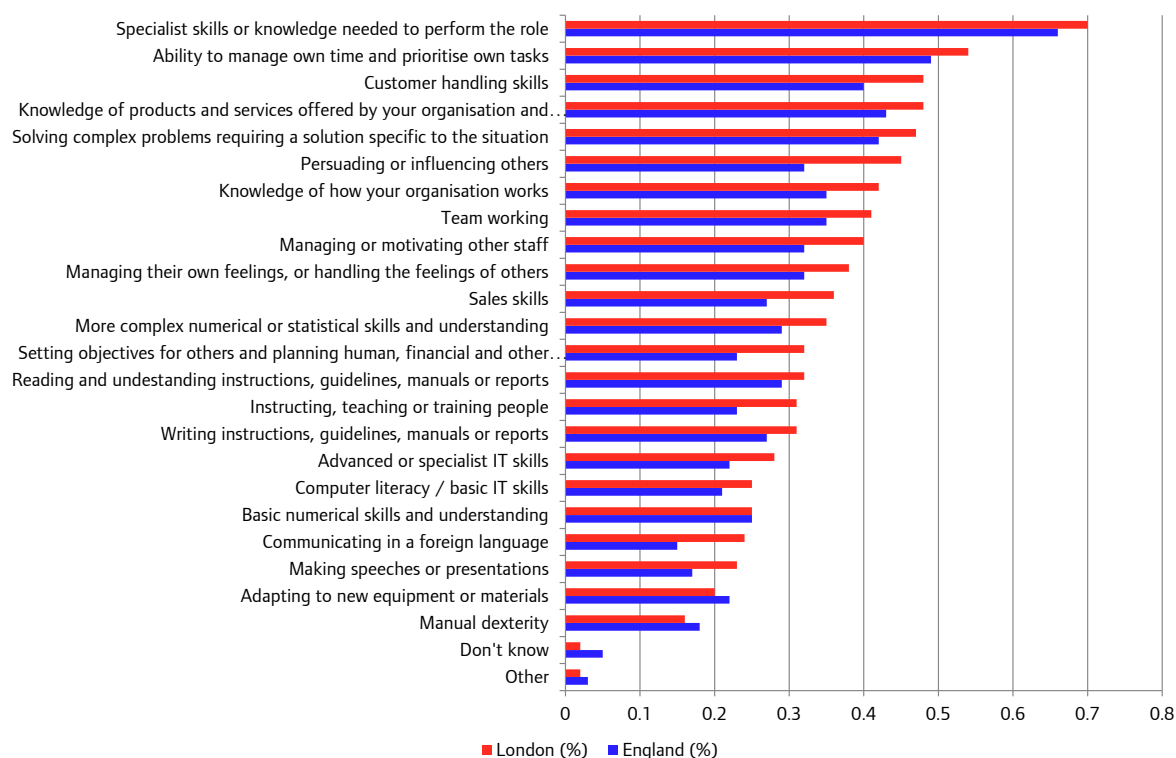
Figure 6.15: Vacancies by occupation and their skills shortage density in London, 2015

Source: UKCES Employer Skills Survey 2015, Tables 54/1 and T63A/1

According to the survey, 27 per cent of vacancies (49,500) were reported by employers as being “hard to fill”. Of these vacancies over 75 per cent (around 37,000) were reported as ‘skills shortage vacancies’ caused by employers being unable to find people with the skills, qualifications or experience for the role. This compares to an estimated 67 per cent of hard to fill vacancies in the rest of the UK.

Figure 6.15 also shows the density of skills shortages defined as the proportion of all vacancies in that occupational category that are skills shortage vacancies. Occupations shaded in darker blue are those with higher densities of skills shortages. As can be seen, the highest densities of skills shortage vacancies are in skilled trades occupations where 42 per cent of vacancies are reported as being due to skills shortages.

Figure 6.16 shows the types of skills found difficult to obtain by London-based employers compared to the England average. The most common types of skills shortages relate to specialist skills or knowledge needed to perform the role - 70 per cent of London-based employers reported this as an issue compared to an average of 66 per cent in England. Indeed, across many of the skills employers were questioned about, a higher proportion of London employers reported them as difficult to obtain compared to the England average.

Figure 6.16: Skills found difficult to obtain in London and England (%)

Source: UKCES Employer Skills Survey, 2015, Table 50/1

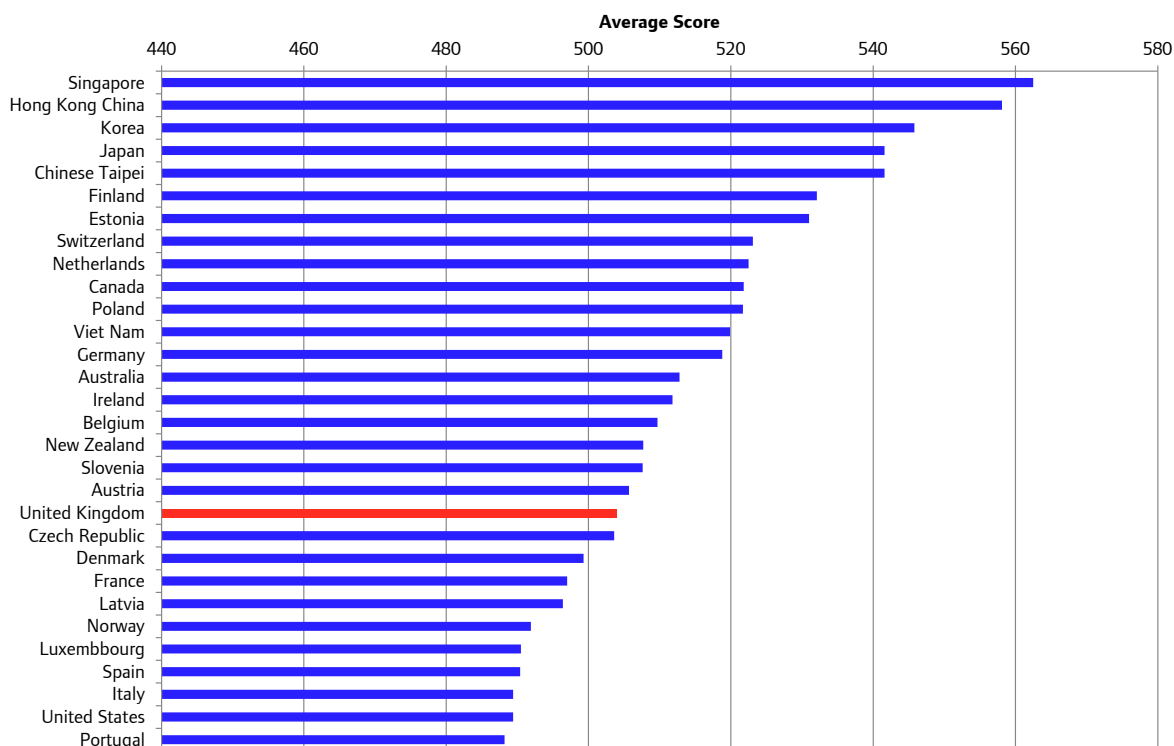
As a result of skills shortage vacancies, around half of affected employers claim that this has resulted in lost business and 40 per cent said it resulted in difficulties meeting quality standards¹³⁶.

Some London employers also experience skills gaps within their existing workforce. While 4 per cent of establishments (11,400) in London reported having a skills shortage vacancy in 2015, 11 per cent (28,300) suffered from skills gaps within their existing workforce. This is in line with the England average where 4 per cent of establishments reported having a skills shortage vacancy and 12 per cent reported having skills gaps among existing staff¹³⁷.

In total, there are almost 223,000 cases where London employers considered existing staff not to be fully proficient in their roles (equivalent to 5 per cent of all those employed). As a proportion of all employment, these skills gaps are most prevalent in administrative/clerical, sales and customer service, and elementary occupations¹³⁸.

Education

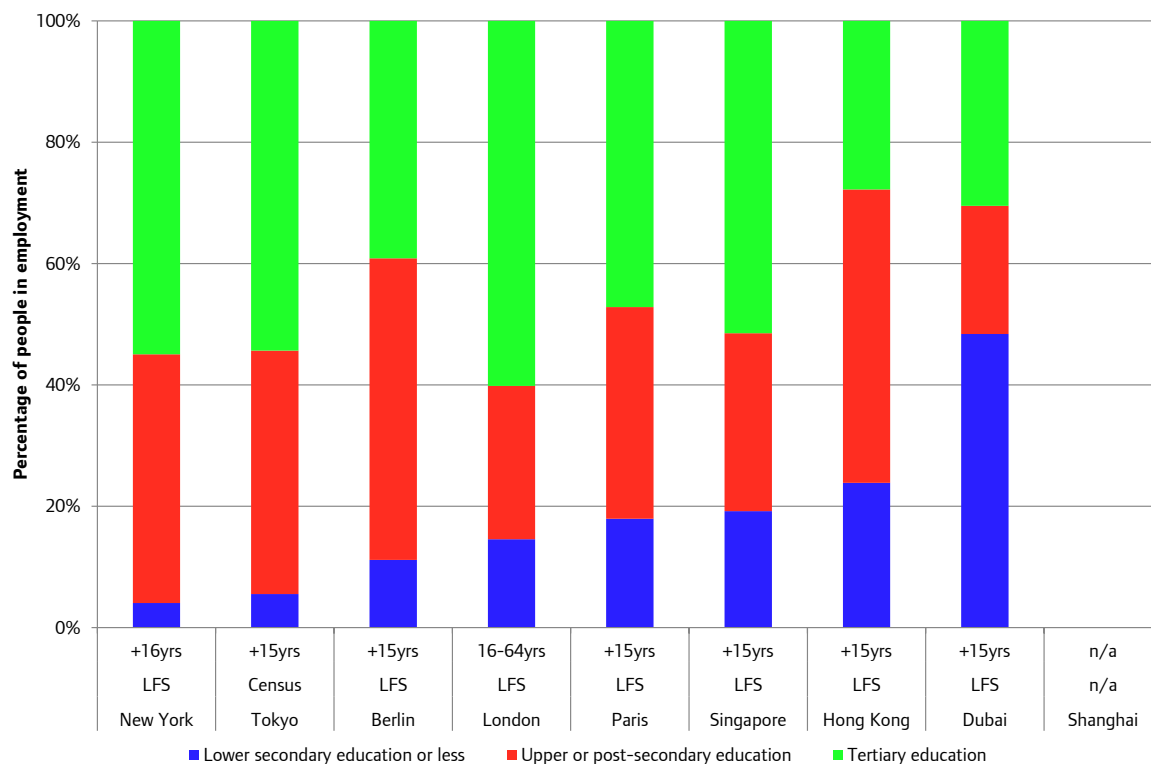
London's ability to supply businesses with skilled labour depends on having a first class education system capable of nurturing talent for the future. There is relatively little data comparing the educational performance of global cities. One standard used for international comparisons at a national level is the Programme for International Student Assessment (PISA) which tests 15-year olds' abilities at maths, science and reading. As shown in Figure 6.17, countries in the Far East such as Singapore, Korea, Japan, and China, generally outperform UK students on these international tests¹³⁹.

Figure 6.17: Average performance on international student achievement tests (top 30 ranked countries)

Source: OECD¹⁴⁰

Researchers at UCL¹⁴¹ have attempted to benchmark London in the PISA rankings to make international comparisons. Using PISA 2009 and 2012 data, they find the average mathematics score in London falls between 462 and 496 test points, reading between 465 and 500 points, and science between 480 and 513 points. Overall, this puts achievement in London behind world leaders such as Massachusetts, New South Wales (Sydney), Ontario and Shanghai¹⁴².

In terms of the level of qualifications of the workforce, the evidence is more positive with workers in London more likely to hold higher degrees than their counterparts in other global cities. Approximately three in every five (60.2 per cent) workers in London had tertiary education¹⁴³ as their highest qualification in 2014. This is higher than many other global cities such as New York, Tokyo and Paris as shown in Figure 6.18. A further 25.3 per cent of workers in London had upper secondary or post-secondary education which is the equivalent of GCSE grades A*-C and A Levels. The remaining 14.6 per cent of London's workforce had lower secondary school education (i.e. GCSE grades D-G) or less as their highest qualification¹⁴⁴.

Figure 6.18: Percentage of employed people by highest qualification achieved in selected global cities, 2014

Source: ONS, US Census Bureau, Eurostat, Tokyo General Affairs Bureau of Statistics, Singapore Ministry of Manpower, HK Census and Statistics Department, Dubai Statistics Centre

Note: Data for Tokyo refers to 2012.

The cost of living

London is also a costly city to live in and there is evidence to suggest this limits labour supply in some occupations (see later section). Table 6.5 shows the relative cost of living in various cities as determined by price levels. London ranks at number six according to this survey by UBS. Examining the affordability of a number of global cities for graduates – an important demographic for future success of the city – Knight Frank ranked London 13th out of 20 cities, behind cities such as Frankfurt, Berlin, Paris and New York, but ahead of Tokyo, Singapore, Shanghai and Hong Kong¹⁴⁵. Mercer ranked London as 12th most expensive out of 207 cities in their 2015 cost of living rankings, behind Luanda (Uganda), Hong Kong, Zurich, Singapore, Geneva, Shanghai, Beijing, Bern, N'Djamena (Chad) and Tokyo, but ahead of New York, Dubai and Paris among others¹⁴⁶. Housing affordability in London is discussed in Chapter 4 and the cost of living in London is discussed further in Chapter 10.

Table 6.5: Price levels in selected world cities (Index New York = 100)¹⁴⁷

Rank	City	Excl. rent	Incl. Rent	Rank	City	Excl. rent	Incl. Rent
1	Zurich	108.7	92.6	26	Taipeh	67.3	62.7
2	Geneva	106.1	91.8	27	Brussels	67.2	57.3
3	New York	100.0	100.0	28	Rome	67.1	57.1
4	Oslo	92.9	79.9	29	Manama (Bahrain)	66.6	55.4
5	Copenhagen	88.0	74.3	30	Frankfurt	65.8	55.1
6	London	84.7	79.5	31	Munich	65.5	56.1
7	Chicago	83.5	76.7	32	Vienna	65.4	53.4
8	Tokyo	83.1	70.6	33	Amsterdam	65.3	55.5
9	Auckland	82.8	67.6	34	Shanghai	64.9	54.3
10	Sydney	80.5	72.5	35	Istanbul	64.8	53.0
11	Seoul	79.2	64.2	36	Doha	64.8	61.4
12	Toronto	78.1	63.7	37	Lyon	64.8	51.2
13	Milan	77.9	64.5	38	Berlin	63.3	51.3
14	Stockholm	76.9	62.8	39	Barcelona	63.2	50.5
15	Montreal	76.2	58.9	40	Beijing	61.4	53.2
16	Miami	76.1	67.7	41	Madrid	60.6	50.4
17	Los Angeles	76.0	67.4	42	Nicosia	60.3	48.4
18	Helsinki	74.3	63.2	43	São Paulo	59.4	49.5
19	Hong Kong	72.9	76.8	44	Athens	58.9	47.5
20	Paris	72.6	63.8	45	Rio de Janeiro	57.9	49.2
21	Luxembourg	72.3	66.1	46	Bangkok	57.5	46.4
22	Tel Aviv	72.0	61.4	47	Lisbon	55.5	45.3
23	Dubai	71.1	66.1	48	Mexico City	54.7	46.2
24	Buenos Aires	70.4	56.1	49	Tallinn	54.4	44.0
25	Dublin	70.3	63.1	50	Ljubljana	54.0	44.0

Source: UBS¹⁴⁸

Housing costs

As set out in Chapter 4, housing costs have been rising in London at a faster rate than the rest of the UK. According to Demographia's annual survey of international housing affordability the ratio of median house prices to resident earnings in London is high by international standards¹⁴⁹. Based on national data from Q3 2015, London is rated the eighth least affordable of 86 major metropolitan markets¹⁵⁰ with an estimated median multiple of 8.5. The data suggests that London is not alone in experiencing issues of affordability, with Hong Kong ranked as the least affordable for the fifth year in a row, with a median multiple of 17.0. These figures should however be treated with caution as they do not account for cross-country differences in the measurement of house prices and incomes, or for differences in the size and quality of housing, or for differences in the way the city region is defined¹⁵¹.

Rents in London are also relatively high compared to other international cities. Data from a UBS 2015 survey of 71 world cities found that London rent levels were, on average, the third highest in the World behind New York and Hong Kong (Table 6.6).

Table 6.6: Average monthly rents by selected major city, 2015

	New York	Hong Kong	London	Chicago	Doha	Sydney	Tokyo	Paris	Munich
Normal local rent (£)	£2,530	£1,680	£1,530	£1,440	£1,330	£1,160	£1,120	£1,050	£890
UBS rank	1	2	3	4	6	11	14	16	21

Source: UBS prices and earnings 2015.

Notes: The figures given are values for average rent prices (monthly gross rents) for local households. To capture local standards, the UBS survey asked for the price of a newly built apartment of typical size, location, and amenities for the respective city. US dollar values given in the report have been converted to pound sterling using the exchange rate 1 USD = 0.65 GBP.

The City of London Corporation has raised concerns about the impact of high house prices on labour supply, observing that “the City and London’s ability to continue to expand is dependent on the availability of local labour, and ensuring London remains attractive to the best international talent. Property prices in London have increased at a rapid rate in recent years, reducing affordability for workers on lower or average incomes... London’s inflated housing market could be damaging to business in the City if skilled workers are discouraged from living within a reasonable commuting distance from the City through unaffordable rents or house prices”¹⁵².

The relatively high transaction costs in the housing market may also be a deterrent to people moving and therefore be a constraint on labour market flexibility. Stamp Duty Land Tax (SDLT) is levied relative to the sale price as are some other transaction costs such as agency fees. Higher transaction costs in London may therefore limit the willingness, or ability to pay, of workers looking to change jobs¹⁵³. Hilber & Lyytikäinen found that the 2 per cent increase in SDLT at the £250,000 threshold can reduce household mobility by 2–3 per cent¹⁵⁴.

High housing costs can also create inflationary pressures in the economy as workers demand higher wages as compensation for higher rents and house prices. This in turn adds to the cost of doing business in London. In addition, people may be required to take out larger mortgages or other forms of personal debt to pay for housing costs (see Chapter 10). Higher levels of debt mean Londoners are potentially more exposed to increases in interest rates, a property market crash, or changes in personal circumstances such as a loss of employment. Issues in the housing market can therefore feed through to the macroeconomy. Indeed, unsustainable house price rises in the USA played a large part in triggering the global financial crisis in 2008. See Chapters 4 and 10 for more on the housing affordability challenges in London.

Demand for public services

As population grows there will be increasing demand for education, healthcare and a range of other public services in London. This will mean providing additional social infrastructure such as schools, hospitals and other facilities. It will also mean ensuring there is the necessary supply of skilled labour to provide public services. In the private sector, price signals help to achieve equilibrium in the labour market – rising demand for labour leads to an increase in wages which in turn increases supply, other things being equal. However, in the public sector, wages are not set by the market and so price signals cannot be relied upon to ensure labour demand is matched by supply.

Education

A combination of rising pupil populations, spiralling building costs and lack of available land is putting increasing pressure on central and local government to provide sufficient school places¹⁵⁵. Table 6.7 shows the net number of additional school-aged children expected over the period to 2050¹⁵⁶. The total youth population is expected to grow from 1.5 million in 2015 to 1.8 million in 2050.

Table 6.7: Projected additional number of children by age group

	Total population 2015	Total population 2050	Changes in five year intervals						
			2016-2020	2021-2025	2026-2030	2031-2035	2036-2040	2041-2045	2046-2050
Age 4-10	768,587	881,667	54,121	1,500	(14,621)	(10,778)	3,973	39,404	39,483
Age 11-16	539,236	687,639	60,489	55,208	11,786	(11,100)	(10,784)	21,684	21,119
Age 17-18	189,909	227,913	(7,479)	28,155	12,730	974	(3,567)	3,769	3,422
Total youth population, ages 4-18	1,497,732	1,797,220	107,131	84,863	9,894	(20,904)	(10,378)	64,857	64,024

Source: Arup/GLA Intelligence Unit¹⁵⁷.

Note: There is considerable uncertainty over the population projections for later periods.

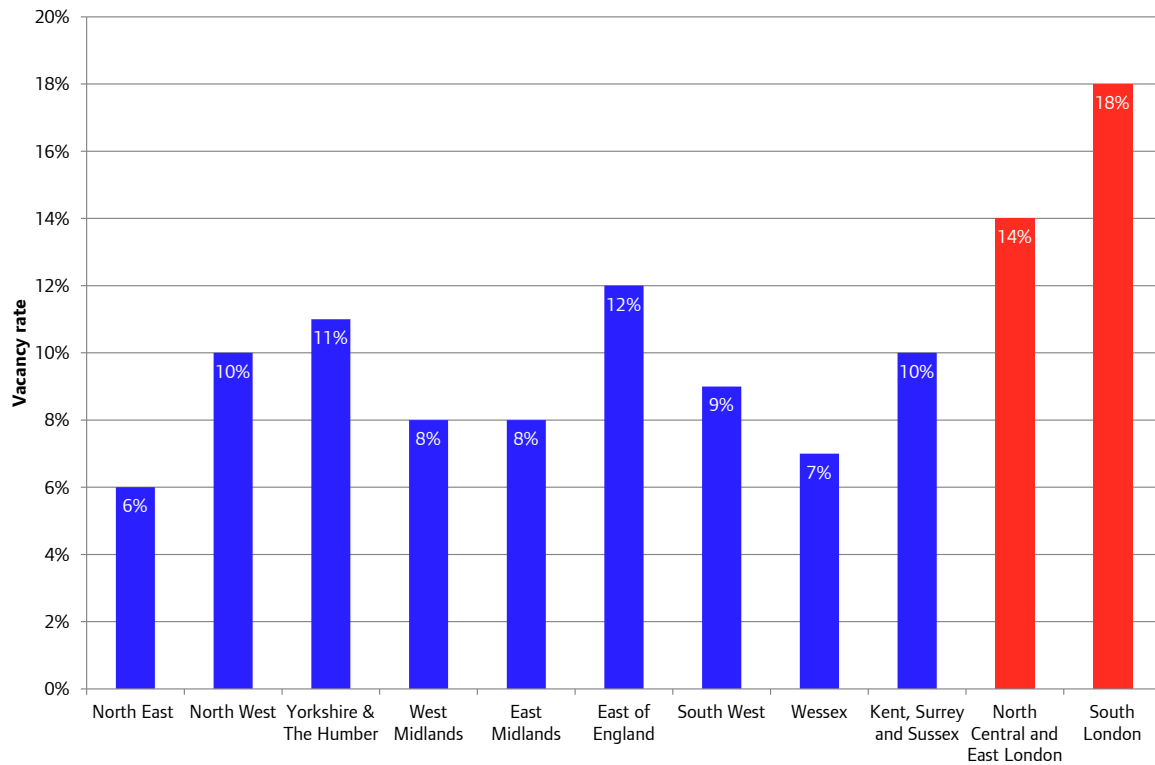
Demand for both primary and secondary school places is particularly acute at the moment and the demographic projections suggest this will continue to be the case through to the early 2020s before tapering off and then increasing again in the 2040s. According to estimates by Arup for the London Infrastructure Plan 2050, this could mean an additional 330 primary schools, 170 secondary schools and 196 sixth form colleges by 2050¹⁵⁸. Failure to build sufficient new facilities or expand existing ones could mean larger class sizes and potentially poorer performance. In addition to new facilities, there will be a need to recruit additional teachers, which could be challenging if the cost of living in London were to rise at a faster rate than teacher pay.

Health and social care

Demands on the health and care sectors in London will increase as a result of a growing population that will live longer with more complex health needs than previous generations. Many NHS Trusts are currently running significant budget deficits as they grapple with growing demand for services and tighter budgets¹⁵⁹. Similarly, an aging population will increase demand for adult social care services at a time when local councils also face significant budgetary pressures¹⁶⁰. If further efficiency savings cannot be made, or alternative sources of funding found, there is a risk that the quantity and/or quality of services could suffer.

Research by the London Health Commission suggests that recruitment may also be an issue in the health and care sector in London. Figure 6.19 shows that London has high vacancy rates in the nursing profession relative to other regions in the UK¹⁶¹. In South London, the vacancy rate was 18 per cent while in North Central and East London it was 14 per cent. These rates are higher than all other regions nationally. The definition of a vacant post in this instance is one that is not permanently occupied so it does not take account of agency or temporary staff filling the posts. When agency staff and temporary workers are accounted for, the vacancy rate was estimated at 14 per cent in South London but only 3 per cent in North Central and East London.

Figure 6.19: Nursing vacancy rates by region, 2014

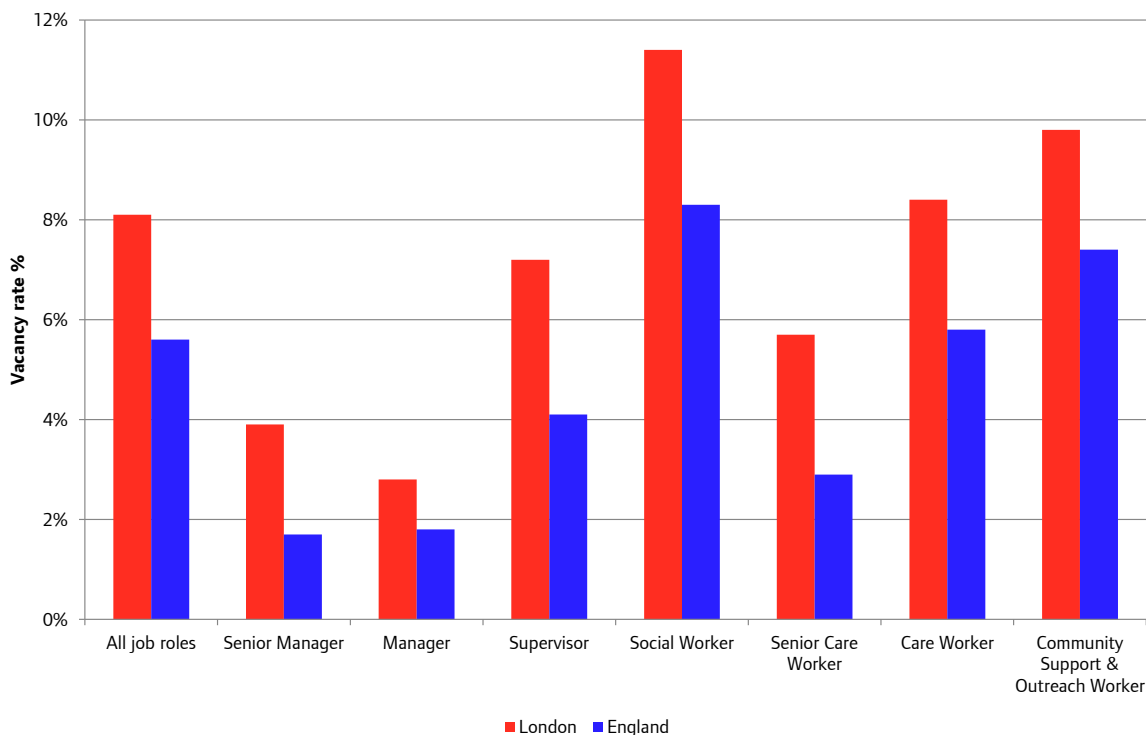


Source: London Health Commission¹⁶²

Note: Regions defined by Local Education Training Board (LETB) boundaries. A vacant post is defined as a post ‘not permanently occupied’. Some vacant posts may be filled by agency or temporary staff. The vacancy rate is therefore the percentage of posts not permanently occupied¹⁶³.

Similarly in the social care sector, vacancy rates in all occupations are above the national average as shown in Figure 6.20.

Figure 6.20: Vacancy rates (%) in the social care sector, London and England



Source: London Health Commission¹⁶⁴

As well as high vacancy rates, the London Health Commission found that the NHS in London has a relatively high turnover of staff which means NHS Trusts in London incur higher recruitment costs. High vacancy rates and low levels of retention are attributed to the high cost of living, in particular the availability of affordable housing, transport costs and the cost of living¹⁶⁵.

Emergency services

The Mayor of London is accountable through the Chair of the London Resilience Forum (LRF)¹⁶⁶ for ensuring that London is resilient to major incidents. Concern has been raised that rising housing costs make it increasingly unaffordable for emergency service workers to live in London. Research by the London Chamber of Commerce (LCCI) found that 54 per cent of London's 'blue light' emergency services frontline personnel now live outside London¹⁶⁷. The risk of emergency services workers living outside London is that it can compromise their ability to respond to a major incident, particularly if the key transport hubs are targeted. If a major incident occurred and London's emergency services were seen as being unable to respond adequately it could lead to loss of life and impact on peoples' willingness to live and/or work in the capital.

The supply of international migrant labour

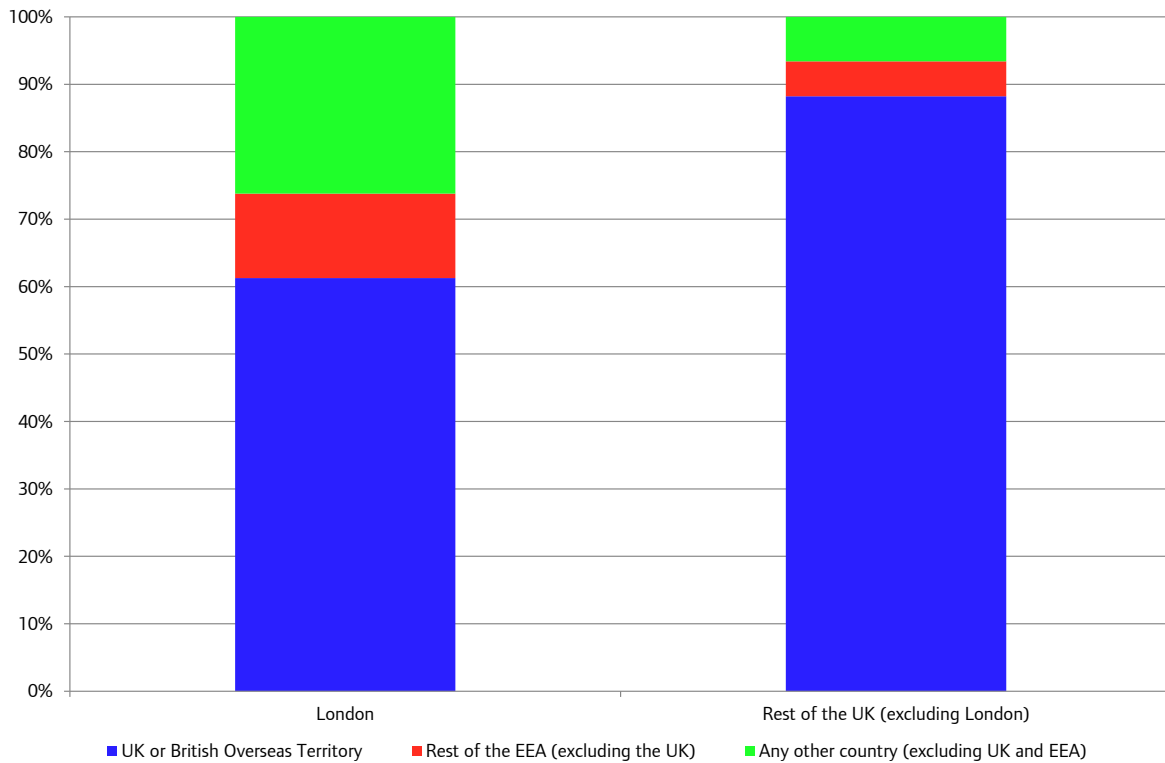
Following the outcome of the EU referendum, the freedom of movement of labour from the EU to the UK is no longer guaranteed. There is a risk that restrictions could impact negatively on the London economy if employers cannot find the skilled labour they need from within the UK and jobs become hard to fill or there are skills gaps. The GLA has for several years expressed concern that tighter controls on immigration from outside the European Union threaten the efficient workings of London's labour market. The implications of Brexit for free movement of labour within the EU heighten these concerns.

There is a broad consensus among economists that labour mobility is welfare-enhancing over the long term although there may be distributional effects¹⁶⁸. Concerns over immigration tend to focus on these distributional effects such as the potential for downward pressure on the wages of native workers or job displacement. However, most academic research in the UK points to a relatively benign impact on the UK labour market (in terms of both wages and employment rates) from EU migration¹⁶⁹ (see the Appendix to Chapter 8 for more on the impact of migration).

Research by the National Institute of Economic and Social Research (NIESR) found beneficial effects of migration such as higher productivity in industries and sectors with a high concentration of migrant workers¹⁷⁰. Moreover, there is evidence that immigration has been good for innovation in London. Research by the Spatial Enterprise Research Centre (SERC) found positive links between migrant entrepreneurs and innovation in London, with diverse management teams significantly more likely to innovate than the average company founder¹⁷¹. This research also found evidence that firms with migrant entrepreneurs on their management teams are better able to enter international markets due to pre-established networks and them having the necessary language skills which make transaction costs lower.

London's economy is more reliant upon workers from overseas than the rest of the UK. As Figure 6.21 shows, 13 per cent of jobs are filled by people born in the Rest of the European Economic Area (EEA) and 26 per cent of jobs are filled by people from outside the EEA. The equivalent figures for the rest of the UK are 5 per cent from the Rest of the EEA and 7 per cent from non-EEA countries.

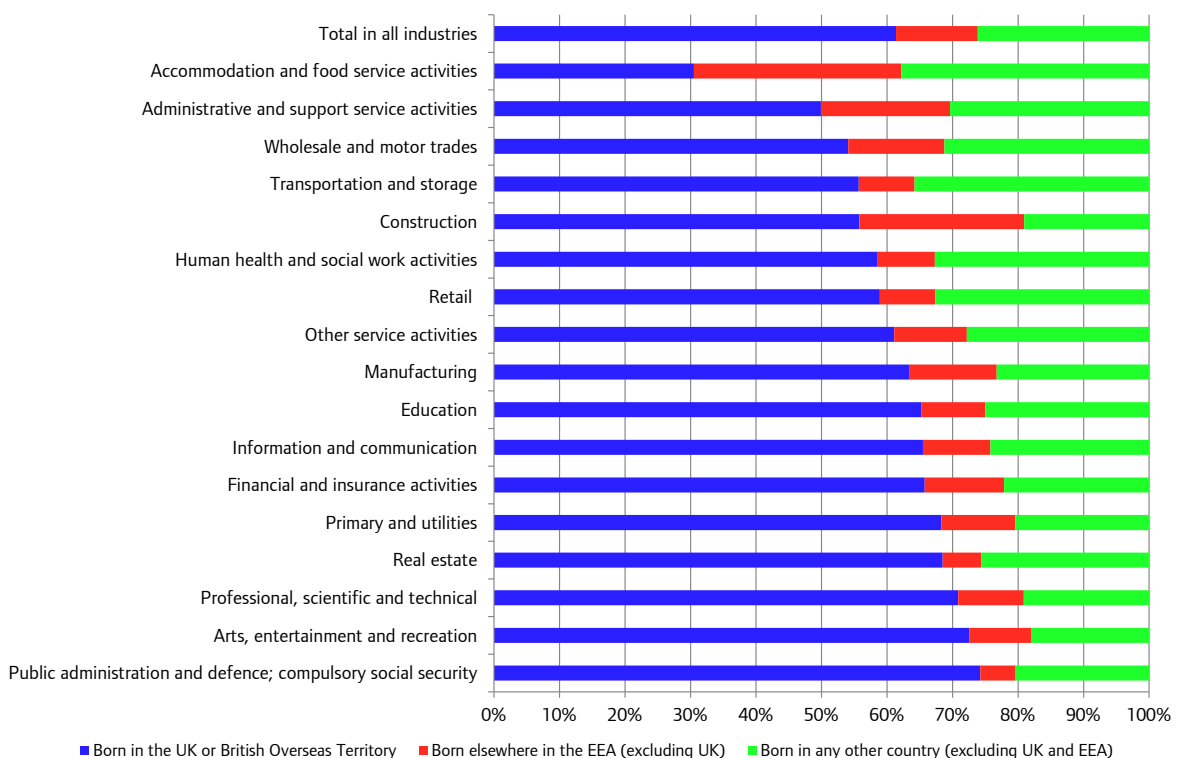
Figure 6.21: Jobs in London and the UK by country of birth (%)



Source: Annual Population Survey, 2015

Figure 6.22 shows a breakdown of jobs by industry and country of birth. Sectors particularly reliant on labour from overseas include ‘Accommodation and food services’ and ‘Administrative and support services’. These industries have high proportions of people born in the EEA and also outside the EEA. The construction sector is particularly reliant on people born in the EEA.

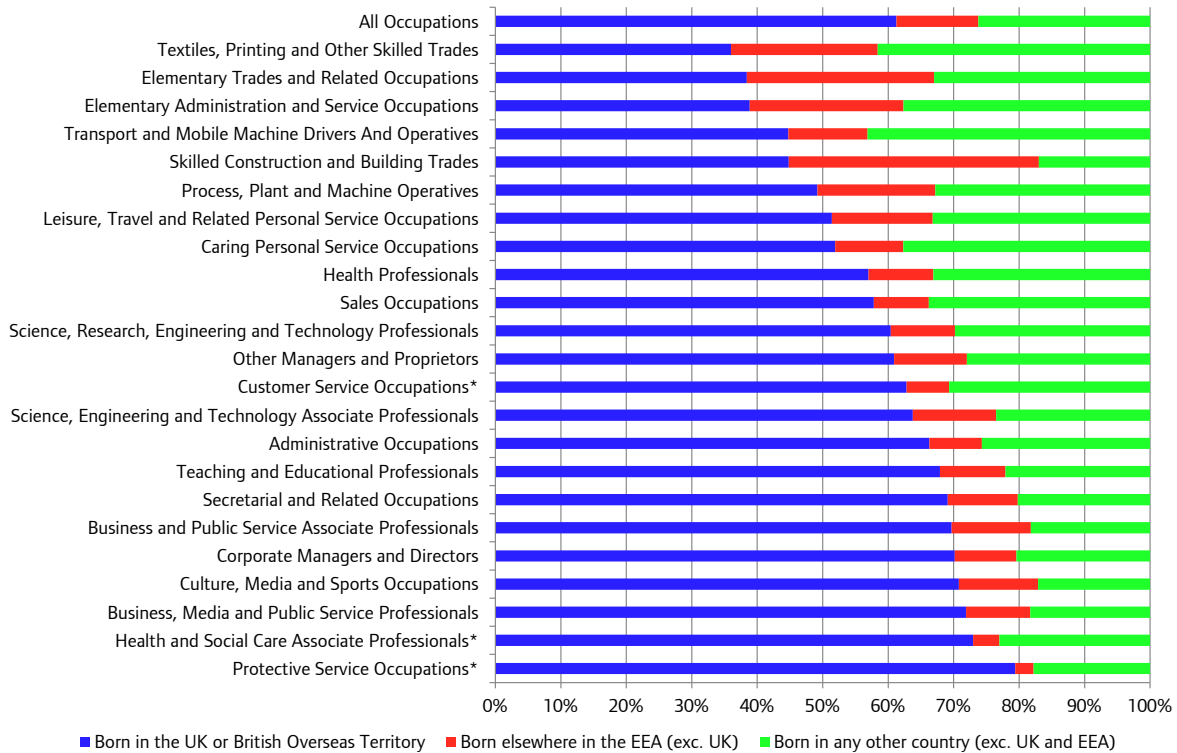
Figure 6.22: Jobs by industry in London by country of birth



Source: Annual Population Survey, 2015

Figure 6.23 shows a breakdown of occupations in London by country of birth. Textiles, printing and elementary trades including administration and service occupations have high numbers of people born overseas. Again, the reliance on labour from the EEA can be seen in construction and building related trades.

Figure 6.23: Occupations in London by country of birth

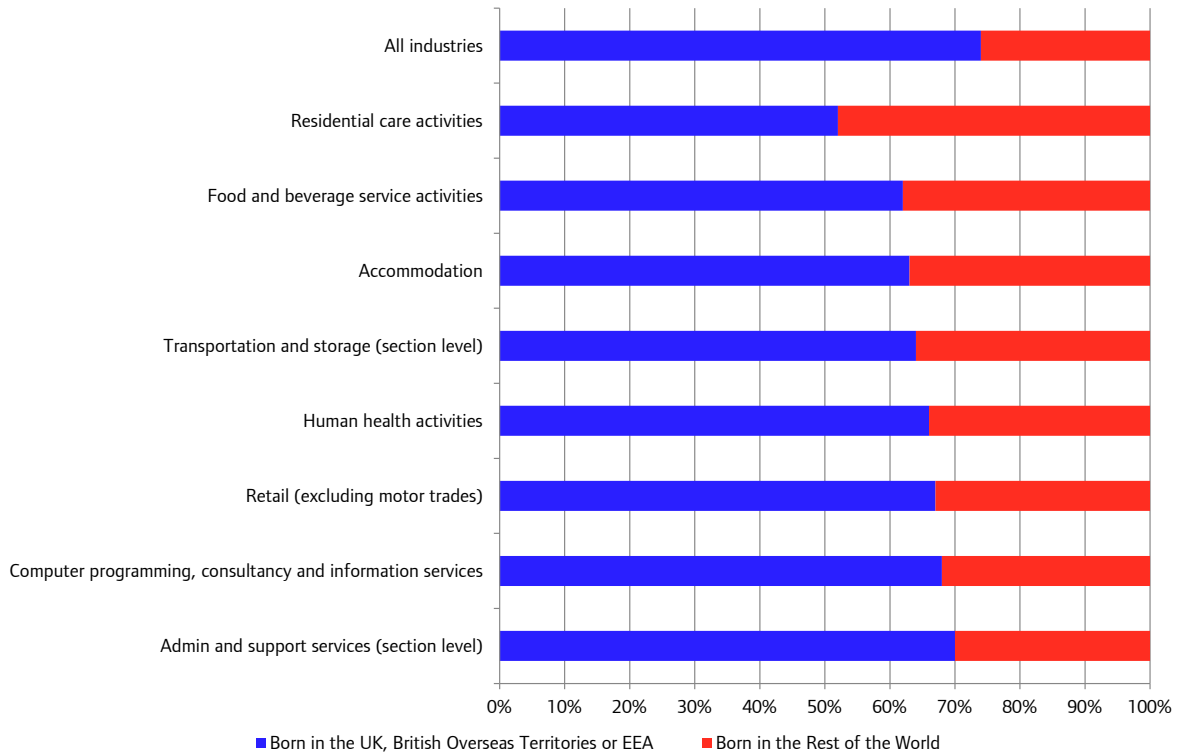


Source: Annual Population Survey, 2015

Note: Occupations marked with an asterisk (*) symbol are based on very small sample sizes and should therefore be treated with caution as they are not robust.

In recent years the Government has moved to introduce stricter controls on international migration from outside the European Union. One in four jobs in London in 2015 was filled by someone born outside the UK/EEA¹⁷². ‘Residential care activities’ (48 per cent), ‘Food and beverage service activities’ (38 per cent), and ‘Accommodation’ (37 per cent) have the highest proportions of jobs filled by people born outside the UK/EEA compared to the average for all sectors (26 per cent). Looking closer at sub-sectors (see Figure 6.24), some ‘high value’ activities such as Computer programming, consultancy and information services (32 per cent) have above average proportions of jobs filled by non-EEA residents. These are activities in which London has a particular specialism and which have seen significant growth.

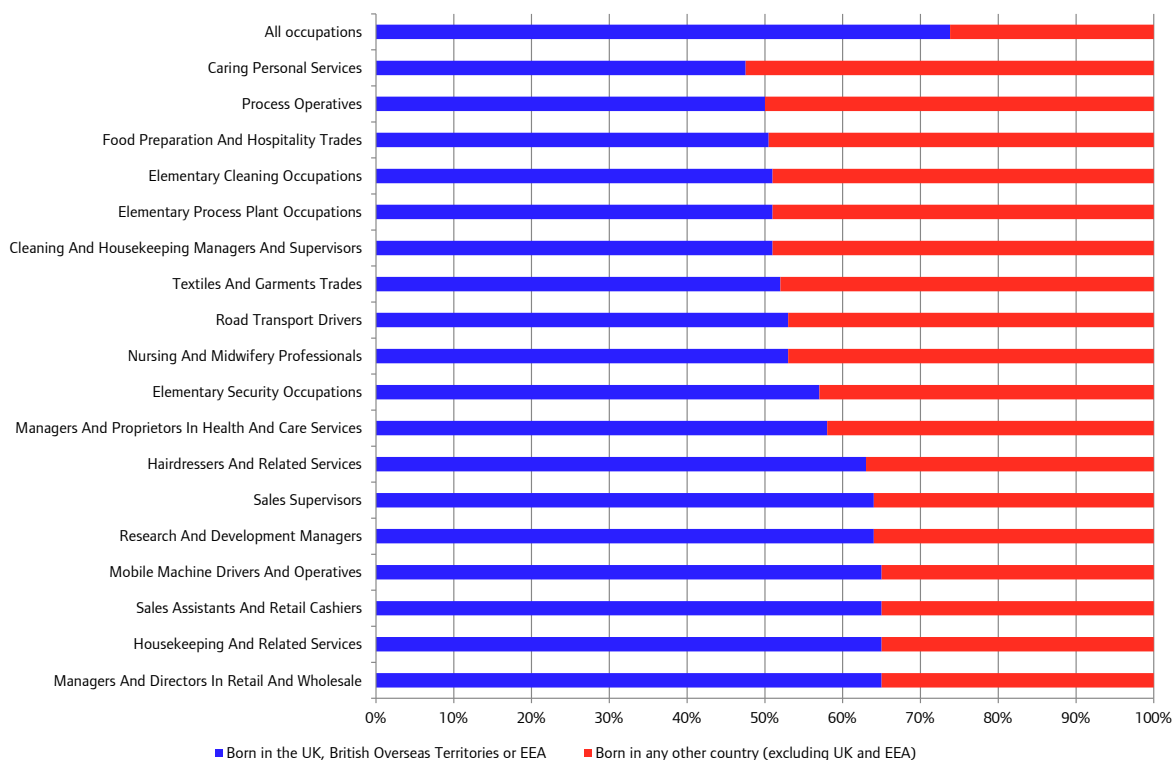
Figure 6.24: Selected sectors (division-level) with high proportions of jobs filled by people born outside the European Economic Area (% of jobs), 2015



Source: ONS Annual Population Survey, 2015¹⁷³

Figure 6.25 shows more detailed set of selected occupations with particularly high proportions of jobs filled by people born outside the EEA. Occupations especially reliant on people born outside the EEA include: carers (53 per cent), process operatives (50 per cent), food preparation and hospitality trades (50 per cent) and elementary cleaning occupations (49 per cent).

Figure 6.25: Occupations in London with high proportions of jobs filled by people born outside the European Economic Area (% of jobs), 2015



Source: ONS Annual Population Survey, 2015

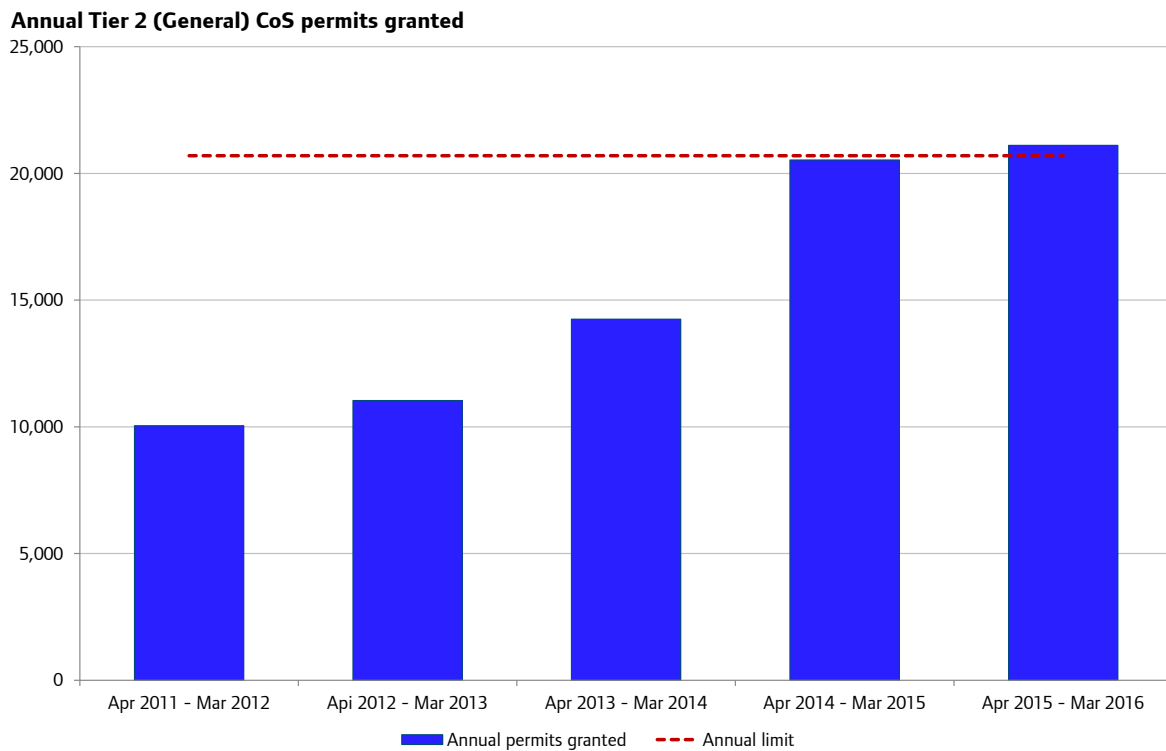
An important route through which skilled workers from non-EEA countries are permitted to work in the UK is the Tier 2 visa system. Other routes within the system are Tier 1 (investors, entrepreneurs and exceptional talent) and Tier 5 (youth mobility and temporary workers)¹⁷⁴. Within Tier 2 there are four routes: General, Intra Company Transfer (ICT), Minister of religion and Sports person. The Tier 2 route as a whole represented just under half of all entry clearance visas granted for work purposes in 2015. Within the Tier 2 route there is a capped element (see below) which represents a smaller subset of approximately 14 per cent of the total of visas granted¹⁷⁵.

Employers must have a license before they can hire from outside the EU and a Certificate of Sponsorship (CoS) for each foreign worker they employ. All applications must meet a minimum salary threshold of £20,800 with different thresholds for different occupations. The Government announced that this minimum threshold for experienced workers would increase to £30,000 by April 2017. The salary threshold for new entrants (i.e. graduates) will remain at £20,800. From April 2016, Tier 2 migrants applying for Indefinite Leave to Remain in the UK will need to earn a minimum £35,000 per year unless they are on the Tier 2 shortage occupation list¹⁷⁶ or scientists and researchers in a PhD level job.

Under the Tier 2 (General) scheme the number of permits is capped at 20,700 a year (an average of 1,725 per month¹⁷⁷). When the cap is reached, a points-based system gives priority to certain applications, including those for jobs that cannot be filled from the domestic UK market and which have passed the Resident Labour Market Test; those on the Shortage Occupation List (SOL); and applications for PhD-level jobs. Jobs with higher salaries also score more points. The application must score a minimum of 21 points to be valid.

Figure 6.26 shows how demand for Tier 2 visas for skilled workers has risen since 2011 when the cap was introduced. Around 10,000 permits were allocated in 2011/12 – significantly below the cap – but this has grown year on year to reach the 20,700 limit in the previous two financial years.

Figure 6.26: The number of restricted certificates allocated to employer sponsors for foreign workers in Tier 2 (General), 2011/12 – 2015/16



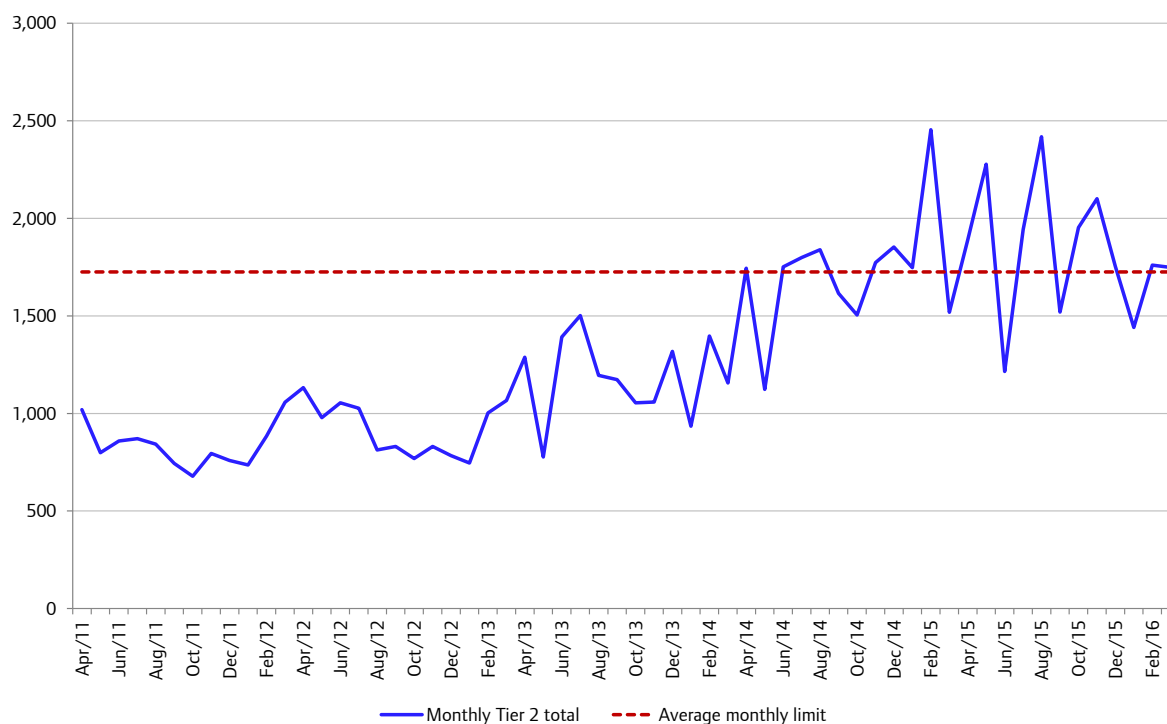
Source: Home Office¹⁷⁸

Note: In 2015/16, 22,017 certificates were allocated but 2,230 were returned unused.

In a number of months in 2015, the operation of the cap led to much higher points requirements and applications for certificates of sponsorship being refused. Should demand for permits continue to rise and the cap remains the same then increasingly a higher salary will be required for skilled migrants to enter the UK.

Figure 6.27: The number of restricted certificates allocated to employer sponsors by month, for non-EEA workers in Tier 2 (General)

Monthly Tier 2 (general) CoS permits granted



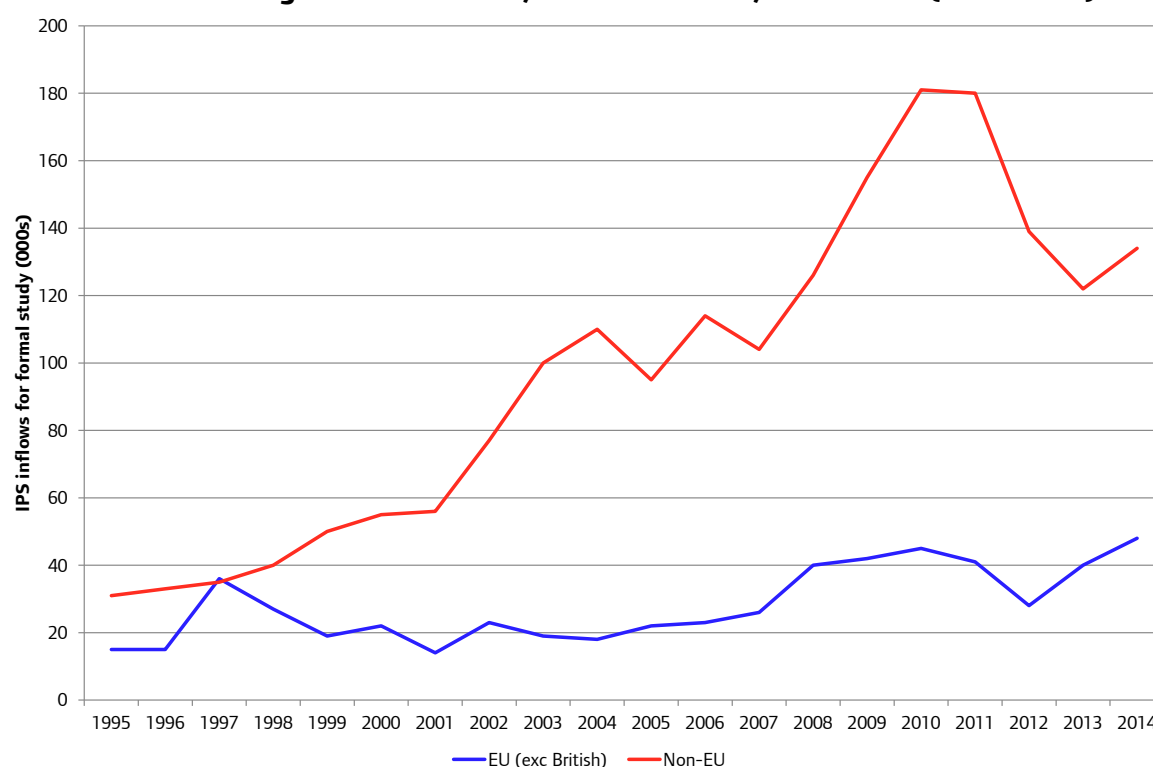
Sources and notes: [Tier 2 allocations Home Office](#), allocations of restricted certificates of sponsorship from March 2015. Data prior to March 2015 is taken from a Home Office FOI response on 29 April 2015. CoS are allocated on a monthly basis with 2,500 available in April and 1,650 in subsequent months. When this limit is not reached, the number of granted applications for subsequent months can be higher than this limit as CoS are carried over from the previous month.

A number of commentators have argued that the operation of the cap is potentially damaging to the economy if it prevents employers hiring the skilled labour they need¹⁷⁹. The breadth and depth of London's international trade and its concentration of knowledge-based firms means that access to international labour is particularly important.

International students

International students are part of the immigration debate because those staying for more than 12 months are included in the net migration statistics cited by Government. In the case of non-EEA students, immigration is managed through Tier 4 of the visa system. From 2010 onwards, the Government introduced more stringent regulations to address 'abuse' of the system whereby a student visa had been viewed by some as a backdoor through which to work in the UK. These conditions included: tighter English language requirements, restrictions on dependants coming to the country and rights to work¹⁸⁰. In April 2012, legislation was introduced which meant non-EEA graduates wishing to stay on to work in the UK after their studies now have four months in which to find a job with a registered sponsor company that will support their application via the Tier 2 visa route. Those switching from a Tier 4 to a Tier 2 visa are not counted in the cap discussed above but they must satisfy the Home Office's criteria including a minimum salary threshold of £20,800. This replaced the automatic two-year post-study work visa to which students were previously entitled.

These stricter conditions have led to a fall in the numbers of some international students enrolling at British universities. Figure 6.28 shows data on inflows of migrants for formal study from the International Passenger Survey (IPS). The number of non-EU students coming to the UK fell from a peak of 180,000 in 2011 to 134,000 in 2014.

Figure 6.28: Student migration to the UK, EU and non-EU, 1995-2014 (thousands)

Source: International Passenger Survey (IPS), ONS long-term migration statistics, table 3.08.

Notes: Data is presented for the year-ending in June. IPS estimates are not-adjusted to account for changes in status between visitors and migrants that occur following entry to the UK.

The risk is that talented graduates are lost to competitor universities in the US, Australia, Germany and Canada due to the tighter controls. These countries treat students as temporary even if they stay for more than a year and actively target an increase in international student numbers. Research by PWC and London & Partners found that international (non-EU) students studying at London universities contributed £2.3 billion in net benefits to the UK economy in 2013-14¹⁸¹. This impact was principally from subsistence spending and the impact of fees paid directly to London universities. China was London's biggest market in terms of both student numbers and local spend followed by the United States and India.

6.4.2.3 Infrastructure

With London's population and workforce projected to grow over the next 20 years, infrastructure will come under increasing pressure. Whilst transport infrastructure is perhaps the most commonly cited area of concern, increases in energy, waste, and water capacity will also be needed to ensure growth is sustainable. Broadband is also increasingly viewed by businesses and residents as an essential utility.

Transport

An efficient and reliable transport network is important for the economy in a number of ways. First, there are time savings benefits as workers shift from unproductive time spent travelling to more productive, or valuable, business and leisure activities. Second, there are agglomeration benefits as businesses and people are brought closer together by transport systems. Third, an efficient transport network can help to facilitate firms' access to markets and lower their transaction costs¹⁸².

Some level of congestion and crowding on London's transport network is arguably the inevitable consequence of having to transport a mass of people to and from central London and the surrounding areas. Dispersing economic activity to avoid these congestion costs, while a potentially desirable objective, could mean fewer agglomeration benefits. The question is therefore whether current levels of congestion and crowding in London are sub-optimal and whether future investment in transport

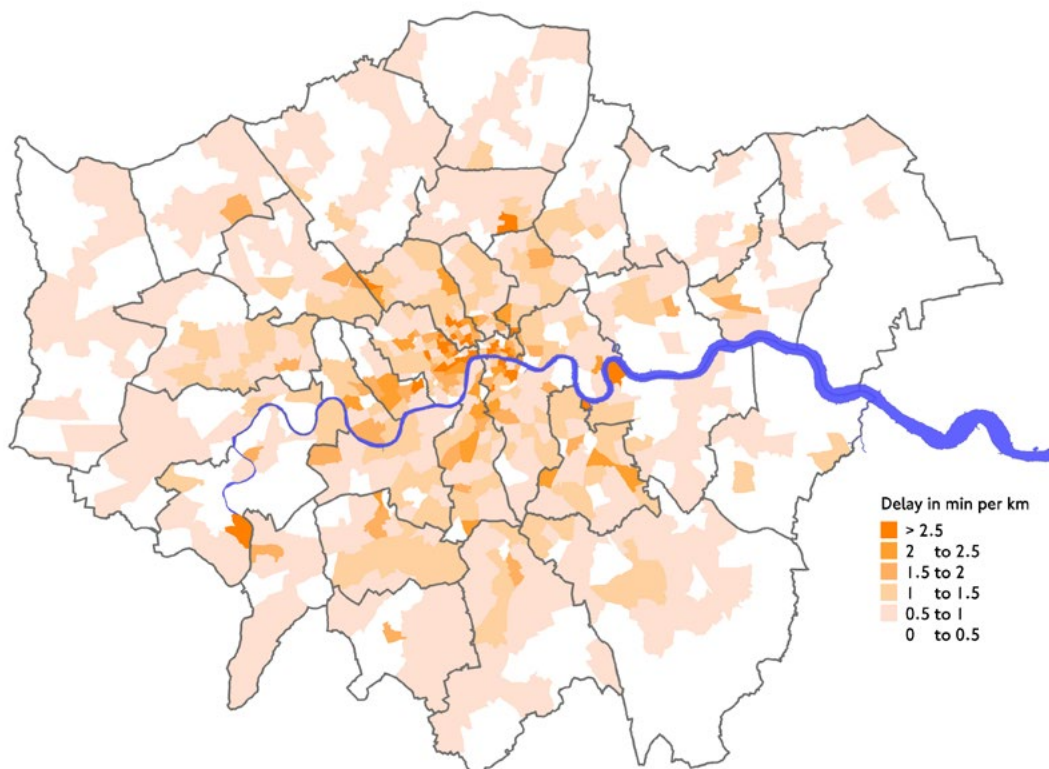
infrastructure can keep pace with rising demand such that London can continue to grow. Improving London’s transport network need not be just about investing in new infrastructure, it could also be about demand management such as road pricing and facilitating other active forms of travel like walking and cycling.

Highways congestion

London suffers from congestion on its roads at peak periods. During the week, the most significant groups affected by congestion in central London are businesses requiring freight and servicing, bus passengers and people travelling by taxi. Vans are a significant part of traffic in London and made up 14 per cent of vehicle kilometres travelled in 2014¹⁸³.

Map 6.2 shows highway congestion at morning peak periods in 2011 measured by the time delay per kilometre. Links on the inner ring road as well as some links inside the Congestion Charging Zone and on key routes such as the Blackwall Tunnel and North and South Circulars show the greatest level of delay. More moderate delays exist across London, particularly on the radial routes.

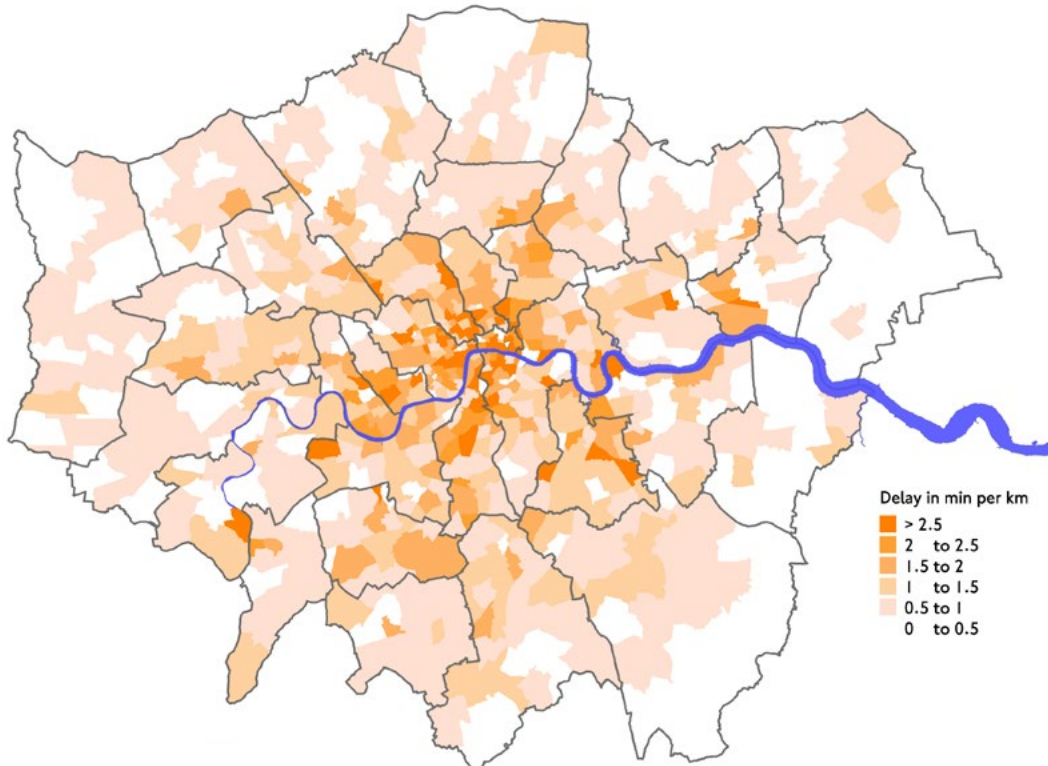
Map 6.2: Highway congestion, morning peak 2011



Source: TFL Planning, Strategic Analysis

Increasing demand driven by population and employment growth will lead to more congestion on many major roads in the future as shown in Map 6.3 which models congestion in London in 2041. The model shows a general deterioration in congestion in most areas across London with the greatest increase in delays in central areas with problems also emerging in east London (particularly on the A13), as well as other points on the North and South Circulars. It should be noted that while this indicates that journeys made by car in central London will be slower in future, continued investment in public transport and cycling could mean that a greater number of journeys can be made by other modes more efficiently.

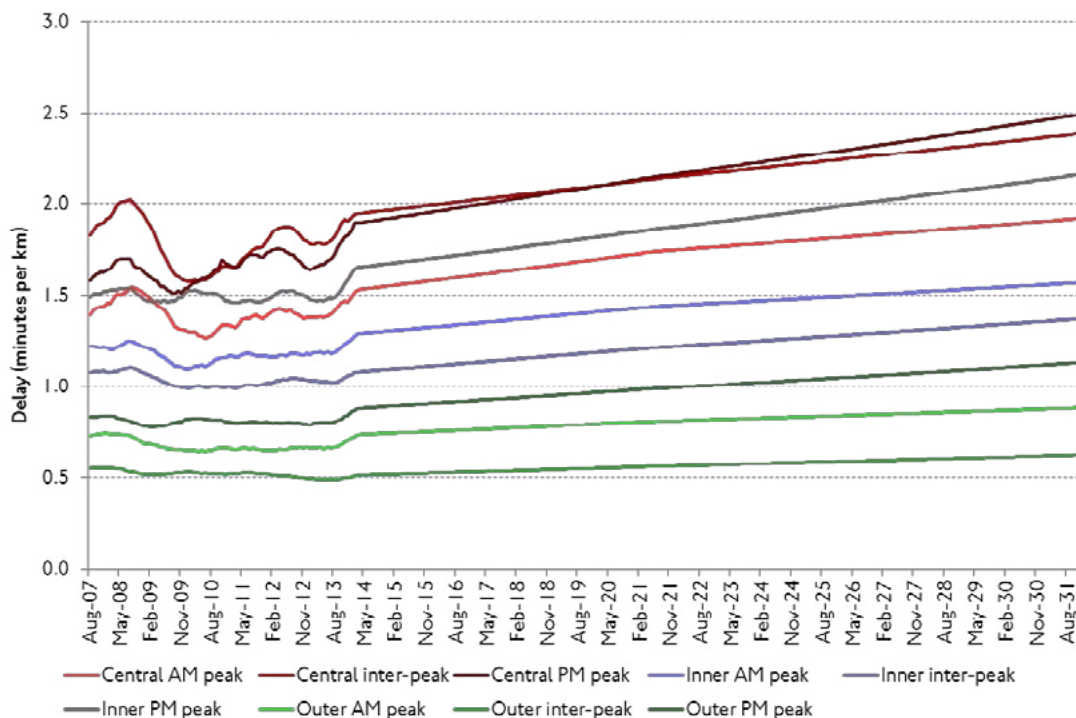
Map 6.3: Highway congestion, morning peak 2041



Source: TfL Planning, Strategic Analysis¹⁸⁴

Figure 6.29 shows the number of minutes delay per kilometre in different parts of London at morning peak (07:00-10:00), afternoon peak (16:00-19:00) and inter-peak periods. Central London suffers the most from congestion on this measure and delays are forecast to rise in all areas of London in future years.

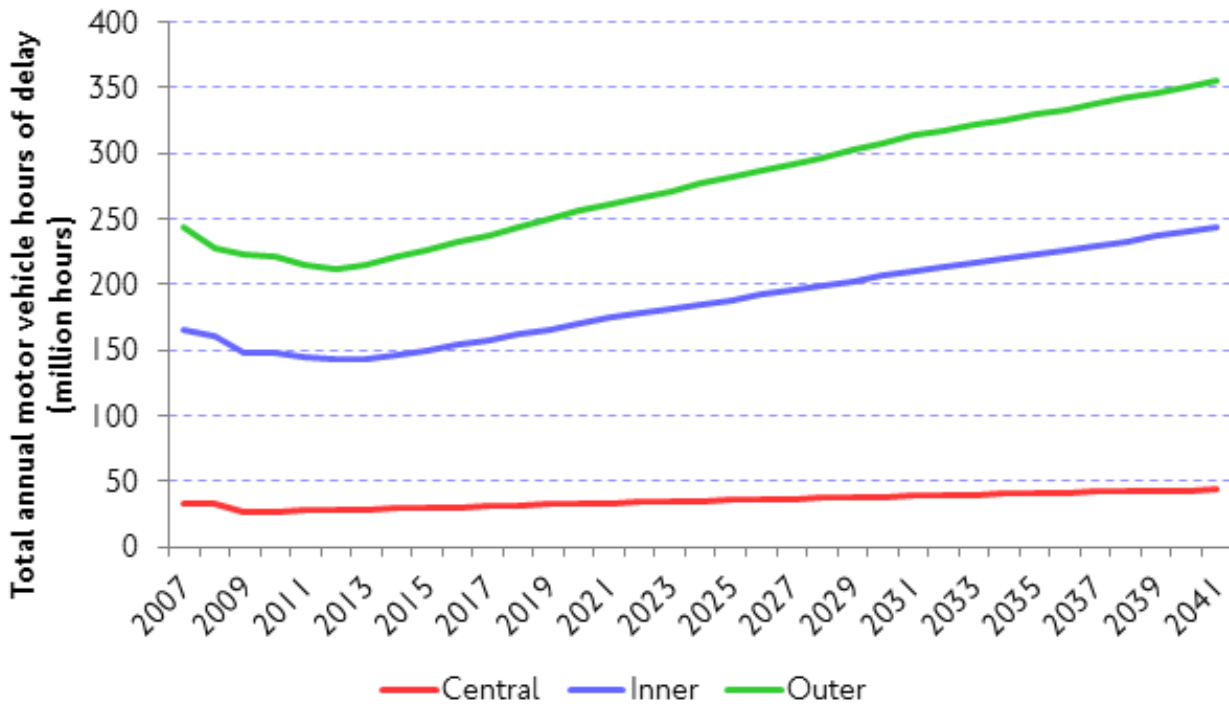
Figure 6.29: Delay by functional sector of London and time period, 12 month rolling average.



Source: TfL Planning, Strategic Analysis¹⁸⁵.

Travel in outer London is more car dependent as trip makers have fewer alternatives and the local economy is therefore more reliant on an efficient road network to transport goods and people. Because of the greater reliance on motor vehicles in outer London, the total time lost to congestion on roads is higher despite it being ‘less congested’ on a minutes per kilometre basis. Figure 6.30 shows total time lost to congestion each year in central, inner and outer London areas. This is calculated on the basis of total travel time above the time a journey would have taken in uncongested conditions (defined as night time travel conditions). This suggests that the total hours of delay each year for motorists will grow fastest in outer London.

Figure 6.30: Total delay experienced by motor vehicles in London



Source: TfL Planning, Strategic Analysis¹⁸⁶

Comparing London with other European cities, Highways in London are among the most congested according to INRIX, a provider of real-time traffic information¹⁸⁷. London commuter zone drivers wasted an average of 96 hours idling in traffic in 2014 – the highest in Europe (see Table 6.8). Of the 94 European cities analysed in the report, nearly half (48 per cent) experienced an increase in traffic compared to 2013.

Table 6.8: Europe's most congested cities in 2014 (ranked by annual hours wasted)

2014 Rank	2013 Rank	Metropolitan area	Hours wasted in traffic 2014	Difference in comparison to hours wasted in 2013
1	2	London (commuter zone)	96	14
2	1	Brussels	74	-9
3	6	Cologne	65	9
4	3	Antwerp	64	-14
5	5	Stuttgart	64	4
6	10	Karlsruhe	63	10
7	7	Milan	57	1
8	13	Düsseldorf	53	4
9	15	Utrecht	53	5
10	9	Ghent	52	-2
11	16	Gr. Manchester	52	6
12	12	S Gravenhage	51	2
13	14	Hamburg	48	0
14	17	Munich	48	4
15	4	Rotterdam	48	-15

Source: INRIX

Total time wasted in traffic in London is significantly higher than the UK average, which was 30 hours per person in 2014. Indeed, all of the UK's most congested roads, as measured by annual hours wasted, are within London according to INRIX.

Table 6.9: The UK's most congested roads in 2014 (ranked by annual hours wasted)

Rank	Area	Road(s)	From	To	Distance (miles)	Worst peak period	Worst Day/ Hour	Total Delay per Year (hours)
1	London	A217	Rosehill Roundabout	New Kings Road	10.37	AM	Weds 08:00	138.6
2	London	A215	Albany Road: Camberwell	Shirley Road: Croydon	9.55	PM	Fri 18:00	119.72
3	London	A4	Henlys Roundabout: Hounslow	Holborn Circus	14.68	AM	Weds 08:00	113.44
4	London	A4	Aldwych	Henlys Roundabout: Hounslow	14.18	PM	Weds 18:00	108
5	London	A23	Thornton Heath	Westminster Bridge	8.62	AM	Tues 08:00	95.96

Source: INRIX

The economic cost of congestion is significant. A study by INRIX and Cebr estimated the annual cost of congestion in London to be £5.4 billion in 2013 and they forecast this could rise to £9.3 billion by 2030, a cumulative cost over the period of £130 billion¹⁸⁸. This includes: direct costs such as the value of fuel and time wasted from workers being stuck in traffic (or having to allow time for this eventuality) rather than being productive at work; and indirect costs such as higher freighting and business costs from company vehicles idling in traffic, which are passed on as additional costs to households.

Public transport crowding

There has been progressive modal shift from private forms of transport to public transport in London (see Chapter 3 for more on travel patterns in London), which together with growing population and employment, has contributed to growing pressure on the public transport network. According to TfL eight in ten arrivals to central London in the morning peak are by rail, underground or DLR. These journeys must then disperse by foot, cycle or bus to their final destination. TfL expects a million additional daytime public transport trips to be made by 2041 to, from and within central London.

Crowding on public transport has significant impacts on individuals and the economy. Customers find travelling in crowded conditions uncomfortable and stressful. Research by ONS suggests that other things being equal, commuters have lower life satisfaction, less of a sense that their daily activities are worthwhile, lower levels of happiness and higher anxiety on average than non-commuters.¹⁸⁹ Crowding has economic implications where it increases journey times as trains become delayed or customers have to wait for a less crowded train or find an alternative route. Some groups are particularly affected by crowding such as those with mobility impairments who can find it difficult or impossible to travel in crowded conditions.

The volume of passengers using public transport in London at peak hours far surpasses that of other major cities in England and Wales due to its large commuter population. This can be seen by examining morning peak time rail passenger arrivals across major city centres, as shown in Map 6.4. In 2014 during morning peak, 563,000 passengers arrived by rail into central London (Zone 1 of the travelcard area), a 3 per cent increase on the previous year and just over one million passengers arrived into central London by rail across the whole day¹⁹⁰. London Bridge station alone has nearly double the number of passenger arrivals in a given day than all Birmingham stations combined and over 3.5 times the number of arrivals at the morning peak¹⁹¹.

It is therefore perhaps unsurprising that crowding is more of an issue in London. There are a number of different ways of analysing crowding on public transport. One measure used by the Department for Transport (DfT) is 'Passengers in excess capacity' (PiXC) which is the number of standard class passengers on a service that are in excess of the standard class capacity expressed as a percentage¹⁹². A higher PiXC percentage represents a worse crowding level. DfT¹⁹³ indicate that on a typical autumn weekday in 2014 overall peak crowding was higher in London than in all other major UK cities, with 4.1 per cent of passengers in excess of capacity (PiXC) compared to 1.4 per cent PiXC across the other 10 cities. Further detail is provided in Table 6.12 of the appendix to this chapter.

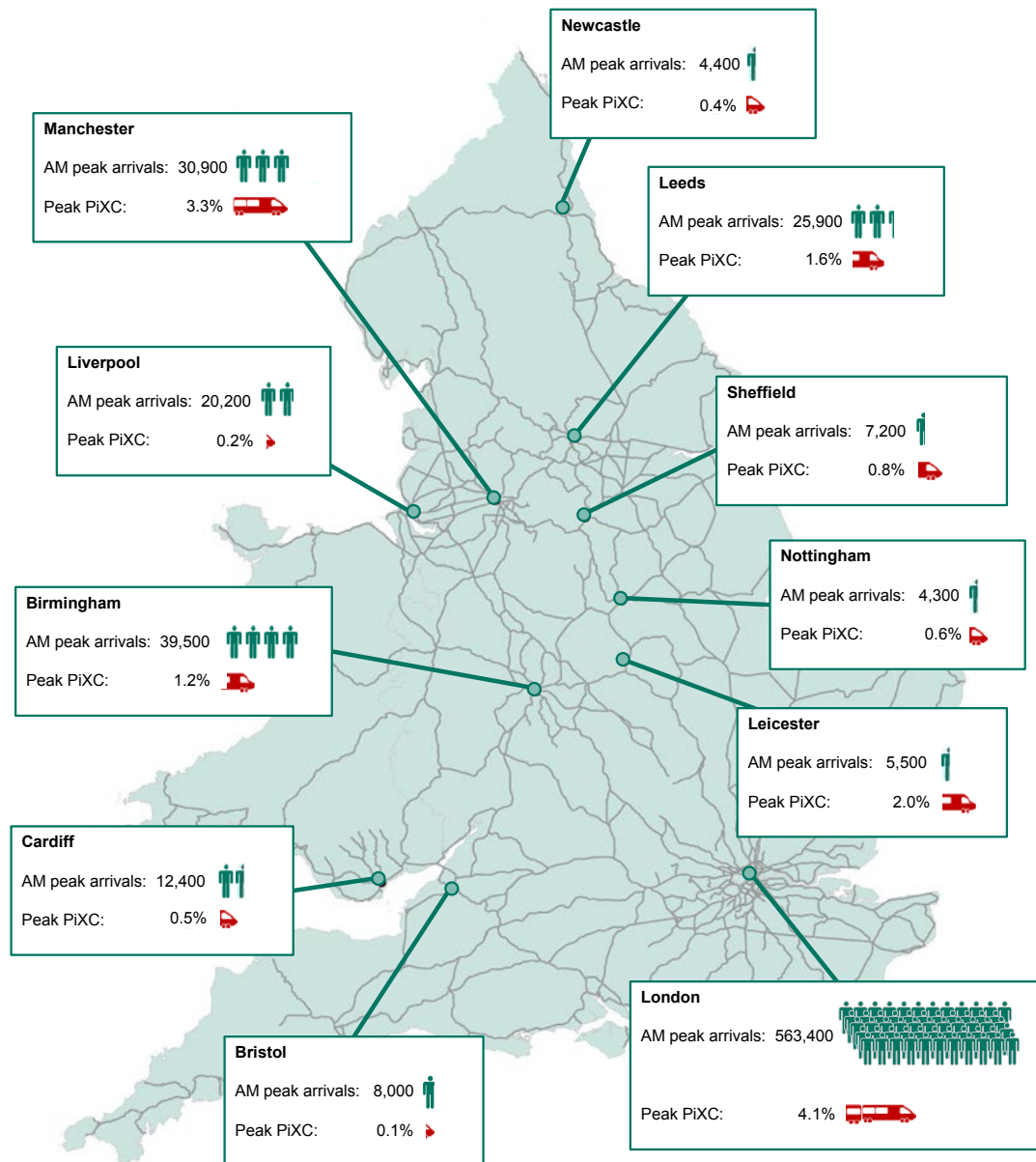
Map 6.4: Rail passenger numbers and crowding on weekdays in major cities in England and Wales, 2014



Rail Executive



Rail passenger numbers and crowding on weekdays in major cities in England and Wales: 2014



Key

AM peak arrivals is the number of passengers arriving into the city centre by national rail on a typical autumn weekday in 2014 during the three hour morning peak (7-10am).

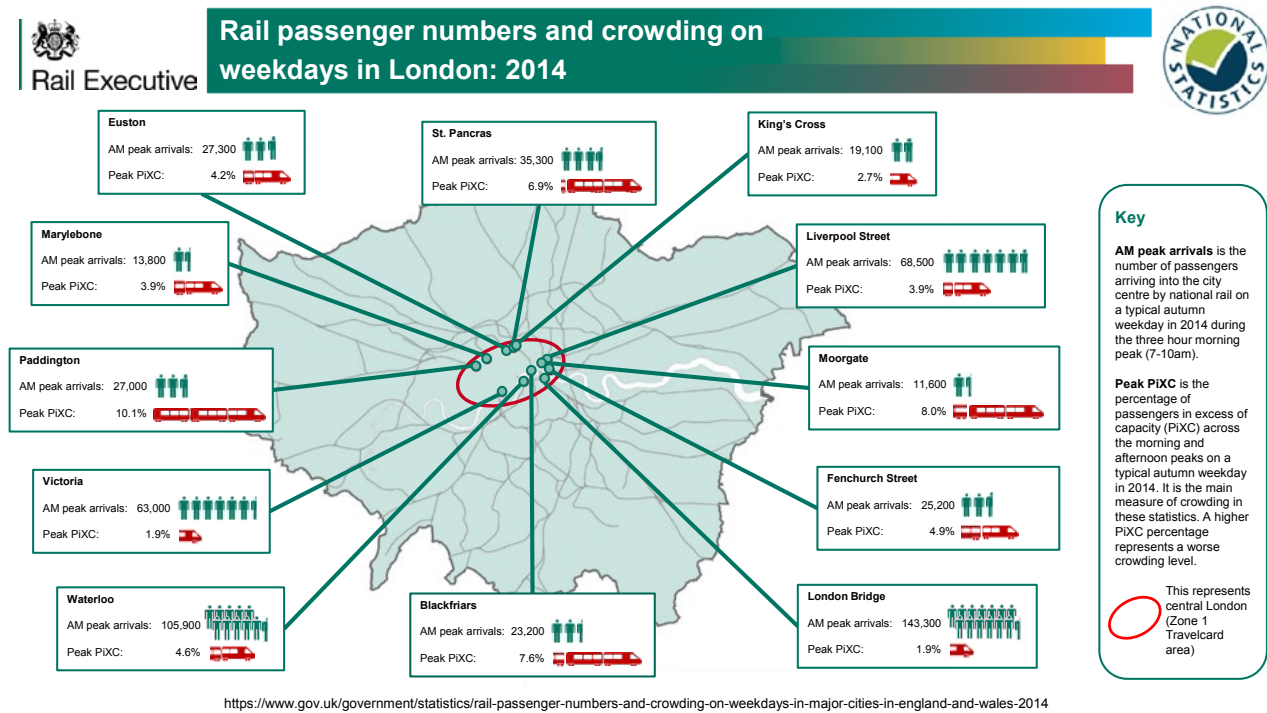
Peak PiXC is the percentage of passengers in excess of capacity (PiXC) across the morning and afternoon peaks on a typical autumn weekday in 2014. It is the main measure of crowding in these statistics. A higher PiXC percentage represents a worse crowding level.

<https://www.gov.uk/government/statistics/rail-passenger-numbers-and-crowding-on-weekdays-in-major-cities-in-england-and-wales-2014>

Source: Department for Transport¹⁹⁴

Map 6.5 shows passenger numbers and crowding at London’s major national rail terminals. In 2014, the largest numbers of passengers arrived at London Bridge (143,300) and Waterloo (106,000) during morning peak. However, crowding as measured by PiXC was more severe at Paddington (10.1 per cent), Moorgate (8.0 per cent) and Blackfriars (7.6 per cent). Further detail on crowding including the number of passengers standing is provided in Table 6.13 of the Appendix.

Map 6.5: Rail passenger numbers and crowding on weekdays in London, 2014



Source: Department for Transport

Table 6.10 shows PiXC percentages in London over the period 1990 to 2014. This suggests that crowding on peak time trains has been a persistent problem in London since 1990 but it appears to have worsened in recent years with PiXC reaching its highest level in 2014 at 5.4 per cent.

Table 6.10: Passengers in excess of capacity (PiXC) on a typical autumn weekday on London & South East train operators' services, annual from 1990

Year	AM peak (07:00-09:59)	PM peak (16:00-18:59)	Both peaks
1990	4.3%	2.2%	3.3%
1991	3.8%	2.1%	3.0%
1992	3.7%	1.5%	2.7%
1993	3.3%	1.4%	2.5%
1994	3.2%	1.0%	2.1%
1995	3.0%	1.0%	2.1%
1996	2.6%	1.2%	1.9%
1997	3.9%	2.1%	3.1%
1998	3.7%	1.4%	2.7%
1999	3.8%	1.6%	2.8%
2000	5.1%	1.8%	3.6%
2001	5.0%	1.7%	3.6%
2002	3.7%	2.1%	2.9%
2003	3.8%	1.5%	2.7%
2004	4.1%	1.5%	2.9%
2005	4.0%	1.6%	2.9%
2006	4.7%	1.9%	3.4%
2007	4.2%	1.5%	3.0%
2008	4.0%	1.8%	3.0%
2009	2.9%	1.4%	2.2%
2010	4.0%	1.9%	3.0%
2011	4.0%	2.2%	3.2%
2012	4.1%	1.7%	3.0%
2013	4.0%	2.0%	3.1%
2014	5.4%	2.5%	4.1%

Source: Department for Transport

Table 6.11 shows PiXC by train operator indicating that at morning peak in autumn 2014, First Great Western had the highest percentage of passengers in excess of capacity (13.5 per cent) followed by Thameslink (7.4 per cent) and c2c (7.0 per cent).

Table 6.11: Passengers in excess of capacity (PiXC) on a typical autumn weekday by operator, London & South East train operators, 2014

	AM Peak PiXC (7:00 to 9:59)	PM Peak PiXC (16:00 to 18:59)	Overall PiXC
c2c	7.0%	2.4%	4.9%
Chiltern Railways ¹⁹⁵	4.9%	2.8%	3.9%
First Great Western ¹⁹⁶	13.5%	6.0%	10.1%
Govia Thameslink Railway	7.4%	5.1%	6.3%
Greater Anglia ¹⁹⁷	5.5%	2.1%	3.9%
London Midland	5.7%	7.4%	6.5%
London Overground ^{198, 199}	0.0%	0.0%	0.0%
South West Trains	5.5%	3.6%	4.6%
Southeastern	2.8%	0.3%	1.6%
Southern	4.9%	0.7%	3.0%
All London & South East operators	5.4%	2.5%	4.1%

Source: Department for Transport

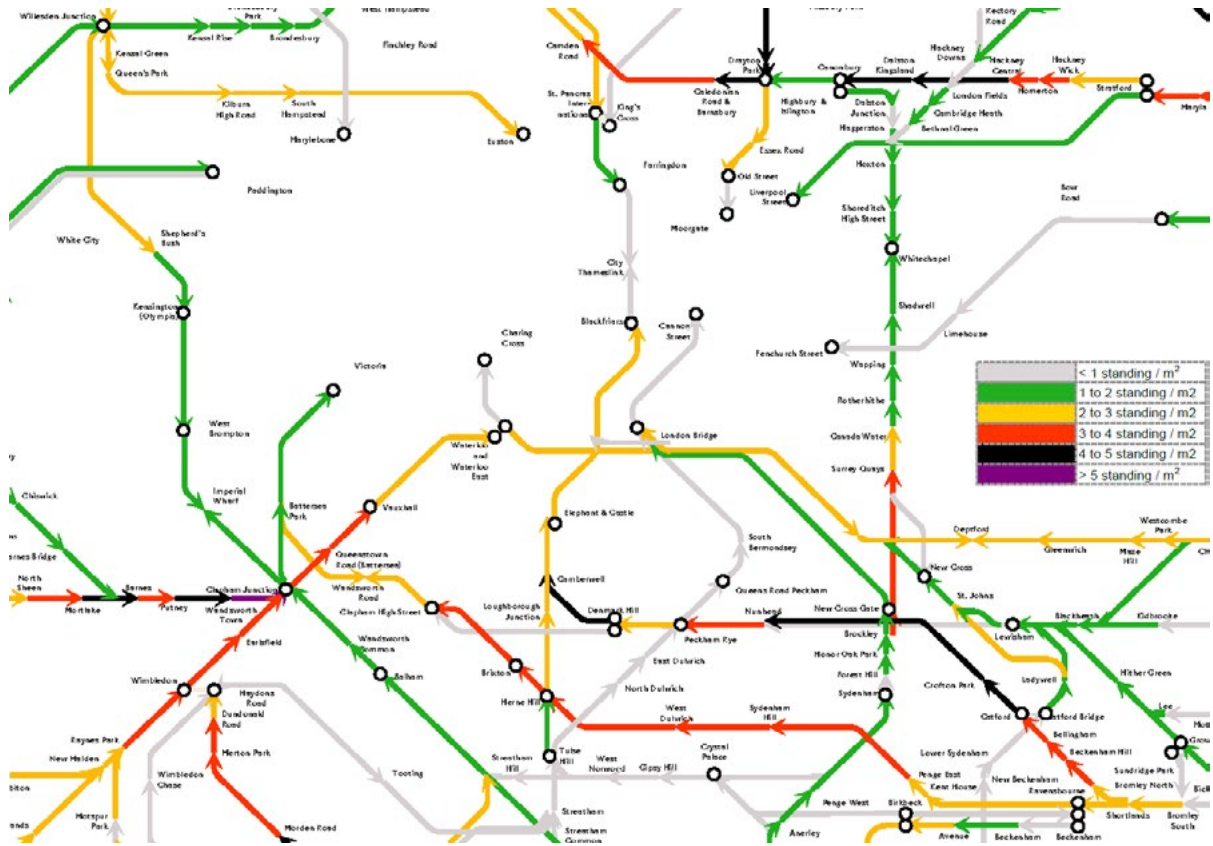
An alternative measure of crowding is the number of passengers per square metre. Research by the University of Greenwich into crowd behaviour in public spaces more generally suggests that crowds of four people per square metre are relatively low risk but if this climbs to six to ten people per square metre it becomes high risk as people become packed so tightly together they are unable to choose how they move²⁰⁰. Map 6.6 shows levels of crowding on the London Underground and DLR network at morning peak periods in 2011 according to this measure. Map 6.7 shows crowding on National Rail routes into London at morning peak in 2011. ‘Crowded’ parts of the line are defined as those with approximately two to three passengers per square metre and ‘very crowded’ lines (marked in red) are those with three to four passengers per square metre. Lines in black are where there are four to five people per square metre, and lines in purple are where there are more than five people standing per square metre, considered to be the maximum levels of crowding.

Map 6.6: London Underground and DLR crowding, morning peak, 2011



Source: TfL Planning, Strategic Analysis²⁰¹.

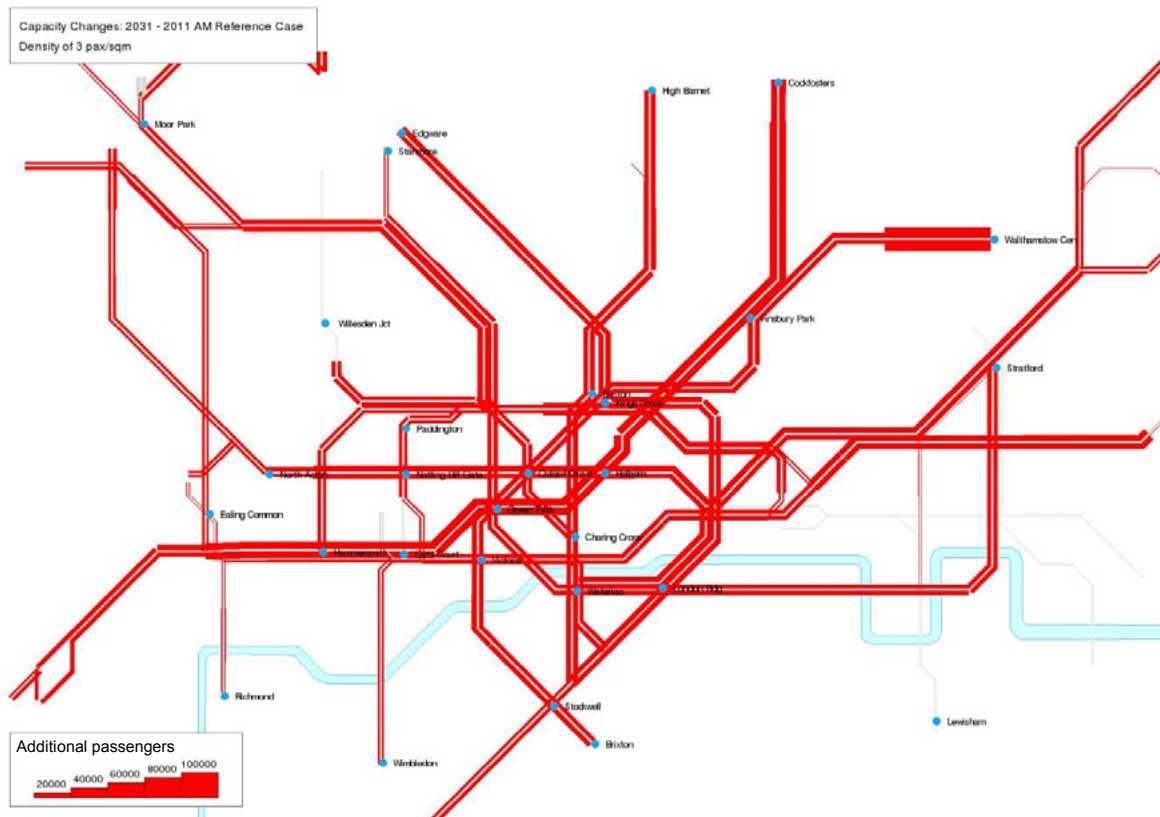
Map 6.7: Rail crowding, morning peak, 2011



Source: TfL Planning, Strategic Analysis²⁰².

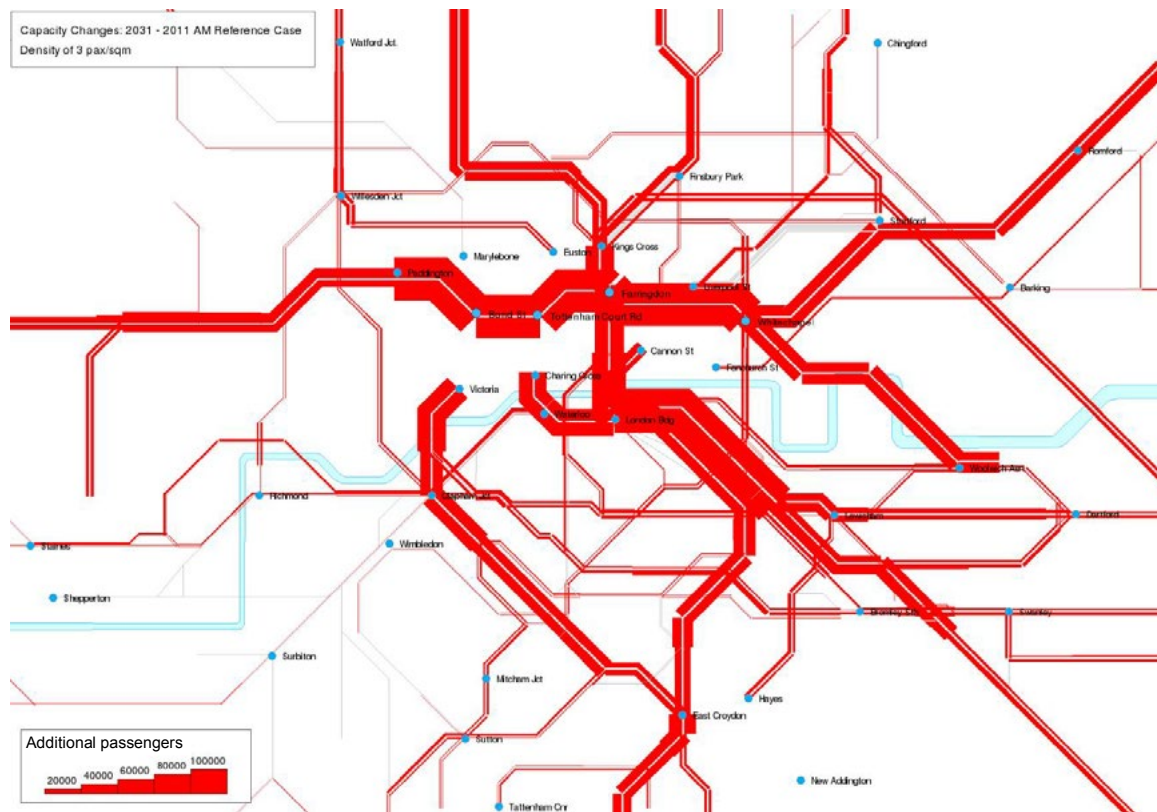
A significant programme of funded rail and underground investment will increase capacity in London. Maps 6.8 and 6.9 show where increases in capacity are expected as a result of new investment. New passenger capacity is created by upgrades to all lines but no significant changes are modelled for the DLR or Tramlink. Thameslink and Crossrail provide new north-south and east-west routes and create significant new capacity at King’s Cross, Liverpool Street, London Bridge, Charing Cross, Victoria and Paddington terminals but not at Waterloo.

Map 6.8: Increase in capacity at morning peak (passenger numbers) from funded schemes on the Underground, 2031



Source: TfL Planning, Strategic Analysis.

Map 6.9 Increase in capacity at morning peak (additional passengers) from funded schemes on National Rail Networks, 2031



Source: TfL Planning, Strategic Analysis.

Despite this new investment, demand is forecast to increase faster than supply. TfL estimate that by 2041 the number of passenger-kilometres travelled exceeding a standing passenger density of two people per square metre is expected to increase by 60 per cent on London Underground and by 150 per cent on National Rail.

Map 6.10 models crowding levels in 2041 factoring in expected demographic and behavioural changes and committed investment including Crossrail. As can be seen, while Crossrail will provide some relief in Zone 1, many parts of the Underground and DLR network will continue to suffer from significant crowding at morning peak. According to TfL's model, by 2041 only three London Underground lines will experience fewer than two people per square metre when entering Fare zone 1, with nine lines experiencing crowding of more than four people per square metre. Furthermore, some lines will experience crowding far outside the central zone, with the Northern line northbound seeing crowding of more than four people per square metre from Balham to Bank (18 minutes travel) and the Central line crowded to a similar level from Leytonstone to St Pauls (17 minutes travel).

Map 6.10: London Underground and DLR crowding, modelled morning peak, 2041



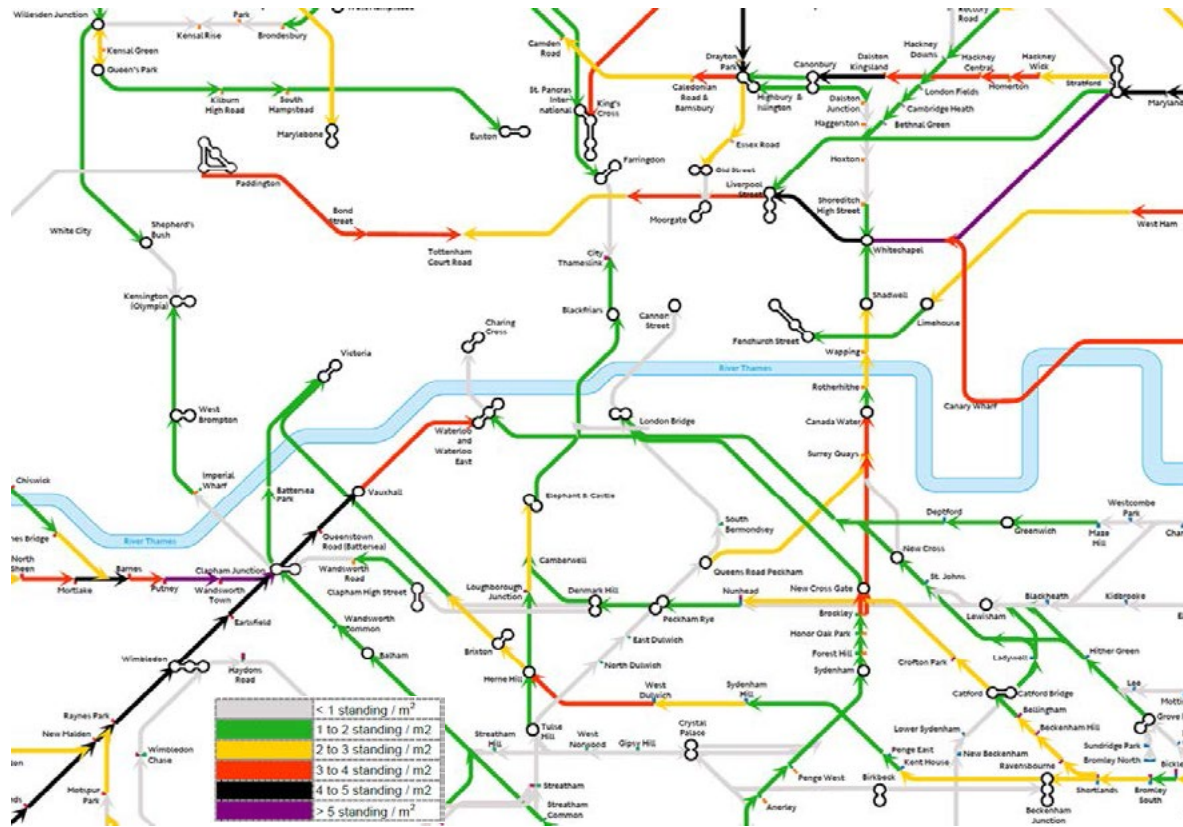
Source: TfL Planning, Strategic Analysis²⁰³

Map 6.11 models crowding on the National Rail network in 2041 accounting for planned TfL investments including Crossrail. On this basis, crowding is expected to be alleviated on some parts of the network where new investment is planned but will worsen on others, for example on trains into Waterloo and Paddington. Crowded travel is expected to increase on most lines between 2011 and 2041 despite upgrades; even new services such as The Elizabeth Line (Crossrail) and Thameslink will experience crowding by 2041. Lines initially relieved by The Elizabeth Line, such as services to Liverpool Street, are expected to experience rapid increases in congestion by 2041. Similarly, whilst Thameslink services are initially relieved by upgrades, crowding then increases rapidly. The exception is that services to Paddington and Euston will be relieved by High Speed 2 over this time period.

Whilst in the short term upgrades provide crowding relief, the substantial rise in demand for travel by 2041, reflecting both population growth and especially the concentration of employment growth in central London, means that crowding will increase considerably. Key areas identified as needing more capacity include:

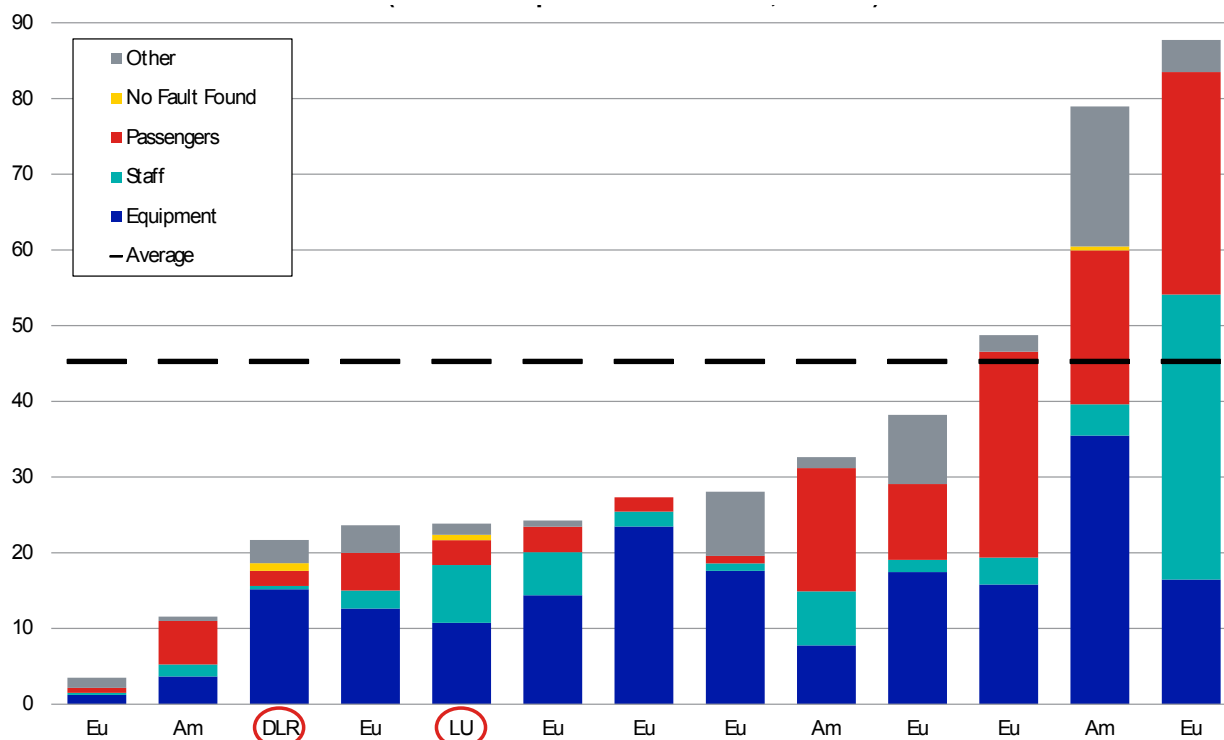
- North East (Victoria, Piccadilly, Central and Northern lines) – South West corridors (Northern, District, and rail lines to Waterloo)
- DLR (Canary Wharf)
- Tramlink (east of Croydon)
- The Elizabeth Line (Ilford to Liverpool Street)

Map 6.11: Rail crowding, modelled morning peak, 2041



Source: TfL Planning, Strategic Analysis²⁰⁴

When compared to similar metro systems in Europe and North America, the London Underground and DLR are relatively reliable networks. Figure 6.31 shows incidents causing a five minute delay across Western Europe and North America metro networks²⁰⁵. The DLR ranks as the third most reliable and London Underground as the fifth most reliable of the major metro networks in Western Europe and America²⁰⁶.

Figure 6.31: Incidents causing a five minute delay per million car kilometre (Western Europe and North America, 2013/14)

Source: TfL

Moreover, despite the level of congestion and crowding on London's transport network, businesses expressed their overall satisfaction with London's transport network in the London Business Survey with 70 per cent of business units saying transport infrastructure within London was good or excellent, 24 per cent saying it was adequate and 4 per cent saying it was poor²⁰⁷.

Airport capacity

Good aviation connectivity is vital for a global city like London. It promotes trade and investment and in doing so generates employment and helps to improve productivity. London's strong services sector, which generates significant export earnings for the UK, is particularly reliant on aviation. Air transport links are also important for attracting tourists to London and for Londoners to be able to travel abroad for leisure which is good for health and wellbeing²⁰⁸.

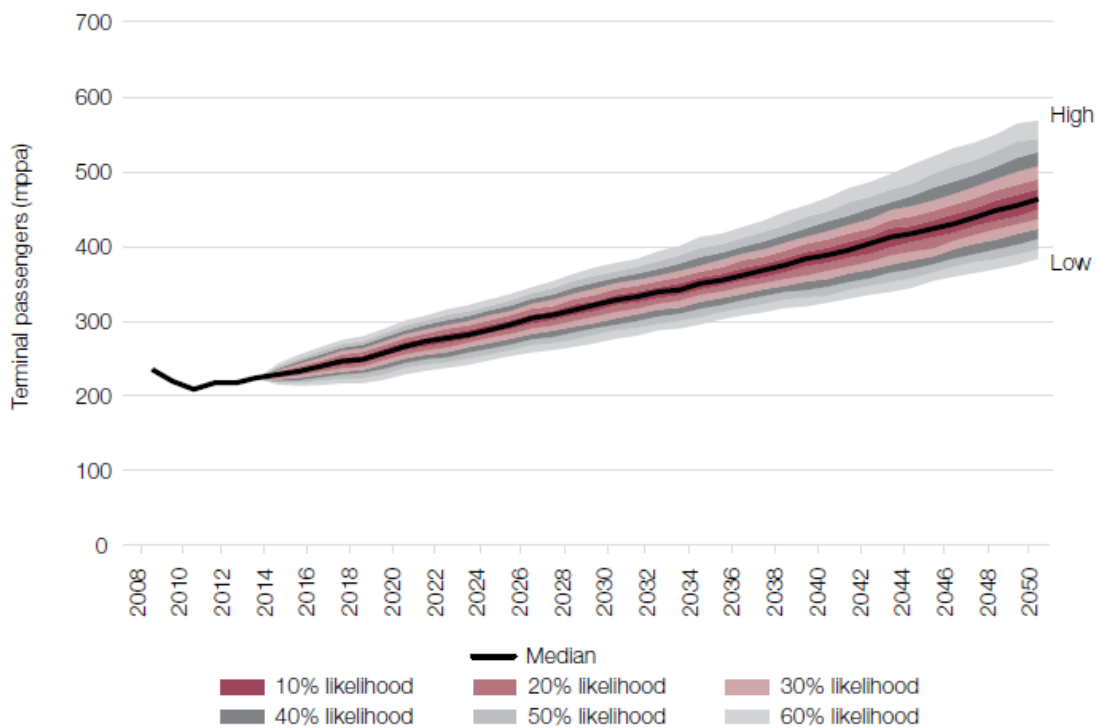
London's airports are amongst the busiest in the world – Heathrow has been at full capacity for many years while Gatwick is operating at 85 per cent capacity and full capacity during peak periods²⁰⁹. Capacity constraints have knock-on impacts in terms of delays and unreliability, making London's airports less resilient to disruptions such as adverse weather. They also mean higher fares, less frequent flights and fewer destinations versus competitor cities²¹⁰. Providing more direct routes, higher frequencies of service and lower fares would have beneficial impacts on businesses by providing time savings and facilitating important connections to export markets.

The Airports Commission carried out a detailed review of the strength of the links to emerging markets from Heathrow compared to other European hubs and Dubai. This showed that Heathrow has comparatively strong links to India (reflecting the UK's historic ties), but poorer links to other emerging economies²¹¹. A key reason cited by the Commission for the UK's underperformance in terms of its long-haul connectivity is the effect of runway capacity constraints in eroding Heathrow's status as an international hub. The airlines operating at the airport, in particular BA and its partners whose hub operation is based there, find it difficult to expand their current networks due to capacity constraints. By 2040, according to forecasts by the Commission, without expansion London could lose

daily connections with up to 20 international cities that it would otherwise have had. The Commission estimated the potential costs of failing to address capacity constraints over a 60-year time period to be £21-23 billion to users and providers of airport infrastructure and £30-45 billion to the wider economy.

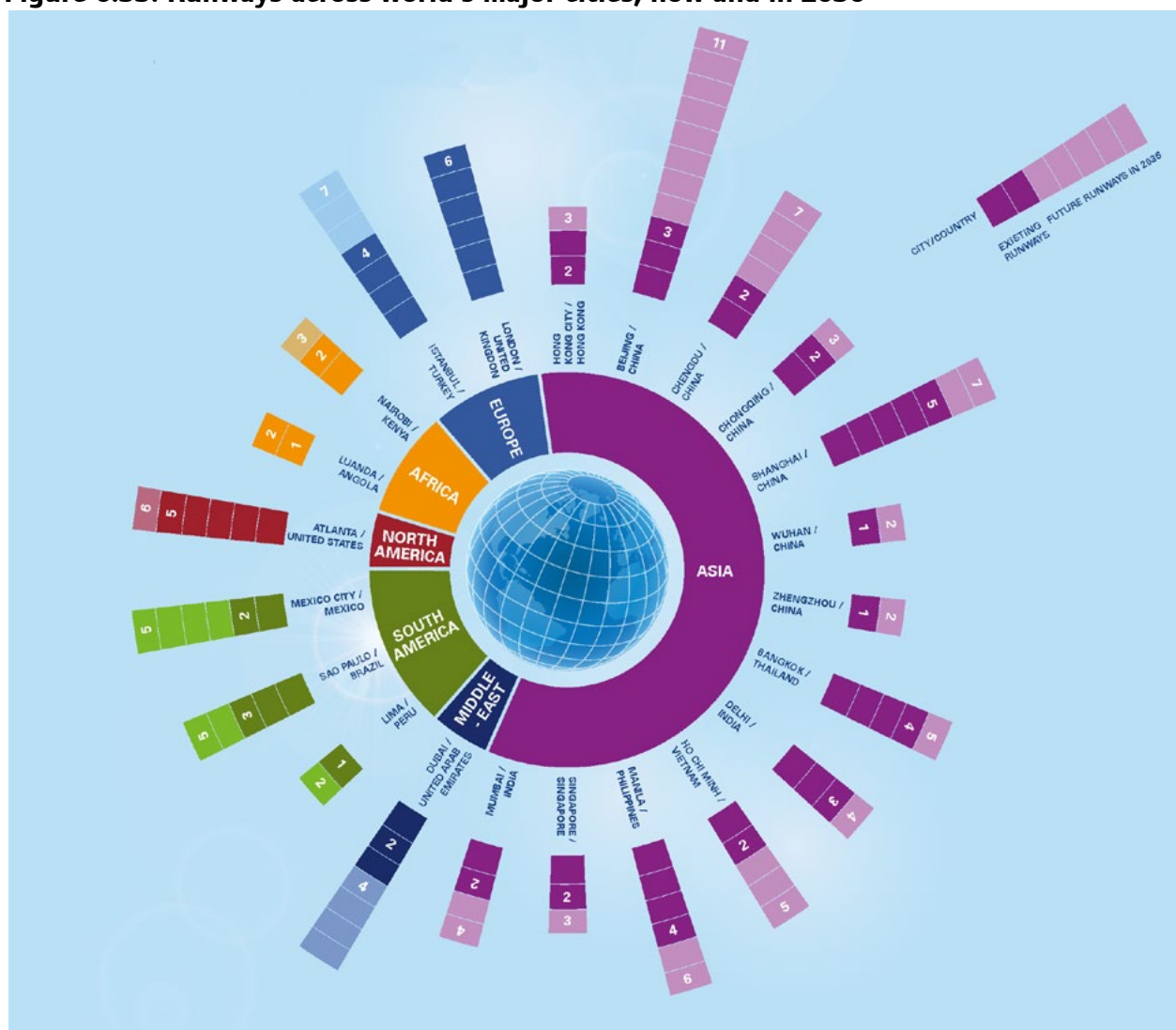
The Commission considered demand management options but found that building new capacity was the only real solution to a growing problem. Their forecasts indicate that demand for aviation in the UK, in the absence of any constraints on capacity, is likely to grow significantly (Figure 6.32). In the carbon-traded forecast²¹², shown below, the central estimate is for demand roughly to double between now and 2050 to around 470 million passengers per annum (mppa).

Figure 6.32: Unconstrained UK air passenger forecasts (carbon-traded), 2008-2050



Source: Airports Commission

While no new full length runways have been constructed in the South East of England since the 1940s, other international cities are investing heavily in their infrastructure and boosting capacity. Paris has 50 per cent more flights to China with four runways at Charles De Gaulle airport compared to Heathrow's two and Gatwick's one.

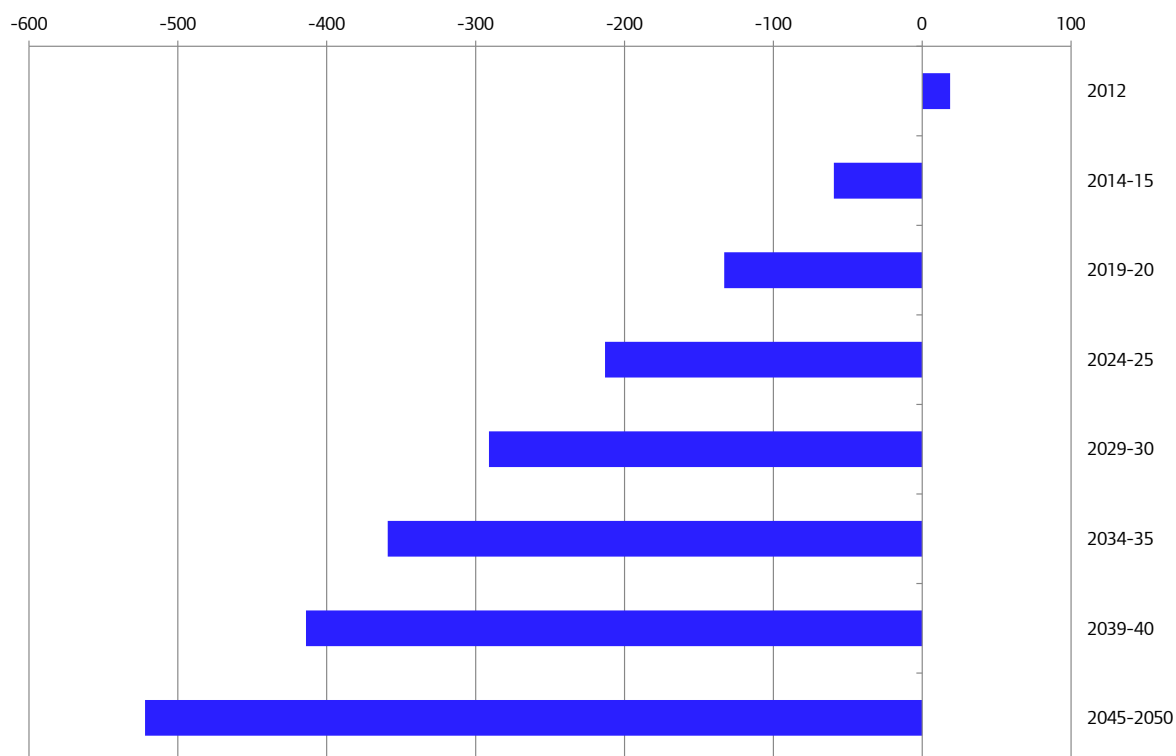
Figure 6.33: Runways across world's major cities, now and in 2036

Source: KPMG (2015)

Figure 6.33 shows airport expansion plans across the world – darker colours show the current number of runways and light colours show those that are planned²¹³. By 2036, China will have built 17 new runways to serve its major cities, providing capacity for around 400 million extra passenger journeys per year. Once complete, the Dubai World Central airport project will provide more passenger capacity than all of London's airports combined. Hong Kong, Singapore, Delhi and Mumbai are also all planning to build new runways to serve growing demand and Istanbul is planning a new six runway airport with almost twice the passenger capacity of London Heathrow.

Water supply and drainage

London's Victorian sewerage and water supply network is struggling to cope with the demands being placed on it. Thames Water forecasts that, without significant new investment, demand for water will exceed supply by 10 per cent in London by 2025, rising to 21 per cent by 2040. This will mean a potential deficit of over half a billion litres of water a day (Figure 6.34) by 2050²¹⁴. To address the gap, various supply and demand-side measures will be needed such as improving the water efficiency of existing and new development, better leakage detection and by encouraging people to become more water efficient through public information²¹⁵. The Environment Agency and the water companies are considering options to boost supply including: new reservoirs, using canals to bring water to the South East from other parts of the UK, purifying effluent from sewage treatments works and potentially more desalination²¹⁶.

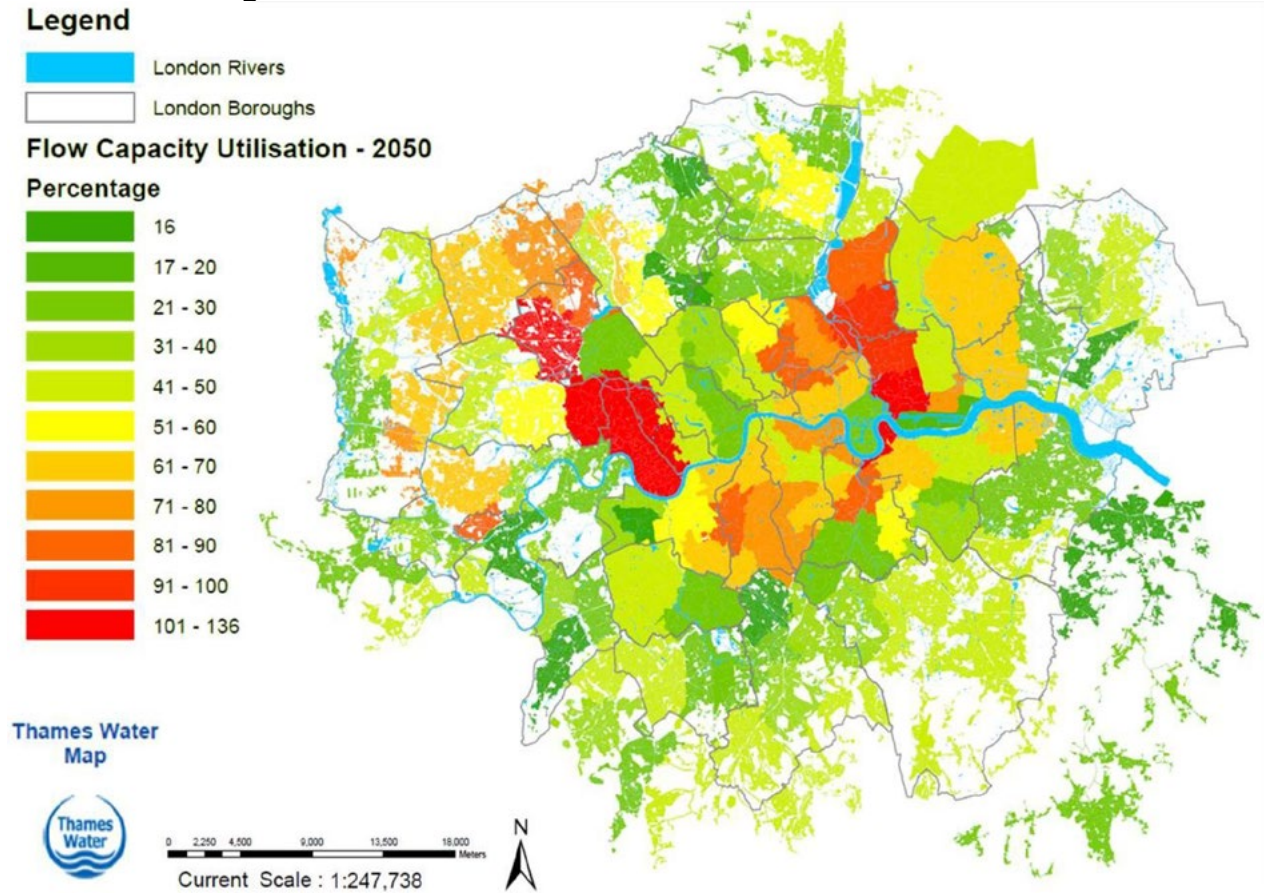
Figure 6.34: Expected deficit in water supply in London (million litres per day)

Source: Thames Water

London's combined sewer system, built over 150 years ago, was designed for a smaller, more permeable city. The challenges of London's growing population, changing land uses and changing climate mean that London is outgrowing its drains and sewers. This in turn is a contributing factor towards the increasing and potentially unacceptable risk of flooding (see Chapter 7 for more on flooding and environmental risks).

Thames Water has modelled the impact of London's projected population growth and climate change on its drains and sewers to assess capacity to cope with future drainage challenges²¹⁷. The modelling shows that for a relatively common rainfall event (one that would be expected on average once every other year) some parts of London would not have sufficient drainage or sewerage capacity to manage the expected flows, leading to a risk of surface water and sewer flooding. Areas highlighted in red on Map 6.12 are where the projected flows in the system exceed its capacity and therefore where some flooding is to be expected. The London Sustainable Drainage Action Plan proposes ways to address the drainage issues in London.

Map 6.12: Modelled drainage and sewerage capacity to manage future population growth and climate change in 2050

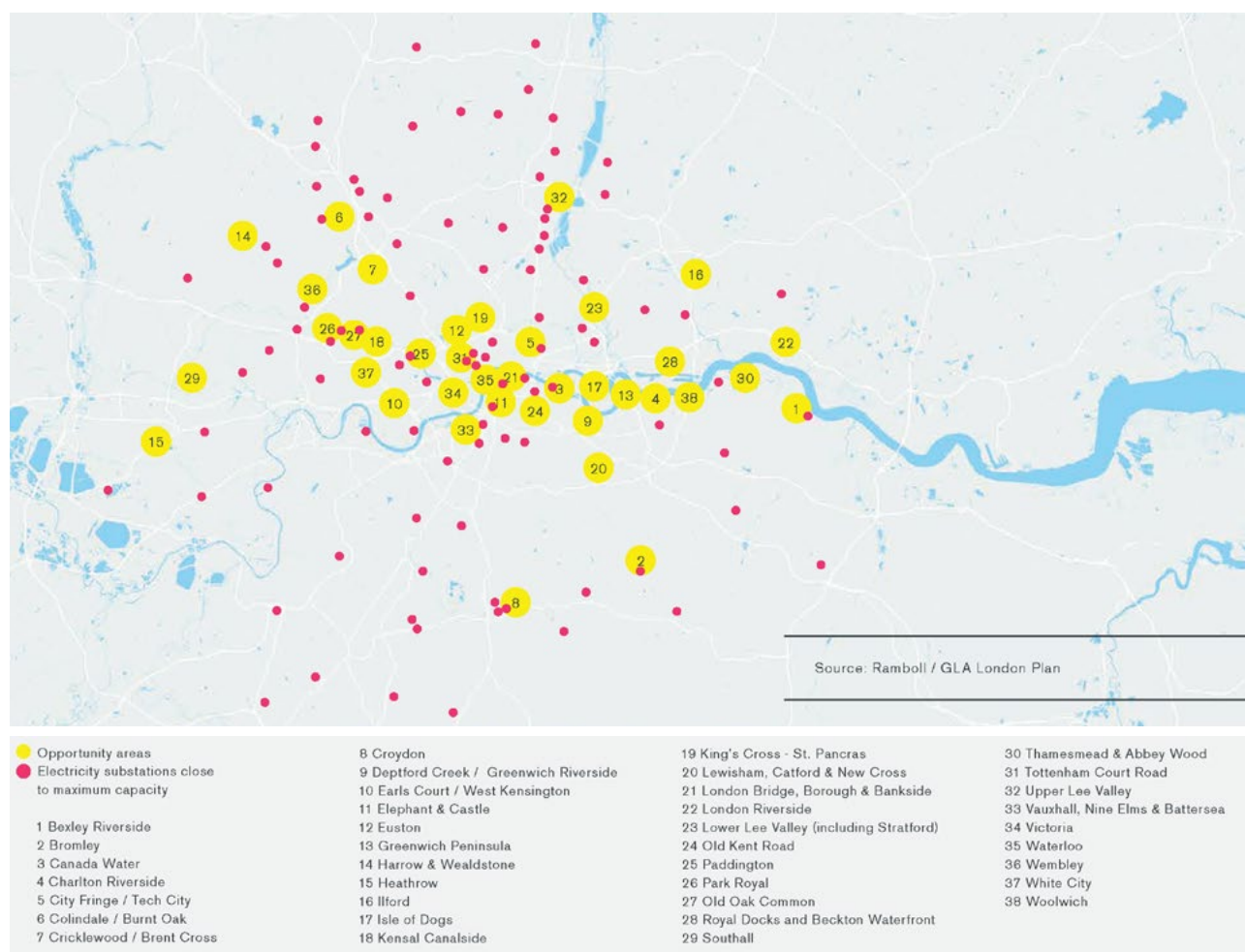


Source: Thames Water

Energy

As London grows, there will be increasing demand for energy to supply the many new homes, offices and other buildings. By 2050, the scale of population and economic growth expected in London will mean an estimated 20 per cent increase in overall energy demand; and with the expected shift away from gas towards electricity, this is likely to mean a doubling of demand for electricity by 2050²¹⁸.

As shown in Map 6.13, many of London’s electricity substations are already close to capacity. This can lead to delays and substantial additional costs for developers²¹⁹. Extra capacity will particularly be required around the Opportunity Areas identified in the London Plan (also shown on Map 6.13) where significant numbers of new homes and jobs are planned.

Map 6.13: Electricity substations currently close to capacity

Source: Ramboll / The London Plan

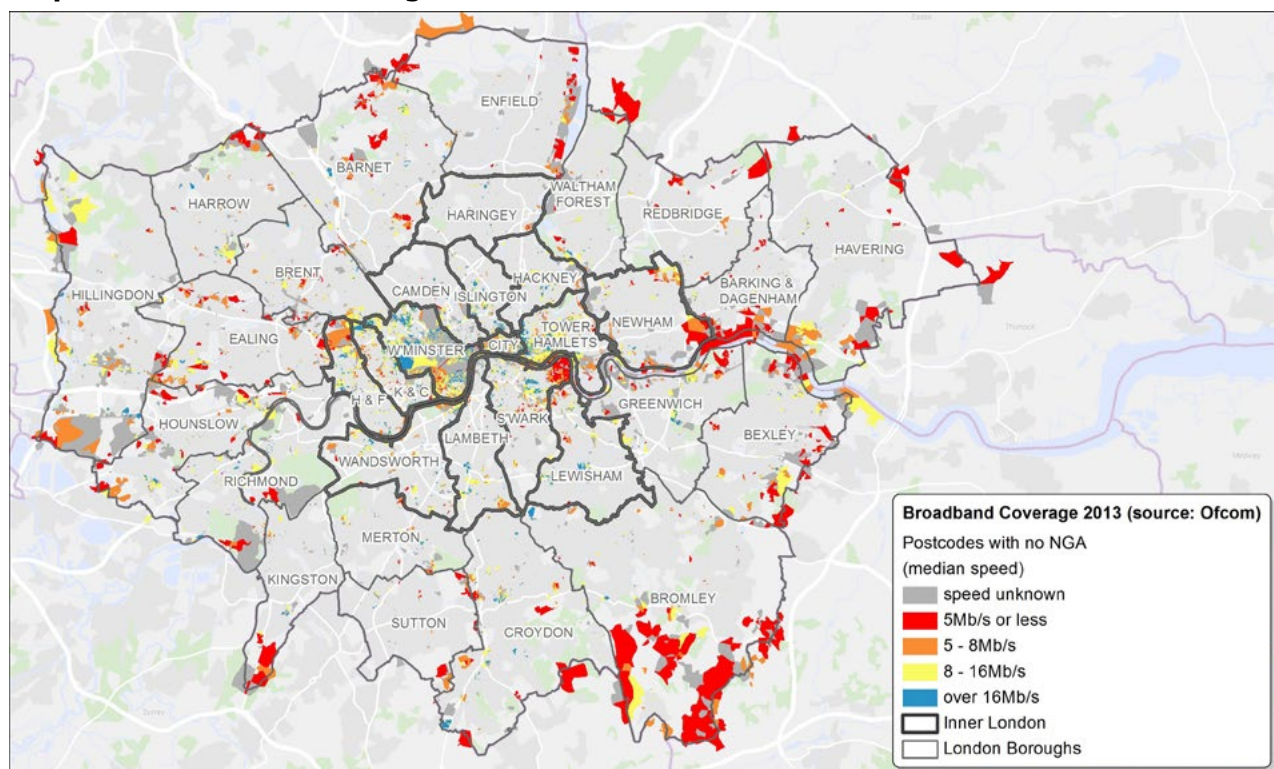
As well as a need to increase supply through new forms of energy generation, there is a need to reduce demand through measures such as retrofitting London's ageing building stock, smart metering and controls, and changing behaviour through public information to reduce peak demand.

Broadband

Reliable, high quality, fixed and mobile broadband connections are essential to most modern businesses and especially for digital tech and creative companies. High speed internet enables businesses to create new and more efficient business processes, opens up new markets, and supports more flexible working. In future years, demand for high speed connections is likely to grow as firms and households need to transfer ever greater volumes of data.

Ofcom's Infrastructure Report 2014 found that the average download speed for the UK was 23mbps, although speeds available to customers vary considerably. Superfast broadband – speeds greater than 24 mbps – is now available in 75 per cent of UK premises, with take-up of 21 per cent²²⁰. In London, average speeds were 27.3mbps, the highest of all UK regions.

In general, London provides good access to high speed broadband, however there are some 'spots' where superfast broadband is unavailable (see Map 6.14). A number of reasons explain these gaps including: the legacy of old infrastructure (notably copper wiring in some industrial areas), planning constraints (road permits for example) and various market failures which make the necessary investment by providers commercially unviable²²¹. Using Ofcom postcode data, an estimated 89 per cent of London is able to access Superfast Broadband²²². However around 6,500 properties can only access speeds of 2Mbps or less (insufficient to run BBC iPlayer for example).

Map 6.14: Broadband coverage in London, 2013

Source: Ofcom/GLA²²³.

NOTE: NGA (next-generation) networks consist wholly or in part of optical elements as opposed to those provided over traditional copper networks.

Gaps in provision are more acute in certain parts of London. A House of Commons research note²²⁴ based on Ofcom data showed that only 32 per cent of properties in the City of London and Westminster constituencies have access to superfast broadband. This ranked the City 612th out of 650 parliamentary constituencies in the UK. In these areas, such is the importance of high speed internet that many firms pay for more secure but costly dedicated leased lines. As a consequence, the market is under-served by more traditional 'fibre to cabinet' services, which is problematic for smaller companies and households in these areas who cannot afford the costs and longer contracts of a dedicated line. Other parts of London have considerably better coverage with 86 per cent of premises connected to superfast broadband in Hackney South and Shoreditch and 93 per cent in Hackney North and Stoke Newington. Bethnal Green and Bow on the other hand have only 56 per cent superfast coverage, which means they rank in the bottom 100 constituencies.

A number of alternative technologies and providers have emerged to fill some of the gaps in London's broadband markets. These include fixed wireless access, satellite and mobile technologies. However, there can be lack of awareness among consumers about these alternative technologies²²⁵.

The Government has set out its ambition of connecting the UK to 'ultrafast' broadband of 100mbps. However, for London to be internationally competitive, gigabit connectivity (1000mbps) is considered to be the gold standard by Tech London Advocates, an industry body²²⁶. Fibre-to-the-premises (FTTP) is offered by some providers and BT is trialling its G.fast technology which could provide 1000mbps. Gigabit technologies are more widely available in other cities such as Hong Kong, which is due to unveil a 10 gigabit service available to over 80 per cent of households.

As noted in a Culture, Media and Sport Committee report²²⁷, one of the largest ‘not spots’ is the London Underground, the only one of the top ten metro systems in the world that does not have a mobile infrastructure. While passengers are able to access wi-fi at Tube stations, the costs of installation in a tunnel environment and other concerns currently mean full mobile and internet coverage throughout the network is not possible. The Committee recommended that “Given that London is a world-class city and tourist destination, there must be an expectation now that its principal transport routes have full mobile and internet connectivity”²²⁸.

Chapter 6 endnotes

- 1 GLA Economics, June 2016, '[London Labour Market Projections](#)'.
- 2 Trends Business Research, February 2016, '[The changing spatial nature of business and employment in London](#)'.
- 3 GLA, 2014, '[Housing in London 2014: The evidence base for the Mayor's Housing Strategy](#)'.
- 4 ONS, 2014, '[Commuting and Personal Well-being](#)'.
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- 6 For London's Economy Today publications, see the [London.gov.uk](#) website.
- 7 [ONS Workforce Jobs, June 2016 Release](#). Employment in this context refers to Workforce Jobs, calculated by summing employee jobs, self-employment jobs from the Labour Force Survey, HM Forces and government-supported trainees. Workforce jobs are a measure of jobs rather than people. For example if a person holds two jobs, each job will be counted in the workforce jobs total.
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- 9 For a more detailed discussion of the productivity puzzle and its impact on the employment projections, see GLA Economics, July 2015, '[Updated employment projections for London by sector and trend-based projections by borough](#)'. Working Paper 67
- 10 See also the discussion on secular stagnation later in this chapter.
- 11 Bank of England, 2014, '[The UK Productivity Puzzle](#)' Quarterly Bulletin 2014 Q2
- 12 Barnett, A, Chiu, A., Franklin, J., Sebastia-Barriel, M., 2014, '[The productivity puzzle: a firm-level investigation into employment behaviour and resource allocation over the crisis](#)', Bank of England Working Paper No. 495.
- 13 See Miles, D., 2012, '[Monetary policy and the damaged economy](#)' and McCafferty, I., 2013, '[Monetary policy in a changing economy](#)'.
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- 17 2014 data are provisional.
- 18 The official regional GVA estimates are all in nominal terms, implying that no adjustment has been made for inflation. The ONS also publishes a real GVA measure estimated using the production approach but these are currently experimental statistics.
- 19 The analysis here looks at GVA per worker, a calculation of nominal GVA (for London and the UK), divided by a four quarter average of workforce jobs. This is one of a number of methods that can be used to assess the relative productivity of regions. GLA Economics has published analysis of GVA per workforce job, which differs from these estimates as it attributes a proportion of headline nominal GVA to that of the workforce (primarily removing rental incomes, since these would not be generated directly from the activity of the workforce). These estimates are provided in GLA Economics, 2015, '[Gross Value Added per Workforce Job in London and the UK](#)'. Working Paper 63.
- 20 It should be noted that the geography of NUTS1 regions may be wider than the just the city, incorporating parts of the region where economic activity is less dense with the effect of lowering output per worker in the official statistics.
- 21 Other international comparisons of output per head are provided in GLA Economics, 2016, 'London in comparison with other global cities'. Output per job in this paper is higher in Paris than London due to methodological differences.
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- 23 King, P. and Millard, S., 2014, '[Modelling the service sector](#)'. Bank of England Working Paper No. 500
- 24 See Reference tables for: ONS, March 2016, '[Subregional Productivity: Labour Productivity](#)'.
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- 26 World Economic Forum, 2012, [‘Redefining the Emerging Market Opportunity: Driving Growth through Financial Services Innovation’](#)
- 27 PWC, 2015, [‘The World in 2050 – Will the shift in global economic power continue?’](#)
- 28 OECD, 2014, [‘Economic Outlook No 95 – Long-term baseline projections’](#).
- 29 OECD, 2007, [‘Moving Up the Value Chain: Staying Competitive in the Global Economy’](#).
- 30 See for example Z/Yen Group, September 2015, [‘The Global Financial Centres Index 18’](#) which ranks London first and New York second. Rankings are based on a mix of indicators and survey responses examining the business environment, financial sector development, infrastructure, human capital and reputation.
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- 36 Gordon, R.J., 2012, [‘Is US Economic Growth Over? Faltering Innovation Confronts the Six Headwinds’](#), CEPR Policy Insight No.63
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- 44 IMF, April 2016, [‘World Economic Outlook: Too Slow for Too Long’](#).
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- 55 HM Treasury, 18 April 2016, [‘HM Treasury analysis: the long-term economic impact of EU membership and the alternatives’](#).
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- 58 See Appendix A in Mayor of London, 2014, [‘The Europe Report: A Win Win Situation: Appendices’](#).
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- 202 For notes, see endnote to Map 6.6
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- 204 For notes, see endnote to Map 6.6. TfL Reference Case Forecasts 2014-2041, TfL Planning, see also Chapter 12 in TfL, 2015, '[Travel in London Report 8](#)'
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