THE ECONOMY 2030 INQUIRY

SHAPING A DECADE OF CHANGE

Business time

How ready are UK firms for the decisive decade?

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The Economy 2030 Inquiry

The Economy 2030 Inquiry is a collaboration between the Resolution Foundation and the Centre for Economic Performance at the London School of Economics, funded by the Nuffield Foundation. The Inquiry's subject matter is the nature, scale, and context for the economic change facing the UK during the 2020s. Its goal is not just to describe the change that Covid-19, Brexit, the Net Zero transition and technology will bring, but to help the country and its policy makers better understand and navigate it against a backdrop of low productivity and high inequality. To achieve these aims the Inquiry is leading a two-year national conversation on the future of the UK economy, bridging rigorous research, public involvement and concrete proposals. The work of the Inquiry will be brought together in a final report in 2023 that will set out a renewed economic strategy for the UK to enable the country to successfully navigate the decade ahead, with proposals to drive strong, sustainable and equitable growth, and significant improvements to people's living standards and well-being.

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Executive summary

The UK is set for a decade of major change and our private sector firms will be in the front line. They will face new arrangements for international trade and migration, new requirements to reduce emissions, and ongoing changes to their workers' and customers' behaviour due to Covid-19, all the while adjusting to demographic and technological change. How ready are they for this change? What form should policy towards business take within a new economic strategy for the UK? This report is the first of a series on firms for the Economy 2030 Inquiry to address these questions.

British firms enter this decisive decade with a poor record on productivity

UK productivity performance is dire in two respects. First, the level of productivity is much higher in countries such as Germany, France and the US than the UK (17 per cent higher in 2019). Second, this level is so low today in part because productivity growth in the UK has slowed since the financial crisis by more than in other countries. In the 12 years to 2007, labour productivity grew at roughly 2 per cent per year in the UK and on average among the 25 richest OECD countries. In the 12 years since the crisis, productivity grew by only 0.4 per cent per year in the UK, and 0.9 per cent per year in those other advanced countries.

The low level and poor growth of productivity is a pervasive feature of most sectors of the UK economy. Productivity is not low or growing slowly simply because there is too little manufacturing

or too much leisure and hospitality: the sectoral composition of the economy explains little of the gap in productivity levels with Germany, France and the US.

One potential cause of poor aggregate performance that receives much attention is the underperformance of a 'long tail' of UK firms. We look afresh at this question. We find that the gap between the most and least productive firms is huge: a worker in the 90th percentile of the firm productivity distribution is around 16 times more productive than at the 10th percentile. But, in contrast to some previous work, the data does not suggest that this problem is especially bad in the UK compared to other countries, nor getting significantly worse overall.

Moreover, the share of output produced in firms in the long tail is so low that raising their productivity will not do much to boost the average. The least productive 40 per cent of firms (weighted by employment) produce only around 12 per cent of total value added, while the most productive 40 per cent produce three-quarters. Raising the productivity of the bottom firms employing 40 per cent of workers by 10 per cent would therefore raise productivity by around 1.2 per cent, whereas the same boost at the top would increase it by 7.5 per cent. Transferring one-tenth of those workers from the bottom to the top (assuming, for illustrative purposes, that this could be done without affecting the productivity of the firms they move between) would boost GDP by some 6 per cent.

Therefore, if improving aggregate productivity is a central objective of policy makers, a more promising avenue to pursue than transforming low-productivity firms may be to reallocate resources from them to better-performing firms. Here, there is cause for optimism. The data suggests that the job reallocation rate in the UK – the fraction of jobs reallocated from shrinking firms to growing ones – has been relatively stable in the 15 years to 2019, in contrast to falls in some other countries. Workers continue to find their way to the more productive firms, boosting aggregate productivity. On this measure, then, given that the evidence suggests that the job reallocation rate seems set to rise over the near future, UK firms are not worse placed than other major advanced economies to handle the coming surge in reallocation.

Years of underinvestment has affected UK firms' productivity

There is much greater cause for concern when assessing the resources that UK firms have available to make labour productive. UK firms have not been investing in capital, ideas or processes at anything like the rates of their peers. French workers, for example, have over 40 per cent more capital than UK workers, enough to account for the whole productivity gap with the UK.

Business capital investment in the UK as a share of GDP (at 10 per cent in 2019) has consistently lagged France, Germany and the US (13 per cent, on average), as has business investment in research and development (1.2 per cent versus an average of 2 per cent in 2019). Despite the UK's strong research system, its patenting intensity – a key measure of innovation output – lags other innovative countries: on average, patenting intensity across France, Germany and the US is over twice that in the UK.

Expanding measures of investment to include intangibles that are not captured in national accounts paints a more positive picture for the UK, but looking at measures of the quality of intangible assets reveals that the UK is not best in class. Management practices in UK firms are, on average, worse than those in the US and Germany. There is a thicker tail of worse-managed firms in the UK, and a thinner tail of good firms – only 11 per cent of UK firms were as well managed as the best quarter of US firms in the 2004-2014 period (though there is some evidence that this might be improving in recent years). Furthermore, UK firms are middling when the extent of digitisation is compared across countries.

A key aspect of the UK's underperformance relates to human capital. Despite rising tertiary education attainment, there are gaps in basic and technical skills that hold back productivity of workers and firms in the UK. Moreover, research has shown that skilled workers and managers are more likely to successfully adopt productivity-enhancing technologies and management practices. There are also troubling patterns of attainment across generations: literacy and numeracy skills of the young in the UK have slipped relative to previous cohorts. The UK needs to address

these challenges to improve the productivity of workers and firms, and to ensure that the labour force is adequately equipped for the technological change and transitions ahead.

But higher investment means either importing more or consuming less

It is clear that investment, broadly defined, needs to rise to narrow these gaps in the resources available to firms. This extra investment must be wisely targeted to raise productivity, as well as helping the UK meet its net zero commitments and benefit from sustainable growth opportunities along the way. These issues have been widely understood for some time, but have not been addressed: total investment in the UK economy rose by only 1 per cent in the five years to Q2 2021, whereas it rose by an average of 16 per cent in France, Germany and the US.

Less well understood is that investment is an expenditure, but one that provides future opportunities for consumption as the reward. In a more-or-less fully employed economy (which may or may not be a feature of the 2020s as a whole), higher investment must be resourced with increased net imports, which already start at a high level in the UK, or with lower domestic consumption. Simple simulations suggest that the path to a higher investment economy involves a large rise in foreign net liabilities or a long period of subdued consumption. For example, financing a 5 percentage point rise in total investment – something that would enable the UK's investment rate (public and private) to match the average of France, Germany and the US – from lower consumption and higher domestic savings could boost growth immediately and generate a cumulative 8 percentage points of extra GDP growth over 20 years. But it would be 15 years before consumption recovered from the initial fall.

The balance between investment, consumption and net imports, and whose consumption takes any hit, are two of the difficult trade-offs that policy makers will need to consider in this area. In the same vein, policy makers will also need to examine the spatial angle of dispersion and resource allocation, where there may be place-based reasons for productivity differences to exist and for reallocation to be resisted. As part of this, the links between improving productivity and worker wellbeing will need to be

considered. Lastly, any retooling of the corporate sector will need to be driven by, and maximise benefits from, the drivers of change that will dominate the 2020s – in particular net zero, but also the restructuring initiated by the Covid-19 pandemic and from exiting the EU. Business and government alike will need to take long-term decisions in a climate of high uncertainty. Future Economy 2030 reports will evaluate these tradeoffs and opportunities from the perspective of firms, people and places and their implications for policy.

Section 1

Introduction

Views on how policy should relate to business can range widely – from the supportive to 'f*ck business'.[1] What these views have in common is that they lack detail about the strengths and weaknesses that UK businesses have, or the challenges they face.

The Launch Report of the Economy 2030 Inquiry showed that the UK is set for a decade of major change. UK private sector firms will be in the front line. They will face new arrangements for international trade and migrant workers, new requirements to reduce emissions, and ongoing changes to their workers' and customers' behaviour due to Covid-19, all the while adjusting to accelerating demographic and technological change. The decisions of firms will influence the nature and quality of employment, and the extent and types of private sector investment and innovation that in turn will determine the amount of economic growth. This paper is the first of a series to examine how ready UK firms are for this change, focusing on the state of play up to and including 2019.

Firms are vital for UK prosperity

The private sector accounts for over 80 per cent of employment, accounts for a large fraction of the country's investment and research and development, and firms, as with any employer, are at the centre of many of their employees' social lives.[2] The efficiency with which firms use the resources available to them is a key determinant of national prosperity.[3]

1 Boris Johnson challenged over Brexit business `expletive', BBC News, 26 June 2018.
2 K Shah & D Tomlinson, Work experiences: Changes in the subjective experience of work, Resolution Foundation, September 2021.
3 C Hsieh & P J Klenow, Development Accounting, American Economic Journal: Macroeconomics 2(1), January 2010.

UK firms are less productive than those in the most productive large economies – France, Germany and the US – and this gap has been growing in recent years. These statements are true on average, but the productivity of UK firms is hugely variable, and this inequality is in turn is a key determinant of the inequality of wages across workers.[4] Even in times, such as the pre-Covid decade, when the industrial composition of employment is relatively steady,[5] there is a significant amount of dynamism beneath the surface, as firms wax and wane, are born and die. A key contribution of this paper is to assess the extent of this inequality and dynamism.

This report assesses UK firms' readiness for the challenges of the 2020s

The drivers of change in the 2020s will require some firms to shrink, others to grow and many to reinvent themselves in order to remain viable in the face of changes to the structure of the economy. The move towards net zero will bring major changes to the transport, construction and food and energy supply industries, among others, forcing many firms to change profoundly or exit.[6] The loss of trade openness following Brexit will shift resources from firms that export to the EU to firms that produce for the domestic market,[7] and all firms will need to manage with less migrant labour. At the same time, firms will need to absorb both a large cohort of young adults and a larger working population above the traditional retirement age.[8]

The aim of this report is to assess the readiness of UK firms for this wave of change. It is set out as follows:

- Section 2 examines the productivity performance of the UK economy overall and, in particular, whether its level, or growth rate, can be explained in terms of its sectoral composition.
- Section 3 examines the dynamism of UK firms and how well resources are allocated across them.
- Section 4 looks at the resources that UK firms have at their disposal – labour, skills, capital, ideas and management.
- Section 5 concludes by examining the implications of financing an increase in these resources from domestic or foreign resources.

4 J Song, et al., Firming Up Inequality, The Quarterly Journal of Economics, 134(1), February 2019.
5 See Figure 9 of T Bell et al., The UK's decisive decade: The launch report of The Economy 2030 Inquiry, Resolution Foundation, May 2021.
6 J Marshall & A Valero, The Carbon Crunch: Turning targets into delivery, Resolution Foundation, September 2021.
7 J De Lyon et al., Trading Places: Brexit and the path to longer-term improvements in living standards, Resolution Foundation, October 2021.
8 M Gustafsson & D Willetts, A return to boom and bust (in births): How birth cycles will affect public spending pressures over the coming decade, Resolution Foundation, October 2021.

Section 2

Where we start from – productivity in the UK economy

UK productivity performance has been poor in two key respects. First, the level of productivity is much higher in other major advanced countries, with France, Germany and the US having productivity on average 17 per cent higher than the UK. Second, this level is so low today in part because productivity growth in the UK has weakened since the financial crisis, and by more than in other countries. Indeed, the gap with other developed countries widened as UK productivity growth fell from 2 per cent per year in the 12 years to 2007 – around average, at the time, for similar countries – to 0.4 per cent per year in the 12 years since – half the rich-country average rate.

The low level and poor growth of productivity is observed in many sectors of the UK economy. It is not the case that productivity is low or has been growing slowly simply because there is too little manufacturing, or too much leisure and hospitality: the sectoral composition of the economy explains little of the gap in productivity levels with Germany, France and the US.

The UK's productivity performance lags its main peers

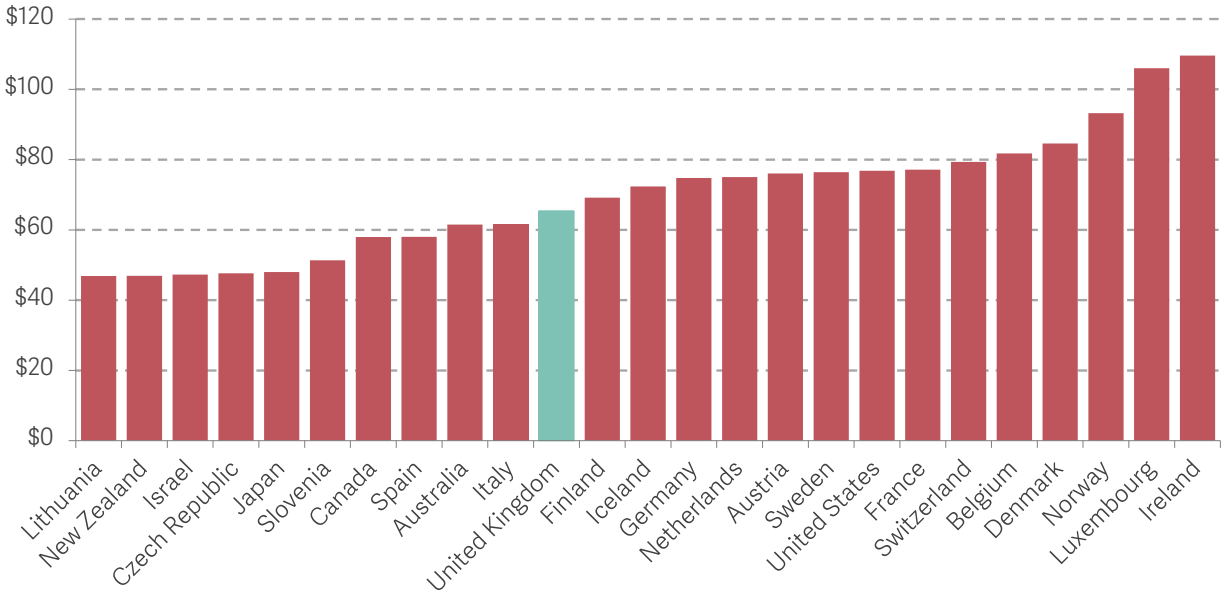
The UK has a longstanding gap in the level of productivity compared to its peers. This is important because productivity gives us a measure of how efficiently output is produced for a given level of inputs.[9] As shown in Figure 1, the UK's productivity is substantially

9 Labour productivity is calculated as GDP per worker or per hour worked at the economy level. At the firm or industry level, the relevant measure of output is gross value added (GVA) which is equal to the value of output net of intermediate consumption (the costs of raw materials or other inputs used up in production). Per hour measures are more comparable in the sense that they account for the fact that workers in different countries, sectors or regions put in differential hours. At the firm level, it is harder to obtain data on hours worked, so per worker measures tend to be used.

below that in France, Germany and the US – according to OECD data, GDP per hour in those countries was around 17 per cent higher in 2019 than in the UK. Given that these are the most productive large economies in the world, this is a demanding group against which to compare the UK. However, even when compared to a broader set of OECD countries, Figure 1 shows that the UK's productivity level is still below the median.

FIGURE 1: **The level of UK productivity is much lower than in some other advanced economies**

Output per hour worked (USD) for the 25 highest-productivity OECD countries: 2019



NOTES: GDP per hour worked in 2019, USD current purchasing power parities (PPPs). Of 33 countries in data, top 25 in terms of GVA per hour shown here.
SOURCE: Analysis of OECD, level of GDP per capita and productivity.

OECD analysis (based on 2016 data) that attempted to improve the comparability of data on hours worked across countries found that hours worked in the UK were lower and hence the productivity gap smaller than previous estimates. But this is not enough to explain all of the difference.[10] And the picture looks similar when productivity is calculated on a per-worker basis, with the UK far behind France and the US (although the gap with Germany is smaller when assessed on a per worker basis).

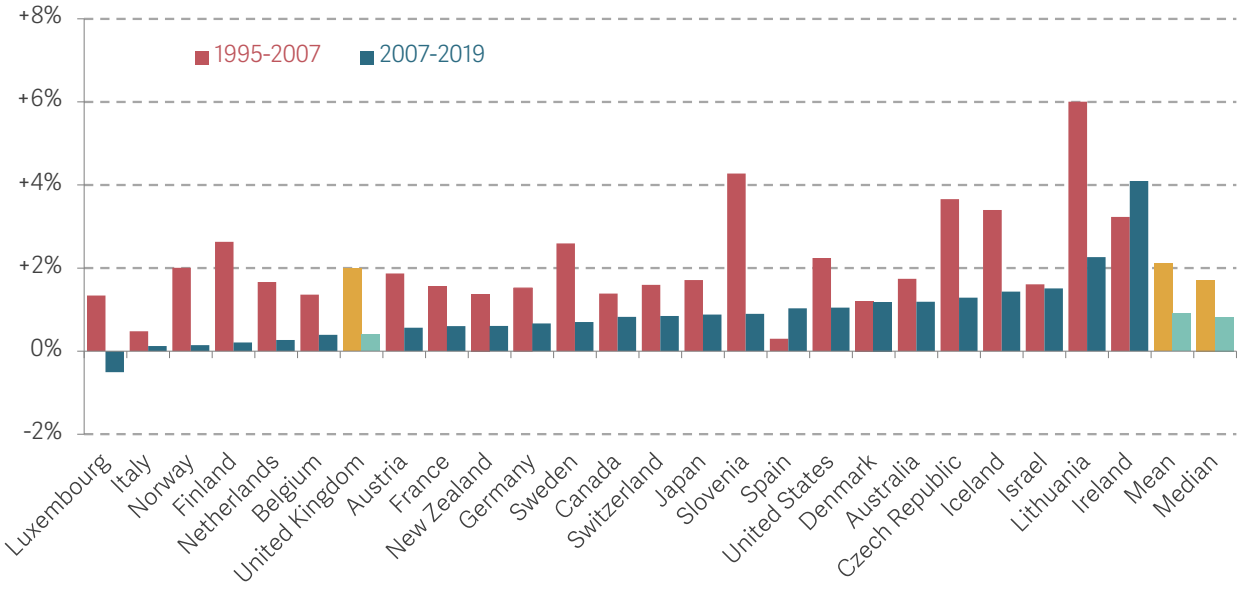
What is harder to explain is why this gap should have widened in recent years, a period when the UK's productivity growth has been weaker than that of its peers. As shown in Figure 2, the UK's productivity growth over the 1995-2007 period averaged 2 per cent

10 OECD, International productivity gaps: Are labour measures comparable?, SDD working paper No. 99, December 2018. See also ONS, Productivity gap narrows, ONS, December 2018. Another authoritative source for international productivity comparisons – the Penn World Tables – suggests a larger gap of 29.3 per cent in GDP per hour in 2019.

per annum – similar to that experienced in the US and stronger than in France and Germany.[11] Most advanced economies have experienced a slowdown in the post financial crisis period, but the UK's is particularly pronounced.

FIGURE 2: **Growth since the financial crisis has been particularly poor in the UK**

Annual average growth rates in GDP per hour worked for the 25 highest-productivity OECD countries



NOTES: GDP per hour worked at constant US 2015 PPP, compound annualised growth rates (CAGR), for same group of countries as Figure 1. Highlighted yellow and green bars correspond to 1995-2007 and 2007-2019, respectively.
SOURCE: Analysis of OECD, level of GDP per capita and productivity.

This slowdown in productivity growth since the financial crisis has been termed the 'productivity puzzle' because so far, there is no consensus explanation for it.[12] To some degree, the puzzle is an international phenomenon, and it is widely accepted that this is driven by a slowdown in Total Factor Productivity (TFP) growth, rather than a slowdown in the growth of capital services.

11 These OECD data record a CAGR of 2.0 per cent over 1995-2007 for the UK. The latest ONS data for the same period (at constant domestic prices rather than constant PPP) suggests productivity growth of 1.9 per cent. These small differences will be attributable to different data vintages but also the distinction between deflating GDP using constant national prices or constant PPP. See Feenstra et al., The Next Generation of the Penn World Table, American Economic Review, 105(10), October 2015.
12 See ONS, Productivity measurement – how to understand the data around the UK's biggest economic issue, 2020, for a recent summary of explanations.

TFP measures how efficiently output can be produced given a quantity of inputs, and it is the amount of growth that cannot be explained by growth in measured inputs of capital and labour, where labour inputs are typically adjusted for their quality. Improvements in TFP therefore reflect improvements in organisational practices, growth in the knowledge base, network effects and spillovers. Estimates of TFP also reflect other factors such as adjustment costs, economies of scale, and measurement errors. For example, increases in educational attainment that are not captured in measures of (quality-adjusted) labour inputs would show up as an increase in TFP.

Some authors are pessimistic about the potential for strong TFP growth in the future, and consider that new technologies have less impact on productivity than those in previous waves.[13] Others argue that the key mechanism at play is a delay in feeling the productivity benefits of new technologies which require complementary intangible investments (in particular, certain types of skills and management practices) to be in place in order to diffuse fully through the economy.[14] Whatever the explanations for the international slowdown may be, there must also be UK-specific elements to the productivity puzzle, in that its productivity performance has been especially weak. One possibility is the sectoral composition of the economy, to which we now turn.

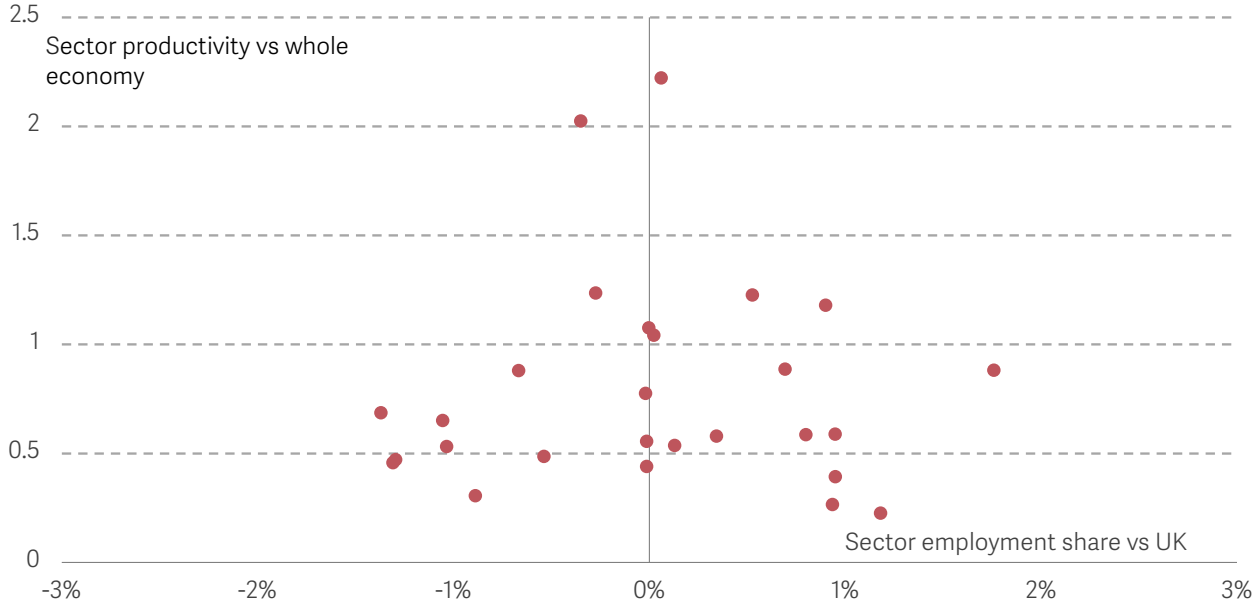
The weaknesses in the level and growth rate of UK productivity are relatively broad-based

A key point that we make in this section is that the low level of labour productivity in the UK is pervasive across sectors. Figure 3 shows the levels of productivity and employment in the UK as well as the average of the peer group by sector. There is little relationship between how big a sector is in the UK and how productive that sector is relative to other sectors.

13 See, for example, R Gordon, Declining American Growth Despite Ongoing Innovation, Explorations in Economic History, 69, 2018.
14 E. Brynjolfsson et al., Artificial Intelligence and the Modern Productivity Paradox: A Clash of Expectations and Statistics, 2017, NBER Working paper 24001.

FIGURE 3: **The UK does not specialise in low productivity sectors**

Relationship between relative size of sectors in the UK and relative productivity of sectors, compared to the economy-wide average



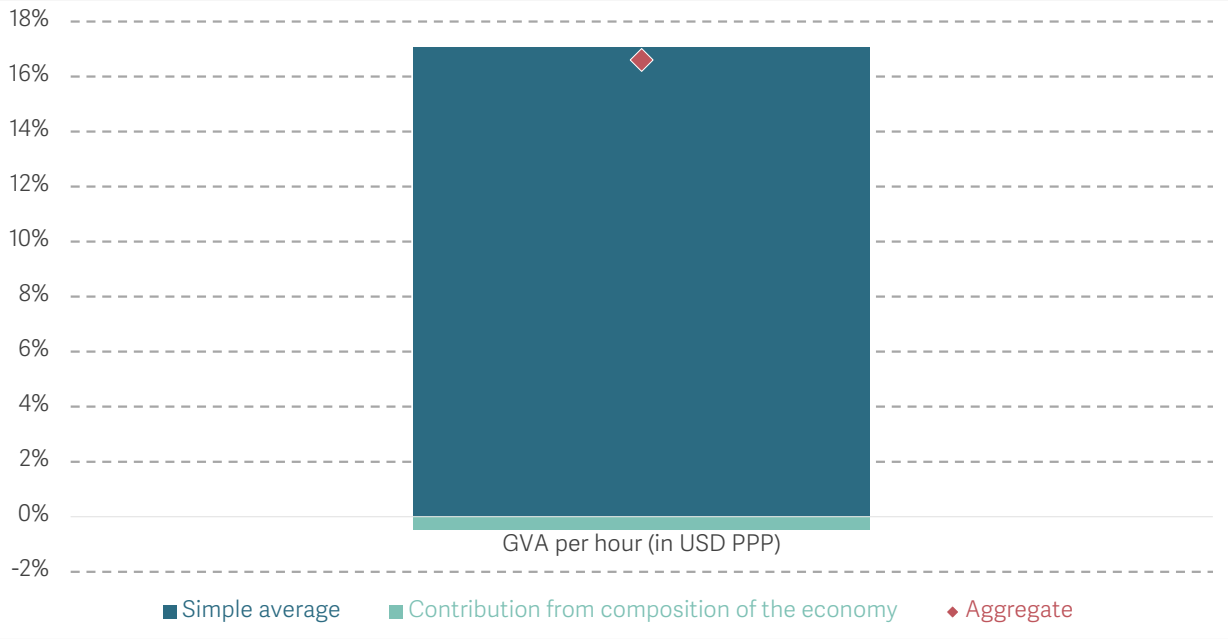
NOTES: The horizontal axis is the average across France, Germany and the US of the share of employment in 1-digit sectors, less the UK share. The vertical axis measures the productivity of the sector, on average in France, Germany and the US, compared to the productivity of the economy as a whole in those countries. The sector aggregate comprised of public administration and defence, compulsory social security, education, and human health and social work activities is omitted due to differences in coverage and measurement of relative prices across countries.
SOURCE: Analysis of OECD, STAN database.

Figure 4 decomposes the gap between average productivity in the UK and the peer group into the average within-sector gap and the impact of the different employment composition (with the notes to the figure giving the full explanation of how this is done). This is important because, if the structure of the UK economy had somehow become skewed towards low productivity sectors, then this could explain some of the difference with other countries. The figure shows that the within-sector gap accounts for almost all of the overall gap productivity gap. The size of the UK's productivity gap varies from sector to sector, but is negative on average.[15]

15 Whole-economy comparisons of productivity can be made, albeit imperfectly, with economy-wide indices of relative prices in common currency (purchasing power parity). Making sector-level comparisons across countries, however, is complicated by the lack of sector-level relative prices. It is possible that what appears to be a low level of productivity in a particular sector reflects a particularly low relative price, relative to other countries, which could potentially reflect high productivity pushing down prices.

FIGURE 4: **Sectoral composition does not explain the UK productivity gap**

Decomposition of the productivity gap with Germany, France and the US into average gap within sectors and composition of employment across sectors



NOTES: The gap in aggregate (employment weighted) productivity (red dot) between the UK and the average of France, Germany and the US is decomposed into the gap in average (unweighted) sectoral productivity (blue bar), and a covariance term (turquoise bar). A positive covariance term corresponds to employment being skewed towards higher productivity sectors in the UK relative to the comparison group. The aggregate gap is the gap between GDP per hour at current PPP in 2019 on average in France, Germany and the US and the corresponding UK level. The covariance term is the difference between (1) the same gap in the 2016 Structural Analysis (STAN) data in national currency, deflated by the 2016 PPP exchange rates, and (2) the gap between the simple average of industry-level productivity in France, Germany and the US and the corresponding UK level. The simple average contribution in the chart is the difference between these two values. The assumption is that the headline productivity data measure overall productivity differences best, while the STAN data give an accurate picture of the relative labour inputs and employment levels across sectors of the economy.
SOURCE: Analysis of OECD, STAN database.

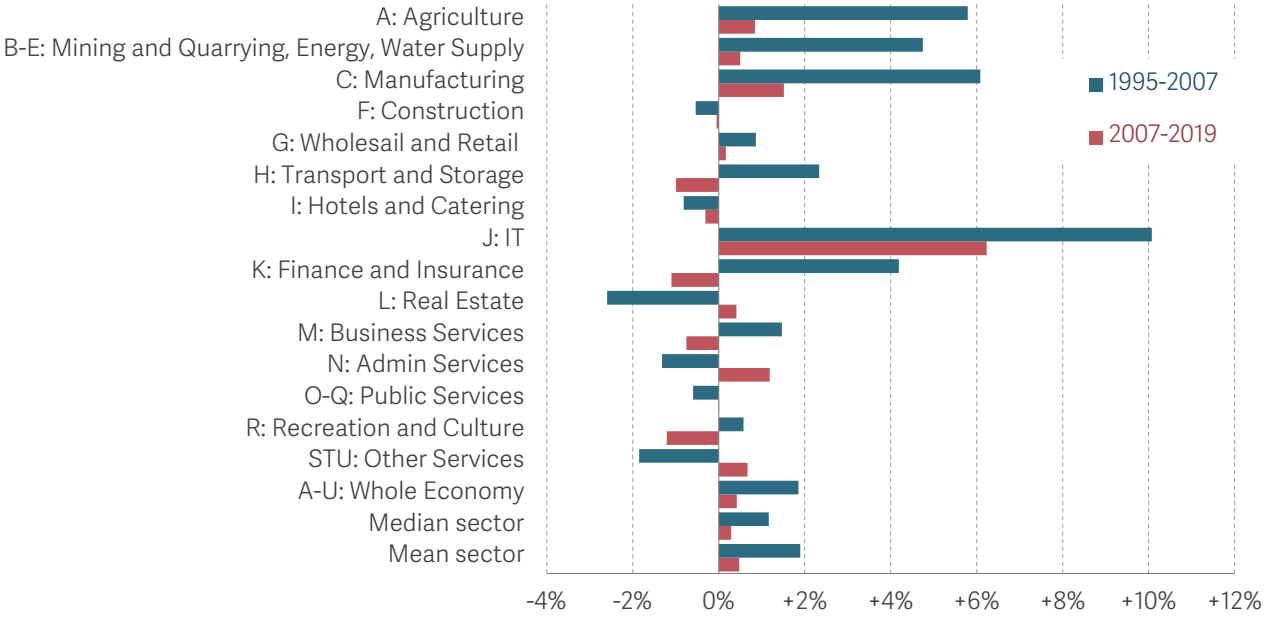
In terms of growth, early studies concluded that the UK's puzzle appeared to be driven by economy-wide factors.[16] Recent ONS restatements of sectoral productivity, including adjustments for double-deflation, have changed the relative performance of some sectors.[17] Although some sectors – such as finance, manufacturing, and ICT – contribute disproportionately to the productivity slowdown with the relative importance shifting (manufacturing now accounts for more of the puzzle; ICT and finance less),[18] the latest data is clear that the lower average productivity growth in the period since the financial crisis has been broad-based (Figure 5). The slowdown experienced across the economy

16 See, for example, Riley et al., Below the aggregate: a sectoral account of the UK productivity puzzle, ESCoE Discussion Paper, 2018.
17 These restatements apply different price indices (deflators) to total output and intermediate consumption when calculating real measures of productivity for analysis over time. Overall, they do not materially affect the growth or level of labour productivity for the whole economy, and the 'puzzle' is still there, though slightly smaller. Double deflation does affect estimates of GVA at the industry level, with some manufacturing sectors doing relatively better, and some service sectors doing worse (with the exception of the telecoms sector). See ONS, Impact of double deflation on labour productivity: 1997 to 2018, June 2021 for more detail.
18 Monetary Policy Report, Bank of England, November 2021.

is seen in both the unweighted average sector and the median sector. Moreover, the slowdown in overall growth does not appear to be driven by an increase in the share of services in the economy (we discuss this more in Box 1).

FIGURE 5: **Weak growth after the financial crisis is widespread**

Annual average growth rates in GDP per hour worked, by sector



SOURCE: Analysis of ONS, Labour Productivity, Q2 2021, 7 October 2021.

BOX 1: **Deindustrialisation and the productivity slowdown**

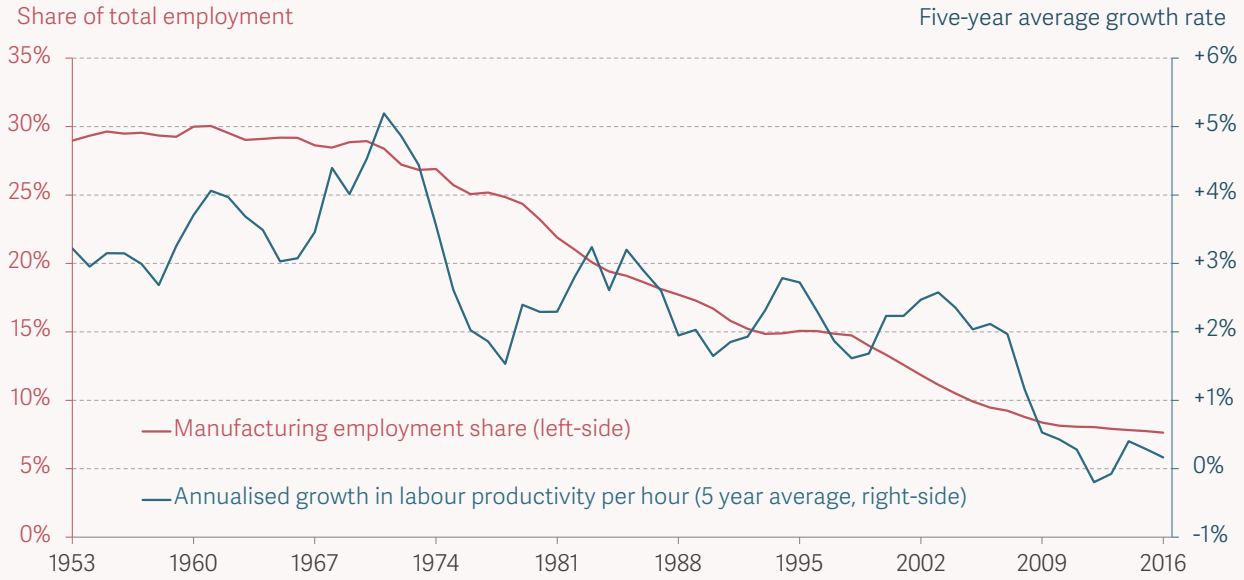
The post-2007 slowdown in productivity growth has at times been attributed to many things. One of these is the deindustrialisation of the economy. Productivity growth is harder to achieve in services, or at least harder to measure, so the argument goes. It is easier to mechanise the production of widgets than the production of haircuts, and easier for statisticians to spot a good widget than a bad haircut. This in turn means that the smaller the share of widget-makers in the economy, the lower that measured productivity growth may be. The output of some services companies – think of Facebook – may be free at the point of use and hence understated in GDP relative to the value placed on it by consumers. A related argument holds that manufacturing is inherently more productive than services, so the route to prosperity lies in boosting manufacturing employment.

There is some truth in these claims. Measured productivity typically grows faster in manufacturing than in services.

It is also true that the UK economy has deindustrialised a great deal over the past half-century (Figure 6), and at a faster rate and to a greater extent than in most other high-income countries. The pattern of deindustrialisation follows similar trends to aggregate productivity growth, with both falling over the past half-century (although there was a prolonged period of strong productivity growth, relative to the UK's main comparators, from the late 1970s to 2010, during which the UK reversed a period of relative economic decline, and this strong productivity growth was also seen in the service sector).

FIGURE 6: **The UK economy has deindustrialised over the past half-century, and productivity growth has slowed, on average, over the same period**

Share of manufacturing in total UK employment and the five-year average growth rate of labour productivity



NOTES: The manufacturing employment share is the ratio of manufacturing employment to total employment. Labour productivity growth is compound annual growth rate of the level of labour productivity per hour, using the latest vintage of data from the Millennium Macro dataset.
SOURCE: Analysis of Bank of England, A millennium of macroeconomic data.

This being said, there is little in Figure 6 to suggest that the post-mid-2000s slowdown in productivity growth has been driven by deindustrialisation. The manufacturing share of employment was relatively stable in this period, and certainly not falling quickly enough to account for the slowdown. And Figure 5 showed that the slowdown in productivity growth was broad-based across sectors, with the mean and median sectors looking similar to the average. Chart C in the Bank of England's November 2021 Monetary Policy Report shows that only a small part of the productivity slowdown

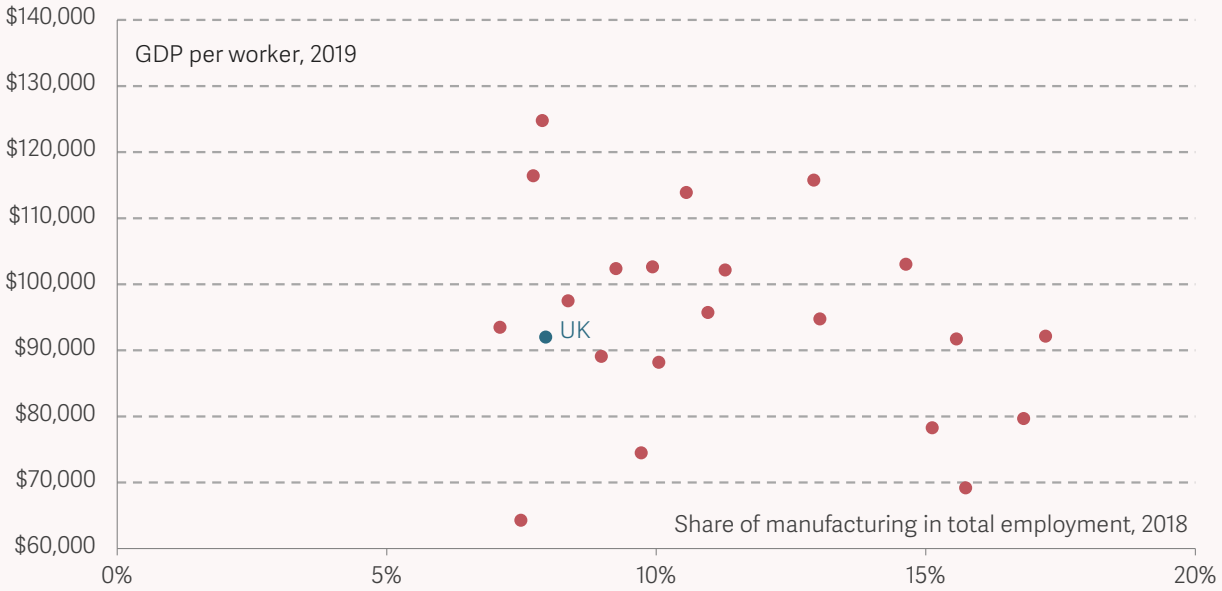
is explained by changing sectoral composition.[19] And recent academic work suggests that unmeasured IT industry output cannot plausibly be large enough to account for the slowdown.[20]

Moreover, there is little relationship among high-income countries between the share of manufacturing employment and overall productivity levels (Figure 7).

Lastly, although a casual glance may indicate that haircuts aren't getting any better, there is nonetheless huge scope for measurable productivity growth within swathes of the service economy: logistics firms can use smarter algorithms, more efficient trucks and better roads to deliver more parcels per hour worked or litre of petrol; communications firms can transmit more gigabytes down fibre-optic cables; and car washes, famously, can be performed by machines rather than people.

FIGURE 7: **The manufacturing employment share is uncorrelated with whole-economy productivity among rich countries**

Share of manufacturing employment and GDP per worker among select OECD countries



NOTES: The horizontal axis shows the share of manufacturing in total employment at the national level. The vertical axis is GDP per worker at current PPP.
SOURCE: Analysis of OECD STAN database.

19 Monetary Policy Report, Bank of England, November 2021.
20 C Syverson, Challenges to Mismeasurement Explanations for the US Productivity Slowdown, Journal of Economic Perspectives 31(2), Spring 2017.

Many theories have been put forward to explain the productivity puzzle in the UK, and it is likely that a combination of these is at play.[21] Measurement issues have been shown to matter, as difficulties measuring intangible assets and digitisation affect the measurement of productivity in a service-based economy such as the UK.[22] Other key factors that have been highlighted in the literature include the UK's exposure to the financial sector, and heightened credit constraints faced by firms since the financial crisis; and issues around weak demand (to which excessive austerity contributed) and uncertainty (following the outcome of the EU referendum, in particular) – all of which have held back investment.[23] Ultimately, these issues since the financial crisis have contributed to widening the UK's longstanding productivity gap which in turn can be explained by underinvestment in productivity-enhancing assets and capabilities.

So far, our discussion has been focused on average performance across the country or in specific sectors. Some have argued that the UK's productivity woes can be explained by increasing dispersion in performance across firms: in particular, that less productive firms are slower to catch up. In a dynamic economy, weaker firms should shrink and stronger firms grow, and this is one route by which aggregate gains in productivity are made. In the next section we explore the extent to which aggregate underperformance is down to a 'long tail' of poorly performing firms and whether there are signs of a decline in business dynamism in the UK.

21 See, for example, ONS, Productivity measurement – how to understand the data around the UK's biggest economic issue, March 2020.
22 J Haskel & S Westlake, Capitalism without Capital: the Rise of the Intangible Economy, 2017.
23 See: O Blanchard & D Leigh, Growth Forecast Errors and Fiscal Multipliers, International Monetary Fund Working Paper 13/1, January 2013, and: N Bloom et al., Brexit and Uncertainty: Insights from the Decision Maker Panel 39(4), December 2018.

Section 3

Dynamism and resource allocation among UK firms

One explanation that has been given for the UK's productivity underperformance is that it is down to a 'long tail' of poorly performing firms. The gap between the best and worst firms is indeed huge: a worker at the 90th percentile of firm productivity is around 16 times more productive than at the 10th percentile. Taking the past two decades as a whole, there is some tendency for the top firms to pull away from the middle ones, and the bottom firms to converge with them. But in contrast to some previous work, our analysis does not suggest that this problem is especially bad in the UK compared to other countries.

Moreover, the share of output produced in the long tail is so low that raising those firms' productivity would do little to boost the average. Raising the productivity of the lowest-productivity firms employing 40 per cent of workers by 10 per cent would raise productivity by around 1.2 per cent, whereas the same boost at the top would increase GDP by 7.5 per cent.

So, if the sole objective were to improve aggregate productivity, rather than transforming low-productivity firms, a more promising avenue to pursue may be to reallocate resources from them to better-performing firms. Here there is some cause for relative optimism. The job reallocation rate – the fraction of jobs that move from shrinking firms to growing ones – has been relatively stable in recent years in the UK, and is relatively high; many other countries have seen falls in recent years. This dynamism allows workers to have found their way to the more productive firms, boosting aggregate productivity. On this measure, then, UK firms are not worse-placed than other major advanced economies to handle the coming surge in reallocation.

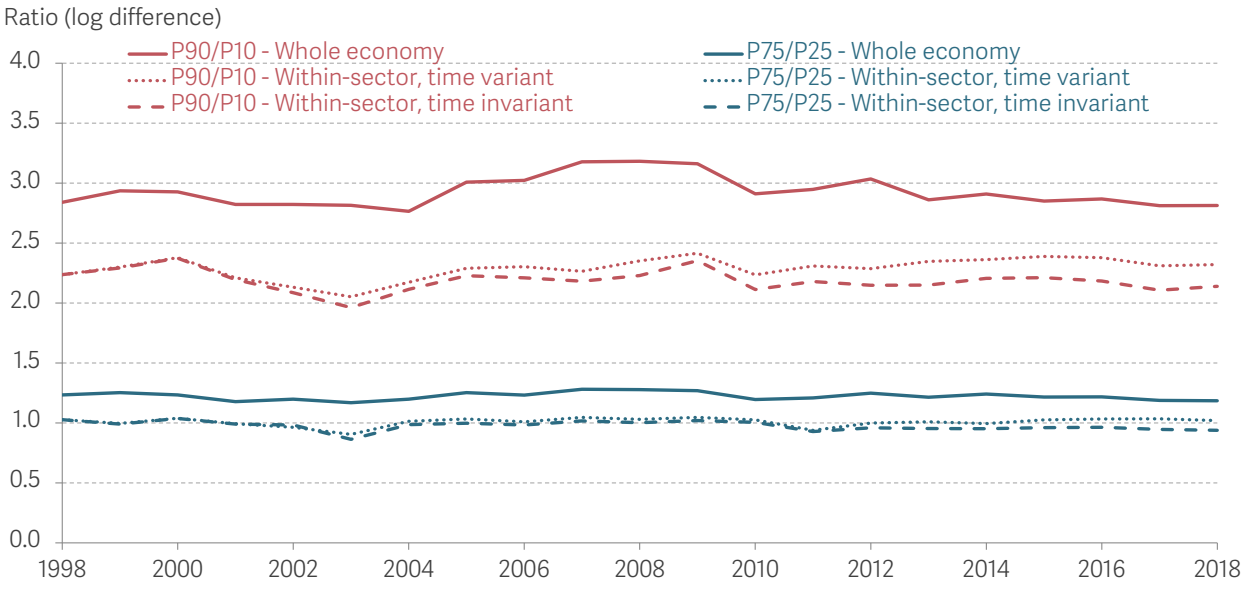
The gap between the best and worst firms is huge

We can measure value added per worker at the level of a country, a sector, a firm or even an individual office or manufacturing plant. When we measure value added per worker at the firm level, we can see how much it varies across firms. If the variability is large then, under certain quite strict conditions, we can say that resources are misallocated and, relatedly, that the productivity of the economy would increase if resources were moved from the low- to the high-productivity firms.[24]

Figure 8 shows that firms at the 90th percentile of the employment-weighted productivity distribution are around 2.8 log points (i.e., 16 times) more productive than those at the 10th percentile.[25] These are huge differences, corresponding in 2018 to the average worker in the 90th percentile of firms producing £98,000 per year, compared to £6,000 per year in the 10th percentile of firms.

FIGURE 8: **There is a large but broadly stable gap between the most and least productive firms in the UK**

The ratio of value added per employee in the 90th percentile of firms to the 10th percentile of firms, and the 75th to the 25th percentile of firms



NOTES: This graph plots the dispersion of UK firm-level labour productivity (employment-weighted GVA per worker) across time, considering the entire distribution (i.e. includes negative GVA firms). It compares the ratios for the whole economy versus the ratios when within-sector weights based on employment at the two-digit industry level are included (within sector, time variant). To account for changes in sectoral composition, we also plot the ratios using sector-level employment at the base period = 1998, or the subsequent available year for given sector (within sector, time invariant).
SOURCE: Analysis of ONS Firm-level labour productivity measures from the Annual Business Survey, Great Britain

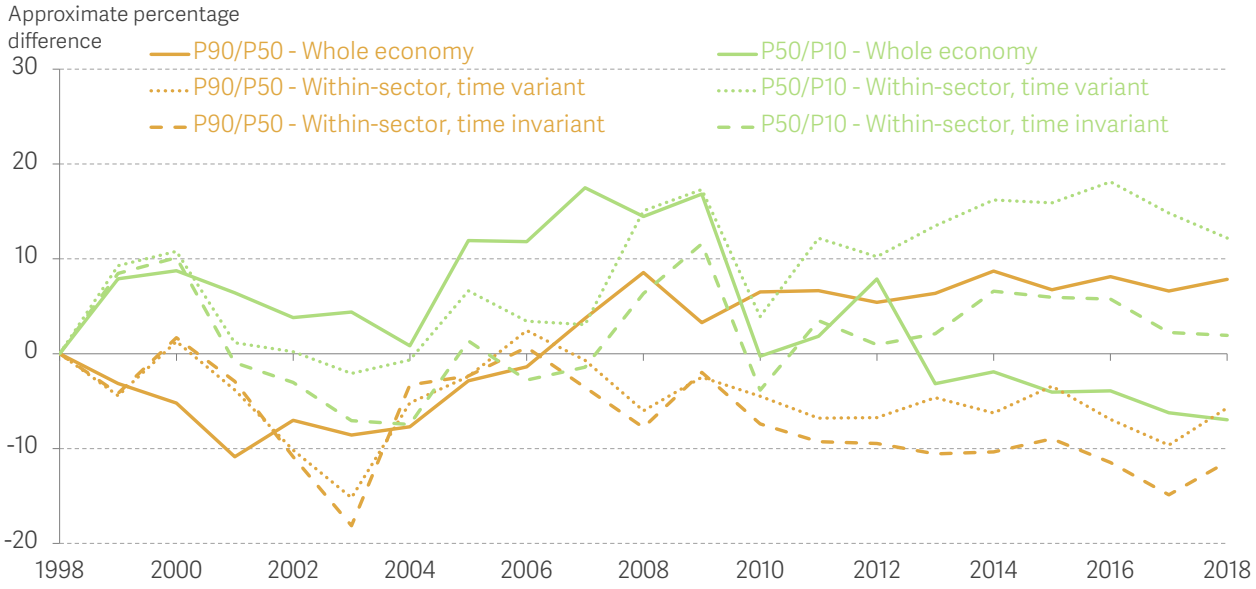
24 These conditions include that average product is proportional to marginal product, and that differences in nominal productivity reflect quantities produced rather than prices charged. See Hsieh and P Klenow, The Reallocation Myth, 2018. See also: Asker et al., Dynamic inputs and resource (mis) allocation, Journal of Political Economy, 2014; and: Bartelsman et al., Cross-country differences in productivity: The role of allocation and selection, American Economic Review, 2013.

25 Here 'employment-weighted' means that we weight firms in the distribution by their employment. We are hereby effectively measuring the dispersion in worker productivity, assigning to each worker the average productivity of the firm they work for.

Underlying the overall stability of the 90-10 ratio, Figure 9 shows that, although it appears that the bottom firms narrowed the gap with the median, the top has pulled away from the middle, suggesting that there has been some increase in inequality at the top.[26]

FIGURE 9: **Over the last two decades, the bottom firms' productivity converged towards the middle, while the top pulled away from the middle**

Change since 1998 in the ratio of value added per employee in the 90th percentile of firms to the 50th percentile of firms, and the 50th to the 10th percentile of firms



NOTES: This graph plots changes in the dispersion of UK labour productivity (employment-weighted GVA per worker) since 1998, considering the entire distribution (i.e. includes negative GVA firms). It compares the ratios for the whole economy versus the ratios when within-sector weights based on employment at the two-digit industry level are included (within sector, time variant). To account for changes in sectoral composition, we also plot the ratios using sector-level employment at the base period = 1998, or the subsequent available year for given sector (within sector, time invariant).
SOURCE: Analysis of ONS Firm-level labour productivity measures from the Annual Business Survey, Great Britain.

Part of the reason that these differences are so large is that we are comparing firms across all sectors of the economy, with widely varying levels of non-labour inputs, skills and hours worked. For example, firms at the top of the distribution could be in sectors with long hours, high skill requirements or lots of capital, such as finance or mining, while those at the bottom could be in sectors where part-time work is common, such as retail. The difference in productivity would therefore not represent true misallocation, in that it would be hard to reallocate labour from one to the other without affecting average productivity in those firms.

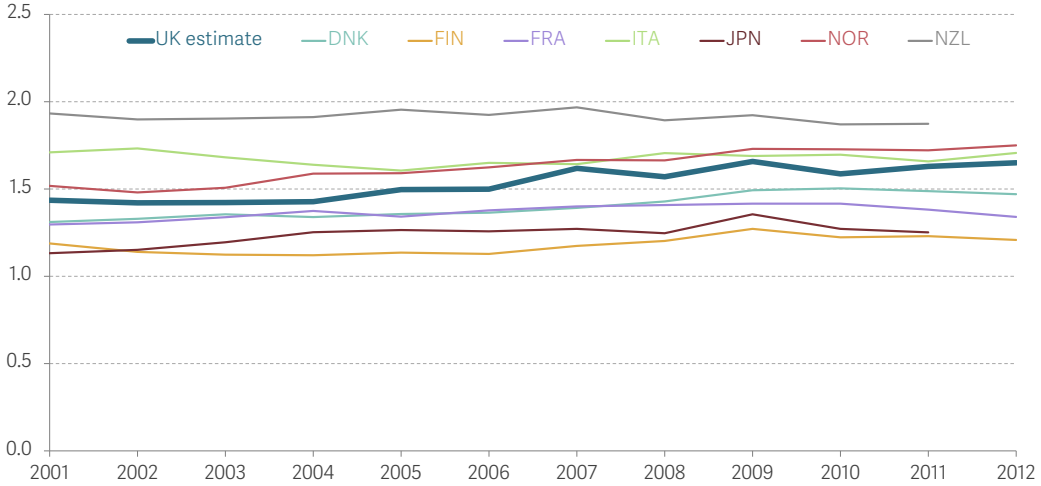
26 This finding is consistent with other contemporary work that uses different data; De Loecker, J., Obermeier, T. and Van Reenen, J., Firms and Inequality, Chapter for the Deaton Review, mimeo.

The 'long tail' does not appear especially bad in the UK

An alternative measure of misallocation, albeit still an imperfect one, is the average dispersion in productivity within sectors. This measure avoids comparing hospitality firms with mining firms, for example and instead would just compare mining firms to other mining firms, and so on. The dotted and dashed lines in Figure 8 and Figure 9 show that these measures are substantially lower and more stable than the whole-economy measures. The fact that the aggregate 90-50 ratio rises despite stability in the within-sector ratio could be due, among other things, to a shift in employment towards sectors with higher dispersion.

These within-sector measures are more directly comparable to those provided by the OECD for other advanced countries for earlier periods.[27] Once adjustments are made to maximise comparability,[28] Figure 10 shows that the dispersion of UK firms' productivity in both manufacturing and services was not exceptionally high compared to the comparison group over the 2001-2012 period, the latest period for which we have comparable data. This finding is in contrast to some previous analyses, which were done when this data for the UK was not available.[29]

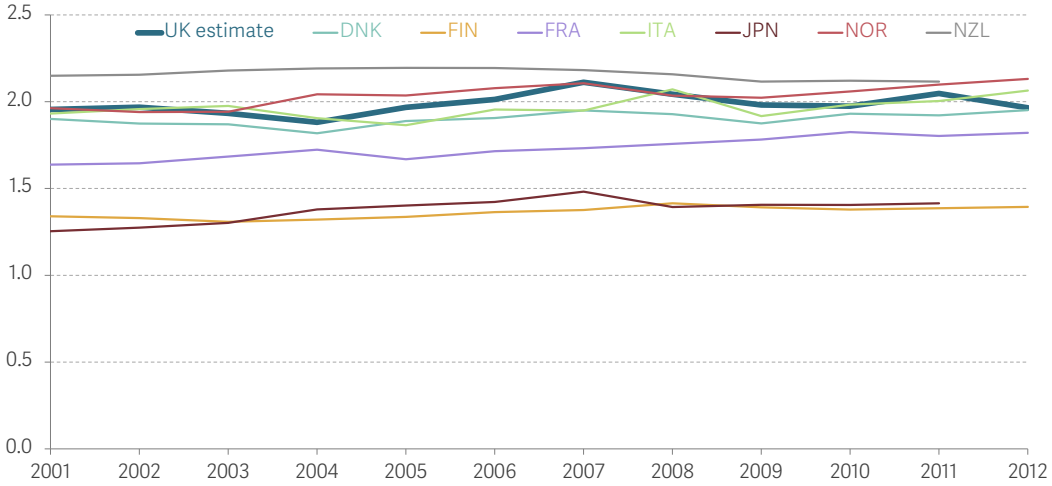
FIGURE 10: **Productivity dispersion in the UK is similar to other countries'**
Log difference of the P90/P10 ratio of labour productivity in the manufacturing sector: UK and select OECD countries



NOTES: Labour productivity is defined as employment-weighted GVA per worker. The UK estimate applies the economy-wide difference in dispersion when negative GVA firms are excluded to the dispersion in the manufacturing sector, to ensure comparability with the OECD data. For the UK (ONS's table 25) and other EU countries, manufacturing corresponds to SIC section C. In both cases, sector employment levels are used to weight within-sector dispersion.
SOURCE: Analysis of ONS; OECD.

27 Berlingieri et al., The Multiprod project: A comprehensive overview, OECD, 2017.
28 Negative GVA firms are included in the ONS data at the sectoral level, but excluded from comparator country distributions. Using economy-wide data from the ONS, we calculate the difference in dispersion that arises from including negative GVA firms, and apply the smallest year's resulting difference to sectoral dispersion. This gives us a more comparable UK estimate in these sectoral analyses, but is conservative because the smallest adjustment over a larger set of years is chosen. In addition, the OECD data measures dispersion at the 'A38' sector level, whereas the UK data measures it at less granular single-digit SIC codes; this would tend to overstate dispersion in the UK data.
29 See Chart 6 in A G Haldane, The UK's Productivity Problem: Hub No Spokes, Academy of Social Sciences Annual Lecture, June 2018 for an example of previous results. One explanation for the discrepancy may be that we have used ONS aggregates that were not available at the time of this previous work. Another could be that this analysis compared measures for the whole of manufacturing or services for the UK with within-sector measures for the other countries. See also Productivity Leadership Group, How good is your business really?, 2018 which uses Orbis data to analyse dispersion.

Log difference of the P90/P10 ratio of labour productivity in the service sector: UK and select OECD countries



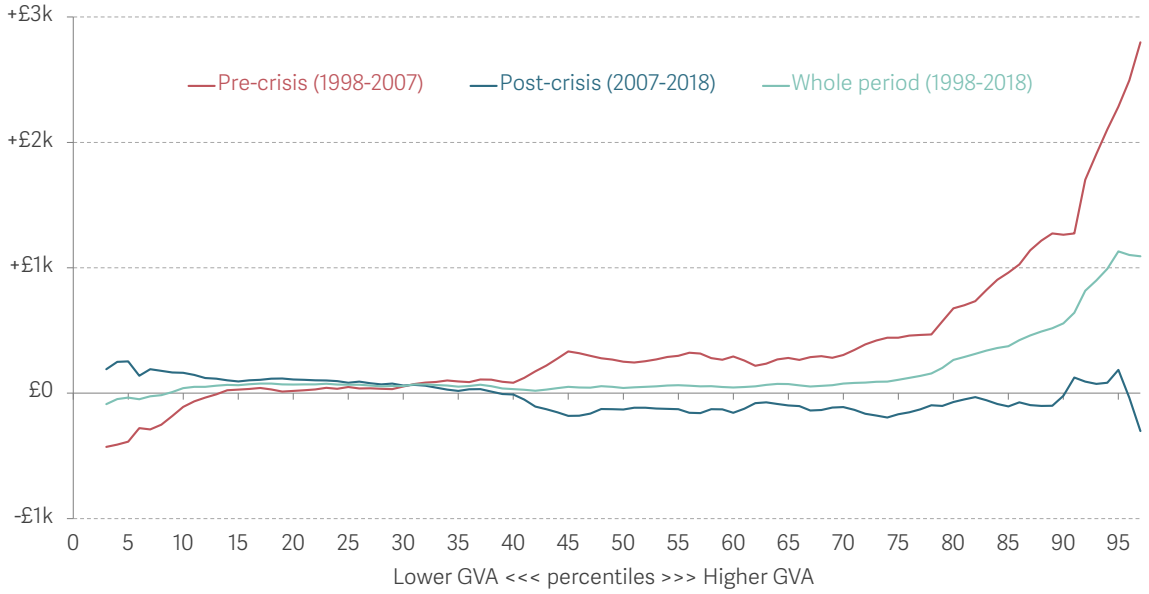
NOTES: Labour productivity is defined as employment-weighted GVA per worker. The UK estimate applies the economy-wide difference in dispersion when negative GVA firms are excluded to the dispersion in the service sector. For the UK (ONS's table 25) and other EU countries, service sector corresponds to SIC sections G-N. In both cases, sector employment levels are used to weight within-sector dispersion.
SOURCE: ONS for the UK and OECD for the other EU countries.

Consistent with this picture of broad stability in the dispersion of productivity across firms, Figure 11 shows that productivity at the very top of the firm productivity distribution appears to have actually fallen between 2007 and 2018, following a period in which top firms pulled away from the rest.[30] Over the longer run, we see a gentle U-shape in productivity growth across the productivity distribution, consistent with the pattern depicted in Figure 9 of the bottom moving towards the middle, while the top has moved away over this period as a whole.

30 We are comparing repeated cross-sections of the UK productivity distribution so, strictly speaking, changes in the productivity levels at any given percentile do not correspond to the productivity changes experienced by any given firm.

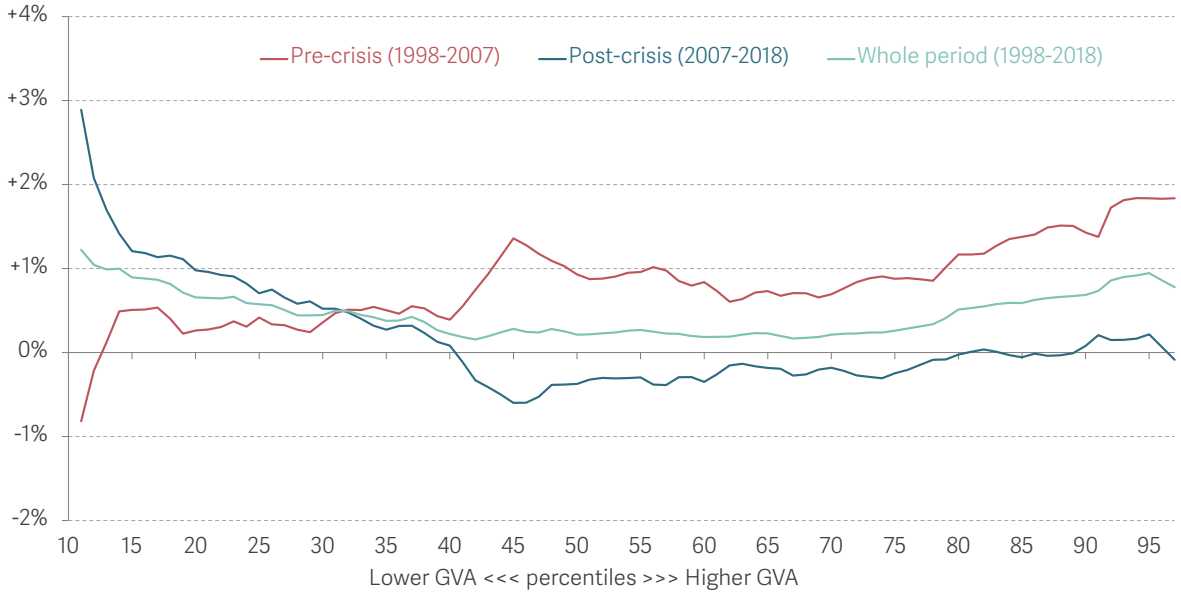
FIGURE 11: **Firms above the median have typically performed worse in the most recent period**

Average annual change (in levels) in mean GVA per worker, by percentile of productivity distribution: GB, 1998 to 2018



NOTES: The change in the level of GVA per worker in constant prices at each point in the employment-weighted whole-economy productivity distribution.
SOURCE: ONS Firm-level labour productivity measures from the Annual Business Survey, Great Britain: 1998 to 2018

Average annual change (in growth rates) in mean GVA per worker, by percentile of productivity distribution: GB, 1988 to 2018

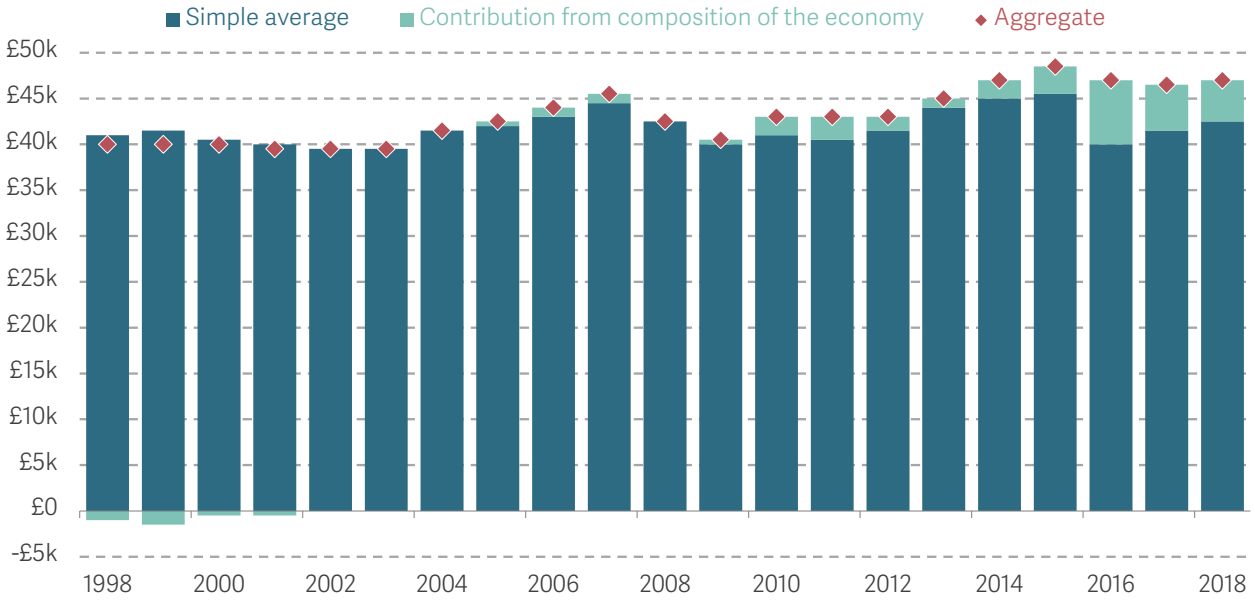


NOTES: The average annual growth in the level of GVA per worker in constant prices at each point in the employment-weighted whole-economy productivity distribution. Percentiles with negative or extremely low value-added are omitted, in the former case because growth rates are undefined, in the latter case because growth rates can be extremely high.
SOURCE: ONS Firm-level labour productivity measures from the Annual Business Survey, Great Britain: 1998 to 2018.

Alternative measures suggest that the allocation of resources may actually have improved in the recent past. Average productivity in the economy can differ from the productivity of an average firm because there may be a tendency for more productive firms to employ more workers. Other things equal, if more productive firms employ more workers, the average productivity of the economy will increase with a 'batting average' effect.[31] Figure 12 decomposes average productivity into the productivity of the average firm and a contribution from any tendency of more or less productive firms to employ more workers than average. If the turquoise bars are positive, more productive firms tend to be larger, such that the average productivity across the economy is larger than the mean productivity of a given firm. The chart shows an increasingly positive contribution from this compositional effect, suggesting that workers have become more likely to be allocated in more productive firms. Figure 13 shows that this positive contribution is relatively broad-based across sectors.[32]

FIGURE 12: **More productive firms are employing more of the workers**

Simple and employment-weighted averages of firm-level labour productivity per head in constant prices: GB

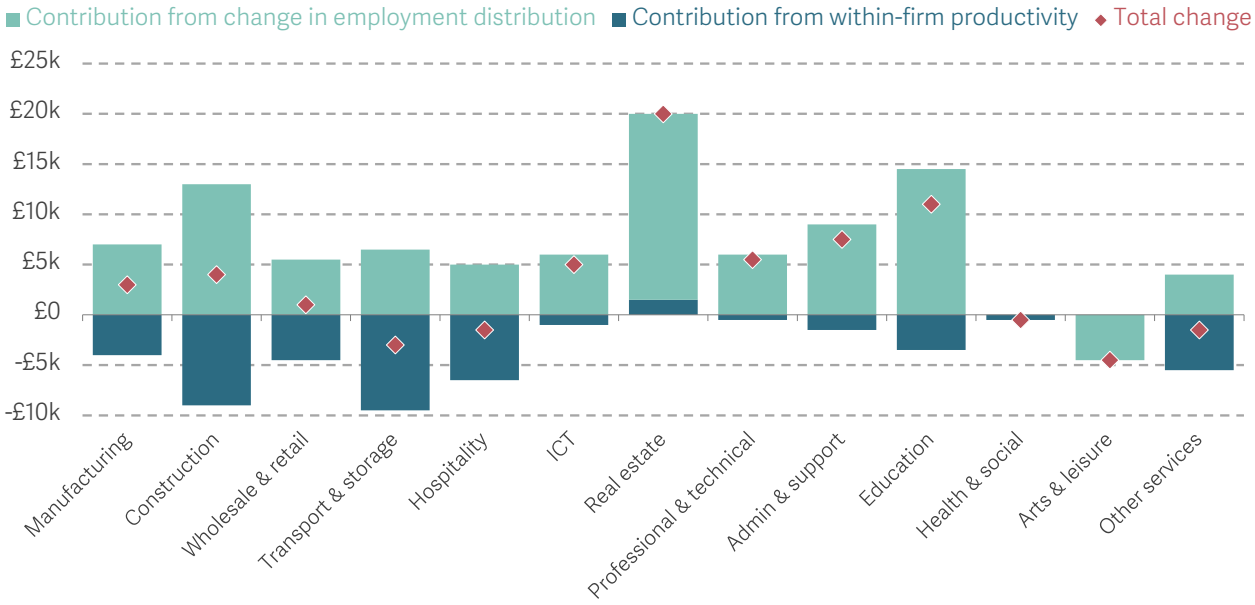


NOTES: The blue bars show the simple average of productivity across firms (within sectors). The total of the turquoise and blue bars is the employment-weighted average of productivity across firms (red dot). The difference between them – the turquoise bars - represents a contribution to aggregate productivity from any tendency of employment to be skewed towards higher-productivity firms.
SOURCE: ONS Firm-level labour productivity measures from the Annual Business Survey, Great Britain: 1998 to 2018

31 This assumes, among other things, that differences in nominal productivity at given points in time represent differences in physical productivity rather than prices. See F Biondi, Resource allocation with markups and policy distortions: is the covariance always informative?, KU Leuven, October 2021.
32 See P Schneider, Decomposing differences in productivity distributions, Bank of England Staff Working Paper No.740, July 2018.

FIGURE 13: **This phenomenon is widespread across sectors**

Changes in simple and employment-weighted averages of firm-level labour productivity per head in constant prices: GB, 1998 to 2018



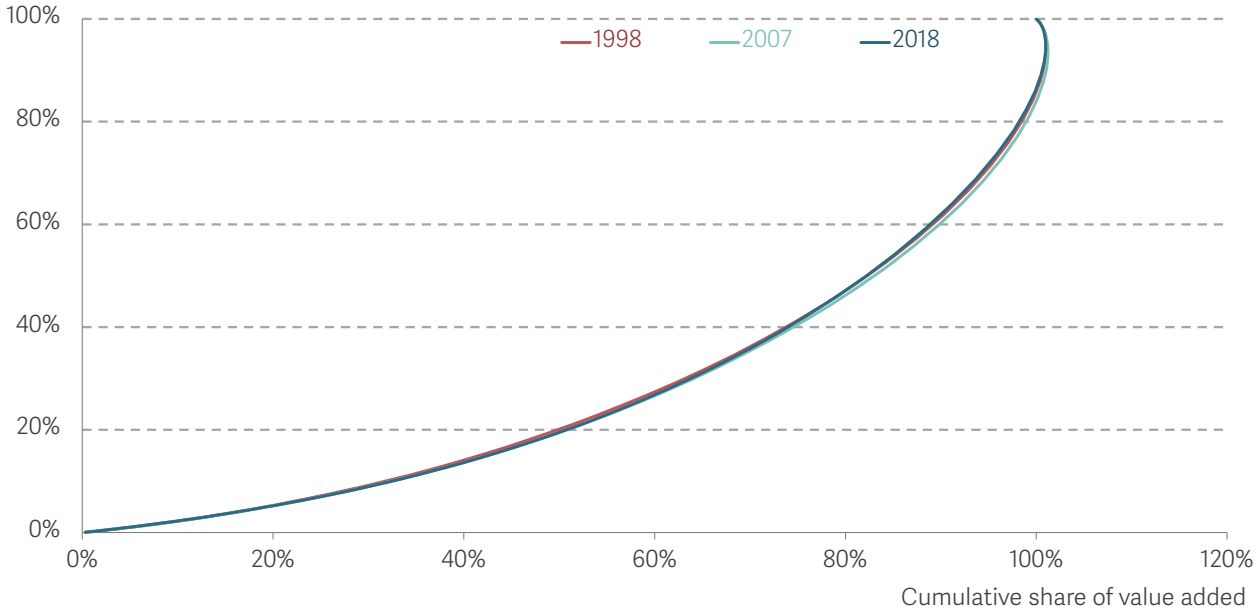
NOTES: The blue bars show the change in simple average of productivity across firms (within sectors). The total of the blue and turquoise bars is the employment-weighted change in the average of productivity across firms (red dot). The difference between them – the turquoise bars – represents a contribution to the change in aggregate productivity from any tendency of employment to be skewed towards higher-productivity firms.
SOURCE: ONS Firm-level labour productivity measures from the Annual Business Survey, Great Britain: 1998 to 2018

The share of output produced in firms in the 'long tail' is so low that raising their productivity will do little to boost the average. The 40 per cent of workers in the least productive firms produce only around 12 per cent of total value added, while the most productive 40 per cent produce three quarters (Figure 14). Raising the productivity of the bottom firms employing 40 per cent of workers by 10 per cent would therefore raise productivity by around 1.2 per cent, whereas the same boost at the top would increase GDP by 7.5 per cent. Alternatively, transferring one-tenth of those workers from the bottom to the top would (assuming, for illustrative purposes, that this could be done without affecting the productivity of those firms) boost GDP by some 6 per cent.[33]

33 Transferring a tenth of the workers in the bottom 40 per cent implies transferring 4 per cent of workers. Normalising total economy GVA to 1, and total employment to 1, so that average output per worker is also 1, these workers were previously producing 0.12/0.4 = 0.3 on average. They would now be producing 0.75/0.4 = 1.875. This represents an average increase in productivity of 1.6. Since only 4 per cent of workers are being transferred, this represents an aggregate uplift of 6 per cent.

FIGURE 14: **Firms employing a large fraction of the workforce produce only a small share of output, and vice versa**

Cumulative share of output produced by cumulative employment-weighted share of firms: GB, 1998 to 2018



NOTES: This graph plots firms in decreasing order of productivity and weights them by their employment level. The x-axis is the cumulative share of value added produced by firms employing the share of workers in the y-axis. The line bends backwards at the top right because there are some firms in the sample with negative value added, such that adding them to the cumulative distribution reduces aggregate output.
SOURCE: ONS Firm-level labour productivity measures from the Annual Business Survey, Great Britain: 1998 to 2018.

In summary, then, there is indeed huge inequality in productivity between UK firms. But, overall, it is has not increased over time and the degree of inequality is not so far above other countries. In this sense, it is unlikely to account for much of either the low level or low and decelerating growth in UK aggregate productivity. Furthermore, raising productivity in the long left tail would not have an especially large impact on aggregate productivity, because it accounts for such a small share of total output (if not of total employment). Therefore, if the sole objective were to raise productivity in the aggregate, then it would be more promising to try to reallocate workers from the bottom end of the productivity distribution to the top, and it is to this that we now turn.

One route to higher productivity would be to reallocate resources from low-productivity firms to better-performing ones

The big shocks and transitions of the 2020s will create winners and losers among firms. These macroeconomic shocks will compound the large everyday volatility that firms face while doing business: the development of new products and services; the advent or demise of a competitor or supplier; and the vagaries of customer demand. A change in

aggregate GDP of 5 per cent over a year counts as extremely large, but is small beer when compared to the volatility that individual firms face.[34]

Firms grow and shrink in order to adjust to these shocks. Even when employment at the level of the whole economy or even a sector is stable, there is a huge amount of 'churn' going on underneath this as, say, one hotel hires more workers and another lets some go. This 'job reallocation rate' is one measure of the dynamism of the corporate sector. It is distinct from the net movement of jobs across industrial sectors – a measure of structural economic change – which our launch report showed has fallen to multi-decade lows.[35] This is because most job reallocation takes place within sectors as, for example, some hospitality firms grow and others shrink.[36] It is also distinct from the rate of movement of individual workers from one job to the other, because workers can swap jobs without firms growing or shrinking.[37]

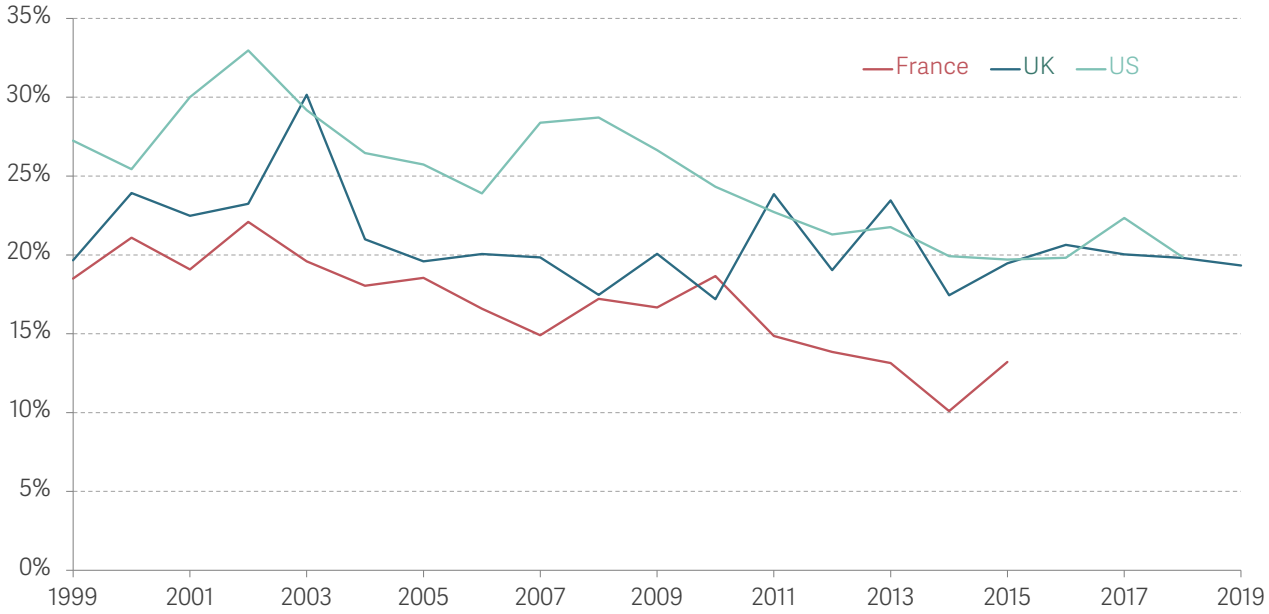
When the job reallocation rate is high, more jobs are moving from shrinking firms to growing firms. To the extent that growing firms are more productive at the margin than the shrinking ones, this process boosts productivity. And the more such 'job churn' we tend to see in the normal course of events, the more confident we might be that UK firms will be able to manage the huge shocks of the 2020s.

A large literature has documented a widespread fall in this and other measures of business dynamism across many industrialised countries over recent decades.[38] and debated its link to the overall slowdown in productivity growth.[39] It is therefore striking that the UK seems to be something of an outlier, in that business dynamism appears to have been broadly stable since the early 2000s (Figure 15). Keeping in mind the caveat that it is difficult to make these measures comparable across countries, it seems that US dynamism has converged down towards UK levels, whereas dynamism in France started off at contemporary UK levels and has since fallen below.[40]

34 N Bloom et al., Really uncertain business cycles, Econometrica 86(3), May 2018.
35 T Bell et al., The UK's Decisive Decade: The Launch Report of the Economy 2030 Inquiry, May 2021
36 L Anayi et al., Labour market reallocation in the wake of Covid-19, VoxEU, August 2021.
37 See Figure 10 of T Bell et al., The UK's decisive decade: The launch report of The Economy 2030 Inquiry, Resolution Foundation, May 2021.
38 For US, see R Decker et al., The secular decline in business dynamism in the US, University of Maryland, June 2014. For OECD, see F Calvino, Declining business dynamism: Structural and policy determinants, OECD Science, Technology and Industry Policy Papers 94, November 2020.
39 R A Decker et al., Declining business dynamism: Implications for productivity, Brookings Institutions Hutchins Center Working Paper, September 2016.
40 See also Figure 2.2 of OECD, Employment Outlook, 2009 for further evidence that job reallocation started this period at relatively high levels when compared to other countries.

FIGURE 15: **The job reallocation rate has fallen in France and the US but has been stable in the UK**

Sum of annualised gross private sector job creation and gross job destruction less net employment growth as a fraction of total employment, 4 quarter moving average



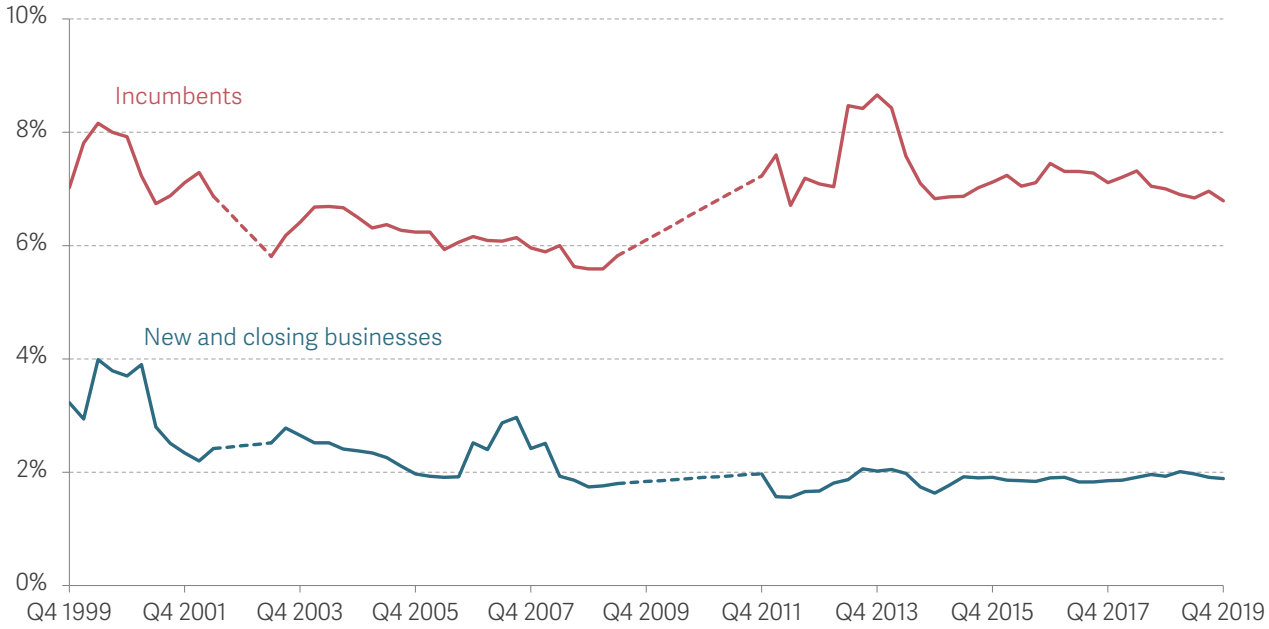
NOTES: The available data for the UK is at a quarterly level. To convert these into annual flows, the quarterly values have been multiplied by two, in line with US evidence.[41] Values have also been adjusted to correct for growth in aggregate employment each year.
SOURCE: Analysis of ONS Business dynamism in the UK economy: Quarter 1 (Jan to Mar) 1999 to Quarter 4 (Oct to Dec) 2019; OECD MultiProd; US Census Bureau.

It is possible to further unpack the job reallocation rate. Jobs can be created or destroyed among incumbent firms (the so-called 'intensive margin'), or among firms that go into or out of businesses (the 'extensive margin'). Figure 16 shows that, underlying the broad stability of the job reallocation rate, more jobs are being reallocated among surviving firms and fewer on the extensive margin. Within this, but not shown in the chart, it is the reduction in the loss of jobs to closing firms that accounts for all of the lower reallocation on the extensive margin.

41 See S J Davis & J Haltiwanger, Measuring Gross Worker and Job Flows, Labor Statistics Measurement Issues, NBER, 1998.

FIGURE 16: **Job reallocation has risen among surviving firms since 2003, and fallen among new or exiting firms**

Private sector reallocation rate among surviving firms (intensive margin) and exiting firms (extensive margin): UK



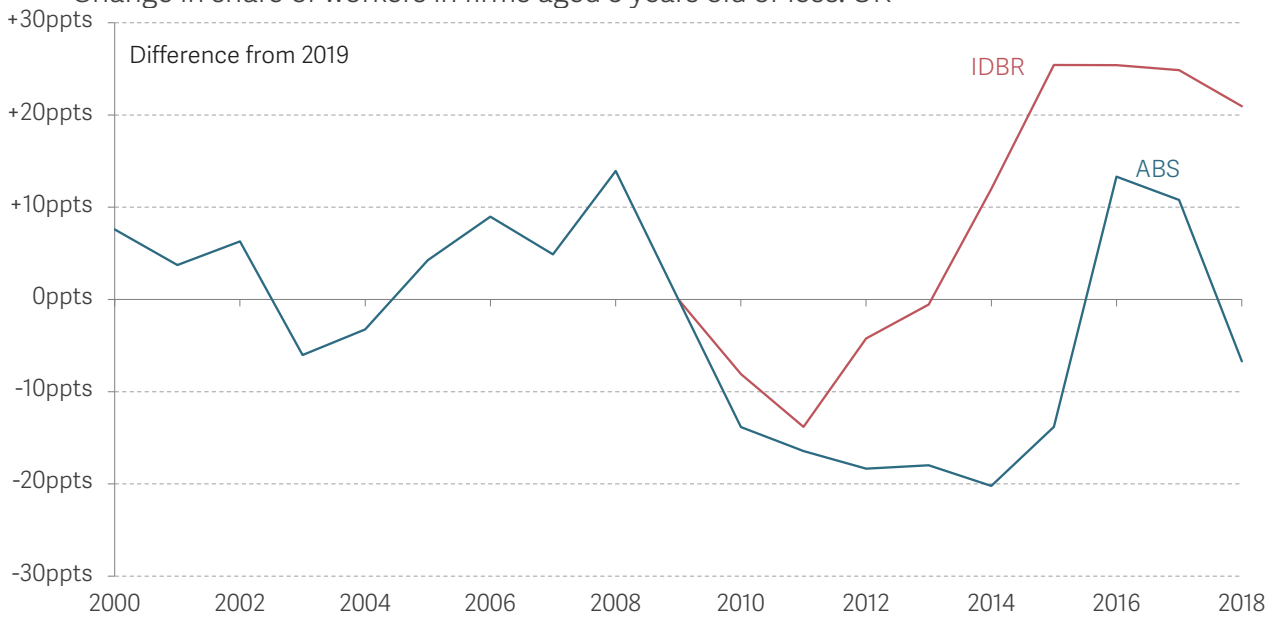
NOTES: The blue line shows the sum of the absolute value of changes in employment among existing firms. The red line shows the number of workers in closing firms plus the number of workers in newly opening firms. Both lines are scaled by total employment. Dotted lines are interpolations.
SOURCE: ONS Business dynamism in the UK economy: Quarter 1 (Jan to Mar) 1999 to Quarter 4 (Oct to Dec) 2019.

The dotted lines in Figure 16 correspond to interpolated periods and attest to the difficulty of measuring changes in firm-level variables over time. A complementary measure of business dynamism, which does not require such longitudinal data is the fraction of workers who are employed in young firms (defined here as firms five years old or less). Compared to the job reallocation rate which, within the intensive margin, does not contain any information about the age of firms gaining or losing employment, it helps to gauge how many of the new jobs are going to young firms, which may tend to be the most innovative ones.[42] The share of employees in young firms seems to be relatively stable on one measure, and rising on another (Figure 17).[43]

42 R A Decker et al., The Role of Entrepreneurship in US Job Creation and Economic Dynamism, Journal of Economic Perspectives 28(3), Summer 2014.
43 Half of workers are in large companies, which have complicated administrative structures in the tax system and in the IDBR. Different parts of their structures have different ages, and it is difficult to tell when structures are reorganised for tax/other reasons, or whether new units represent genuinely new business areas for the large company. The ABS excludes finance and the public sector. ABS is reporting unit age rather than enterprise age. The ABS is not stratified by age.

FIGURE 17: **The trend in the share of workers in young firms is unclear**

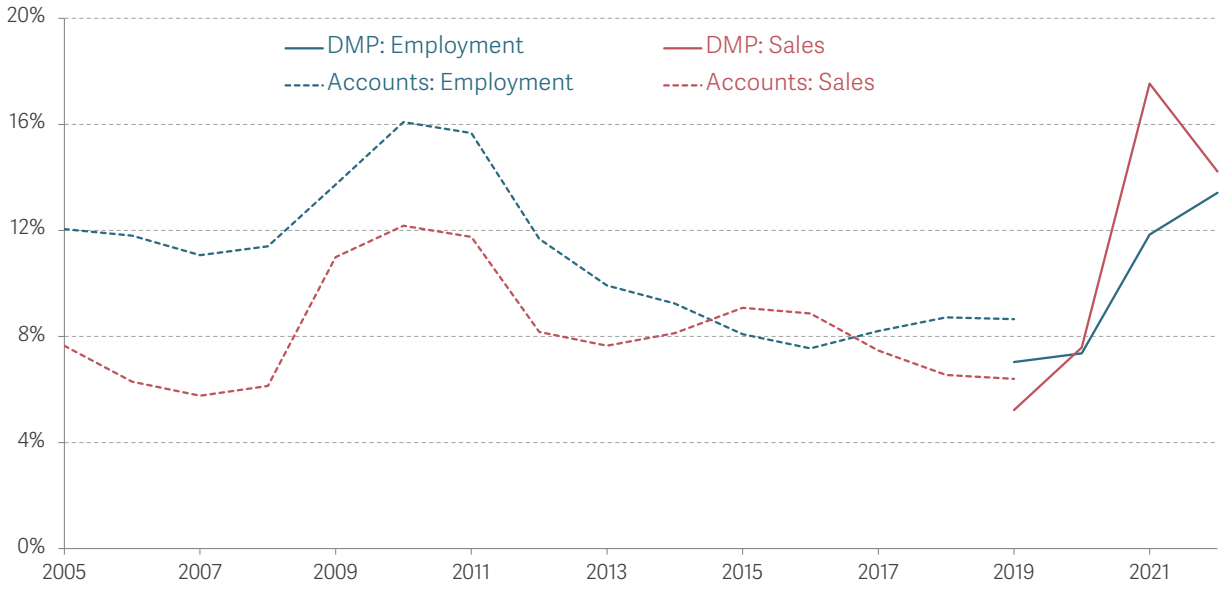
Change in share of workers in firms aged 5 years old or less: UK



NOTES: Data on employment by firm age are sourced from Inter-Departmental Business Register and Annual Business Survey.
SOURCE: Analysis of ONS.

FIGURE 18: **Survey evidence suggests that job reallocation is set to increase**

Outturns and forecasts of employment and sales reallocation among Decision Maker Panel members: UK



NOTES: Three-year, backward-looking job and sales reallocation series for 2005 to 2019 using annual company accounts data. Two-year look-back and one-year expectations data from the DMP data to forward-looking variables.
SOURCE: Decision Maker Panel.

In contrast to this picture of broad stability in job reallocation in recent years, survey evidence suggests that reallocation is set to rise. Figure 18 contains a forecast of job reallocation based on firms' forecasts of their employment and sales in a monthly survey of UK private sector firms. This foretells a coming large rise in reallocation.[44] The analysis set out in this section shows that the UK's relatively poor productivity performance, whether in terms of levels or growth rates, stands in contrast to levels of business dispersion or dynamism that are broadly stable, and at typical levels relative to other countries.

The UK corporate sector has been reallocating workers between firms at a relatively stable rate in the past two decades, even though inter-sectoral reallocation has fallen over the longer run. Reallocation between sectors may be set to rise in the 2030s, and a concomitant rise in job reallocation away from closing firms would be a big change from the recent falls we have seen. Most obviously, the reallocation we have seen has not led to UK firms closing the productivity gap with other countries. So whether UK firms can continue to reallocate workers at the required rate and in a manner that supports productivity growth is therefore an open question. Crucial to this will be UK firms' propensity to invest, innovate and train, and government policies that influence this.

44 It is possible that forecasts of reallocation may be biased upwards or downwards relative to realised changes.

Section 4

Resources available to UK firms

A key area of concern for UK firms is the resources that they have to increase labour productivity. Indeed, UK firms have not been investing in capital, ideas or processes at anything like the rates of their peers. In this context, the UK's relatively low investment rate is well-known. What is perhaps less well known is the sheer scale of the gap, and how much the gap has widened with international peers over recent years. In the UK business capital investment as a share of GDP was 10 per cent in 2019, and has consistently lagged France, Germany and the US where such investment was 13 per cent of GDP on average. Low investment can explain all of the productivity gap with France, while the gaps with Germany and the US are largely about efficiency of resource use.

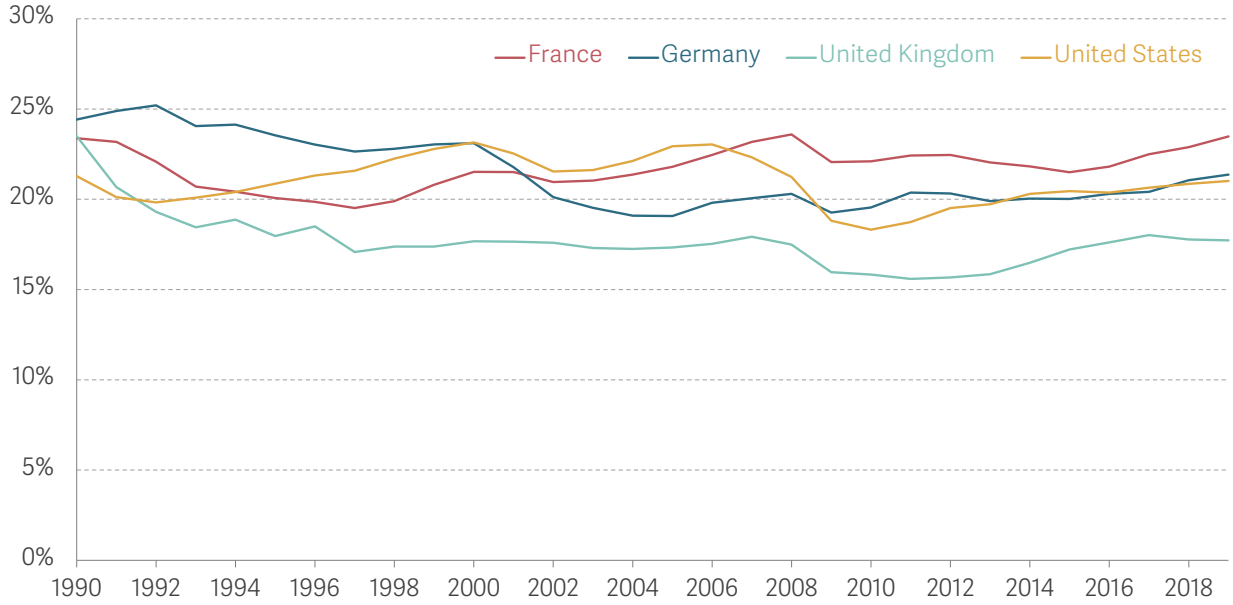
Improving the performance of the UK's firms requires investments in equipment and physical capital, human capital and in new ideas and technologies (innovation) – some of which are measured as part of capital investment (for example, new computing equipment), and some of which affect the way businesses combine inputs to produce output (for example, management practices and broader organisational technologies and capabilities). Business' investment in research and development, for example, was 1.2 per cent of GDP, compared to 2 per cent for the average of France, Germany and the US in 2019. And despite the UK's strong research system, its patenting intensity – a key measure of innovation output – lags other innovative countries: patenting intensity across France, Germany and the US is over twice that in the UK. It is likely that such underinvestment is at least in part due to the lack of long-term, coordinated business and growth policies in the UK, as policy uncertainty deters investment in long-term assets.

UK firms have not been investing in capital or ideas at anything like the rates of their peers

We begin by considering trends in capital investment as a share of GDP, comparing the UK to its main peers. Figure 19 shows Gross Fixed Capital Formation (GFCF) as a share of GDP. GFCF includes investment in assets that are intended for use in the production of other goods and services. This includes fixed assets such as buildings, and also investments in Information and Communication Technology (ICT) and Research and Development (R&D). On this measure, we see that not only does the UK invest less than its main peers as a share of GDP, consistently so since the early 1990s, but also that there has been a decline since 2017 while others saw a rise.

FIGURE 19: **Investment in the UK has been persistently low**

Whole-economy investment as a share of GDP

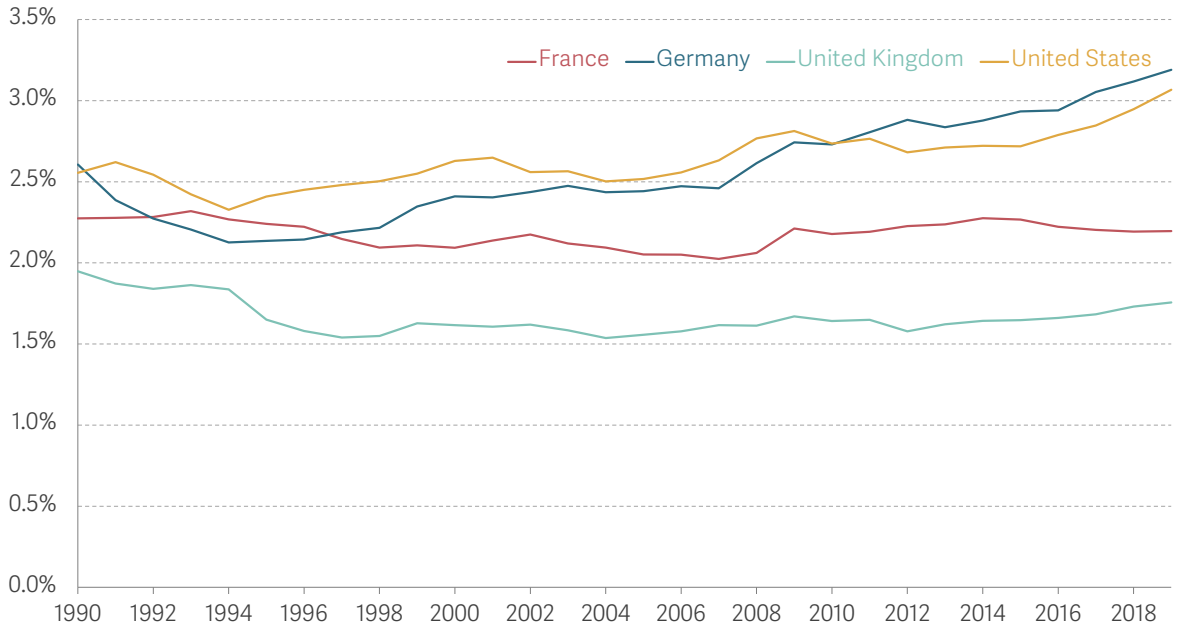


NOTES: Gross fixed capital formation (GFCF) as a share of GDP. Ratio of series in current PPP USD.
SOURCE: Analysis of OECD.

Focusing on investment in R&D, a key measure of innovation input, reveals a similar picture of chronic underinvestment, though here the most recent trend is more encouraging.

FIGURE 20: **UK R&D intensity lags its main peers**

Gross Domestic Expenditure on R&D as a share of GDP



NOTES: Gross domestic expenditure on R&D (GERD) as a percentage of GDP.
SOURCE: Analysis of OECD.

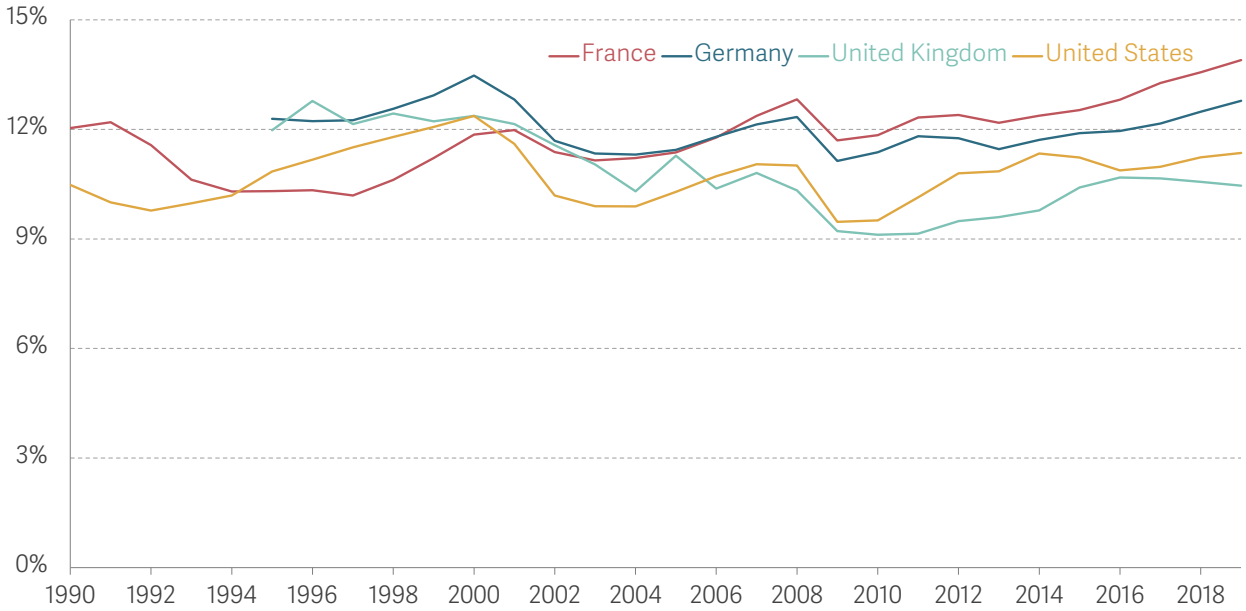
These analyses contain expenditures by both the public and private sector. Both matter in terms of driving the productivity of firms – for example, infrastructure assets invested in by the government affect the connectivity of workers, products and services, and government-financed R&D can generate direct and indirect ('spillover') effects for the private sector.[45] Most activity occurs in the private sector across total investment (59 per cent of GFCF in 2019) and R&D (66 per cent in 2019). Similar analyses isolating just private sector investment reveal similar patterns: Figure 21 shows that while corporate investment in the UK tracked that in Germany, and exceeded that in France and the US in the late 1990s and early 2000s, it has been lower as a share of GDP since the financial crisis.

Figure 22 shows that business expenditure on R&D fell in the early 1990s, and then stayed persistently lower than peers, though there has been a slight rise from 2012.

45 See J Haskel et al., The Economic Significance of the UK Science Base: A report for the campaign for science and engineering, UK-Innovation Research Centre, March 2014.

FIGURE 21: **Corporate investment has been low since the financial crisis**

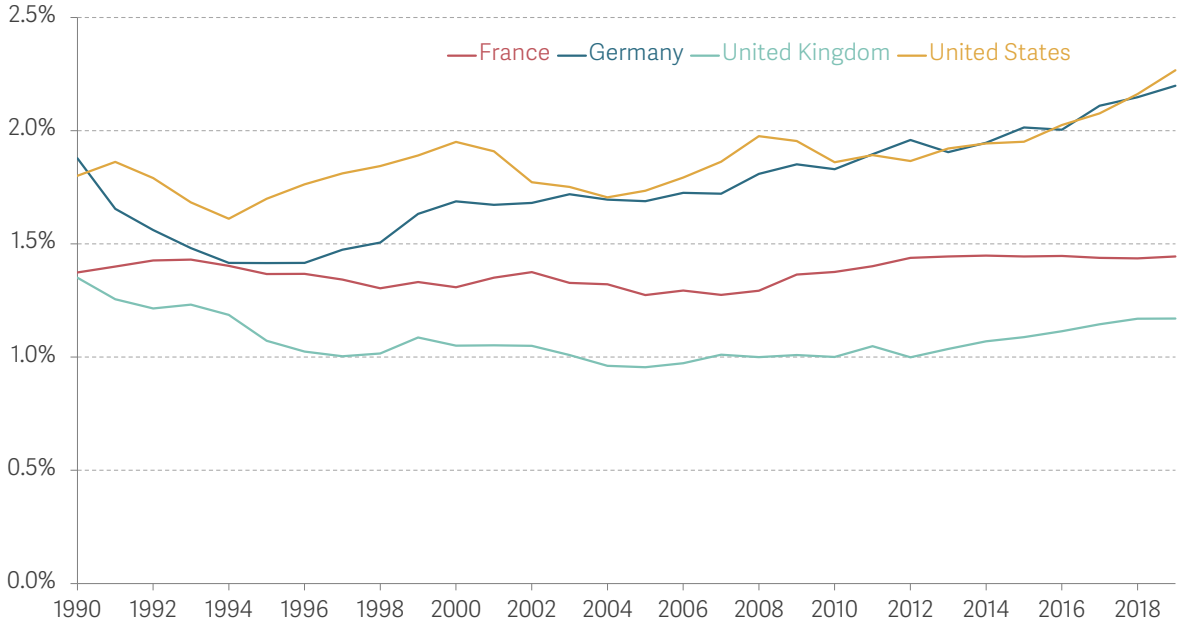
Corporate GFCF as a share of GDP



NOTES: Gross Fixed Capital Formation in the corporate sector as a share of GDP, ratio of series in current PPP dollars.
SOURCE: Analysis of OECD.

FIGURE 22: **UK Business R&D is consistently low**

Business Expenditure on R&D (BERD) as a share of GDP

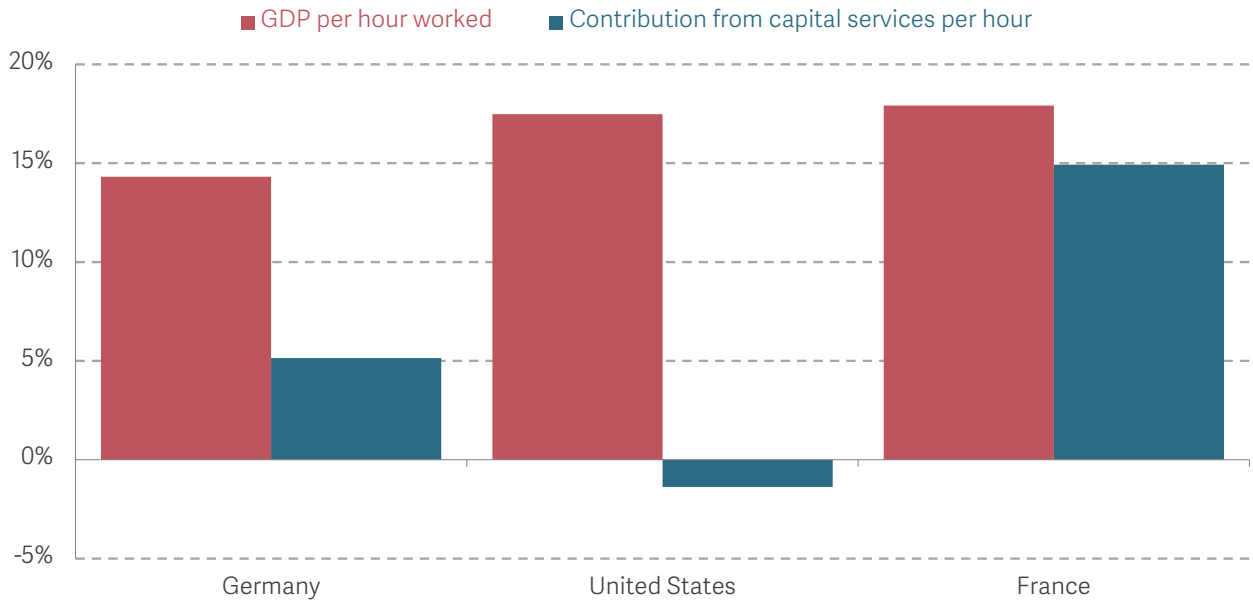


NOTES: Business enterprise expenditure on R&D (BERD) as a percentage of GDP.
SOURCE: OECD, Main Science and Technology Indicators.

In fact, low capital per worker accounts for all of the labour productivity gap with France, but not the gap with the US and Germany – suggesting that other factors, including intangibles and skills – are at play (see discussion below).

FIGURE 23: **Low capital per worker explains the gap with France, but not with the US or Germany**

Difference in GDP per hour worked to the UK and contribution from capital per hour worked in France, Germany and the US



NOTES: GDP per hour worked is the level of GDP per hour worked in US dollars at 2019 PPP. The contribution of capital per hour worked is one-third times the level of capital services per unit of GDP (PWT data) multiplied by GDP per hour worked.
SOURCE: OECD and Penn World Tables.

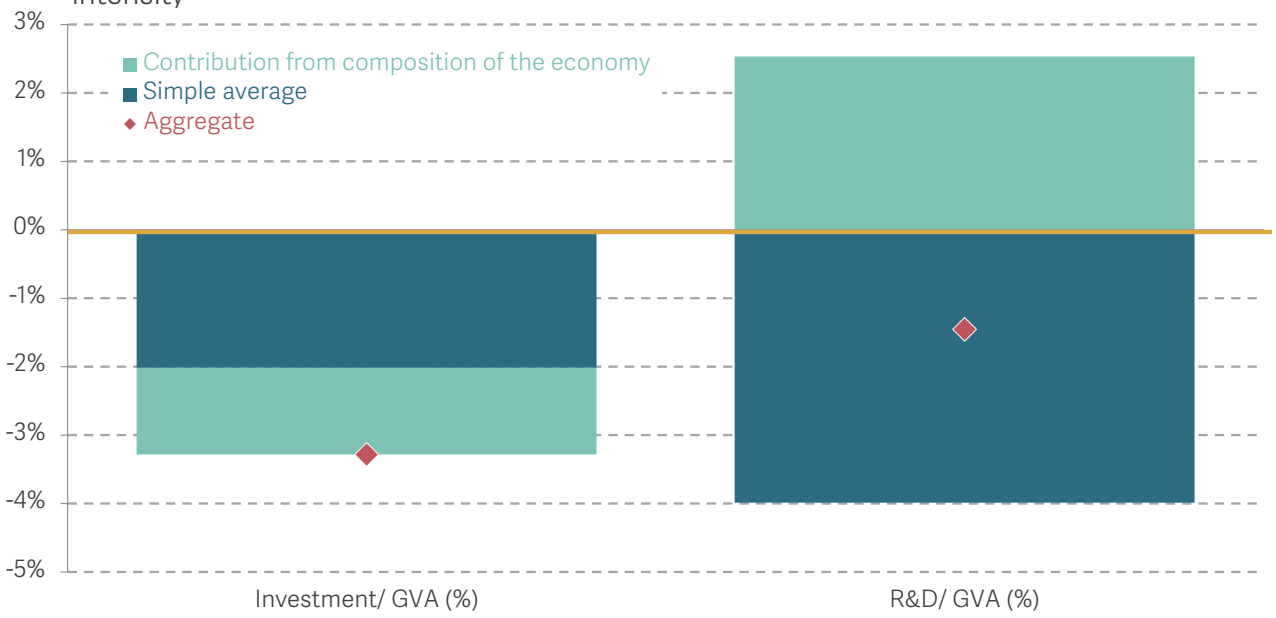
Given these patterns, it is natural to ask whether they are explained by the UK's sectoral composition. For example, capital investment and R&D tend to be higher in manufacturing firms, and the UK economy is dominated by services. In fact we find that low investment intensity occurs across the board.

Figure 24 decomposes the gap in investment rates between the UK and the average across France, Germany and the US. The economy-wide gap is shown by the red dots, for investment and R&D as a share of GDP respectively. The blue bars show that a large share of both gaps is accounted for by lower investment in the average sector. In the case of capital investment this is then reinforced by a tendency of lower investment sectors to employ more workers on average (as shown by the turquoise bar, which is also negative). With R&D we find that the composition effect works in the opposite direction, with higher R&D sectors employing a relatively high share of workers on average.[46]

46 For example, the professional, scientific, and technical activities sector in the UK has an employment share higher than the average of its peers and compares favourably to them in terms of R&D spending as a share of GVA. Conversely, that same sector in the UK has lower capital investment intensity than its peers, on average, illustrating the opposite effects of sector composition.

FIGURE 24: **Composition explains part of weak UK investment but not weak UK R&D**

Simple and employment-weighted averages of sectoral capital intensity and R&D intensity



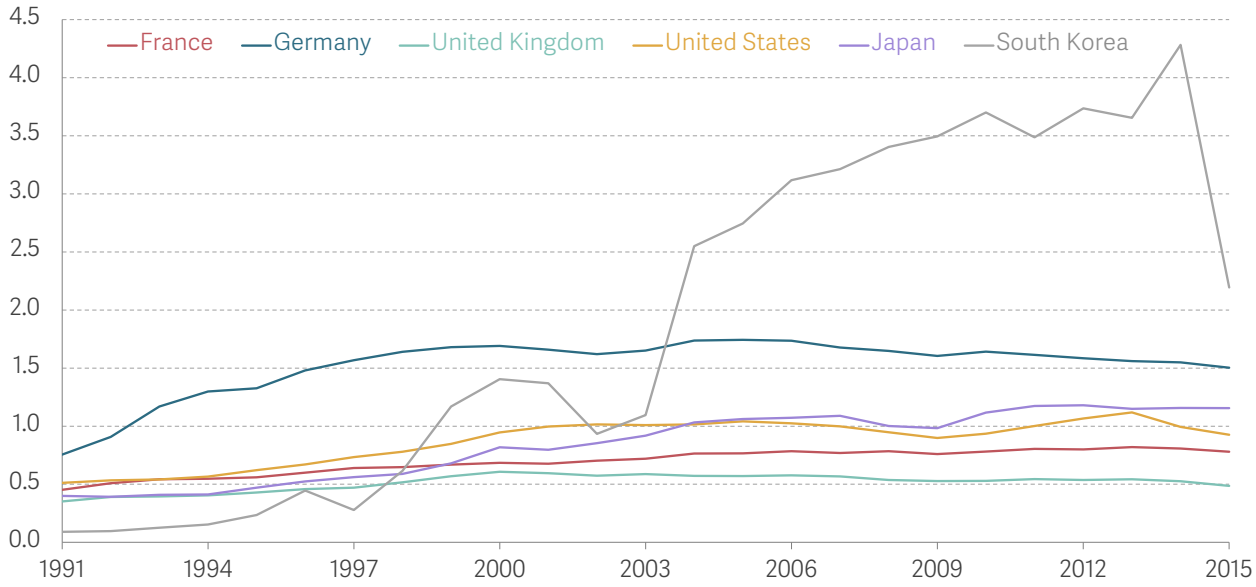
NOTES: Sectoral investment rates at the two-digit (or more aggregated) level in the UK are compared to the average across the US, France and Germany (red dot). The difference is decomposed into the difference in the unweighted sectoral means (blue bar), and the covariance term (turquoise bar) which reflects sectoral composition. The investment data is from 2016 and the R&D from 2017.
SOURCE: OECD, STAN and ANBERD data.

Despite the relative underspend on innovation, the UK has consistently performed well internationally with respect to its research quality and impact.[47] But it has performed less well when it comes to connecting businesses with its research base,[48] or commercialising innovation more broadly. Analysis of patenting – a standard measure of innovation output – again highlights a relatively low innovation intensity compared to the UK's main peers as shown in Figure 25 where patents are normalised by employed people.[49] On average, patenting intensity across France, Germany and the US is over twice that in the UK.

47 BEIS, International comparison of the UK research base, 2019
48 See A Dowling, The Dowling Review of Business-University Research Collaborations, July 2015.
49 While not all innovation is patented, patents are a standard measure of innovation output. Where an inventor seeks intellectual property rights via a patent, this suggests that they are planning to commercialise the innovation.

FIGURE 25: **The UK is a top patenter in absolute terms, but patents per employee are relatively low**

Patents per 1,000 employees: selected advanced economies



NOTES: Count of patent families (underlying innovation) by country, based on the year of the earliest filing data of a patent application within the family. Top six most patenting countries (cumulatively over the period) shown.
SOURCE: OECD, PATSTAT Global 2018 Spring Edition.

Including intangible investment paints a more positive picture for the UK but gaps remain relative to other countries

R&D and spending on software are two aspects of investments in intangible capital that are relatively easy to measure. Indeed, as highlighted in the discussion above, spending on these areas is included in investment figures within national accounts.

As a measure of innovation, R&D tends to be more relevant for manufacturing firms and a broader view of intangibles should also be considered in service-based economies such as the UK. While intangibles such as computerised information (e.g. purchased software and databases) are treated as capital in National Accounts, training, design, branding and organisational capital are not.

Recent experimental estimates from the ONS find that in 2018, total UK intangible investment (of nearly £170bn) actually exceeded tangible investment (£151bn).[50] And within intangible investments, only 24 per cent was capitalised.[51] Benchmarking the UK in terms of intangibles tends to present a more positive picture. Over the period 2000-13,

50 See Office for National Statistics, Investment in intangible assets in the UK: 2018, April 2021.
51 See Department for Business, Energy & Industrial Strategy, International Comparison of the UK Research Base, 2019.

the UK was found to have one of the highest rates of investment in intangible assets as share of GDP in the EU-14, at 9 per cent of GDP, second only to Sweden.[52]

While investments across all aspects of intangibles can be difficult to compare across countries in a consistent manner, different datasets based more on the outcomes of intangible investments allow us to build an understanding of the UK's strengths and weaknesses. First, we consider the digitisation of UK firms – which broadly can be considered the outcome of investments in IT, software, data and associated digital capabilities in firms.

The 2019 World Economic Forum World Competitiveness report concludes that in the UK 'ICT adoption, while increasing, remains low by OECD standards: the country ranks 31st globally and only 16th in Europe, with a score of 73.0, which is 20 and 15 points lower than the scores of Korea and Sweden, respectively'.[53] A consistent message comes from statistics compiled by the European Commission's Digital Scoreboard, which show that digital intensity among UK enterprises is only slightly higher than the average among EU countries, though larger firms do relatively better than their smaller counterparts as shown in Figure 26.

FIGURE 26: **Digitisation in UK firms is middling versus European countries**

Enterprises with high levels of digital intensity, by size (2019)

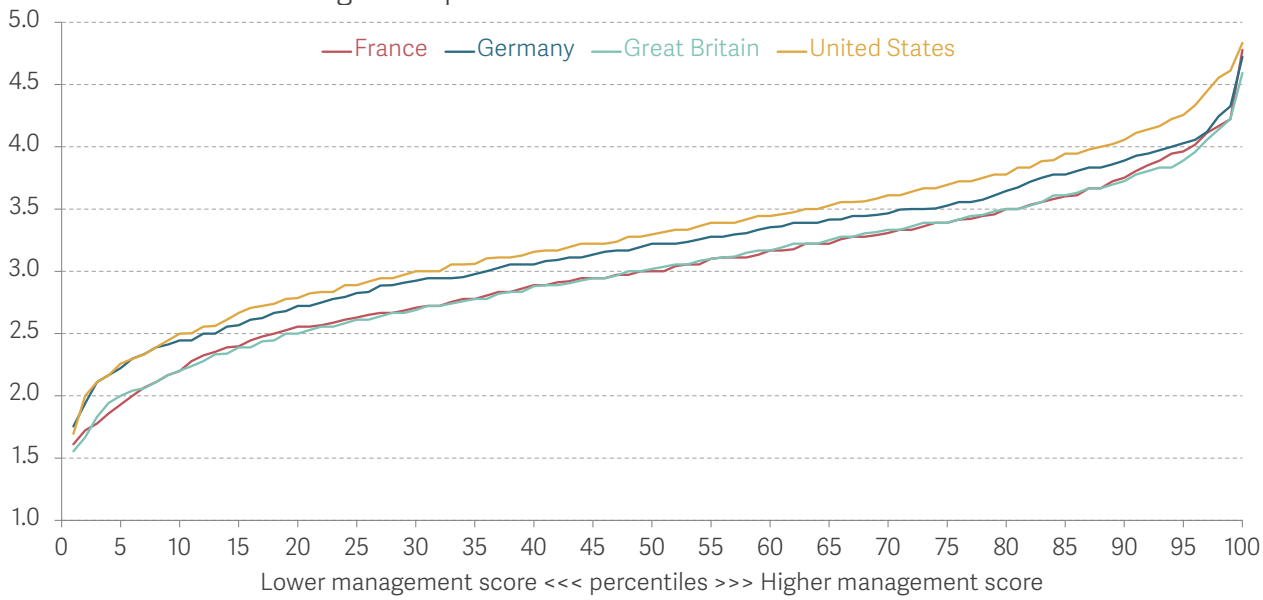
NOTES: Digital Intensity score is based on counting how many out of 12 key digital technologies are used by each enterprise. High levels are attributed to those enterprises using at least 7 of the listed digital technologies. SME: 10-249 employees, Large: over 250 employees, excluding financial sector.
SOURCE: Analysis of European Commission, Digital Scoreboard; Eurostat, Community survey on ICT usage and eCommerce in Enterprises.

52 Corrado, C. et al., Intangible investment in the EU and US before and since the Great Recession and its contribution to productivity growth, Journal of Infrastructure, Policy and Development (2018) Volume 2 Issue 1.
53 World Economic Forum, The Global Competitiveness Report, 2019

The UK also lags behind the US and Germany in terms of productivity-enhancing organisational capital in firms. Over the past two decades, the World Management Survey has systematically measured management practices in firms and public sector organisations over 35 countries.[54] On average, management scores in UK firms are lower than in the US and Germany, though similar to France. Looking at the distribution of scores, it is also clear that UK firms have a thicker left tail of badly-managed firms (see Figure 27), and there are fewer firms with really good management practices.

FIGURE 27: **The UK has more badly managed firms than the US**

Distribution of management practice scores: selected advanced economies



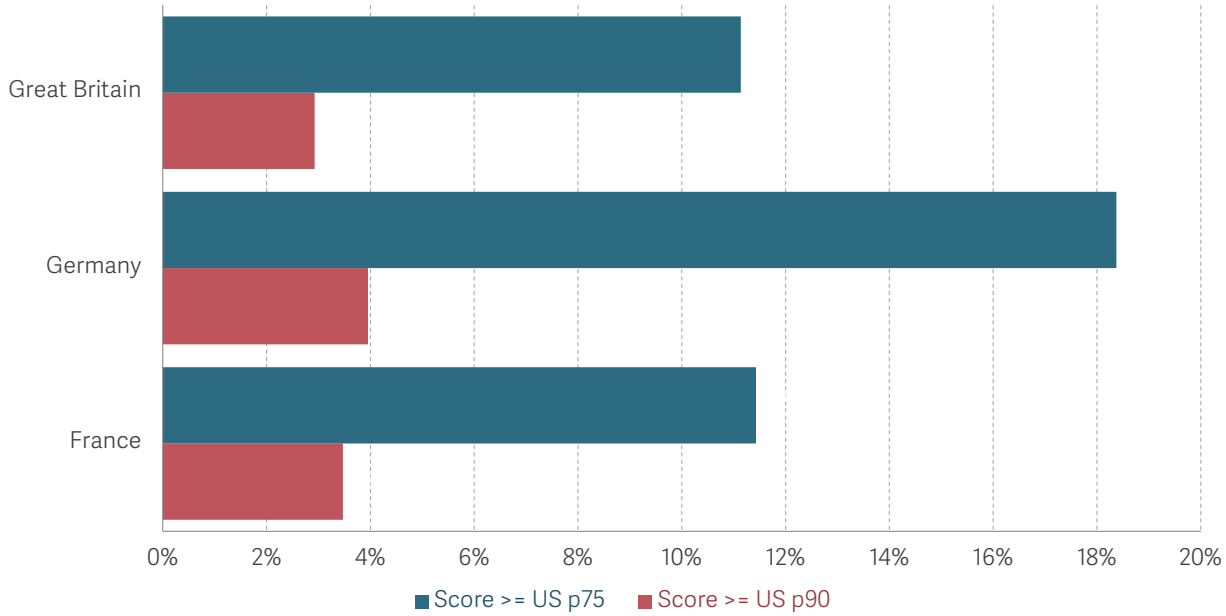
NOTES: Inverse cumulative density function of management practices scores across countries. Manufacturing firms surveyed between 2004-2014. Management practice scores range from 1 (lowest) to 5 (highest).
SOURCE: Analysis of World Management Survey, public data, https://worldmanagementsurvey.org.

Figure 28 shows that only a small fraction of UK firms are as well-managed as the best-managed US firms. Analysis that treats management practices as a form of intangible capital has estimated that over half of the UK's gap in TFP relative to the US can be explained by management practices.[55]

54 See D Scur et al., The World Management Survey at 18: lessons and the way forward, Oxford Review of Economic Policy 37(2), June 2021.
55 N Bloom et al., Management as a Technology?, National Bureau of Economic Research Working Paper 22327, June 2016.

FIGURE 28: **A low share of UK firms are as well-managed as the best in the US**

Share of firms at least as well-managed as the best US firms: Great Britain, Germany and France



NOTES: Share of firms that are at least as well managed as US firms in the top quartile and decile respectively.
SOURCE: Analysis of World Management Survey, public data, https://worldmanagementsurvey.org.

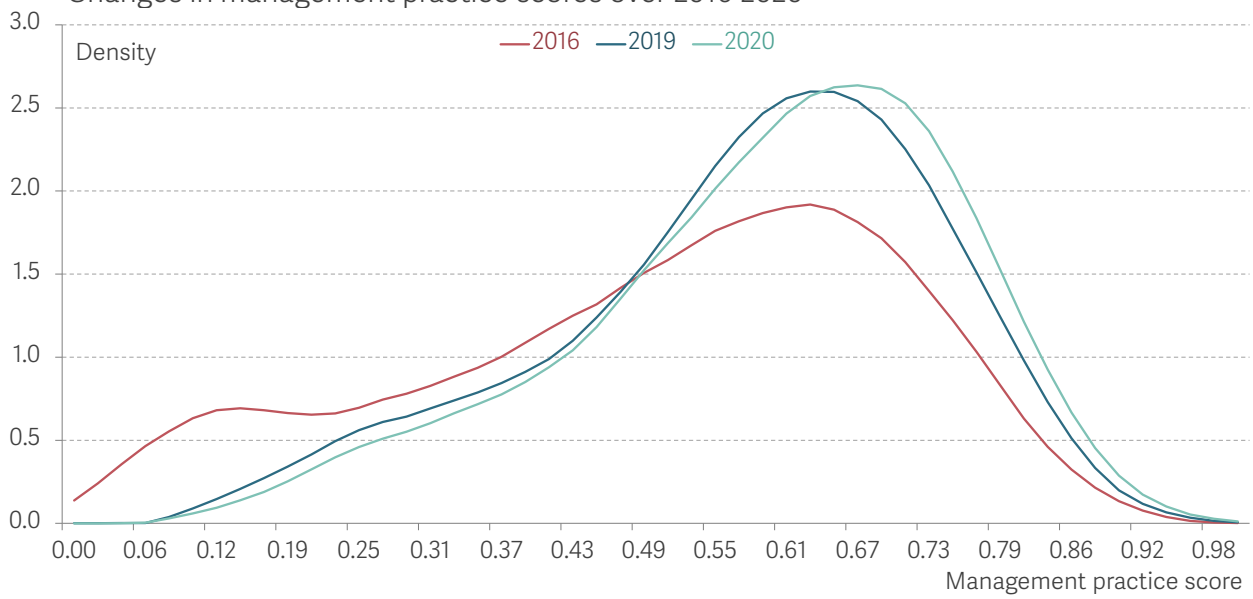
More recent data on management practices in UK firms is available in the ONS Management and Expectations Survey (MES), and this in fact suggests that management practices are improving, in particular that the thick lower tail might be getting smaller, and that the share of very well managed firms is rising (Figure 29). Analysis of firms that respondent to multiple survey waves suggests that these results are driven, at least in part, by improvements within firms, rather than a changing composition of survey respondents.

Across survey waves (and in the wider literature), smaller firms tend to be worse managed. Distributional analysis across size bands shows that small firms in particular have improved their performance and that this effect has been key to the thinning of the tail of badly-managed firms.[56]

56 See Figure 3 in Office for National Statistics, Management practices in Great Britain: 2016 to 2020, May 2021.

FIGURE 29: **Management practices have improved in recent years**

Changes in management practice scores over 2016-2020



NOTES: Distribution of management practices scores. Management practices scores are on a scale of 0 to 1.
SOURCE: ONS Management and Expectations Survey, Management Practices in Great Britain: 2016 to 2020, Figure 2.

Nevertheless, given the UK's poor productivity performance, international comparisons on technology adoption and management practices that show room for improvement in UK firms have prompted a series of policy initiatives focused in particular on smaller firms – most recently the "Help to Grow" Digital and Management schemes that were announced in the Government's "Plan for Growth" in March 2021.

While the pandemic appears to have accelerated the adoption of productivity-enhancing technologies and management practices in firms,[57] it also appears that larger and more technologically sophisticated firms have been more likely to do this and report positive impacts, which could suggest that gaps between the most and least productive firms could widen.

Despite rising tertiary education attainment, there are gaps in basic and technical skills that hold back productivity of workers and firms

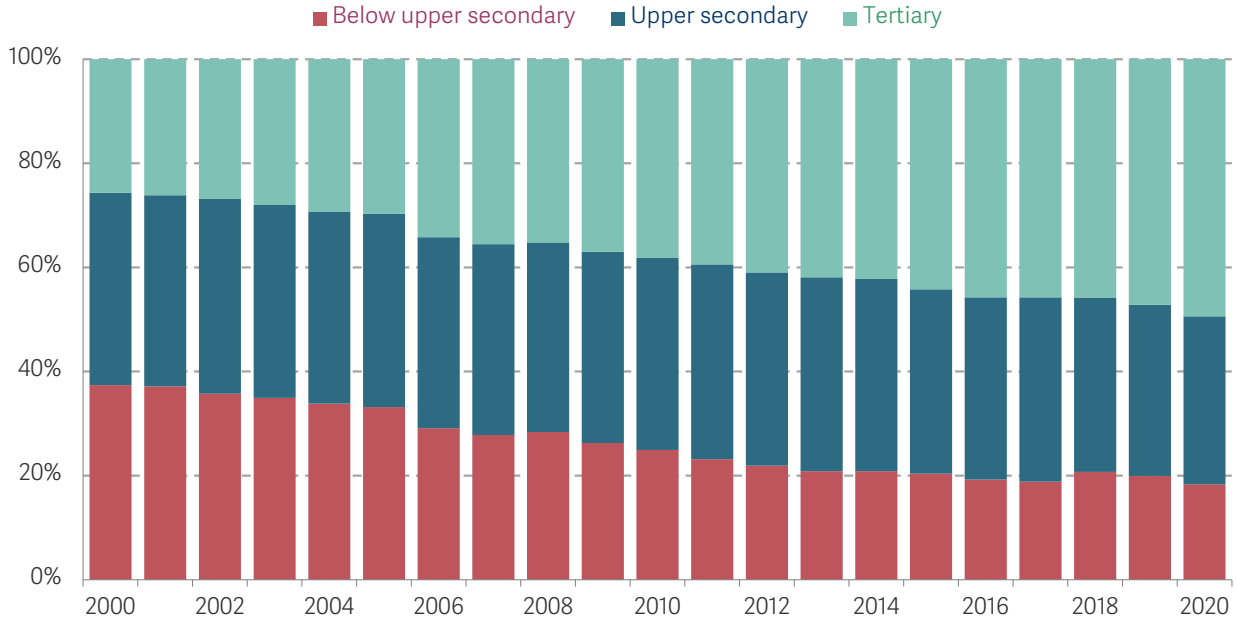
Investment in human capital is key for improving the productivity of workers and the firms they work in.[58] More skilled workers are not only more productive themselves, but also generate spillovers for other workers and other firms.[59] Skilled workers are a crucial

57 See Valero et al., The business response to Covid-19 one year on: findings from the second wave of the CEP-CBI survey on technology adoption, CEP Covid-19 Analysis Series, Paper Number CEPCOVID-19-024, 2021.
58 For a review of the literature that has linked human capital to the economic performance of countries, regions and firms, see A Valero, Education and Economic Growth, CEP discussion paper CEPDP1764, April 2021.
59 E Moretti, Estimating the social return to higher education: Evidence from longitudinal and repeated cross-sectional data, Journal of Econometrics, vol. 121(1-2), pp. 175–212, 2004; E Moretti, Worker's education, spillovers, and productivity: Evidence from plant-level production functions, American Economic Review, vol. 94(3), pp. 656–690, June 2004.

input in the R&D process and in the generation of innovation, and aid the diffusion of new technologies and organisational practices, due to technology-skill complementarities.[60] While it is challenging to obtain comparable measures of human capital across countries, analyses that have focused on cognitive abilities have shown that a one standard deviation increase in student attainment (equivalent to the difference between the average Mexican student and the OECD average) is associated with a 1.7 to 2 percentage point uplift to annual growth rates.[61]

FIGURE 30: **The share of tertiary education in the UK has grown**

Share of adult population by educational attainment: UK



NOTES: Educational attainment composition, defined as the highest level of education completed by the 25-64 year-old population.
SOURCE: OECD.

The UK has done well in terms of increasing tertiary education attainment and is actually on a par with the US in the latest data, with nearly 50 per cent of the population holding a university degree (or equivalent). But the share achieving 'upper secondary' qualifications as their highest level of attainment, which contains A-levels and technical and vocational education, has not grown over time, and in fact it has fallen slightly since 2014. Moreover, the share of the population achieving upper secondary (at 32 per cent) is below the OECD average of 42 per cent (France and the US are also around this level), and far below the share in Germany (55 per cent).

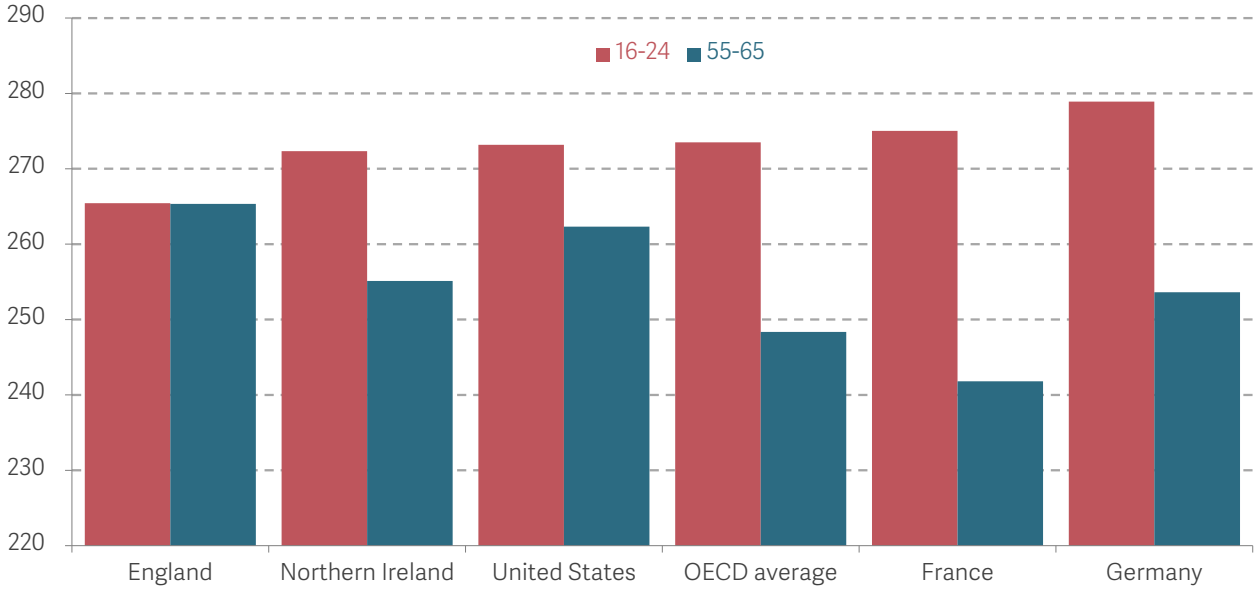
60 For discussion on complementarities between management practices and skills, see A Valero, Education and management practices, Oxford Review of Economic Policy 37(2), June 2021.
61 E A Hanushek & L Woessmann, The Knowledge Capital of Nations: Education and the Economics of Growth, The MIT Press, April 2015.

A key issue for the UK has been the consistently large share of young people unable to progress above GCSE-level qualifications, and the slowdown in the rate of improvement for these groups in recent years.[62]

In comparative terms, the UK has a relatively high share of children who leave school with low levels of literacy and numeracy, often disproportionately those from disadvantaged backgrounds. OECD data shows that, on average, young adults in England and Northern Ireland have literacy and numeracy levels that are below the OECD average. Moreover, in the OECD and core comparator countries, scores among 19–24-year-olds exceed those of 55–65-year-olds, but this is not the case in England and Northern Ireland. Figure 31 shows how literacy scores for young adults are lower than comparator countries in both England and Northern Ireland, and scores among the younger and older age groups are the same in England. There is a similar picture in terms of numeracy (Figure 32). This data suggests that although a larger share younger generations are progressing into tertiary education, there remains a consistently sizeable proportion of young people that lack basic skills.

FIGURE 31: **Young adults' literacy is low, and has not improved compared to older generations**

Literacy scores, by age: England, Northern Ireland and selected OECD countries

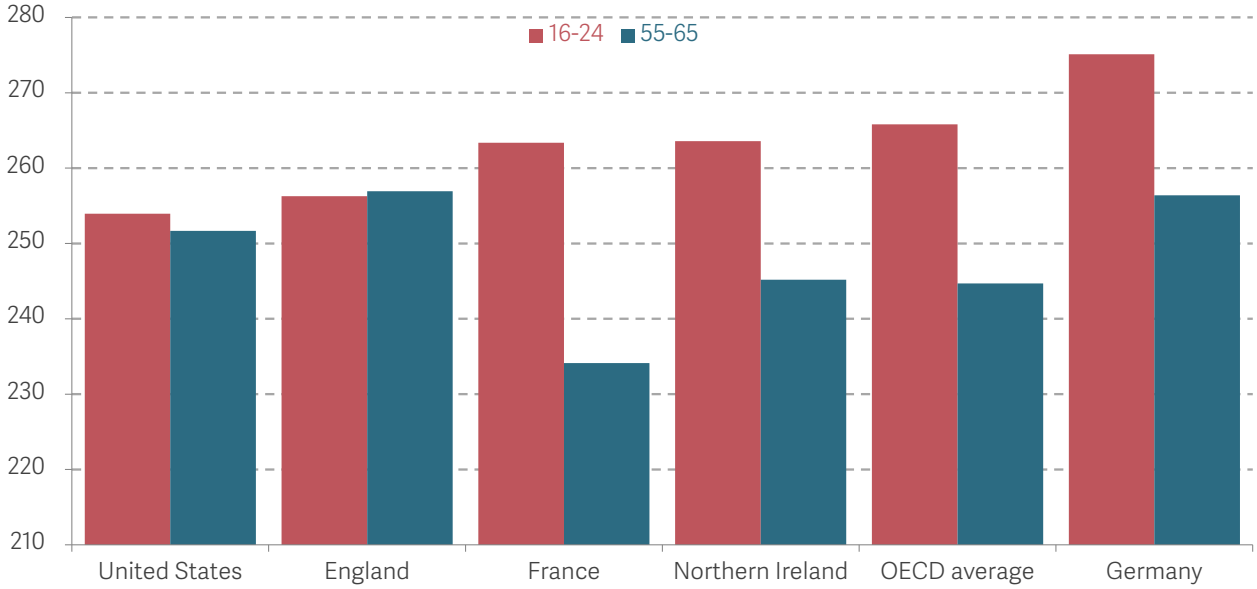


NOTES: Literacy proficiency scores range from 0 to 500, with higher scores corresponding to higher levels of proficiency.
SOURCE: Table A3.5 (L) in OECD (2019), Skills Matter: Additional Results from the Survey of Adult Skills, OECD Skills Studies, OECD Publishing, Paris. Survey of Adult Skills (PIAAC).

62 K Henehan, Pick up the pace: The slowdown in educational attainment growth and its widespread effects, Resolution Foundation, March 2019.

FIGURE 32: **Young adults' numeracy is low and no better than older generations**

Numeracy scores, by age: England, Northern Ireland and selected OECD countries



NOTES: Numeracy proficiency scores range from 0 to 500, with higher scores corresponding to higher levels of proficiency.
SOURCE: Analysis of OECD, Survey of Adult Skills (PIAAC), taken from 'Skills Matter: Additional Results from the Survey of Adult Skills', 2019.

The gap between young adults in England and other OECD countries tends to open up after the age of 15, particularly for those that do not follow academic routes – and this highlights the importance of the further education sector for closing these gaps.[63] There are longstanding concerns about the quality of technical and vocational education in the UK,[64] particularly in light of recent budgetary pressures.[65]

At the same time, firms appear to be investing less in training their workforce today compared to the past. In fact, training rates have fallen for younger (and highly-skilled workers), and have been persistently low for those with lower-skill levels.[66] And while the number of apprenticeships has risen in recent years, there have been concerns over the quality of programmes.[67] In particular, the share of older apprentices has increased (following the Government's removal of the age cap in 2004) and there were concerns

63 K Henehan & A Vignoles, Technical Fault: Options for promoting human capital growth, Resolution Foundation, April 2018.
64 A Wolf, Review of vocational education: The Wolf report, UK Department for Education and Department for Business Innovation and Skills, 2011; P Musset and S Field, A Skills beyond School Review of England, Paris: OECD Publishing, 2013; C Hupkau et al., Post-compulsory education in England: choices and implications. National Institute Economic Review, 240(1), R42-R57, 2017.
65 The Augar Review gives a detailed summary of the state of play in post-18 education in England, highlighting funding pressures in the further education sector. While more money has been promised for Further Education in Autumn Budget 2021, cuts since 2010 have only been partially reversed. For more information, see Department of Education, Post-18 review of education and funding: independent panel report, May 2019.
66 See J Li et al., Trends in job-related training and polices for building future skills into the recovery, Centre for Vocational Educational Research Discussion paper 033, December 2020.
67 S McNally, Apprenticeships in England: what does research tell us?, Centre for Vocational Educational Research Briefing Note 008, July 2018.

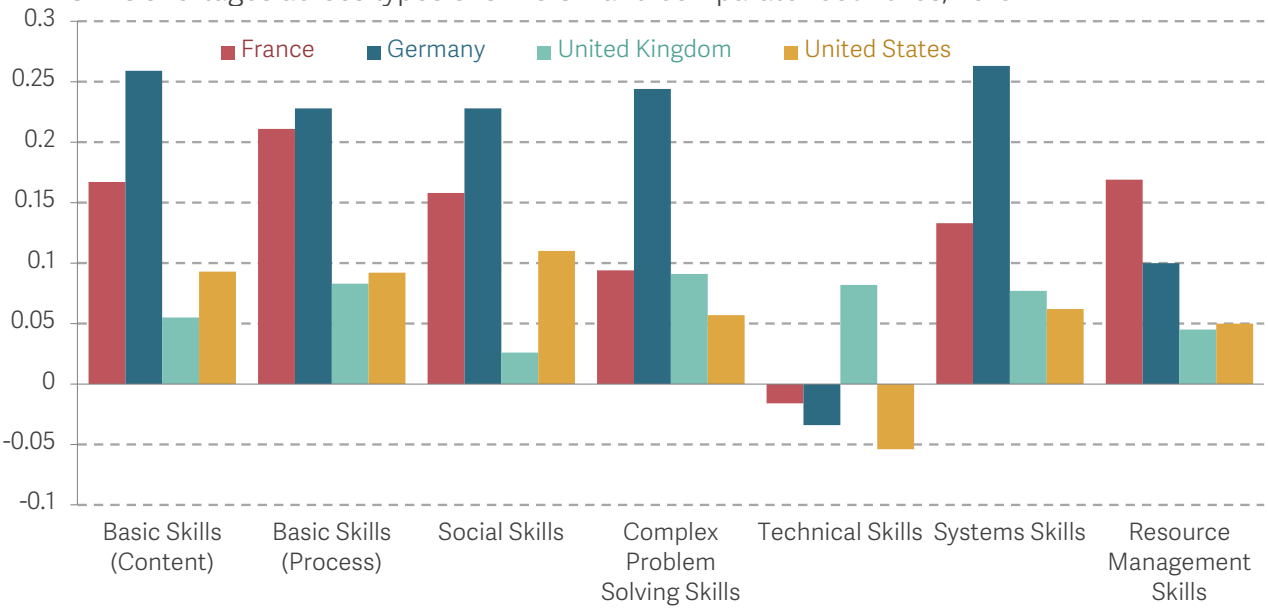
about the decline in the duration of apprenticeships which prompted government to mandate a minimum length of 12 months from 2017.

It is unlikely that these trends in work-related training can be explained by firms having all the skills they need. Even before the current acute shortages being faced in some occupations, the UK's Employer Skills Survey has consistently reported skills shortages in a number of areas.[68,69] For example, in the most recent data (2019), employers faced the greatest challenges finding suitably skilled candidates in 'skilled trades' occupations, with nearly half of related vacancies being skill-shortage vacancies. And across skills-shortage vacancies, 84 per cent were at least partially caused by a lack of technical or practical skills.

Consistent with this data, and the lower share of the population with technical or vocational qualifications (as indicated by the upper secondary category in Figure 30), Figure 33 shows that, based on data from 2015, technical skills shortages have been more prevalent in the UK, while such skills are in surplus in France, Germany or the US.[70] Interestingly, skills shortages in other areas appear to have been less acute in the UK, in particular compared to Germany and France.

FIGURE 33: **Technical skills shortages are an issue in the UK**

Skills shortages across types of skills UK and comparator countries, 2015



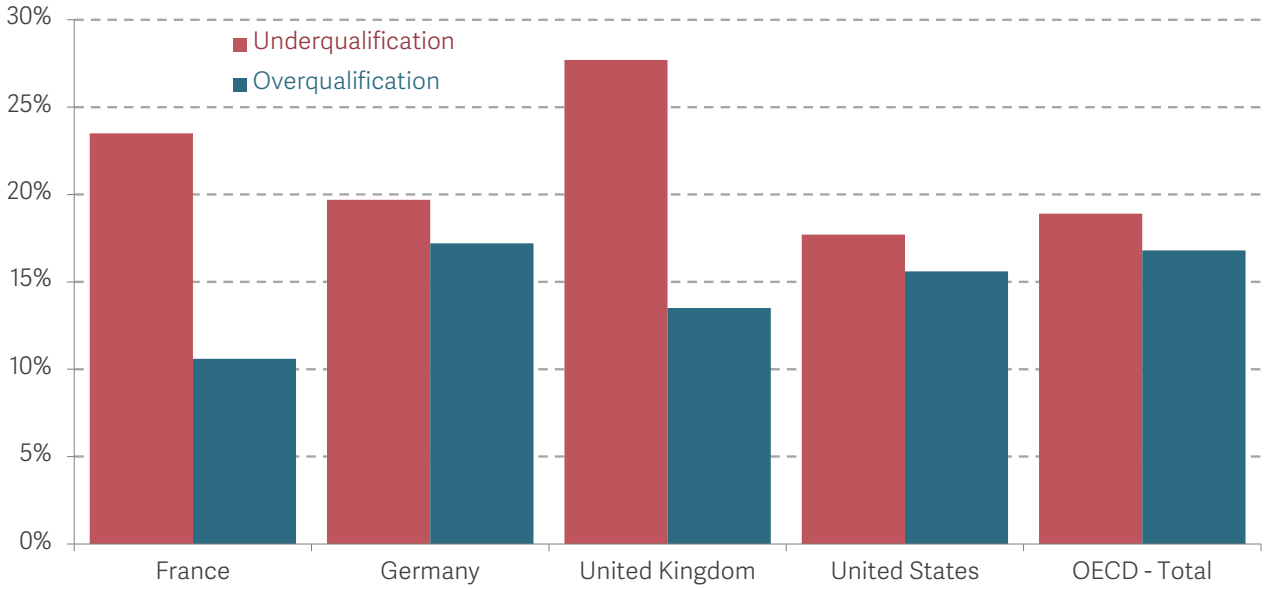
NOTES: Positive values indicate skill shortage while negative values point to skill surplus. The larger the absolute value, the larger the imbalance. Results are presented on a scale that ranges between -1 and +1. The maximum value reflects the strongest shortage observed.
SOURCE: Analysis of OECD, Skills for Jobs, Skills Needs.

68 See, for example, Reuters, UK employers face worst shortage of job candidates on record – REC, September 2021.
69 M Winterbotham et al., Employer Skills Survey 2019: Summary report, Department for Education, November 2020.
70 These measures are constructed using labour force survey data and information on the skills content of occupations, so that the skills that are required in occupations that are facing shortages are identified.

More broadly, comparative OECD data point to issues of mismatch between the skills needed in jobs, and the skills that workers have in the UK. 28 per cent of the UK workforce are underqualified for their occupations, compared with an OECD average of 19 per cent, as shown in Figure 34. In addition, a lower share of workers are over-qualified for their job in the UK compared to the US, Germany and OECD average.

FIGURE 34: **A relatively high share of workers are underqualified for their job**

Share under and over-qualified as a percentage of total workers: selected OECD countries, 2016



NOTES: Qualification mismatch arises when workers have an educational attainment that is higher or lower than that required by their job. If their education level is higher than that required by their job, workers are classified as over-qualified; if the opposite is true, they are classified as underqualified. All values are expressed as a percentage of the total number of workers. Mismatch refers to people aged between 15 and 64 years old.
SOURCE: OECD, Skills for Jobs, Mismatch Dataset.

This analysis highlights that despite rising tertiary education attainment in the UK, there are gaps in both basic and technical skills. These gaps are likely to be related, as a high share of adults without basic literacy and numeracy skills implies a smaller share of individuals that can successfully pursue technical qualifications. Troubling patterns of attainment across generations need to be addressed to improve the productivity of the UK's workers and firms, and to ensure that the UK's labour force is adequately equipped for technological change and transitions in this decade and beyond.

What explains underinvestment in British firms?

Investments in capital, innovation and skills are long-term investments – the pay-offs are not always immediate. Long-term investments require stability and coordination in the policy environment so that investors can manage risks. Such stability in policies,

frameworks and the institutions governing industrial and business policies has not been achieved.[71]

A lack of policy stability is coupled with issues around short-termism in financial markets with excessive focus on short-term results as opposed to longer term value creation. Imperfections in capital markets and resulting financing constraints tend to hold back investment in innovation. These are felt in particular by smaller firms which tend to be over-reliant on bank finance, and were heightened in the period following the financial crisis.

Finally, firms may be discouraged from investments in new technologies or management practices due to gaps in complementary worker or managerial skills.[72]

71 LSE Growth Commission, UK Growth: a new chapter, Centre for Economic Performance, 2017. Similar arguments are made in: B van Ark & A J Venables, A Concerted Effort to Tackle the UK Productivity Puzzle, International Productivity Monitor, Centre for the Study of Living Standards, 39, Fall 2020.

72 For a summary of the literature that links workforce and managerial education to the adoption of management practices see A Valero, Education and Management Practices, Oxford Review of Economic Policy 37(2), June 2021.

Section 5

Moving to a higher-investment economy

The past sections have shown that the UK's low productivity levels are real and largely traceable to a combination of mediocre management and weak investment in ideas, capital and skills. Increased investment will be required in order to improve productivity, and to manage the shocks and transitions in this decade and beyond: large investments are required in order to meet the UK's net zero commitments and to retool the economy following Covid-19 and Brexit.

But while the benefits of higher investment are widely understood, the implications, in terms of postponed consumption or higher imports, are less fully appreciated. For a more-or-less fully employed economy like the UK's today, the transition to a higher investment future will mean less consumption along the way, or an even higher current account deficit. A simple simulation suggests that an increase in investment large enough to halve the gap in productivity with France after 20 years would take 15 years to yield higher consumption if financed from domestic savings. If financed abroad, net foreign liabilities would increase by 60pp relative to GDP, although the impact on national wealth would be balanced by the increased capital stock at home.

Investment is an expenditure with future consumption as the reward

The previous section showed that investment is relatively low in the UK, and that the path to higher productivity will most likely involve higher investment. Total investment in the UK economy actually fell by 0.5 per cent in the five years to Q2 2021, whereas it rose by an average of 14 per cent in France, Germany and the US.

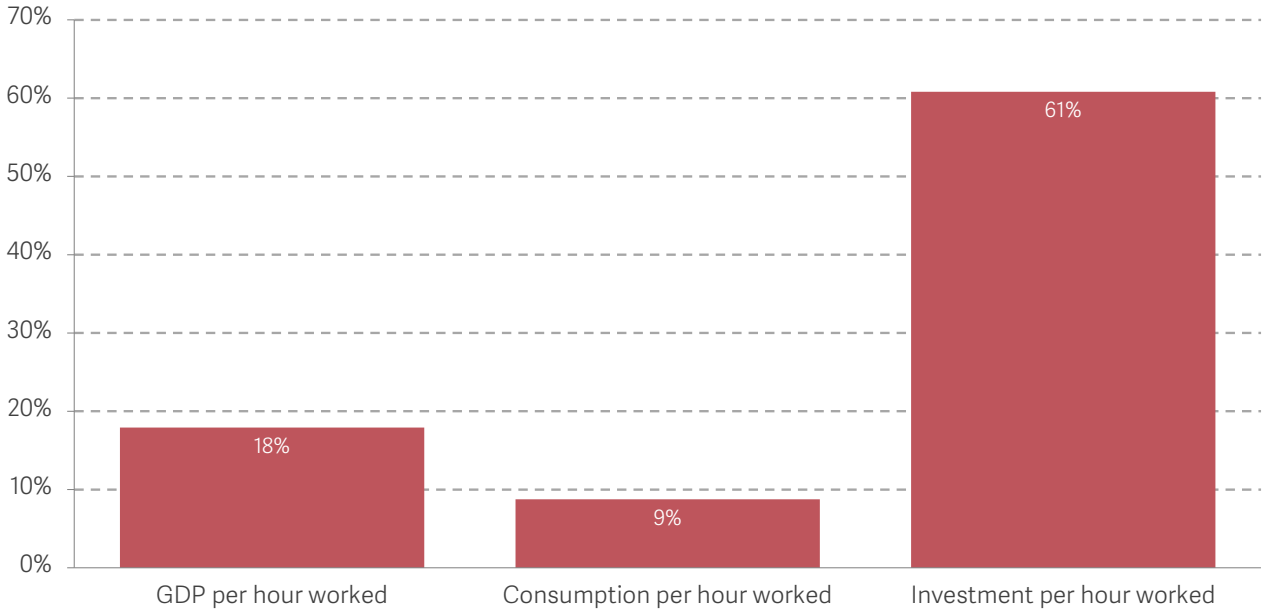
Investment is not an end in itself, but rather a means to higher consumption. Except to the extent that people enjoy their jobs, factories and offices are worth building

because they afford opportunities to produce goods and services which can ultimately be consumed. This section of the report analyses what a move to a higher-investment economy might look like.

In a fully employed economy, output is basically fixed in the short run. The goods and services that comprise output can be allocated to consumption, investment or net exports. Think of a UK worker who produces a good such as steel. It can find its way into a consumer product that a UK consumer buys, a machine tool that a UK company invests in, or a product that is sold overseas. If a UK firm wants to invest using more steel, and there are no underemployed UK steel workers or firms that can increase supply, that extra steel has to not be consumed, not go abroad for export, or come from abroad as an import. In brief, investing more resources therefore means, in the short run, either not consuming them or borrowing money to import them from overseas.[73]

FIGURE 35: **The UK invests less than France so is less productive, but the gap in consumption is smaller**

Percentage difference in GDP, consumption and investment per hour worked of France relative to the UK: 2019



NOTES: GDP per hour worked is the ratio of the level in France to the UK at 2019 PPP. Investment and consumption per hour are obtained by multiplying the 2019 nominal investment-GDP and consumption-GDP ratios respectively by GDP per hour worked.
SOURCE: Analysis of OECD.

The increase in the capital stock raises the amount of goods the economy can supply, permitting both higher consumption and investment over the medium term. A simple calculation suggests that an increase of investment of £1 for 1 year may raise output

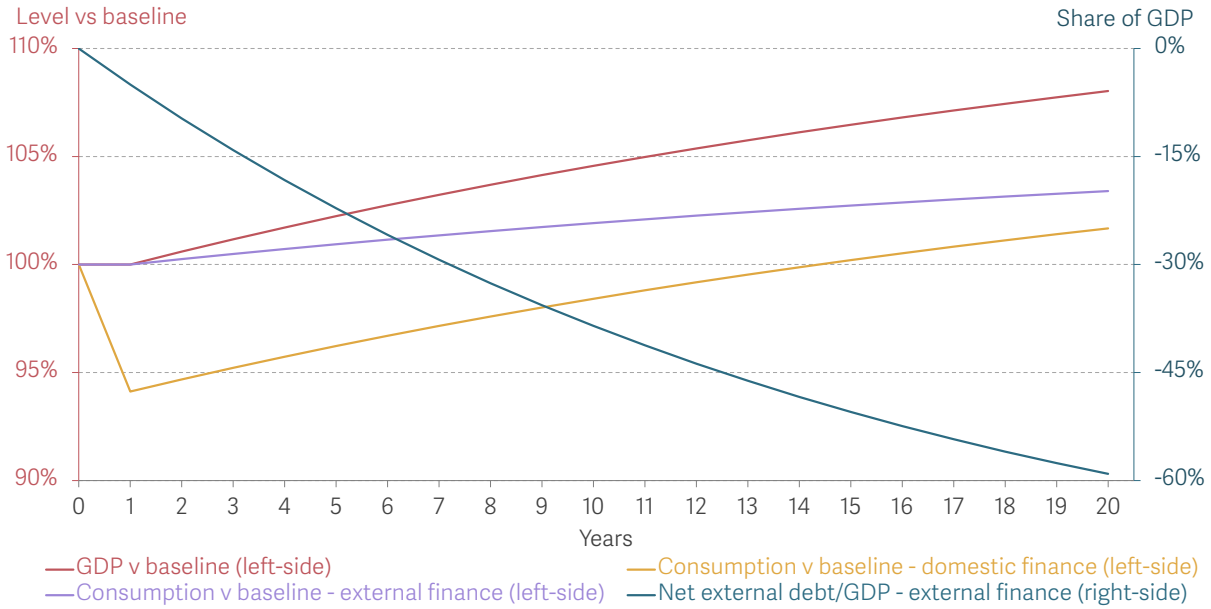
73 Strictly speaking, the higher imports can also be paid for by selling foreign assets, or incurring non-debt liabilities such as equity financing from abroad. Higher exports cannot finance higher imports in the short run unless the resources to produce them are diverted from domestic consumption.

by between 10-20p per year once the new capital it represents comes on stream.[74] It therefore takes several years for higher investment to pay for itself in the form of higher opportunities for consumption. Moreover, once capital is installed, resources must be devoted to maintaining it.

Consistent with this, the gap between UK and France in consumption per hour worked is smaller than the gap in GDP per hour worked (Figure 35). This is because higher investment and capital per worker, rather than the efficiency with which these resources are used, accounts for basically all of the higher labour productivity in France.

FIGURE 36: **Higher investment must be financed by lower consumption or an increasing foreign debt**

Illustrative simulations of the paths of GDP, consumption and net external debt



NOTES: The red line shows the level of GDP relative to the counterfactual path in both simulations. The blue and purple lines show consumption relative to baseline in the domestically- and externally-financed scenarios respectively. The yellow line shows the change in the net external asset-GDP ratio in the externally-financed scenario.
SOURCE: RF and LSE analysis.

To make these trade-offs more concrete, Figure 36 depicts some simple simulations which show how higher investment would affect GDP, consumption and foreign debt in the UK, depending on how it is financed. We consider a 5 percentage point rise in the investment-GDP ratio, to bring UK investment as a share of GDP in line with average in France, Germany and the US, and show how the levels of consumption, investment and net debt would evolve relative to a baseline in which the economy is growing at 1.5

74 Based on a Cobb-Douglas production function with an elasticity of output with respect to capital of one third to 40 per cent and an initial capital-output ratio of 2.5 to 3.

per cent per year.[75] We evaluate two cases, representing domestic and largely external financing of the extra investment.[76]

GDP and hence labour productivity rise 8 per cent above baseline after two decades, as the extra investment adds to the capital stock and hence the productive capacity of the economy. But the 0.6 per cent boost to GDP in the first year, while significant, is far less than the 5 per cent of GDP extra that is needed for investment on day one. Consumption has to fall in the short run, and only surpasses the level it would have otherwise reached after 15 years.

In contrast, when investment is financed with net savings from overseas, domestic consumption can rise from the get-go: the extra investment boosts output and a rise in imports and the trade deficit means that consumption need not adjust. However, the trade deficits must be paid for with foreign debt or lower foreign assets in the short run, and in the long run serviced with trade surpluses (resources that cannot be consumed at home). In this illustrative simulation, the net international investment position deteriorates by 60 percentage points after two decades, taking the ratio from the current value of –30 per cent to –90 per cent – between that of Spain (–84 per cent) and Portugal (–113 per cent).[77] But, importantly, these higher debts correspond to increased productive assets in the UK, and therefore no fall in national wealth. In contrast, borrowing for consumption raises debt but not productive capacity or gross assets.

The faster the economy is growing, the more gradual the rise in investment that is contemplated, and the weaker any constraint on any overseas financing, the easier it is to raise investment without causing consumption to fall outright at any point, but rather to grow less quickly during the transition period. In an economy such as the UK's, which faces substantial productivity headwinds following our exit from the European Union,[78] major investment requirements in order to meet net zero targets as well as to narrow the productivity gap,[79] and a pre-existing current account deficit, these conditions are not present. On the other hand, the UK can borrow abroad at low interest rates, limiting the size of increased trade surpluses needed to stabilise debt in the long run.

To close the investment gap at anything more than a glacial pace, then, consumption may need to fall somewhat over the short run or overseas borrowing must rise sharply.

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75 To calculate the resulting rise in output, we make standard assumptions about the elasticity of output with respect to capital of a third, and the depreciation rate (4 per cent). The model starts in a steady state, which implies an initial capital-output ratio of 2.8. We assume that foreign borrowing yields 2 per cent in real terms.

76 In the case of domestic financing, we assume that the current account remains at zero and the consumption-GDP ratio therefore must fall immediately to 80 per cent. In the case of external financing, we assume that domestic households consume half the extra GDP generated by the rise in investment, thereby attenuating some of the rise in foreign debt over the long term.

77 G M Milesi-Ferretti, The external wealth of nations: September 2021 update, Brookings, September 2021.

78 OBR, Brexit Analysis, March 2021.

79 J Marshall & A Valero, The Carbon Crunch: Turning targets into delivery, The Economy 2030 Inquiry, September 2021.

This illustrates the difficult choices that a move to a higher investment path will entail, and also the importance of improving economic efficiency through additional, complementary, means.

Outstanding questions

This report has demonstrated that the UK's productivity problems – both in terms of level and growth rates – are real. They are traceable in large part to a lack of investment and innovation, broadly defined, at the level of individual firms. UK private sector firms need to retool if they are to generate the productivity growth needed to raise wages towards the levels paid in countries we might reasonably compare ourselves to. As well as more new physical capital, firms will need workers with better skills, not only to do their jobs better but also to contribute to improved management and innovation.

This retooling will take place in the context of major change drivers that will raise the level of churn among UK firms. On one hand, this presents an opportunity: the need to acquire new machines and skills to respond to these changes will come at a time when existing stocks of these things are low. And in some respects, UK firms are relatively well-placed for this turbulence: as we have shown, the levels of and relative stability in productivity dispersion and firm dynamism are not obviously worse in the UK than in other countries. On the other hand, making long-term investment decisions that are costly to reverse is difficult in a climate of high uncertainty.

It's not just the size of these investments that matter, but their nature, in order to facilitate the socio-economic outcomes we are looking for: stronger, more inclusive, and low-carbon growth. There is a real need for coordinated and long-term policies for sustainable growth that ensure that uncertainties for businesses are minimised, and incentives are aligned to stimulate the investments that are required. The evidence we are gathering as part of the Economy 2030 Inquiry is designed to provide the basis for considering the implications for such policies in future work.

THE ECONOMY 2030 INQUIRY

SHAPING A DECADE OF CHANGE

The UK is on the brink of a decade of huge economic change – from the Covid-19 recovery, to exiting the EU and transitioning towards a Net Zero future. The Economy 2030 Inquiry will examine this decisive decade for Britain, and set out a plan for how we can successfully navigate it.

The Inquiry is a collaboration between the Resolution Foundation and the Centre for Economic Performance at the London School of Economics. It is funded by the Nuffield Foundation.

For more information on The Economy 2030 Inquiry, visit economy2030.resolutionfoundation.org.

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