

# Productivity: firing on all cylinders

Why restoring growth is a matter  
for every UK sector



# About this report

Since the financial crisis that began in 2008, UK productivity and growth has failed to return to their pre-crisis levels, costing the economy billions in lost output. This report examines the extent to which this can be blamed on UK sectoral policy, and argues that to restore nationwide productivity, policy makers need to take into account economic demand as a key factor explaining productivity trends.

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# Summary

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Around 2008, the productivity growth the UK had become accustomed to for decades ground almost to a halt. While employment has continued to grow just as strongly as before the financial crisis that began that year, GDP growth has slowed dramatically to on average almost 1.5 percentage points less than in the pre-crisis decade. Increases in productivity – getting more output from less input – are what ultimately drive prosperity, and the failure of UK productivity growth to return to pre-crisis levels has become central to economic policy discussions.

The past 20 years have also seen marked shifts in the shape of the UK economy, in terms of its sectoral composition. The share of workers in manufacturing has almost halved; service jobs such as administration, hospitality, health care and education have risen to fill the gap. Often, but not always, the industries that have absorbed the labour are less productive – in terms of output per head – than manufacturing, and less technological in character.

Industrial policy has also been at a low ebb. The government stopped owning swathes of industry in the 1980s and has generally eschewed large-scale intervention in the private sector in the decades since. Although industrial strategy has staged a comeback in the past 10 years, it has been light-touch in comparison to the 1970s, focused upon selective support for a few, technologically sensitive sectors such as aerospace, automotive and energy.<sup>1</sup>

For policy makers, it is tempting to lace all three of these themes into one thesis, which goes as follows: UK productivity faltered because the economy shifted towards lower-productivity sectors and failed to nurture the higher-productivity ones. Arithmetically, putting more eggs into the lower-productivity baskets leads to lower national productivity, and it feels natural to blame this on the neglect or poor execution of industrial strategy. To address this, the argument goes, we need a programme of intervention, centred around innovation, that reallocates the UK's resources to the high-value sectors and makes them grow more quickly.

There are echoes of this view in the Treasury's *Build Back Better: Our plan for growth*, published in March 2021, with its repeated references to "high-growth, innovative sectors".<sup>2</sup> It is scattered through opinion pieces on how the UK's productivity problem needs more efforts aimed at the 'right' industries, which governments have implicitly failed to nurture for the past few decades.<sup>3</sup> Policy should therefore be directed towards making that happen.<sup>4</sup>

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The Johnson administration is activist and interventionist in outlook, and clearly intends to prioritise certain aspects of the economy, such as net zero, health care innovation and technologies like quantum computing. Whether or not this is called 'industrial strategy' (the government is ambivalent about the term), this is a good idea given the challenges facing the economy. What this paper argues, however, is that such selective industrial interventionism on its own might do little to solve the UK's productivity challenge. Sector-specific failings are only part of the reason for the slowdown in productivity, and so selective sector-specific policy will not be enough to drag the UK back towards a path of higher growth.

Moreover, the country's shift towards services should not be portrayed as a productivity-sapping strategic mistake. The shift was seen across many countries and is natural during the evolution of advanced economies, which as they age spend more on services.<sup>5</sup> The government should treat it as an invitation to take services – even the traditionally low value-add ones – more seriously as a potential source of growth.

The analysis presented here shows that the productivity malaise that took root after 2008 has little to do with the failure to pursue the 'right' sectoral shape for the economy, or to support the right sectors with the right technologies. The slowdown is far too large, international, and spread across the sectors for that to be a convincing thesis. Differing sectoral shapes are not sufficient to explain the regional gaps in productivity that preoccupy policy makers. Although the UK *has* shifted employment away from manufacturing to some lower-value services, the timing of this shift does not match the worst spell of productivity weakness that began after 2008. Even if the UK could have stemmed the erosion of its manufacturing share, as Germany has managed to, most or all the past decade's weakness would remain.

Sector analysis does show that the shortfall in productivity growth that emerged since 2008 was skewed towards a few industries: slower growth in ICT and professional and business services explains a significant chunk of the shortfall, as does the halt in the growth of the financial sector, hitherto a major driver of GDP. But it is difficult to blame these on the absence of an industrial strategy so much as exposure to a sharp global slowdown that followed the financial crisis.<sup>\*</sup> Moreover, weaker performance was seen right across the economy – most employees worked in a sector that grew less in the 10 years after 2008 than in the 10 before. Economy-wide explanations are therefore likely to be important, too.

This leads naturally to a discussion of the downside of sector-by-sector analyses. Sector boundaries are often arbitrary and the sectors themselves interdependent. The output of one is the input of another, and one sector being bigger is not necessarily to the benefit of the whole. A narrow sector-by-sector examination risks focusing upon individual economic areas to the detriment of macroeconomic insight – to 'miss the wood for the trees'. The state of aggregate demand is one variable that might be overlooked. A broad productivity crisis hit many developed countries at the same time as the financial crisis damaged global demand and confidence. Sharp movements in

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\* Moreover, there have been question marks over the methodology for measuring the value of Telecommunications, and subsequent revisions, that diminish the size of the slowdown in this particular sector

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aggregate demand land unevenly across sectors and are often highly correlated with shifts in productivity. The persistence of these effects must be considered before the performance of any sector is accorded a purely sectoral diagnosis.

Sectors are also imperfect units for state intervention. Being determined by patterns of demand, their sizes are not easily affected by government policy. Unlike a business, a government cannot simply decide what activities its country should specialise in and outsource the rest. The Johnson administration puts a heavy emphasis on innovation policy as a tool for driving economic progress, but the sector-level relationships between technology, innovation, productivity and livelihoods are far from straightforward. More technology does not always lead to a larger market, more jobs or higher pay. During a dozen years of relative productivity disappointment, the US economy has generated \$6 trillion of extra equity value in just four giant digital technology companies.\*

For future policy, there are clear conclusions from this analysis. First, although there is a strong case for selective economic intervention, it would be a mistake to address the UK's broad productivity malaise entirely through this. Productivity is not a problem that can be solved with a laser focus on the right, high-technology sectors: if the aim is to help the bulk of the economy, efforts need to be much broader. Problems including weak management practices, slow adoption of technology, a lack of skilled staff, patchy infrastructure and access to finance need to be addressed across the economy, not just the cutting-edge parts.

It is also a mistake to see growth or productivity as the only objective for innovation. Energy sector innovation is a clear example; this is going to be vital for the transition to net zero and, done well, will have a positive effect on myriad other parts of the economy. But it might do this without having any direct perceptible effect on the GDP figures, as lower CO<sub>2</sub> emissions do not count towards GDP.

In particular, to spread prosperity widely, policies must not neglect those high-employment service sectors that often receive little attention in discussions of industrial policy. Some of these – like administrative services and retail – have been surprising success stories during the years of productivity stagnation elsewhere in the economy. Their structure makes them ill-suited to the grand bargains of the government's 'sector deal' approach, in which the government and sector representatives sit down to agree mutually beneficial actions. But other policy ventures have more promise, such as Help to Grow, with its support for improved management skills. Technology is important, but much more in its adoption and use than in its creation. The bulk of the gains from innovation go to its users rather than its creators, and it is this aspect that policy makers need to focus on if they are to help the technology-using service sectors. Help to Grow: Digital, the push to encourage better adoption of digital tools, is more important to productivity than ARIA, the Advanced Research and Innovation Agency championed by the techno-optimists in the government.<sup>6</sup>

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\* Author's calculation of the rise in the market capitalisation of Apple, Google, Amazon and Microsoft. A good argument for how this result might be expected is in [www.nber.org/system/files/working\\_papers/w19462/w19462.pdf](http://www.nber.org/system/files/working_papers/w19462/w19462.pdf)

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Economy-wide factors will remain critical to solving productivity problems. For example, the government's push to improve infrastructure across the country is important; weaker agglomeration is associated with lower service sector productivity, which might be mitigated by better transport links.<sup>7</sup> Other factors include the availability of credit, the state of the labour market and levels of skills.

The economy-wide factor that policy makers should be most concerned with is the state of aggregate demand, which may be crucial to explaining shifts in productivity. Although it goes beyond the remit of this paper to ask whether the UK's macroeconomic framework needs re-examination, policy makers must keep this factor in mind – particularly as the UK is about to undergo a real-life experiment. Demand growth is poised to outstrip recent records, buoyed by supportive fiscal and monetary policy. An economy that is 'running hot', and where labour is not as cheap and plentiful as it has recently been, could encourage many of the activities needed to end the long productivity slump – training, investment and innovation. Most of what the economy needs to do to become more productive will happen from the decisions of private sector actors, responding to their environment, and not some government programme. The most important feature of this environment is the growth of spending power. In this regard, the long-term agenda of boosting the UK's economic potential coincides nicely with the short-run imperative to ensure a robust recovery from the pandemic.



# The 'bad sectoral allocation' and 'bad sectoral performance' theories

We begin with an examination of two propositions. The first, which we crudely call 'the bad sectoral allocation' theory, is that the UK's post-2008 productivity shortfall stems from its configuration of sectors. The second, 'bad sectoral performance', is that the problem lies with the specific failures of a few important sectors.

## Background

For the decade and a half before the 2008 financial crisis, the UK enjoyed its longest spell of uninterrupted growth in modern times. In the decade after, its performance had faltered badly. As Figure 1 shows, this failure of growth to return to pre-2008 levels was widespread across peer countries. This report has chosen the US and four European countries of a roughly similar size to the UK for purposes of comparison.

Figure 1 **GDP growth, two decades compared**

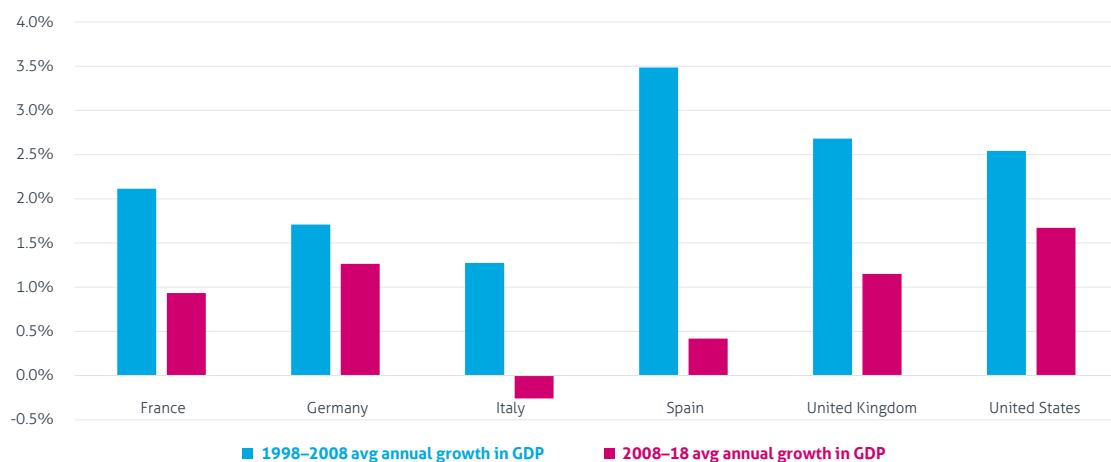
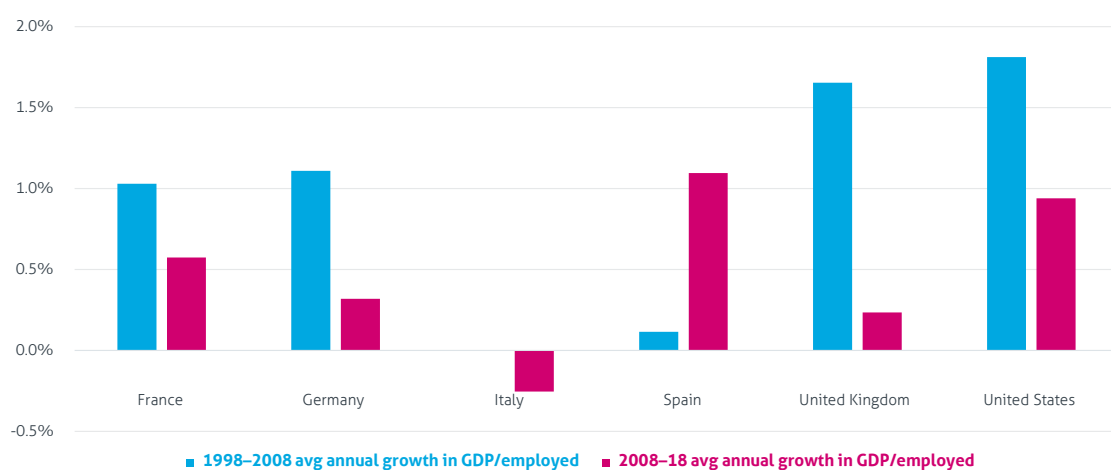


Figure 2 **GDP/employed worker growth, two decades compared**



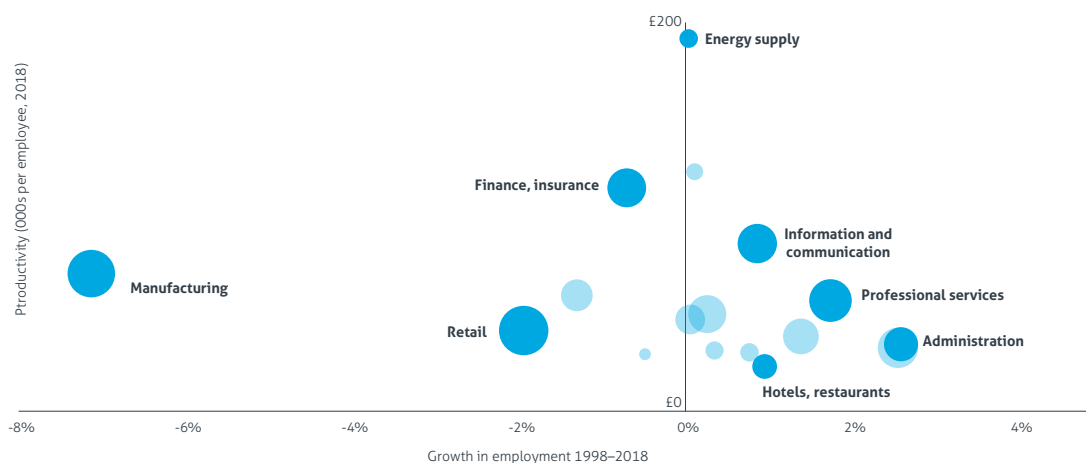
Sources: Institute for Government analysis of data in the OECD STAN structural database.

Figure 2 shows that among these six countries the slowdown in GDP per worker – a measure of productivity – has been greatest in the UK, when comparing the pre-crisis rate to the 10 years after. The UK has dropped from second to fifth, with only Italy behind.

## Reasons to support the 'bad sector allocation' theory

At first glance, this story has backing in the data. Figure 3 shows how employment grew or shrank across key UK sectors between 1998 and 2018, and their productivities. The sectors that expanded employment included many, such as administration, and food and hospitality, that are now low productivity. Contracting sectors were often high productivity. Most strikingly, the period saw the share of UK employment in the relatively productive manufacturing sector drop from 15% to 8%. However, there were clear exceptions, notably information and communication technology (ICT), and professional, scientific and technical activities, both relatively high productivity, and both increasing employment over the period. Overall, however, the chart is mostly downward sloping: the less productive a sector was in 2018, the more likely it was to have contributed to the rise in UK employment over the previous 20 years.

Figure 3 **Employment growth, productivity and size of the major UK sectors, 1998–2018**



Source: Institute for Government analysis of data in the OECD STAN structural database.

All in all, sectors with productivity below 80% of the economy average contributed almost 14 points of the UK's 20 percentage points rise in employment over the period. Meanwhile, the sectors that were 20% more productive than average added no jobs overall.

## Reasons to doubt the 'bad sectoral allocation' story

It is one thing to observe a suggestive pattern, and quite another for that pattern to be a full explanation for a phenomenon as large as the UK growth and productivity slowdown after 2008. In numerical terms, the UK's drop from 1.65% annual gains in productivity per worker to below 0.25% accumulates to a gap of 17% after 10 years. If we were to assume the same levels of employment, this would translate to a loss of £300 billion in terms of 2018 GDP – which takes a great deal

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of explanation. Even a very large reallocation of workers from a high-value sector to a lower-value one can explain only a fraction of an amount that large. For context, if manufacturing workers were 50% more productive than all others, a shift from 20% of the population working in manufacturing to 10% would lower economy-wide productivity by only about 4.5%.\*

It is by examining the actual effect of the shifts in sectoral composition that academics are able to assess how much of the UK's productivity slowdown to blame on sectoral allocation. The consensus is that it is not hugely significant. For example, the OECD found in 2018 that although the 'shift' effect (the result of shifts of labour between sectors of different productivity levels) accounted for some slowdown after 2011, this is overshadowed by the effect of a general slowdown in productivity *within* each sector.<sup>1</sup> Writing in 2018 for the Economic Statistics Centre of Excellence, Rebecca Riley, Ana Rincon-Aznar and Lea Samek found that "the re-allocation of jobs and relative price movements towards less rather than more productive industries does not explain the [productivity] puzzle". In fact, in so far as reallocation was a significant drag on overall productivity, this was meaningful in the period before 2008 (when manufacturing employment was already in steep decline) rather than after. They go on to write:

**"The collapse in labour productivity growth has been more pronounced in the UK than elsewhere, but the broad sector patterns of productivity stagnation are in many respects similar across other advanced economies, emphasising the importance of global explanations for the puzzle. UK industries that saw the biggest reductions in productivity growth tended to be internationally competitive and more dependent on global demand than other industries."**<sup>2</sup>

A comprehensive look at sectors was brought together by the recently terminated Industrial Strategy Council (ISC).<sup>3</sup> It found that the role of low-value services has indeed grown with time, but agree with Riley et al that the large fall in productivity growth since 2008 cannot be explained this way to any great extent. Furthermore, it found little evidence that sectoral composition is key to explaining the gaps in interregional productivity. While London's productivity is 40% above the national average<sup>4</sup>, the ISC finds that just four percentage points can be explained by its configuration of industry sectors. The differences between the regions are simply not large enough. In so far as there are significant differences, it is London and the South-East's dominance of finance and information/communications that weighs most heavily.

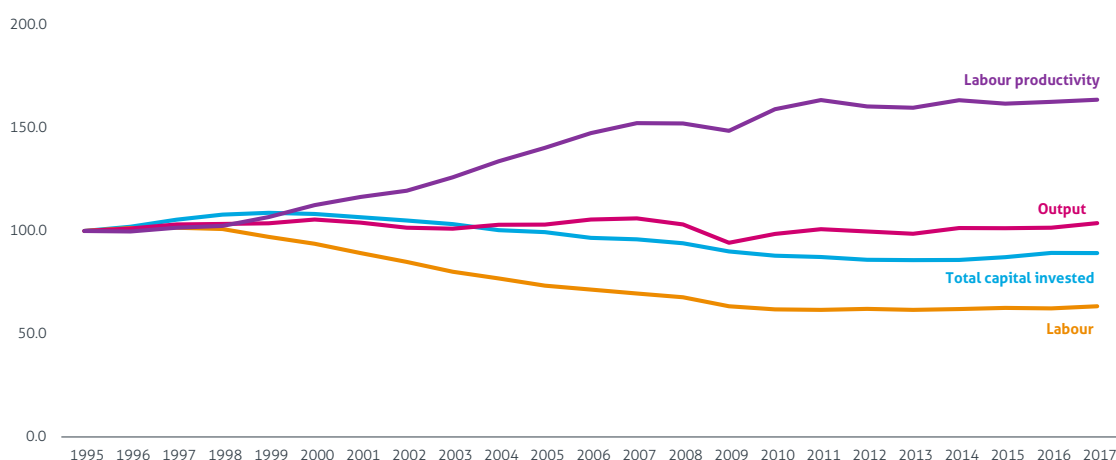
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\* In mathematical terms, if a normal worker is worth X, and the manufacturing worker is worth 1.5X, then the economy with 20 manufacturing workers and 80 others would produce 110X. If it had 10 manufacturing workers and 90 others, it would produce 105X – about 4.5% less. All of this assumes, of course, that you can simply add workers to a sector and they immediately produce the average production for that sector – a questionable assumption.

## The UK's period of productivity underperformance did not coincide with its sharpest shift from manufacturing

It is true that the UK has over the past 20 years seen a shift out of manufacturing employment and towards other sectors. But the bulk of that change occurred in the decade leading up to 2008, when per-worker productivity was growing quite smartly. Manufacturing saw its share of UK employment fall by six points in the pre-crisis period, and only one point in the years since.\* In fact, the period since 2008 has seen UK employment in manufacturing stabilise in absolute terms at around 2.5 million workers, after falling by 1.5 million in the 15 years previously.

Figure 4 **Workers, output, capital and productivity in UK manufacturing since 1995 (1995 = 100)**



Source: Institute for Government analysis of data in the OECD STAN structural database.

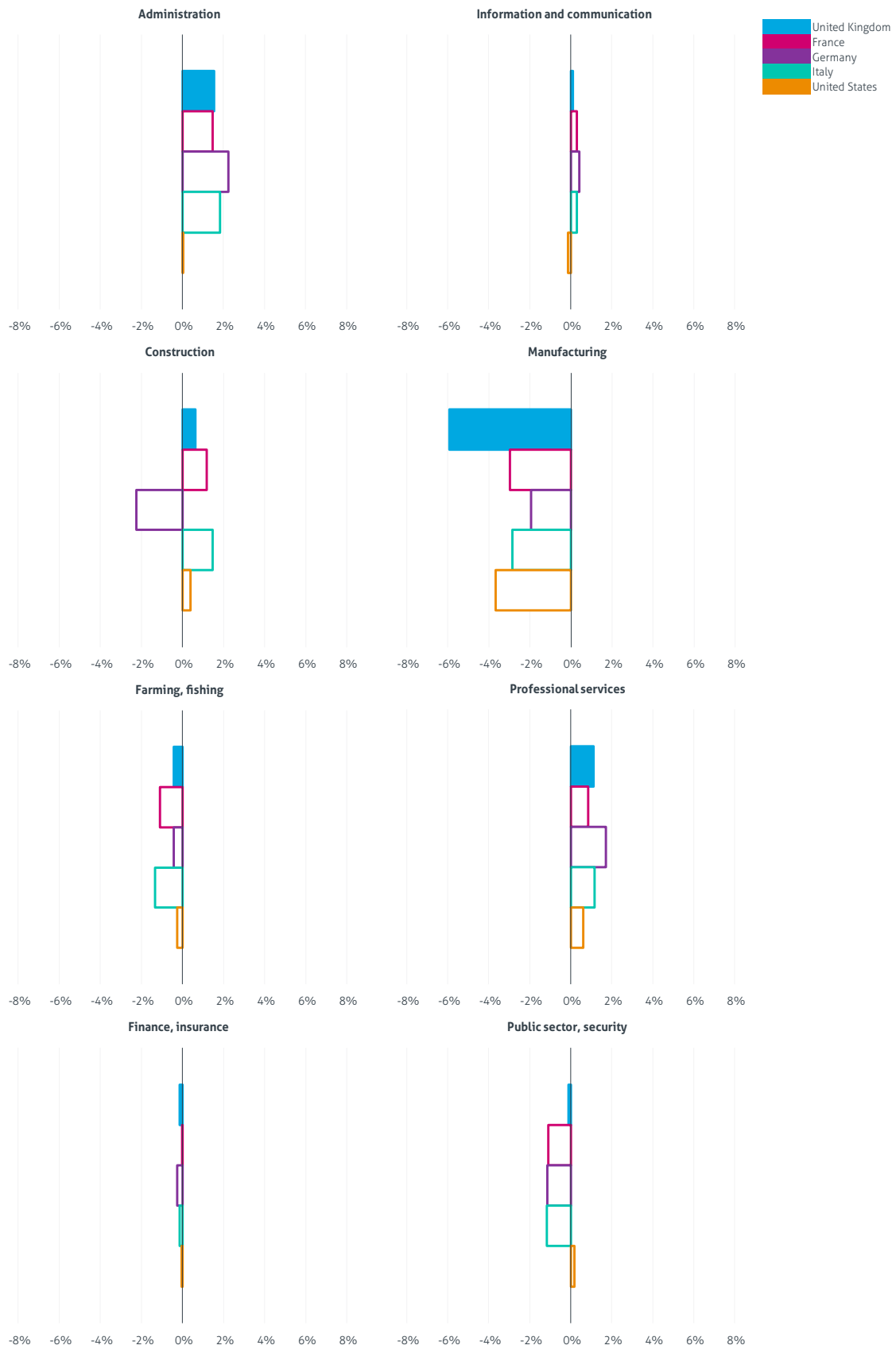
Low value-added sectors like education, health and social work, and administration expanded at a greater pace in the 10 years before 2008 than after. The high value-added ICT sector increased employment more in the period after 2008 than the period before. In so far as UK employment was more distributed towards high-value sectors in 1998 than in 2018, the major shift from this distribution took place during the earlier, high-growth period, not the period when the productivity crisis emerged, after 2008. In conclusion, the UK's shifts in sectoral composition appears to have been a bigger drag on growth during the *strong* period than the *weak* one. It does not explain the productivity 'puzzle' so much as add to it.

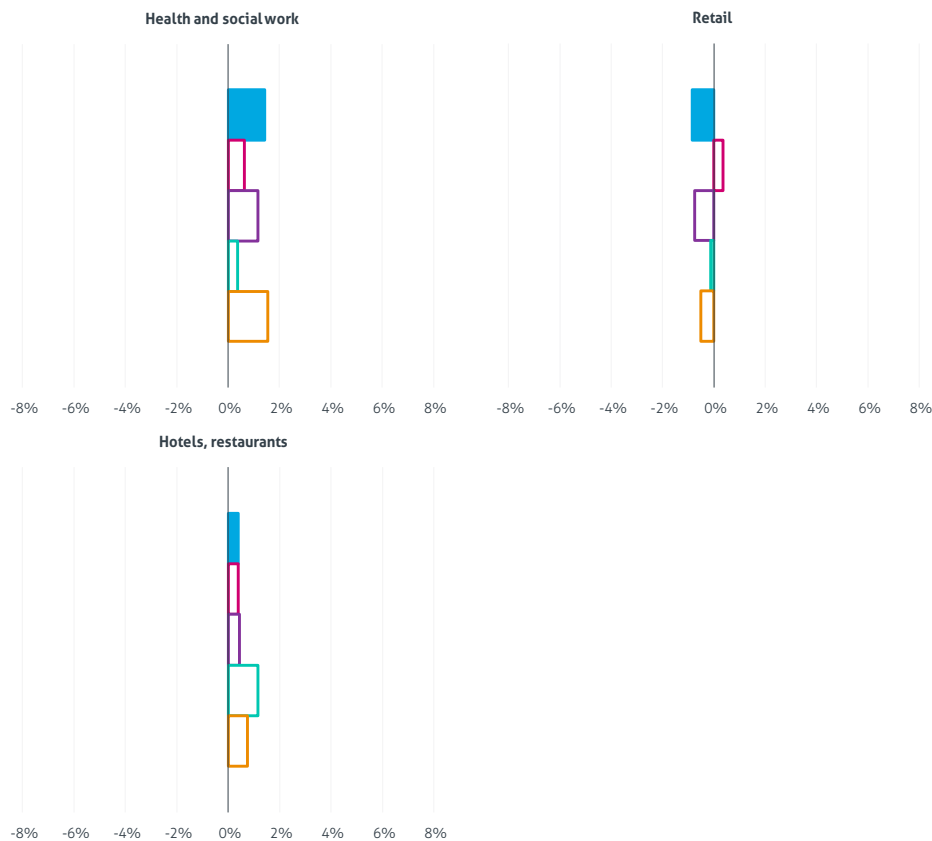
## The international angle

Further problems with the 'bad sectoral allocation' theory can be seen when we provide international context. The first point is that the UK's shifts are typical of those among its peer countries. Figure 5 provides a quick assessment using OECD data of how employment patterns have changed in the five other peer countries first introduced in Table 1. (Figures run to 2017, as the French data is not updated to 2018.)

\* Furthermore, manufacturing GVA per employee was not actually much higher than the rest of the economy in 1998.

Figure 5 Growth in employment 1998–2017 by selected sectors





Source: Institute for Government analysis of data in the OECD STAN structural database.

Every country in the group saw large increases in employment in health and social work, administrative activities and hospitality, and even Germany saw significant falls in manufacturing employment as a share of the whole. The data does not support a story of the UK making extreme, damaging sectoral choices in favour of the unproductive industries. It should be noted that the downward-sloping nature of Figure 3 for the UK could also be seen in other countries.

Overall, the UK's sector mix is simply too alike that of its peers for sectoral shape to be a major factor behind any significant shift in productivity trends – at least, not one that would also apply to much of the developed world in the West. In the words of Riley et al: "The depth of the UK puzzle compared with other advanced economies is not easily explained by differences in industry structure across countries."

It is possible to carry out a thought experiment to illustrate this. Imagine swapping the UK's employment patterns in 2018 for any of those from these five peer countries, while holding the same figures for productivity per head. How much larger might its economy have been?

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The only country for which there is a significant boost in GDP from swapping employment patterns is Germany, owing to how it has 18% of its employment in manufacturing, compared to just 8% for the UK. If a tenth of the UK's workforce were shifted into manufacturing, without troubling the absolute productivity figures in any of the sectors affected, then this could indeed be worth over £40bn to the UK economy, or 2% of GDP. But this is barely an eighth of the productivity shortfall that has emerged since 2008. It is also highly implausible: output does not rise in a sector simply because employment goes there. For example, if a sector successfully lobbied for a drastic cut to employment taxes just for its own workers, it is probable that employment would rise in that sector, but this would not ensure that output would as well, and certainly not in proportion. The effect might well be simply a shift in terms of how the sector uses capital and labour.

Jeegar Kakkad, of the Tony Blair Institute, performed a similar thought experiment in March 2020, examining growth rather than levels of GDP. Looking at what happens if we combine UK productivity performance with Germany's initial sectoral shape, he found that this would have generated post-crisis UK growth even lower than it has been.<sup>5</sup>

### **The 'bad sectoral performance' theory**

The other hypothesis we opened with suggests that the UK's productivity weakness stems from a stall in just a few of the key sectors. Maybe the UK didn't simply 'leave its eggs in all the wrong sectoral baskets' – but could it have failed to nurture its leading sectors to a sufficient degree?

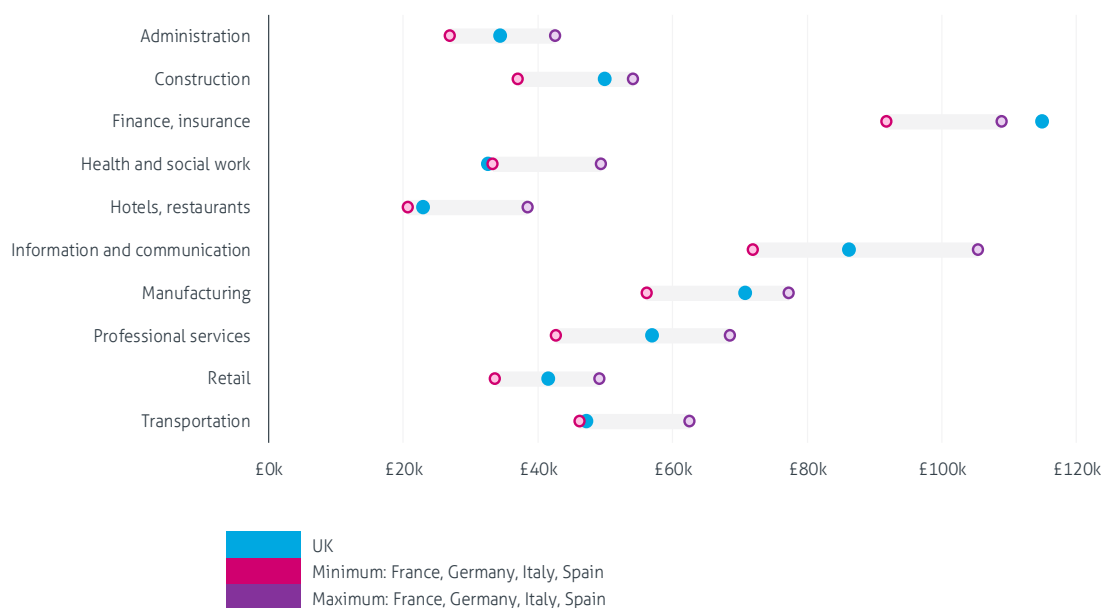
### **UK productivity by sector is similar to that of European peers, but weak in hotels, restaurants, health and social care**

We start by looking at the absolute level of performance of the various sectors, to see if the UK lags badly in any to such a degree as to explain the national performance. To answer this question we must compare productivity across national economies, and any such comparison is inexact as it depends on a currency assumption. In this case, we have chosen to convert performance in 2018 into sterling equivalent, using 1 euro = 85p.\* We do not include four extremely capital-intensive sectors (real estate, energy, water/waste and extractive), as their productivity with regard to labour is a misleading indicator, for reasons discussed later.

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\* We exclude comparisons with the US, simply because with only a couple of exceptions, its productivity outperformance is so great that it makes it harder to see the difference between the UK and its EU peers.

Figure 6 **Productivity (in £000s per annum per worker) in the UK compared to selected countries, 2018**



Source: Institute for Government analysis of data in the OECD STAN structural database.

Figure 6 shows selected UK productivities by sector, against the highest and lowest productivities for four European countries. There is marked underperformance for the UK in hotels/restaurants. To give a concrete example, both the UK and France produce about 2.75% of their GDP from this sector but the UK does so with 6.7% of its workforce, compared to 4.4% for France. It is possible to see a similar poor performance in health and social care but problems with measuring the output of this sector makes any international comparison problematic. Its output in the UK is delivered in large part by the public sector, in a non-market way, and therefore the measurement of output is uncertain.\* Otherwise, at these exchange rates, UK productivity performance in terms of gross value added (GVA) per employee is on a par with Germany's, and just a little behind France's.\*\*

### The 'bad sector theory' examined

As well as a level comparison to international peers, it is instructive to measure where the UK's post-2008 'growth and productivity disappointment' comes from relative to the 10 years that went before.

For most sectors and over most periods, gross value added (GVA) is a much more volatile variable than employment (L). It follows that when explaining movements in GVA/L, explanations will often be most influenced by shifts in GVA. In a later discussion, we discuss how for the post-crisis period, the growth in GVA and the

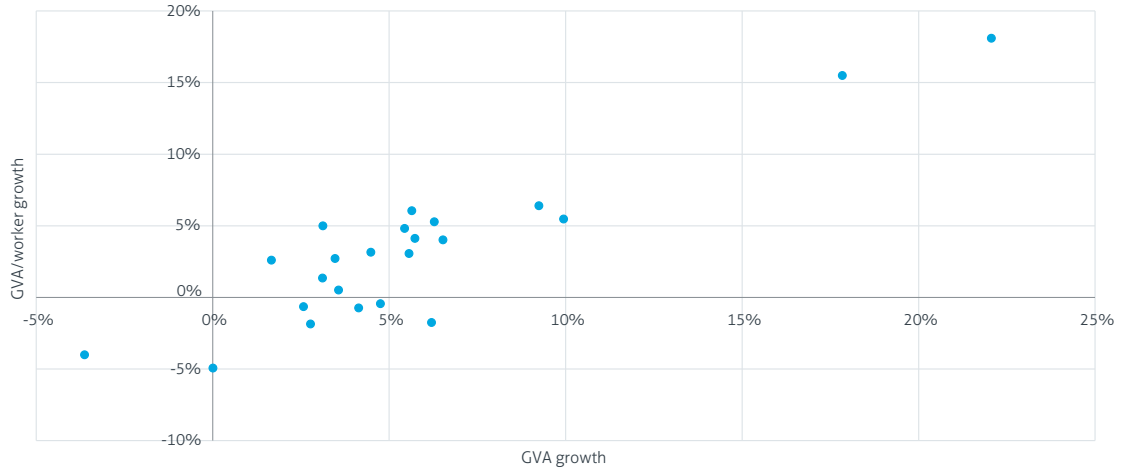
\* When output is uncertain, expenditure data can be substituted, which is by definition very similar to the input. This leads to the risk that high wage input is automatically assumed to imply high output, for example. [www.ons.gov.uk/economy/economicoutputandproductivity/publicservicesproductivity/articles/measuringadultsocialcareproductivity/2018-06-01](http://www.ons.gov.uk/economy/economicoutputandproductivity/publicservicesproductivity/articles/measuringadultsocialcareproductivity/2018-06-01)

\*\* There is considerable debate as to the correct exchange rate to use to attempt international comparisons (See Coyle D, *GDP: A Brief but Affectionate History*, Princeton University Press, 2014). Using a purchasing-power-parity rate that puts the euro closer to parity against the pound would lead to a higher gap between the UK and peers such as Germany.



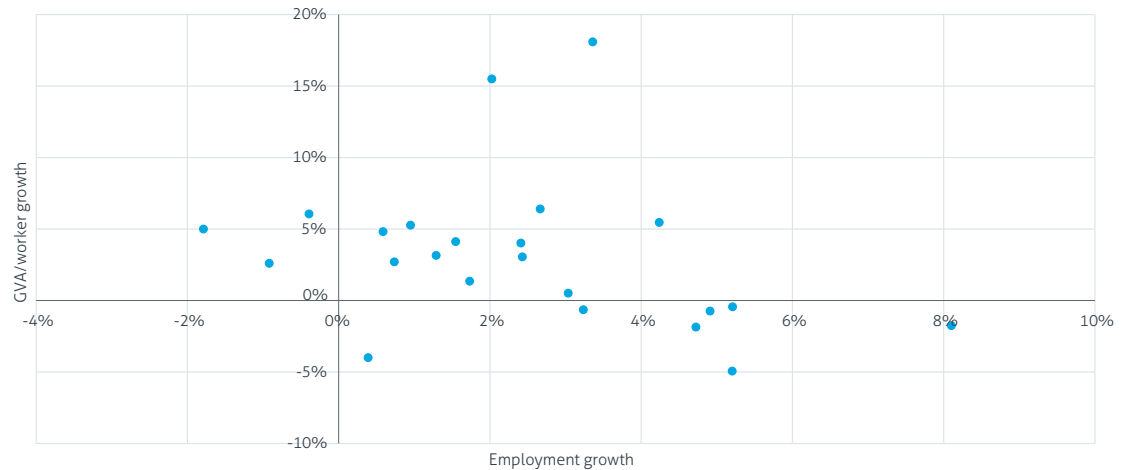
growth in productivity by sector looked significantly correlated. The same occurs for most sectors when examining year-on-year changes in productivity. For example, Figures 7 and 8 show the relationship between annual changes in GVA growth and productivity growth, and annual changes in employment growth and productivity growth, for the UK information and communications sector.

Figure 7 **Relationship between annual GVA growth and productivity growth, ICT sector, 1995–2018**



Source: Institute for Government analysis of data in the OECD STAN structural database.

Figure 8 **Relationship between annual employment growth and productivity growth, ICT sector, 1995–2018**

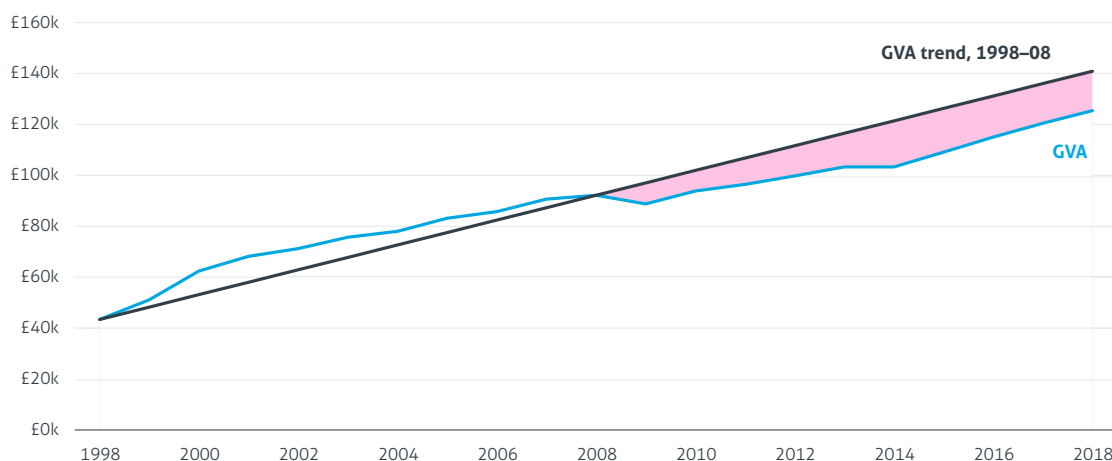


Source: Institute for Government analysis of data in the OECD STAN structural database.

It can be seen that the GVA variable is much more closely correlated with productivity than the employment variable. Therefore, to explain movements in productivity, it makes considerable inroads to start by looking at movements in growth.

To explore this, we pose a simple question: if an economist in 2008 had predicted that the next 10 years would be like the previous 10, where would the greatest mistakes in their forecast have turned up? For example, Figure 9 shows the GVA of the information/communications sector over 1998 to 2018, and the trend line that would extrapolate the first 10 year's performance. The gap between the actual result and the trend line is the disappointment portion given to this sector.

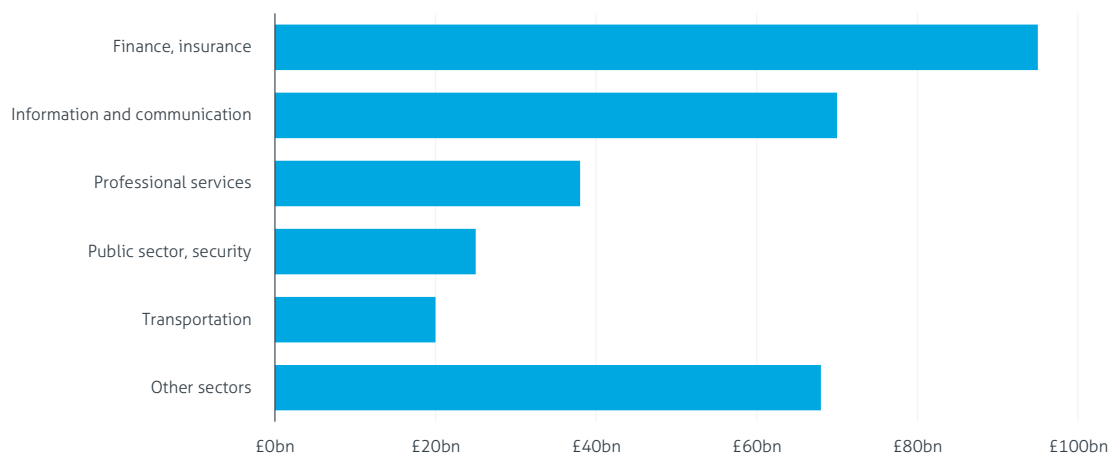
Figure 9 ICT sector GVA 1998–2018



Source: Institute for Government analysis of data in the OECD STAN structural database.

Clearly, this is an imperfect method for forecasting the evolution of an economy. Assuming the future should mirror the past is naïve; taken to an extreme, it would end up with a counterfactual where the sectors that grew at an above-average pace would come to dominate the economy, and the others shrink into insignificance. Therefore it should not be taken as a firm guide to what the economy 'should' do, just a rough signpost towards where further examination of productivity shortfalls might be warranted. Carrying out this exercise across all the sectors, the disappointment-from-trend is displayed in Figure 10 in billions of GVA.

Figure 10 Breakdown by sector of loss of GVA by sector



Source: Institute for Government analysis of data in the OECD STAN structural database.

The biggest contributors to the growth disappointment were the finance/insurance and information/communication sectors, which between them were more than £160bn below their previous pathways. Professional services accounted for another £38bn. Each of these were sectors that grew considerably faster than the economy as a whole from 1998 to 2008: GVA across the rest of the economy expanded by 28% in the decade to 2008, while these sectors grew by 66%, 112% and 74%. In the case of information/communication and professional services, growth continued but at a

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slower pace, at around 36-38%, whereas the finance/insurance sector actually shrank from its 2008 levels in the wake of the crisis. The loss of output from public sector/ security is unsurprising, given the onset of austerity after 2010. Like health care and social care, it should again be noted that there are difficulties with measurement of public sector output – a non-market sector – that make growth accounting methods less appropriate for a productivity discussion.\*

At the level of 20 broad sector groups, only two grew faster in the second decade than the first: manufacturing by a tiny amount (but it effectively flatlined over the whole period), and wholesale and retail trade, which expanded 22% in the second decade compared to 19% in the first, thereby adding an extra £5bn of GVA.

Note that mining and quarrying – North Sea oil in the most part – does not show up as particularly significant, despite it often featuring prominently in discussions of the UK's slowdown. The reason is that GVA in this industry has been steadily falling through the whole period, and hence no particular break took place in 2008. This sector has declined, from providing 1.4% of GVA in 1998 to 0.8% in 2018 as the oilfields have become depleted – at this size, its ability to explain total UK GVA trends, and therefore productivity trends, is quite limited.

### **The role of manufacturing**

It should also be noted that, using this method, the manufacturing sector does not play a large role in explaining why the UK's post-2008 decade fell short of the pre-2008 decade. This is because UK manufacturing output was broadly flat across the whole period from 1998 to 2018, and showed no particular break in GVA performance in 2008. From that point of view, there was no disappointment in the second period compared to the first, and manufacturing's weakness played no role in explaining the weak second decade. However, what did change in 2008 was that the trend in employment, which had shrunk rapidly in the decade from 1998 to 2008, stopped falling. In terms of productivity, this meant that manufacturing became considerably richer in terms of GVA per worker in the first decade, and then saw this favourable trend stop. Manufacturing is a rare example of a sector where the change in productivity occurred alongside large shifts in employment rather than shifts in value-added. All of its pre-crisis productivity growth came from a 40% collapse in workers employed.

There are often calls for the UK to revive manufacturing as a way of improving productivity, such as in Onward's recent publication *Making a Comeback*.<sup>6</sup> While the past does not determine the future, the data of the past 20 years shows how difficult this would be in practice. To contribute meaningfully to higher national productivity, manufacturing would have to grow both in terms of productivity and employment – in other words, greatly expand output, which is the product of these two. On recent form, UK manufacturing has only ever managed one or the other.

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\* Riley et al acknowledge this, also excluding education and human health and social work from calculations.

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It is of course possible to say that the UK's failure to increase its manufacturing output after the financial crisis is a disappointment. In terms of GVA, the UK in 2018 had still not regained its peak production from before the crisis, whereas countries like the US, Germany and Austria were 5, 15 and 20 percentage points higher respectively. But even had the UK managed to match the best of these, while using exactly the same number of workers, the effect on national GDP and national productivity would have been to raise both by around 2% – barely an eighth of the shortfall. If manufacturing instead achieved this by drawing workers from other sectors, the effect on national productivity would be even less. Whichever way you look at it, failures to seize opportunities in manufacturing can explain only a portion of the UK's growth slowdown, and hence its productivity slowdown, since 2008.

Sector data for the UK exists at a much more granular level than the broad 20 or so that have been used in this report so far. For brevity, we have not included a more exhaustive analysis in this report (though we include a chart in the Annex), but the verdict from other studies does not contradict the general impression in Table 4. For example, writing in 2018, Riley, Rincon-Aznar and Samek note:

**“UK industries that saw the biggest reductions in productivity growth tended to be internationally competitive and more dependent on global demand than other industries; e.g. finance and pharmaceuticals. This pattern points to two potential contributing factors to the productivity puzzle: global demand weakness and the possibility that the scope for catch-up to the technology frontier has become lower in these sectors.”<sup>7</sup>**

A glance at how other countries' performance fell back shows that the UK was an outlier in terms of how much its GDP growth was damaged by a slowdown in the financial sector itself, and that its previous growth rate in the ICT and professional services sectors were exceptional. But in light of the financial crisis and global slowdown, it is difficult to pin the shortfalls in these sectors in the decade afterwards on particular policy mistakes. 'Bad sectoral performance' therefore has reasonably strong empirical backing – for the UK the loss of growth has coincided with a few big, formerly fast-growing sectors suddenly stalling. However, it is doubtful that the underlying causes of their failure over that period could have easily been countered by UK policy alone. In the case of the financial sector, it is not even clear that continuing growth would have been desirable, given the risks, so damagingly illustrated by the crisis itself, it could have brought with it.

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## A recap on the 'bad sectoral allocation' and 'bad sectoral performance' theories

For the 'bad sectoral allocation' theory, superficially convincing evidence – the steady fall in the employment share of the manufacturing sector and the rise in other lower-productivity sectors – diminishes on closer examination. This is because:

- Major shifts in UK industrial structure – notably, the fall in manufacturing employment share – occurred more during the pre-financial crisis period, when productivity and growth were strong. They *deepen* the 'puzzle', in so far as they leave more to be explained by other factors.
- The sorts of shifts the UK saw were typical of peer countries like France, Germany, Italy, Spain and the US.
- Even if we, implausibly, imagined the UK had somehow constructed a set of policies that had pushed its share of employment in manufacturing up to German levels, and maintained the same productivity per employee in that sector, the entire effect of this would have been to raise GDP by £40bn – a large total, but a small fraction of the total loss in GDP relative to the previous trend.
- Overall, echoing work of academics, sectoral composition is not a material factor in explaining the UK's slowdown relative to its peers.\*

The 'bad sectoral performance' can similarly be questioned because:

- The UK's general levels of productivity are weak across the board, when compared to European peers, albeit with a large gap in the hotels/restaurants sector.
- However, the sharp slowdown since 2008 is largely explained by stalling in growth of several large, hitherto-fast growing sectors, in particular financial services, information and communications, and professional services. The problem with these is a failure to maintain the same (impressive) growth trajectory as before.
- The UK's long-standing failure to grow its manufacturing sector is a disappointment – just not one that can explain more than a fraction of the productivity shortfall. GVA has flatlined in this sector since 1998. Yet matching even the strongest European growth rate here would not explain more than a small fraction of the UK's slowdown in GDP and hence productivity growth.
- Otherwise, the slowdown in the contribution to overall economic growth by sector is widespread. Compared to 1998–2008, apart from transport equipment, no sector has been able to improve its performance sufficiently to add more than 0.05 percentage points to the UK's overall growth rate.

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\* The clearest statement of this is in Riley et al, albeit their study had data up to 2015: "Aggregating the growth performance of UK industries using the sector composition of the US or the EU-15 does not materially affect the UK growth gap."

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There is a tendency among economists to refer to the UK's fall in productivity as a 'puzzle'. The word is misplaced. Seen against a similar fall in productivity among international peers, and with much of the fall in sectors hurt by the financial crisis and its weak growth aftermath, the puzzle is somewhat less puzzling. But much of what happened would have been hard for policy makers to prevent through sector-focused policy.

Nevertheless, this is not an argument for fatalism. The government wants to prioritise its efforts on the right growth sectors. The next sections discuss possible pitfalls in this approach, and then offers some recommendations for the best way to proceed.

### **Box 1 Problems with over-reliance on production per unit of labour**

The usual way productivity statistics are discussed is in terms of GDP or GVA per unit of labour – per worker, or per hour worked: GVA/L. For some sectors, notably transport, education, health and public administration, labour costs amount to over 70% of value-added. Measures to increase output without needing to increase the labour input are consequently valuable. However, GVA/L clearly misses much that matters for productivity and growth – and much that matters for everything else.

The most established issue is that productivity needs to incorporate how capital is used. In the UK, mining, real estate, energy and water supply are all sectors where labour costs make up less than 35% of costs (for real estate, it is just 6%). For these sectors, efficient use of invested capital is clearly as significant a factor as their use of labour. But for any sector, a policy that boosted production per worker only by deploying hugely increased capital does not represent a straightforward improvement in productivity. Capital must be funded out of the economy's savings, and this cannot be increased indefinitely without damaging living standards.\* Capital-led growth does not automatically lead to better-off workers.

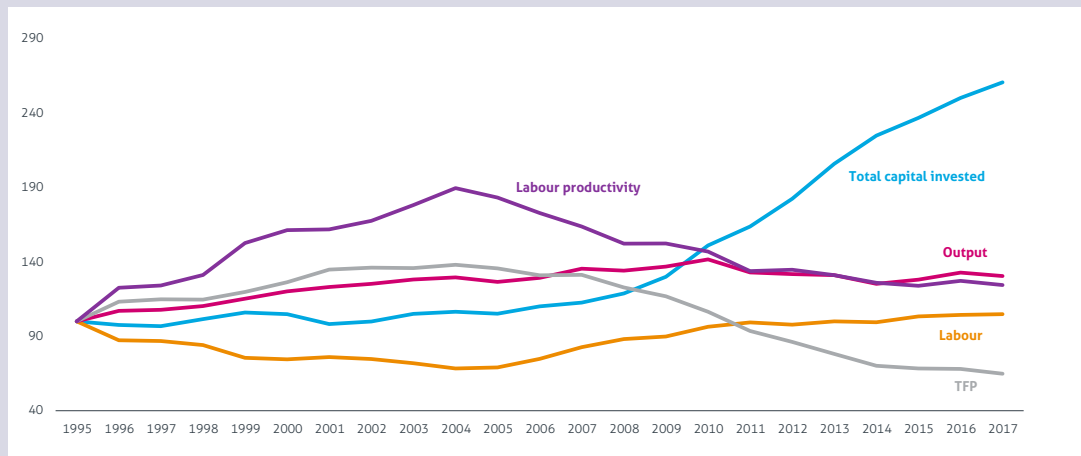
This is why growth economists tend to base analysis more upon 'total factor productivity' (TFP), which is a variable generated by calculating how much growth is left unexplained by the increased use of labour and capital. Even factoring in capital, simply measuring production per combined units of input can leave much out that is intrinsic to innovation and progress. At times or places in history, land has been the factor in shortest supply, spurring land-saving innovations, rather than the labour-saving ones that ultimately led to the Industrial Revolution, according to one theory.<sup>8</sup> The miracle of computing is not well captured by how many fewer workers it takes to make a silicon chip (though no doubt this has improved hugely), but the exponential rise in the processing power packed into each single unit.

\* The best discussion of this can be found in Krugman P, 'The Myth of Asia's Miracle: A cautionary fable', *Foreign Affairs*, November/December 1994. In it he writes: "Economic growth that is based on expansion of inputs, rather than on growth in output per unit of input, is inevitable subject to diminishing returns. It was simply not possible for the Soviet economies to sustain the rates of growth of labor force participation, average education levels, and above all the physical capital stock that had prevailed in previous years. Communist growth would predictably slow down, perhaps drastically."

## A case study: energy supply in the UK

The example of energy encapsulates some of the problems with conventional ways of assessing productivity. Figure 11 displays key variables for the UK, rebased to an index of 100 in 1995: capital invested, labour force, real output, labour productivity and an estimate for total factor productivity.

Figure 11 **The UK electricity, gas, steam and air conditioning supply sector (1995 = 100)**



Source: Institute for Government analysis of data in the OECD STAN structural database.

Seen from the point of view of maximising GVA, this may look like a bad news story. The sector grew its labour force by 10% and its invested capital by 70%, and yet its output increased by only a quarter – a clear loss of productivity. This is shown in the TFP line, which peaked in 2004 before falling steadily to little more than half its peak level. As a result, although worth less than 2% of GDP, the failure of this sector's TFP to stay level might have lowered the size of the entire UK economy by over 0.5 percentage points.

Yet this is clearly a misleading picture. First, energy revenues are costs to the rest of the economy. Prices falling from 2011 will have provided other consumers – including industry – with a windfall. Second, that sustained increase in capital and labour from 2005–07 onwards will have reflected the increased investment needed to begin transforming the electricity network to lower-carbon production. The resulting lower carbon emissions are not included in the measure of output and so are not captured in the chart. Since 2010 UK carbon emissions have fallen by 29%, the economy has grown by a fifth, and the lights have not gone out.<sup>9</sup> This is a success story, but one that normal growth accounting might make look like a failure.

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# Problems with a sector-picking answer to the productivity problem

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It is tempting to conceive of a growth strategy as a process of choosing the 'right' sectors to prioritise, be that through investment spending, R&D support or specific regulatory interventions. There are signs through the *Plan for Growth* that the government is leaning towards this. For example, in describing its forthcoming Innovation Strategy, the government writes that it will "set out a vision for high-growth sectors and technologies where we are well-placed to develop a globally competitive advantage". Its regulatory reform efforts are aimed specifically at key sectors like financial services, health, data and agriculture. Trade policy is to be aimed at the "key growth" or "pioneering" sectors and under "Opportunities for growth from EU exit" is listed "Building our strongest sectors".

If the government were in the same position as a factory owner, with the 20 broad sectors described in national statistics the equivalent of 20 distinct product lines, this kind of strategic approach would be all that were needed. A disciplined entrepreneur would choose those lines most likely to grow, put extra resources there, and try to limit or close down those with worse prospects. If one product line is languishing, but another has the potential to grow tenfold, the company should simply shift workers into the winning product. In this formulation, the key to higher UK growth is to produce less low-value retail, health care or recreation output, and more information tech, high-value manufactured goods, and legal services.

For a national economy, far less linear and with far more sectors than the example above, defining an economic growth strategy in such sector-picking terms is more problematic, and in some cases might produce perverse results. One clear issue is that large, developed economies must operate across the full range of sectors; even if a policy maker decided that having a social care, transport or education sector was dragging down national productivity, they do not have the choice simply not to have one.

But breaking a complex system like an economy into sectoral chunks also masks significant interrelationships and other complexities. For any one sector, it is not possible to judge success simply based on whether it is larger or even more productive than it was before. Below, we discuss several distinct problems with seeing the whole economy as simply the sum of 20 distinct sectoral parts.



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## **The size of a sector is not within the direct control of a policy maker, and is a poor indicator of policy success**

Demand conditions are a dominant factor in determining the turnover of a sector – and are why it is not just within the gift of the government to determine how large it is. For example, demand for agricultural goods has grown much more slowly than the rest of the economy since the Industrial Revolution, and with productivity improvements the share of the workforce in that sector has shrunk dramatically. None of these trends – falling relative demand, fewer jobs, less contribution to GDP, rising productivity – is easy or sensible to counteract. Nor, clearly, are they a sign that policy has failed.

Certain service sectors, in contrast, show the opposite tendency – steady or rising demand as an economy develops, even when the productivity gains are hard to come by. The economist Dieter Vollrath observes in his book *Fully Grown* that it is hard to reduce the labour input needed for job titles like doctor, waiter, personal trainer and teacher, as the input is inseparable from the output – you are paying for an hour of the doctor’s time, for example. In these cases, the combination of steady demand and rising wage levels leads to these services commanding an increased monetary share of the economy.\*

For the large share of the economy that is about servicing domestic demand, policy makers’ influence is slight. Economies, as they grow richer, shift demand towards services relative to manufactured goods – in the parlance of economists, the demand for services is ‘income-elastic’, while for goods it is ‘income-inelastic’. This is a long-standing feature of development. It does not lie within the gift of the government to make people buy more cars and have fewer haircuts, say, even if a naïve analysis would suggest this would shift the economy in a more productive direction.

## **Technological advance does not simply generate more jobs and growth for a sector**

Economies ultimately grow through the adoption of better technology and techniques, which enable them to produce more from less. However, it is a long-observed feature of innovation that the benefits are enjoyed throughout the economy, not simply in the sector or company that originated the innovation.<sup>1</sup> When trying to assess the impact of some of the most dizzying advances in innovation – such as the harnessing of electricity, or the invention of the automobile and computer – it makes little sense to examine jobs and value-added in the sector in question. The effects are seen everywhere. Electricity transformed manufacturing, computing transformed communications and finance, the manufacture of cars transformed transport, logistics and retail, and so on. Counting the sales of the innovating industry is almost beside the point: which production line in the example above would our imagined owner favour over another?

In fact, for the fastest-innovating sectors, you might not even see an increase in their own GVA at all, since the innovation can generate *deflation* in the real price of the product. The clearest example is provided in the computing industry. In terms of

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\* This phenomenon is called Baumol’s cost disease, named after the economist William Baumol, who first discussed it more than 50 years ago.

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processing speed, it generates output billions of times greater than just a few decades ago. But at the same time the cost of the same processing speed has fallen just as fast. The net effect, particularly when translated into jobs, incomes and other economic variables, is irreducibly ambiguous.\* Another good example is the music industry, which in terms of output (songs played) has grown explosively since the 1990s – but not in terms of revenues and jobs.

This contrast between the benefits generated by a sector, and the direct jobs and incomes that it commands, highlights the contrast between consumer and producer interest. Politicians, when they talk of some investment or innovation bringing jobs and growth, are generally extolling the producer side. From this point of view, the more jobs and investment required to produce the same output, the better – which is exactly the opposite of what the consumers, paying for it, might want. It is also the opposite of what technological progress achieves. For a clear and current example, consider the Covid-19 vaccination programme: its success is not measured by how many jobs or profits it generates, but how well people are vaccinated. This confusion characterises discussion of how the net zero challenge will generate 'good, green' jobs. That it will do this is inevitable (although it ought ultimately to destroy a great many, too<sup>2</sup>). But given the vast investment challenge required to achieve net zero, policy makers should not be designing programmes as if the job or growth creation are the point. The point is to cut carbon emissions.

## **Sectors are not distinct units but interact and compete for resources**

The way technology in one sector benefits the others is just one example of how artificial it can be to see them as separate units rather than part of a single economic system. The boundaries between them are arbitrary, which muddies the picture in several ways.

First, the boundaries shift. Once, a single business, such as a factory, might have contained a combination of production and service industries – the assembly line, the catering department, the management of the pension fund, cleaning and so on – which would all have sat under the same sector heading. The decades since have seen increasing use of outsourcing, so that these individual functions are now separately identified. As a result, a factory that outsourced half its service employees would see an apparent rise in productivity per worker, and its surrounding services industries a boost in employment, for example.<sup>3</sup>

Second, sectors do not serve only final consumers but also one another. The efficiency of one might therefore have a knock-on effect on the next, which means that to treat their productivities as matters of entirely distinct concern provides an incomplete picture. The manufacturing sector suffers if there are failings in logistics, for example. The relatively sluggish growth of (dollar-valued) value-add in the computer manufacturing sector has a flipside in the form of greatly expanded, cheap

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\* More than 10 years ago the writer Michael Baxter coined the term the "paradox of innovation", that some kinds of innovation may lead to demand problems: paradoxically, innovation can also create problems for the economy. Innovation can lead to a fall in prices, and innovation may lead to a requirement for less labour, driving down wages. Innovation can lead to higher profits, without necessarily leading to higher wages. Meaning, innovation can create a scenario in which demand lags behind capacity.

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use of digital technology everywhere else – as in the music industry example above. This means that when prices fall for efficiency reasons in one industry, lowering its apparent value-add, this may be to the benefit of the rest of the economy.

Third, sectors compete with one another for their 'factors of production' – their labour, capital, land and more. An increase in resources for one may appear to boost its performance but at the aggregate level any benefit depends on what the opportunity cost was for the rest of the economy. A well-known example of this effect could be seen when the manufacturing sector in the UK used to complain that the finance sector was poaching all the best engineering talent. An opposite phenomenon can be seen when the productivity gains of one sector release labour resources for another, with possibly perverse results. As Lord Turner argued in an influential talk: "Rapid productivity growth in one sector of the economy, reflecting rapid technological progress, can therefore be combined with low overall productivity growth, if freed up labour moves into low productivity growth sectors."<sup>4</sup> At other times, the prosperity of one sector is a direct benefit to others because of demand spillovers. For example, if a new high-value industry becomes established in a region, bringing with it higher-than-average wages for its staff, the effect on the local economy will show up not just directly, through that industry's statistics, but also through spillovers such as extra demand in the local economy and improved business for companies in its supply chain.

### **Macro matters: individual sector analyses risk missing the wood for the trees**

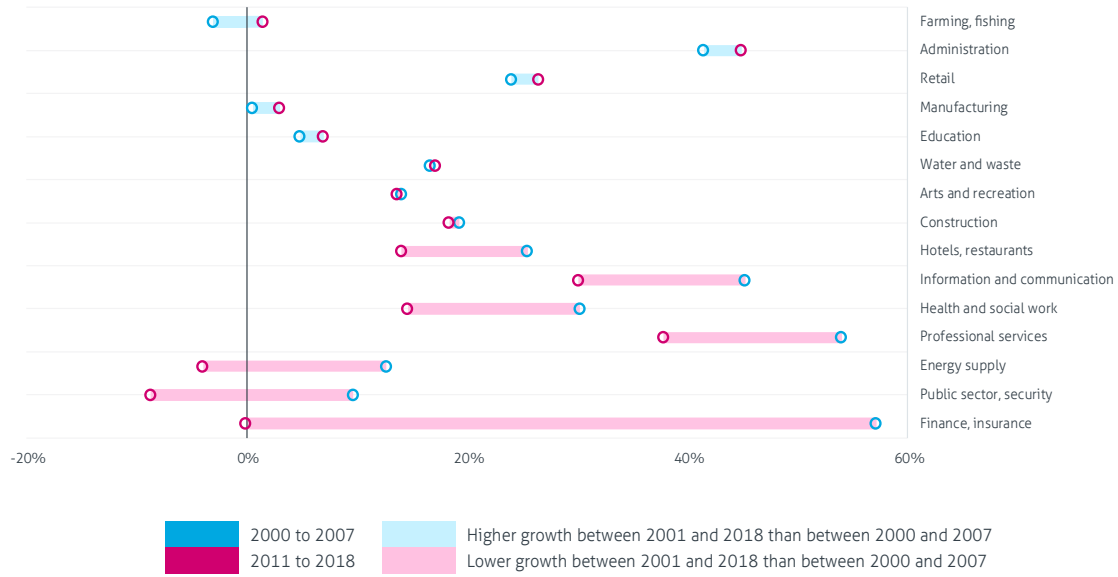
The UK's productivity shortfall became far starker just as a financial crisis roiled the world. The ramifications of this crisis were manifold: an immediate shock to aggregate demand, both its level and growth; a change in the supply of credit; a shock to business confidence; weaker government finances, and a subsequent period of fiscal tightening. Although with some sectoral skew, these are emphatically macroeconomic events.

The shock to aggregate demand was the most important of these. A key variable in any business plan is the expected level of sales. As discussed above, for most sectors the movement in GVA plays by far the largest role in explaining short-term movements in productivity, far more than changes in relatively slow-moving employment.

The shock and subsequent period of slower revenue growth will have damaged different sectors differently, however, depending on how elastic demand for their specific product is and how easily their costs respond to changing revenues. As observed earlier, some products are naturally income elastic, and some inelastic, and this can be seen in the patterns of demand post-crisis.

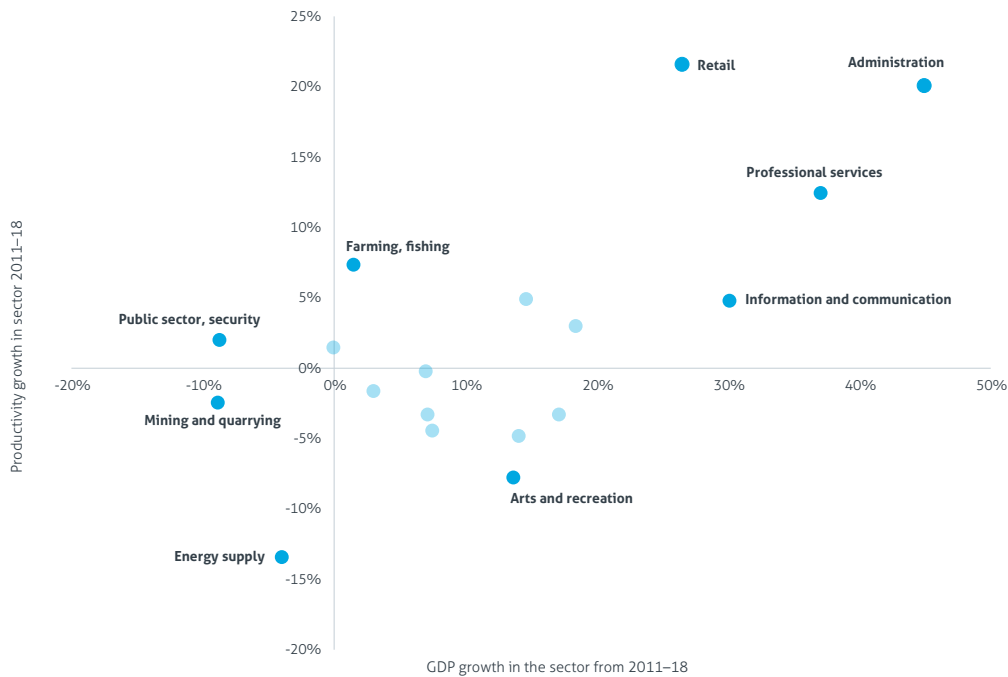
Figure 12 shows how major sectors in the UK economy grew in the seven years up to 2007, and then in the seven years since 2011, when the immediate effect of the financial crisis was past. Several grew almost exactly as they did before, and a few others – information and communications, finance and insurance, the public sector and energy in particular – fell well short. Figure 13 then shows how the later growth in the sectors compares to their productivity growth in terms of GVA per unit of employment.

Figure 12 **Growth in UK sectors' GVA, two different seven-year periods**



Source: Institute for Government analysis of data in the OECD STAN structural database.

Figure 13 **Relationship between change in growth and change in productivity growth, between 2000–07 and 2011–18**



Source: Institute for Government analysis of data in the OECD STAN structural database.

There is a clear correlation between how individual sectors' productivity growth changed after the crisis and how their GVA growth changed. As observed earlier, manufacturing provides an exception: its pre-crisis spell of productivity improvement was driven by falls in employment, not rises in GVA.

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A simple correlation cannot prove causation, or its direction. Although a fall in GVA will often cause a fall in productivity, it is possible for sectors to lose business because their ability to produce efficiently fell away. What is clear is that there was a post financial crisis shock to aggregate demand growth, which appeared to hit certain sectors harder than others, and variations in how demand affected sectors correlate reasonably well with how productivity changed in those sectors. It is also the case that across a great number of sectors, year-on-year changes in productivity are far better explained by movements in GVA than movements in employment, with the exception for the UK of manufacturing.

As of mid-2021, developed economies are on the cusp of a fast recovery from the Covid pandemic. The question of how demand affects productivity may become relevant again, except this time with a positive shock in mind. The consultants McKinsey have argued that robust demand growth is needed as well as expansion of supply-side capacity. With just the latter and not the former, the risk could be a rerun of the kind of sluggish recovery seen between 2010 and 2019.<sup>5</sup> Demand conditions have a crucial effect on business investment incentives, including the confidence needed to start up new businesses and enter new markets.

The economist and writer Martin Sandbu, in his recent book *The Economics of Belonging*, has argued that the effects may be more than short term, writing that “there is strong evidence... that temporary downturns can leave permanent scars on an economy’s productivity in the long run” and as a result “short term aggregate demand management does affect the underlying trend of the economy’s productivity”. He discusses several mechanisms by which this might come about, including: how low aggregate demand discourages investment; an absence of demand pressures lessens the need to find new, innovative ways of delivering a product or service; and to make the most of all the workers in an economy often requires that the level of demand pressure is strong. When demand is too low, the jobs available for people are more likely to fail to match their talents and potential.

Aggregate demand is not the only economy-wide factor that might have shown effects at a sector level. The financial crisis caused a tightening in financial conditions. It was followed in the UK by what looked like a sharp rise in effective labour supply – for the years after 2010, employment rose more, and wages less, than was originally anticipated by the Office for Budget Responsibility. The underlying causes of this positive shock go beyond the scope of this paper; they might include the abolition of mandatory retirement ages, a cut to taxes on employment, the income shock from the financial crisis and lower welfare payments, high immigration and more. But whatever the cause, an economy-wide loosening in the labour market combined with more expensive credit could have changed company incentives, making it more attractive to hire a cheap worker and riskier to take on finance for an investment.

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# What does this mean for policy?

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Successive governments have been increasingly preoccupied with restoring UK productivity growth, but efforts to approach this from a sectoral point of view are relatively recent. The analysis in this report points to several clear lessons.

## **Do not put all the eggs in the high-productivity sector basket...**

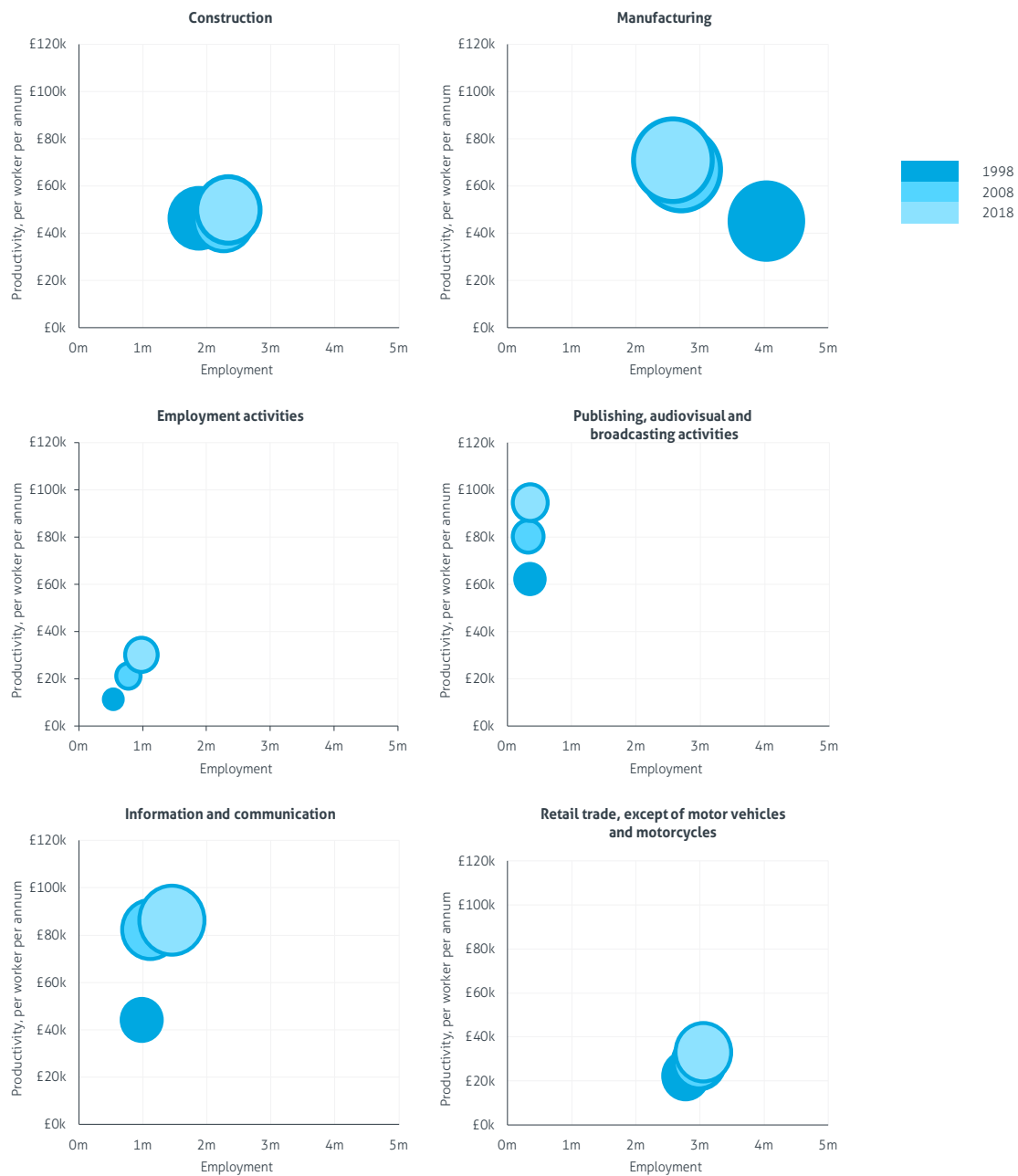
The clearest conclusion is that the government should not base its entire productivity strategy upon sectors usually seen as technology- and innovation-rich, such as advanced manufacturing, information technology, research-intensive industries like advanced health care, and new technologies like quantum computing.

The most obvious reason for this is scale. Adequate economic growth over the next decade means GVA being around £400bn–£500bn-a-year higher within 10 years. The difference between success and failure should be measured in the tens or hundreds of billions of pounds of GVA. In comparison, UK GVA in 2018 for the manufacturing sector and IT sector combined was less than £300bn. Over the periods we have examined, even countries with a phenomenal success story, such as the US with its IT sector, seldom relied on that 'star industry' for more than around a fifth of growth. The major high-productivity sectors (professional and financial services, manufacturing, information and communications) also account for fewer than a quarter of workers in the UK, and a shrinking share over time.

Another reason to be wary of over-emphasis on sectors with high productivity per head is that in many cases this simply reflects high capital intensity. Just because a sector happens to need a lot of capital is not a reason to mark it out for special support. The most capital-intensive sectors in the UK economy – real estate, mining/oil extraction, and utilities – between them employ fewer than a million people. Although their GVA per worker is far higher than the economy as a whole – £340,000, compared to £55,000 – labour compensation is only about a quarter higher. Clearly, if the point is to create higher-paying jobs, there is only so much these sectors can do. Most of the value-add needs to go towards remunerating the capital.

But the most fundamental reason is that even successful innovation does not translate straightforwardly into more jobs and growth, in theory or practice. Figure 14 shows the evolution of selected sub-sectors in the UK economy from 1998 to 2018, with employment on the horizontal axis, productivity on the vertical.

Figure 14 **The evolution of selected sectors in the UK, 1998–2018**



Source: Institute for Government analysis of data in the OECD STAN structural database.

In it can be seen examples of sectors growing jobs, losing jobs, and gaining and losing productivity. It is impossible to tell from these variables which sector has been successful at adopting or creating technology and which has not; in fact, one might argue that all of them have been subject to technological change, but have demonstrated it differently. In one sense, the most successful is employment activities, which saw employment increase by 80%, output per employee by 180%, and GVA therefore by 380%. This includes the activities of jobs agencies, recruitment firms and other companies that help provide human resources. Success here is probably explained by the growth of the outsourcing market, rather than anything particularly technological. Publishing and audiovisual, in contrast, has been utterly revolutionised

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by the arrival of the internet, downloads, streaming and the accompanying new business models. The sector's productivity has grown rapidly – this is a good example of a service sector that has contributed towards higher national productivity growth. But employment has barely changed.

### **... and don't judge the success of technology policy purely through jobs and growth**

This also suggests a second conclusion – that technology policy should not be entirely the servant of the agenda of jobs, growth and productivity. Productivity improvements are often captured by consumers, in terms of lower prices and better services; that they do not generate ever more jobs and monetary sales is a benefit to the rest of economy. This can be seen in the computer manufacturing and telecommunications industry, for example. At other times, the point of the innovation is to solve problems that are not straightforwardly economic. The successful innovations seen in energy in the past decade are a good example (see Box 1). Innovation policy should be supported even when it does not produce the right answer to the question 'will this produce jobs and growth?' The purpose cannot be generalised – it depends on the innovation in question.

Another perfect example of this kind of thinking is seen in recent analysis by the Public Accounts Committee (PAC) of the performance of the Industrial Strategy Challenge Funds (ISCFs). Created five years ago, the ISCFs address challenges stretching from battery development, low-carbon energy grids and vertical farming through innovative methods of building construction, new kinds of magnet, robot technology and the software needed in creative clusters.<sup>1</sup> The PAC criticised UK Research and Innovation (UKRI), the body with higher oversight of the ISCFs, because:

**“[It does] not give an indication of whether the Fund as a whole is making a difference, for example, by creating high quality, high productivity jobs. Difficulties in assessing what the Fund is achieving overall are exacerbated by the number and diversity of the challenges the Fund is currently supporting and the growth in the number of initiatives to which it is looking to contribute.”**

They go on to recommend that “UKRI... should clearly set out, by October 2021, what it expects the Fund to deliver. This should include its impact on jobs and economic impact in the short, medium and long term.”

The PAC report makes valuable points about the operational efficiency of the ISCFs. But the implication that the 24 challenges run by UKRI should be judged through the “impact on jobs and economic impact in the short, medium and long term” is too crude. Technological progress might not register straightforwardly through a direct burst of high-paying jobs, profits and GVA. The effects are diffuse. Consumers benefit from new products and services; other businesses and sectors profit from new productivity-enhancing techniques; profits are made in new industries and eroded in the old; jobs are displaced. Marking down any that do not produce a direct, measurable boost to GDP and jobs would risk losing the benefit of valuable innovations where the benefit shows up in other ways.



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## Service sectors can be productivity drivers – even the low-value ones

Technological change can have profound impacts that do not necessarily register in the 'technology-producing' sector; this is just as well, since if the UK is to hope for continued productivity growth, it will need broad-based improvement in the larger employment sectors. Despite concern that service sectors are often less productive than average, many have proven successful at raising productivity, often while adding employment as well. For example, between 1998 and 2018 administrative and support service activities increased its employment by 80% and productivity per worker by half, as did the professional and business services, which includes legal, architectural, management consulting and other such industries. Others, like arts and recreation and the hotels/restaurants industries, have shown rising employment and stagnating productivity.

Compared to the US and various European countries, the UK's productivity performance across a range of lower-paid sectors is not particularly strong, suggesting significant room for improvement through investment, training, use of technology or adoption of better techniques.<sup>2</sup> As was recently argued by Hetan Shah, of the British Academy, it is important to avoid an outdated notion of innovation as being all about cutting-edge ideas, but also look at how it can help "what are too often dismissed as relatively unglamorous sectors that are stuck in a cycle of low-pay, low-skilled jobs such as retail, hospitality".<sup>3</sup> More in-depth studies such as by Forth and Aznar<sup>4</sup> find the reasons for the UK's lagging performance to be varied – sometimes underinvestment, sometimes labour quality, sometimes use of technology – but the wide range of performance internationally suggests there is room for improvement. There are signs that the Covid pandemic has itself provided the necessary jolt to encourage such sectors to take on more modern techniques, for example in Italy, where faster uptake of digital technology has helped produce a 6% boost in exports.<sup>5</sup> Moreover, the case for optimism is not simply based upon lagging countries catching up with the frontier. There is a convincing argument that non-digital industries (everything where the output is not bits and bytes – from construction and transportation to health care, retail and education) are still far behind their potential everywhere in terms of adoption of digital techniques, and that significant productivity gains are possible if this is to change.<sup>6</sup>

The Covid crisis has been an unwelcome, exogenous shock that governments have struggled to control. But other aspects of the business environment can be influenced in a way that encourages more productivity-enhancing behaviour by companies. For example, Sandbu uses the example of the high-wage Nordic economies to argue for policies like a higher minimum wage, which directly encourages companies to find ways to make more from their labour force. Since 2015, the UK government has been moving in this direction, with a higher national minimum wage and more emphasis on labour protection in precarious employment. This might be a part of their productivity policy too.

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## Helping a sector does not have to mean bargaining with it

For high employment sectors, broad-based interventions like Help to Grow: Management (which is intended to improve tens of thousands of businesses) are more effective than attempts to strike grand bargains, which is what the government's 'sector deal' policy attempts. The sector deals are premised on the idea that a sector can act as a cohesive unit, and reach agreements with the government to collaborate in solving problems, while somehow handling the competition concerns along the way. Where this works, it can be helpful: for example, the manufacture of transport equipment – in effect, the automotive and aerospace industries, which have enjoyed explicit sector support since the post financial crisis relaunch of industrial strategy – is a bright spot in the story of post-2008 growth, at least up to 2018. These strategies have been built upon co-investments where risk is shared between the government and industries. Figure 13 shows how its productivity grew, and employment remained steady (which is good compared to the rest of manufacturing).

This bargaining approach can work well in relatively concentrated, high-investment, R&D-based manufacturing sectors like aerospace, automotive, life sciences and offshore wind, so long as risks to competition are recognised and handled. But it is ill-suited to widely dispersed service industries with high rates of entry and exit. Bargains struck at the 'commanding heights' of the economy run the risk of damaging competitive vigour by favouring incumbents over would-be entrants. A longer discussion of this can be found in an earlier Institute for Government report.<sup>7</sup>

This report is written largely to provide analysis on where policy makers' emphasis should be placed, rather than attempt a guide to how exactly productivity improvements can be encouraged by government policy. But the dispersed, often small-business-dominated nature of the high-employment sectors that we advocate for points towards a policy approach more concerned with the general business environment and the incentives it provides, rather than specific investments, bets, bargains and programmes. The competitive landscape, regulation, access to finance, skill levels, the quality of infrastructure are all part of this environment. However, arguably the key environmental feature affecting business incentives to invest and grow is macroeconomic.

## Weak aggregate demand can damage productivity – the opposite might improve it

Ever since 1976 when the then prime minister, James Callaghan, told the Labour Party conference that a government cannot spend its way out of a recession<sup>8</sup>, British economic thinking has shied away from treating aggregate demand as an enduring factor in the economy's productivity. Extra spending without improvements in 'real' variables like skills, technology and infrastructure will achieve a temporary growth boost at best, later undone by inflation. This underpins the approach taken by central banks attempting to regulate the speed of the economy; whatever sustainable pace they think can be achieved, it is treated as independent of the level of stimulus chosen.<sup>9</sup>

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However, analysis here and others' academic arguments suggest several ways levels of demand matter for productivity. It is not simply a case of the productivity crisis emerging at the same time as the fall in aggregate demand growth. Over the short run, the correlation between demand growth and productivity growth is strong, both between sectors and for the same sectors through time. Apart from manufacturing, in the UK for any sector next year's productivity performance is best explained by the movement in GVA, which is clearly affected by demand. The former Federal Reserve chair and current US Treasury secretary, Janet Yellen, in 2016 discussed several ways in which a 'high-pressure' economy (which combines tight labour market with robust demand) might boost the productive capacity of the economy, by acting as an inducement to investment and innovation, for example.<sup>10</sup> The absence of these pressures during slower-demand periods (such as in the years up to 2018) might symmetrically have damaged these incentives too. In the case of the UK, the shock to global demand growth after 2008 affected some sectors more than others, in particular several that had outgrown the rest of the economy in the years before.

While it may be trite to recommend the government avoid macroeconomic crises, the government needs to be alive to the possibility that inadequate demand growth could have consequences for productivity as well as short-term cyclical effects. This should influence how the government sets a remit for the Bank of England, and decides its own fiscal policy too. In Yellen's words:

**"If strong economic conditions can partially reverse supply-side damage after it has occurred, then policy makers may want to aim at being more accommodative during recoveries than would be called for under the traditional view that supply is largely independent of demand."**

### **Demand matters at a sub-national level too**

At a more sectoral level, the government's Grand Challenges (part of the 2017 Industrial Strategy) were an attempt to shape policy around large, sweeping changes to the economy on the demand side. The basic idea was to focus efforts on market building, innovation, skills and so on in areas where there were predictably large markets ahead, such as in electric transportation, the ageing economy and clean growth. Confidence that there will be demand in an area is a necessary condition for growth but is not on its own sufficient. A good example of beneficial action here is provided by the Electricity Market Reform programme, which created Contracts for Difference that underpin new renewable technologies like offshore wind. It was easy to forecast that climate change would bring increased need for wind power, but there was still an increased need for the government to help in order to bring investment to bear to meet that demand.

Although the government appears to have stepped away from a straight continuation of the 2017 Industrial Strategy, it should keep up this kind of approach, as it helps guide industry towards consistent goals.<sup>11</sup>

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The question of demand is also relevant to regional productivity. As has been observed by Professor Jonathan Portes in an article about 'levelling up', many of the lower-productivity, labour-intensive, non-tradeable services naturally benefit from the economics of agglomeration: in his words: "They thrive because there are lots of people living and working in a densely populated area: restaurants, transport, delivery services and so on."<sup>12</sup> London's restaurateurs are not more productive than Sheffield's because they enjoy direct access to better broadband or infrastructure, say, so much as the higher incomes and denser population found in London. This is a powerful demand-side point. As a result, anything that helps with the agglomeration of better jobs into deprived areas will have a beneficial knock-on effect on to these lower-paid sectors. The government's infrastructure programme is therefore a key policy in this regard, particularly in light of the shifts in work patterns that follow the Covid-19 pandemic. Even improvement in local services and amenities, if it encourages well-paid graduates to remain in the areas they grew up, might in this way influence productivity outside of the greater South-East.

Demand spillovers help to justify the policy of supporting high-productivity clusters as part of the 'levelling up' agenda, as described in a recent Centre for Cities report by David Sainsbury, 'Levelling up the UK's regional economies: increasing the UK's rate of economic growth'.<sup>13</sup> For the challenge of boosting the more lagging regions, such cluster creation and support could greatly bolster the agglomeration effects referred to above. Mobile, investment-dependent and often technology-rich industries can help to drag up the incomes of entire regions, as has been documented by economic geographers such as Enrico Moretti.<sup>14</sup> These then lead to more demand for the other, non-tradeable services. However, this effect will vary depending on the nature of the industry in question: some of the high-investment industries required for net zero might produce less demand through wages than the tech-clusters documented by Moretti. Moreover, the lesson of this report is that, given the fuzzy boundaries between sectors, and their interdependencies, cluster support should not be too narrowly aimed at the high-tech sector itself. The surrounding area, with all its various services, is important for attracting skilled people, for example.

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# Conclusion

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The UK productivity crisis is a £300bn problem. That is a reasonable estimate of the gulf in 2018 economic production caused by faltering growth in productivity per employee, compared to the trend before 2008. Close analysis of how this gap emerged provides a number of lessons. The hardest of these is that there is not a single culprit to blame for a gap this size.

We have specifically examined the popular idea that a shift into low-value sectors and out of high-value ones is responsible for the average UK worker being less productive than before. This idea does not stack up – neither the shifts nor the productivity gaps were large enough to account for more than a fraction of the loss. We have also looked at whether failings in a few select industries are to be blamed. Here, the evidence is a little stronger, though again not conclusive. Financial services, high-value professional services and information technology all failed to maintain their heady pace from before 2008, which contributes to a significant portion of the decline in growth after. But the slowdown was also widespread across other sectors. In any case, it is implausible to blame a failure of sector-specific policy so much as the widespread slowdown in aggregate demand growth that hit these fast-growing sectors after the financial crisis.

And it is a stretch to pin the blame for the UK's growth and productivity slowdown on a failure to make the most of manufacturing. UK manufacturing has certainly been a disappointment, particularly when set against its glorious heritage; it has contributed almost nothing to economic growth for more than two decades. But while manufacturing jobs are more productive than the average, their advantage is not so high that a shift back towards 'making things' could have raised overall UK performance by more than a small amount.

The lack of a single explanation for the slowdown suggests that policy makers should not expect any silver bullet to solve it. They should resist the temptation to put all their emphasis on the cutting-edge industries of the future, the companies promising breakthroughs and scientific advance. There may be good economic and other reasons to bring special attention to technological challenges, but technological intervention can play only a small part in addressing the productivity gap. At least as important will be steps to lift the performance of less productive service industries, such as retail, administration, hospitality and transport. Innovation is just as relevant to these sectors as any other – consider the transformation wrought throughout the pandemic to how offices and the retail economy work.

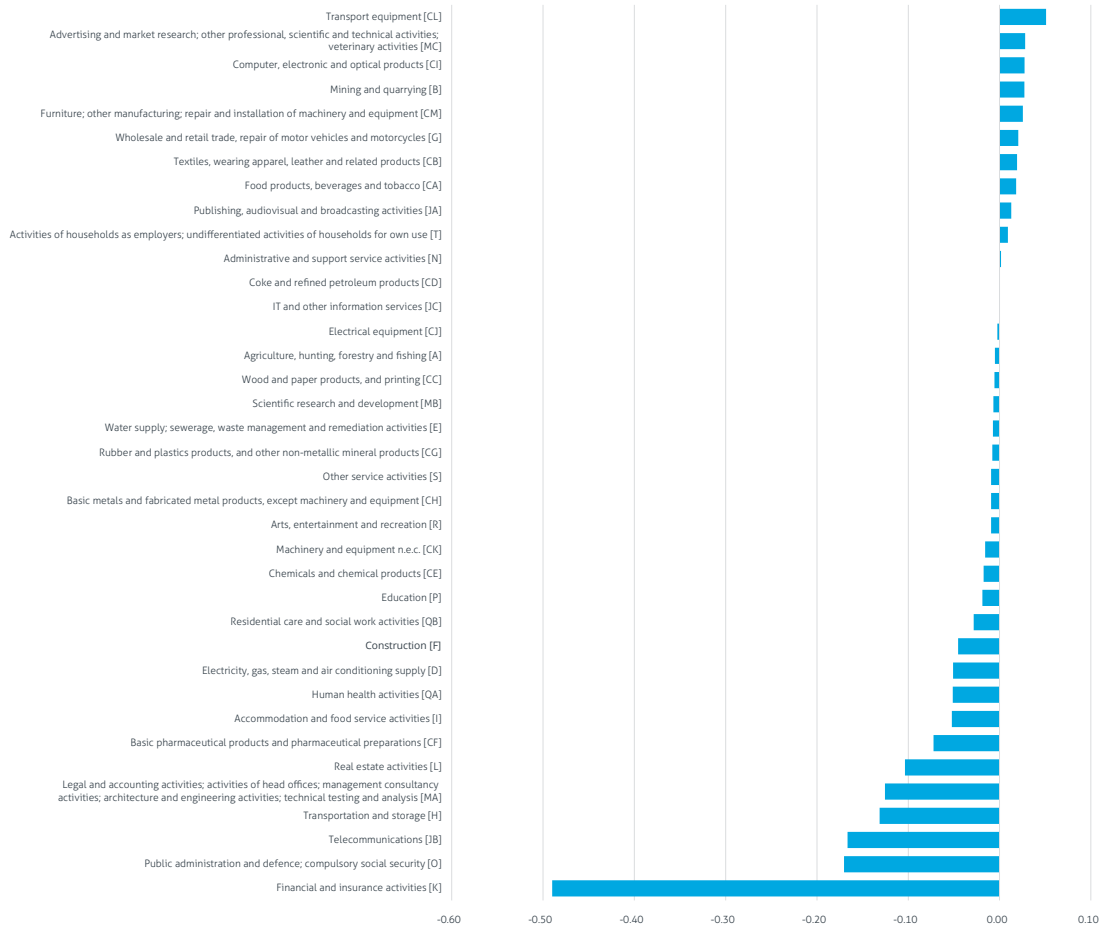
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But the policies the government needs to contemplate are not a handful of inspired technological bets, nor a few grand bargains with key anointed sectors, but a broad focus on the policy environment. Productivity gains need to find their way into companies throughout the economy, diffused through market forces and motivated management seeking better ways to service growing demand. The most important element of such a pro-growth environment might well be the last named. It is a long time since the UK economy could really be said to have been 'running hot' – that is, trying to service demand running well ahead of supply. It is also a long time since productivity gains have exceeded expectations.

The productivity crisis hit the UK across a broad front. It will not be fixed with narrow, targeted policies.

# Annex

Figure 15 **Estimate for lower-level sectors' contributions to the shortfall in growth, 2008–18 compared to 1998–2008, GDP points per annum**



Source: Institute for Government analysis of data in the OECD STAN structural database.

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