

Ultrafast full fibre broadband: a platform for growth

Covid-19 update

April 2021

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Foreword



C. Selley

Clive Selley
CEO Openreach

Digital connectivity has been never been more important. If you don't believe that, just look back at the last year.

The broadband network which we built over the last decade enabled millions of people to switch to home working overnight. It's kept children in touch with schools, kept businesses trading and kept all of us connected with friends and family, when we couldn't meet in-person.

Yet despite that digital resilience, the pandemic has also made the case even stronger for a further upgrade to the UK's broadband infrastructure.

Unlocking economic and social benefits. Supporting new models of healthcare and public service delivery. These are goals which we all share, and fully fibring the nation is the way to reach them.

With the right framework to incentivise investment and rapid deployment, we can achieve it.

For our part, no company is more ambitious than Openreach when it comes to building broadband. We're already delivering a £12 billion investment to upgrade 20 million homes. And at least 3.2 million of those will be in the hardest to reach parts of the UK.

The build is being delivered by our army of skilled engineers and we've created more than 5,000 new jobs this year alone to help get the job done. Meanwhile our investment in regional training centres is helping us give thousands of people the skills to keep accelerating the build without compromising on quality.

Cebr's previous research explained the economic windfall in store for the UK with a nationwide upgrade – including a £59 billion boost to productivity. And this updated report highlights how full fibre can help to level-up the UK, bringing up to one million people back into the workforce.

With the challenges we face as a country, this an opportunity we can't afford to ignore.

On top of the positive economics, full fibre is also massively green. It will help us build back better and support the net zero agenda by enabling more home working and slashing emissions from commuting. And at Openreach, we'll combine that with reducing our own carbon footprint, by switching our vans – the second largest commercial fleet in the UK – to electric vehicles.

So, it's time to crack on with the job, especially in the areas where commercial investments won't be possible. DCMS has outlined its strategy for delivering £5 billion in support for rural upgrades and we're keen to play a big role in supporting that. We believe that a framework which incentivises large, rapid and high-quality build programmes offers the best path forwards, so it's vital that the Government's plan unlocks investment from operators of all sizes.

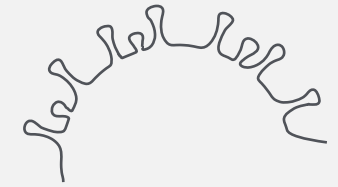
There's more Government can do to help deliver the benefits in this report sooner. In particular, many network builders have highlighted the importance of exempting new full fibre deployment from the business rates system – removing a significant disincentive to investment. And while progress has been made on reducing barriers to rapid deployment, there's more to do – including helping builders gain access to blocks of flats and social housing.

This report demonstrates the size of the prize for the UK if we can work together to deliver this critical infrastructure project. With the right framework for delivery, full fibre can help us move beyond the challenges of Covid, level up the country and super-charge the green revolution.



The pandemic has changed the way we live and work

Full fibre broadband will enable and support these changes



£59bn

boost to UK productivity by 2025
powered by nationwide rollout of full fibre



700k



tonnes of carbon saved from
reduced commuting



500k

people could move
to rural areas



People free to live and
work where they choose,
helping to level up the UK

nearly **2m** more people working
from home



1m back in to the workforce

FTTP could bring one million people back into
the workforce through remote working

£25bn

boost to productivity
from these new workers

Key findings

Covid-19

Covid-19 has brought immense health and economic costs. It has also, however, forced a rethink of working practices as a result of enforced home working for many workers. A culture of remote and increasingly flexible working is becoming more established, and this could have two major types of direct impact, that will have significant ramifications for the economy and wider society. **Cebr have updated our conclusions** based on evidence around expected future levels of home working. Our spatial model now suggests that the cultural change brought about by Covid-19, together with the technological impact of nationwide full fibre rollout, could result in:

Home working

Nearly **2,000,000** more people working mainly at home relative to 2019, **850,000** more than the impact of full fibre rollout alone as estimated in our previous study.



Spatial impacts

Changes in where people live and work – more workers may choose to mainly work at home and in some cases live further from their place of employment, trading a shorter daily commute for a longer, occasional one from a location which offers an improved quality of life. This would bring benefits including reduced housing and transport pressures in major cities, increased economic opportunity in more remote areas, and reduced CO₂ emissions due to fewer commuting trips.

500,000 people could move out of high density areas.

140,000 workers moving out of London, and a further **180,000** out of urban areas in the North and Midlands (compared to **75,000** and **95,000** for full fibre rollout alone).

80,000 workers moving into the rural North and over **50,000** to Wales (compared to approximately **45,000** and **25,000** in previous research).

Changes in composition and size of the workforce

Groups previously unable to fully participate in employment, including working-age carers, parents of dependent children, and older people may be enabled to enter work. This will provide social and economic benefits, including reduced poverty and inequality, improved mental health, and a lower welfare bill and increased tax revenue. This will be especially important in mitigating some of the economic and social challenges caused by the pandemic.

Nearly **1,000,000** more people could enter the **workforce by 2025** (compared to around 500,000 in the previous research): this includes over 300,000 working-age carers, nearly 250,000 older workers, and 400,000 parents of dependent children.

This increase in participation would have a **GVA impact of £25 billion** (approximately doubling the previously estimated impact of £13 billion) – **increasing GVA in 2025 by just over 1.3%**, from a baseline forecast of £1,862 billion to £1,886 billion.

1.0

Introduction

1.0 Introduction

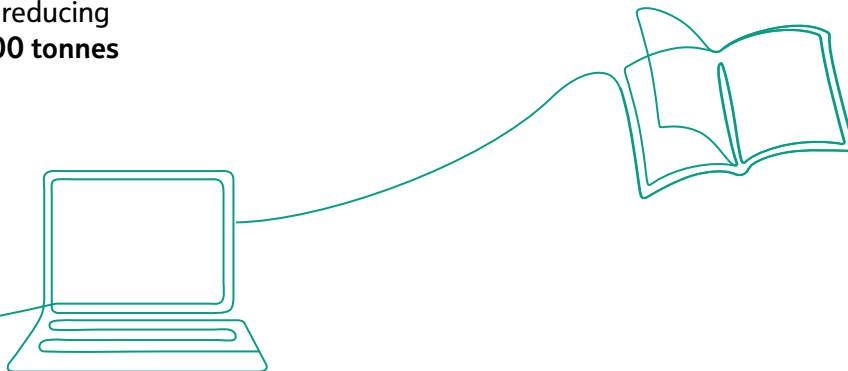
1.1 Ultrafast full fibre broadband: a platform for growth

In 2019, Openreach commissioned Cebr to assess the impacts of a nationwide full fibre rollout. The findings, published in *Full fibre broadband: A platform for growth* in October 2019, showed that a nationwide full fibre deployment could:¹

- **Boost productivity**, increasing UK GVA by £59 billion by 2025;
- **Enable over 1,000,000 more people to work from home** once rollout was completed;²
- **Change workers' residential decisions**, with our model suggesting 270,000 people could be supported to move from urban to more rural areas;
- **Attract over 500,000 new parents, carers and over-65s to join or remain in the workforce**;
- **Remove 300 million commuter trips**, reducing CO₂ emissions by an estimated **360,000 tonnes** each year.

This work took place in a pre-Covid economic context. A gradual move towards home working was underway, supported by the UK's improving digital infrastructure and slowly changing individual and corporate attitudes towards remote working.

Alongside widespread health and economic impacts, the pandemic appears likely to have accelerated this shift – this report sets out the results of new analysis that incorporates this phenomenon.



Purpose and structure of this report

This report sets out updated spatial and workforce impacts analysis to account for the post-Covid context – showing how full fibre broadband may underpin even more significant changes.

The spatial impacts analysis and workforce impacts analysis sections each include:

- ✓ **Context and assumptions** for the analysis – available evidence on the changes that might result from a greater culture of remote and flexible working and the assumptions made on the basis of this evidence;
- ✓ **Results** of the analysis;
- ✓ **Conclusions** including the broad social and economic impacts that could result from these changes, and how they may interact with wider government policy.



1.2 The new economic context

Covid-19 forced an enormous experiment in home working, starting in mid-March 2020,³ which has proven to be more successful than initially expected – both in terms of how individuals and organisations have adapted and how the UK’s digital infrastructure has coped with massively increased demand.

At the start of the first lockdown, there was widespread speculation that the broadband network may not have coped with increased demand, despite the public reassurances of many experts in the telecoms sector. Fortunately, for the most part, the UK’s digital networks held up well for the vast majority of people – underpinning this massive and sudden shift in public behaviour.

The poor experiences of the few people with very poor internet connections have, however, demonstrated the importance of continued improvements to digital infrastructure.⁴ It is of course important to note that there are a number of reasons why people may be offline, or have low speed connections – evidenced by the fact that the take up of superfast broadband remains relatively low in comparison to what is now near-universal availability (96%) of superfast services.⁵

The ongoing vaccination programme offers hope that ongoing restrictions will be relaxed, but it is likely that home working will nevertheless become much more prevalent in future. A number of larger firms have made public statements suggesting that they are unlikely to require their workers to return to the office in the near future, and there is survey evidence to support this, including for example those showing that:

- **74% of firms plan on maintaining an increase in home working;**⁶
- **Managers and employees feel that home working has boosted productivity;**⁷
- **50% of employees working at home during the pandemic expect to do so more in future; just 11% expect to work from home less.**⁸

Analysis by McKinsey suggested that across different advanced economies, **39% of working time is spent on activities which could in theory be done remotely, with wide variance across different sectors.**⁹

The evidence on future levels of home working is revisited and discussed in more detail later in this report.



In terms of the research conducted in 2019, this new material suggests that the cost of digital commuting (which limits the extent of home working in our spatial model) is lower than employers and employees perceived it to be prior to Covid-19. This could be because:

- benefits such as **time and money savings** from not commuting to work and some degree of flexibility in working patterns have been realised;
- expected costs such as lower productivity or a lack of cohesion appear to have been smaller than anticipated, particularly as **digital infrastructure and technologies like video conferencing allow for quality, real-time communication** – even if face-to-face interaction remains preferable for some activities;
- **co-ordination problems have been solved** by the forced nature of the ‘experiment’ – for instance employees don’t have to worry that choosing to work from home may make them look unmotivated compared to colleagues who attend the office every day. Employees at all levels of different organisations have also simply been forced into ‘making it work’ in the absence of any alternatives.

The number of employees affected by this shift in attitudes and the extent of the change in working habits will depend on decisions made by large and small employers and their employees, the success of continued improvements in the UK’s digital infrastructure in providing fast, reliable connections to more households, and wider government policy in areas like transport and housing.

There will also be associated spatial impacts in terms of where people can live and work as a result. As people travel to physical places of work less often, they will be more open to living further from them.

This could both ease the ‘overheating’ problems faced by London and other big cities and provide an influx of relatively high-earning workers into rural and coastal areas, supporting economic growth in left-behind communities and regions. In essence, it will allow cities to grow ‘virtually’ and in a way that is faster, because there are fewer constraints, and which will spread economic opportunity more widely.

The impact is not limited to those currently in the workforce: as remote and flexible working become more established in company cultures, this will create new opportunities for people previously less likely to be able to work, such as carers, older workers, and those with dependent children. This will reduce the problems associated with economic inactivity – often poverty related – and help to mitigate the economic impacts of an ageing population.

The heightened importance of digital infrastructure

During lockdown, digital connectivity became more important than ever. Although the economic and social consequences have been severe, digital alternatives have allowed many aspects of life to safely carry on to an extent: work has been conducted from home; online classes allowed schooling to continue; takeaways and groceries ordered online have replaced meals out and trips to the supermarket; families, friends, and religious congregations unable to meet in person have instead gathered online; leisure time has increasingly been spent gaming and watching videos online. Increasing numbers of interactions with the public sector, including higher numbers of GP appointments now also take place online, highlighting future opportunities for public sector reform.

The findings of Ofcom's latest annual *Online Nation* report included that:¹⁰

- On average, **UK adults spent over four hours per day online in April 2020**, up from just under three and a half in September 2019;
- Between February and May 2020, **the number of online adult consumers used video calling at least weekly doubled from 35% to 71%**;
- **Zoom's UK user base grew from 659,000 in February 2020 to 13 million in April 2020**. Microsoft Teams saw a less dramatic but still significant increase, from three million to 6.5 million, while the Houseparty app went from 175,000 to four million users.

As severe as the consequences of the pandemic and lockdown have been, they would have been much worse with the digital infrastructure of twenty or even ten years ago. Home workers would have been less productive, more workers would have been furloughed, more businesses would have closed, education may have ground to a halt altogether, and more people would have been completely isolated from their loved ones. The choices faced by the government would have been even more difficult – for instance, the prospect of intolerable social and economic costs may have led to less stringent lockdown measures, resulting in even more suffering and lives lost, or an even bigger social and economic hit would have been needed to save lives.

Openreach recently found that internet traffic had doubled over the course of 2020, driven by increased home data use during the pandemic.¹³

The importance of providing fast, reliable Internet for all parts of the UK is therefore clearer than ever – and although coverage has been improving rapidly, there is still work to do. By the end of 2020:¹¹

- Over 97% of UK homes could access superfast broadband (speeds of at least 30 Mbit/s);
- 18% (over 5 million homes) could access full fibre broadband offering speeds up to at least 1 Gbit/s).

Openreach has recently set out their plans to reach 20 million homes by the mid to late 2020s with its full fibre network, of which 3.2 million will be in harder to reach locations.¹² The Government had set out a manifesto commitment to reach nationwide gigabit capable networks by 2025, and had committed £5 billion in public subsidy to support deployment in the final 20% of the UK which otherwise will not see commercial investment. This ambition has recently been reduced to aiming for 85% coverage by 2025, with the aspiration to go further. The Government has however said that nationwide coverage remains the longer-term ambition, so this paper assumes nationwide coverage will eventually be delivered, even if at a slower pace than had been promised.

2.0

Spatial impacts analysis

2.0 Spatial impacts analysis

2.1 Context and assumptions

Changing attitudes to work and home

The most recent ONS figures show that 34.1% of the UK workforce are working remotely instead of at their normal place of work. This is lower than the level seen at the height of the first lockdown (but higher than levels seen during the lifting of restrictions in the second half of 2020).¹⁴ While a further return to the workplace is likely, it is to be expected that some of this increased home working will be retained in the long run. Evidence from the property market and elsewhere suggests that expectations of greater home working are being reflected in buyer and organisational behaviour:

A report from Zoopla showed that as buyers returned to the housing market after the first lockdown, the pattern of demand had changed: *“Four- and five-bed houses are selling 33% faster than in 2019, as buyers prioritise more space and widen their search criteria – migrating away from the more expensive cities, suburbs and commuter belts while enabling their budgets to stretch further. Meanwhile, flats are taking the longest time to sell.”* This suggests that buyers are less concerned about proximity to employment centres and are instead seeking properties in attractive rural locations with more space to work from home.¹⁵

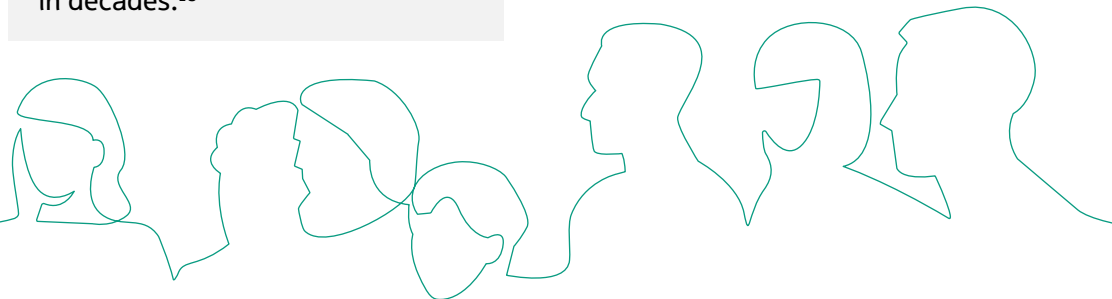
A survey conducted in late April 2020 by Savills found further evidence of shifting priorities among prospective home buyers, e.g.¹⁶

- 39% of under 50s now want a bigger home than previously;
- 40% of respondents are more likely to choose a village location, and one in six are ready for a longer commute;
- 71% of younger buyers seek more outdoor space and rural locations (meanwhile, older homeowners are more committed to downsizing).

Hamptons also recently found that Covid restrictions have led to a ‘huge London exodus’, which has already had significant impacts on **property prices in satellite towns** around the capital.¹⁷

A recent study by PwC estimated that **300,000 London residents could choose to leave** owing to greater home working opportunities, representing the first decline in London’s population in decades.¹⁸

A KPMG survey found that **77% of global CEOs will continue to build on their use of digital communication and collaboration tools** – which are particularly relevant when employees are working remotely – and **69% will be downsizing office space** (though it is not clear how drastically).¹⁹



This shows that the pandemic is shaping people's long-term decision-making in relation to their residential location choices and suggests that either the experience of the pandemic itself has brought about changes in their preferences or that they perceive the costs of more remote working to have decreased – or both.

'Cost' here is not simply direct financial cost, but also includes non-monetary factors that might deter people from working at home including, for example, cultural factors, a lack of means for replicating the benefits of physical proximity to colleagues, shared equipment etc., or boredom/loneliness associated with home working.



The potential level of home working

The ONS found: *“The extent to which an employee can work from home depends on whether a **specific physical environment, tools, or proximity to other people** are required for the role. The **technological capability** of employers and employees also needs to be high enough to enable efficient home working. If technology can be accessed and used from home, it partially reflects the **ability of a business** to switch to remote working arrangements.”*²⁰

This captures the constraints on and opportunities for home working. Some jobs require a person to be physically present for the operation of machinery or face-to-face contact – this applies to many jobs in manufacturing, agriculture, childcare, healthcare, hospitality, and so on. They cannot be done remotely. Jobs which are largely or wholly computer-based, and where digital communication or collaboration can substitute for face-to-face contact, can in principle be done remotely – these include many professional, technical, and administrative jobs. There are, however, technological and cultural constraints to the realisation of home working opportunities. The former relate to digital skills and infrastructure. The latter relate to the willingness of organisations and their employees to adapt to new arrangements.

The fact that some jobs require a physical presence puts a ‘ceiling’ on the possible level of home working, although this level may change over time as the structure of the economy evolves. There is clearly a gap between actual and potential levels however, which can be closed by technological and cultural changes. The forced experiment in home working resulting from Covid-19 has broken down some of the cultural barriers and may help to establish a ‘new normal’ level which accelerates previous trends.

Figure 1 shows results on the extent of home working by industrial sector prior to Covid-19. The surveyed employees were asked to report whether or not:

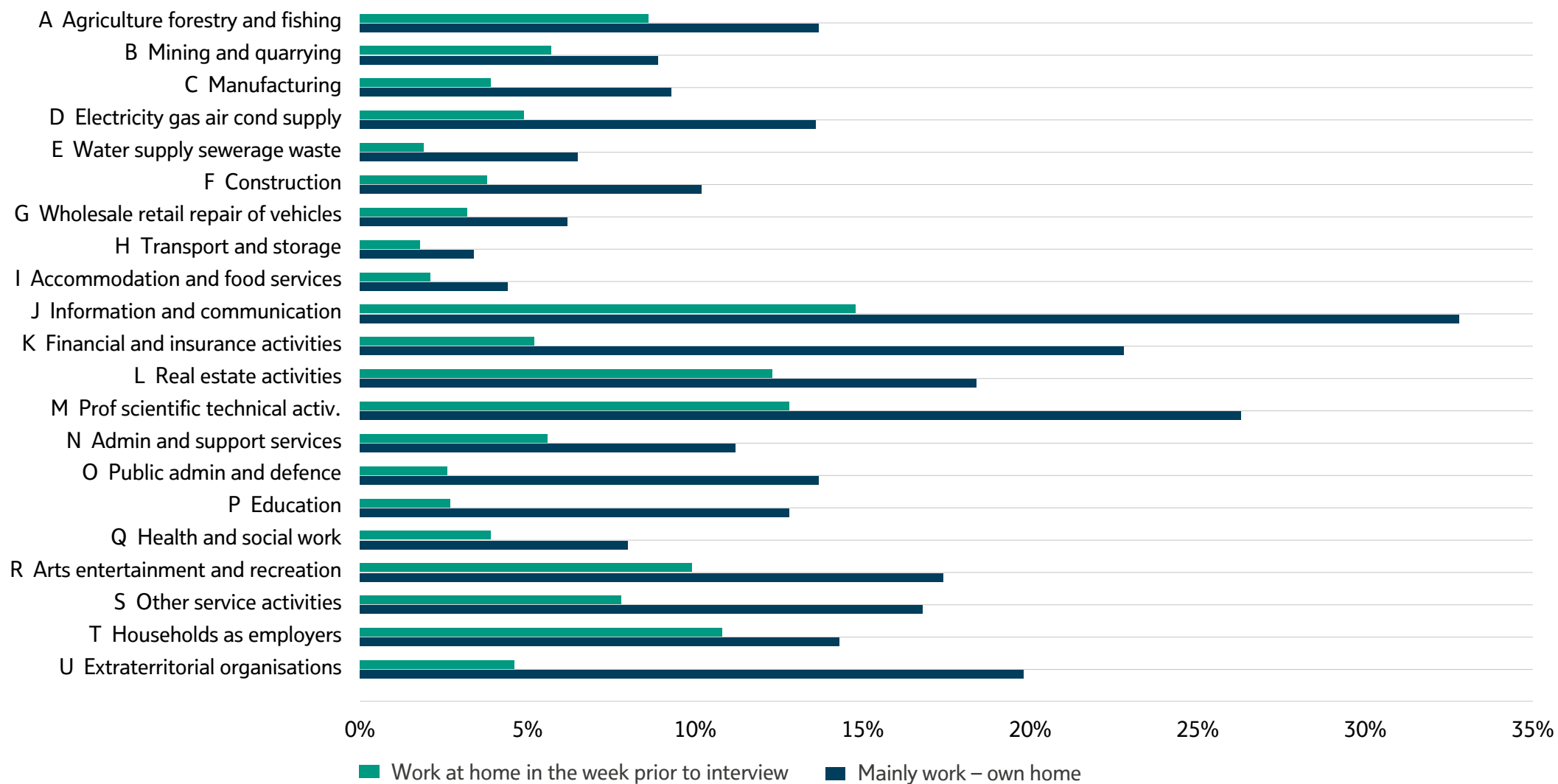
- they mainly worked at their own home;
- they had worked at home in the week prior to the survey interview;
- they ever worked at home (not shown on Figure 1).

We treat ‘Mainly work – own home’ as the current level of home working. ‘Work at home in the week prior to interview’ is treated as the potential level of home working following Covid-19.

This may miss out some people who could work from home but rarely do so (either due to personal preference or corporate culture), but it probably represents a realistic maximum.

The ‘Ever work at home’ measure could be used instead but is likely to be too high – for instance it may include those in jobs like teaching, construction, or manufacturing who complete administrative tasks at home from time to time but whose core tasks require physical presence at a place of work.

Figure 1: Extent of home working in the UK by industrial sector, January to December 2019



During the first lockdown, the level of home working may have exceeded this level. In some cases, home working was the only option (and better than not working at all), but a return to the workplace would have been clearly preferable where possible. An obvious example is in primary and secondary education – some teaching could continue online but returning students to the classroom was a priority once restrictions were first lifted. For these people, working mainly at home is not sustainable, so they should not be included in a long-term estimate of the maximum potential home working rate.

Weighting these figures by the most recent Business Register and Employment Survey (BRES) data on employment by industrial sector,²¹ we have estimated the overall percentages of workers in these categories during 2019. These are shown in Table 1.

Table 1: Estimated rates of home working – whole economy (2019)

Category	% of all workers
Mainly work – own home	5.2%
Work at home in the week prior to interview	12.2%

At this point it is important to be clear about a further distinction in how rates of home working are

measured. The spatial model uses and is calibrated with Census 2001 and 2011 data. This data was used because it records each individual’s place of residence, place of work, and home working pattern.

The question asked in the Census is whether or not a person works mainly at *or from* home. This distinction is significant as it means the Census ‘home working’ measure picks up those who are based at home but do not conduct their work there – for example maintenance staff who live on site or tradespeople who travel to jobs from their home.

These people are not affected by improved opportunities to work from home due to full fibre but are included in the overall Census figure. Our spatial model is based on the Census measure of working at or from home, and *changes to it* (rather than new absolute levels) are applied based on our analysis of the ONS data.

Changes to the rate of home working are based on a closing of the gap between *actual* and *potential* rates – in effect measuring how many more people who could work at home, but previously didn’t, would do so in the future.

As shown in Table 1, 5.2% of workers mainly worked in their own home prior to Covid-19. This was the actual rate of home working in 2019. We take 12.2%, ‘Work at home in the week prior to

interview’, as the potential rate of longer-term home working. The 7.0% difference between the two figures is the percentage of all workers who currently could work mainly at home but do not.

With the potential increase in home working established, it is important to realistically assess how much of this gap might in fact be closed.

Technological and cultural barriers will remain which will limit the number of people who choose to work from home in future. Individual organisations or employees may continue to have a preference for returning to the workplace, or may currently lack the IT infrastructure for extended home working.



CBRE, the real estate services company, carried out a survey of its clients' employees.²² Findings included:

The percentages of both employees and company leaders who feel that home working has increased productivity significantly exceed the percentages who feel it has reduced productivity.

After the Covid-19 crisis is over, only 16% of employees would like to fully or mostly (3+ days a week) work at the office. The rest are split evenly between those who would like to work fully remotely, mostly remotely, or to do an equal mix of both.

Whilst their whole team working remotely all of the time would be unacceptable to 31% of managers, the whole team working partly remotely is only unacceptable to 9%, and is now more preferred by them than the team working in the office all the time.

Resolution Foundation

A **Resolution Foundation** survey conducted by YouGov asked those working from home during the pandemic whether they expect to do so more or less once it is over. 50% expected to do so more, and only **11%** less.²⁴

The Understanding Society: Covid-19 Study includes survey evidence on attitudes towards home working, and strongly suggests a sustained increase is likely:²³

88.2% of employees who worked at home during the lockdown would like to continue doing so in some capacity once the crisis has passed.

47.3% would like to do so often or always – this figure is **50.0%** among employees with little or no prior experience of home working, suggesting that being forced to work at home did not put them off.

KPMG

A report and survey by **KPMG** and the Financial Services Skills Commission found that **78%** of financial services workers were able to effectively work remotely during lockdown, and **26%** want to do so full time once it has passed (with many others wanting to some of the time). **13%** want to relocate (home or office) following the pandemic.²⁵

Taken together, this evidence shows that the forced experiment brought about by Covid-19 has generated a substantial and widespread increase in the UK's appetite for home working. A clear majority would like to work from home more (nearly **90%**, according to *Understanding Society: Covid-19*), and a substantial proportion of them would like to do so most or even all of the time. Crucially, there appears to be support for this from company decision-makers (based on figures from CBRE's survey of managers).

There remains, however, some uncertainty as to just how large this shift will be. We base our spatial analysis on the Resolution Foundation's survey for a few reasons:

- It is UK-specific rather than international, so is best-placed to account for the particular technological, economic, social, and cultural context relevant to this research;
- Figures focus on all UK workers who were working from home, rather than just one sector, and are weighted by YouGov to be representative of UK adults by age, gender, and region;
- Survey participants were asked whether or not they *expect* to work from home more in future, rather than whether or not they *want* to – this distinction is helpful as not all companies will necessarily allow increases in home working once the pandemic is over.

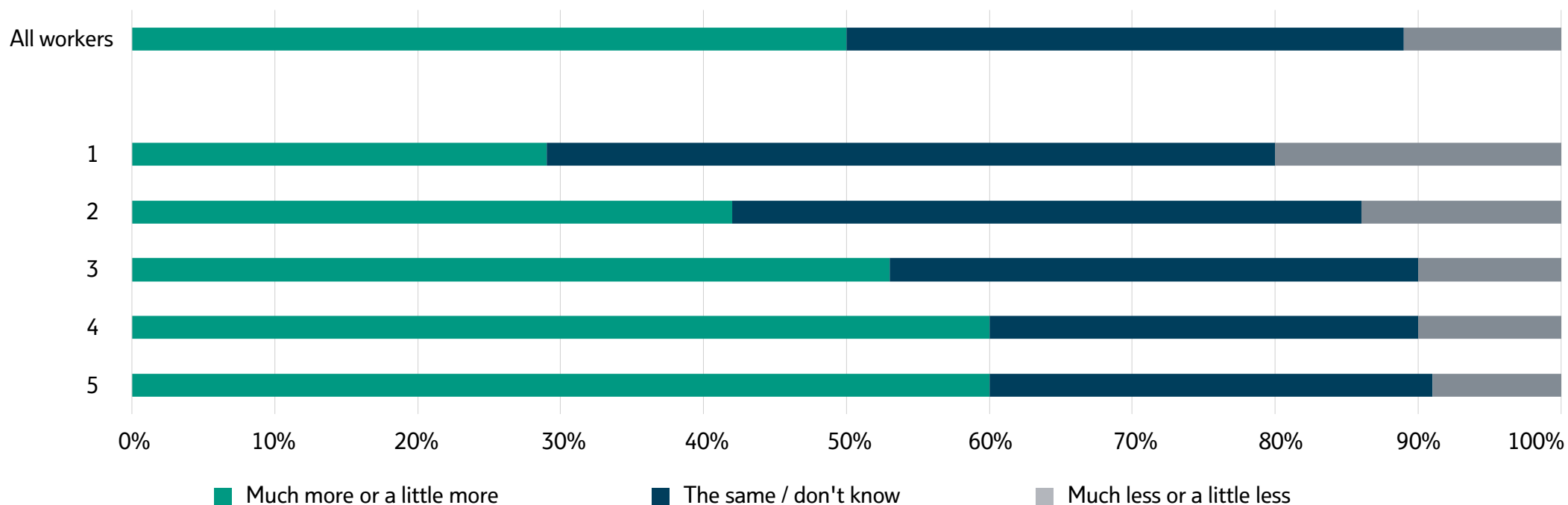


On the basis of the Resolution Foundation survey, we net out the 50% who expect to work from home more and the 11% who expect to work from home less, and assume that 39% of those who can work from home but previously did not will do so in future. Therefore, **the cultural change brought about by Covid-19 closes 39% of the 7.0% gap between actual and potential home working.** This suggests that in the long term 2.7% of the workforce will mainly work from home rather than mainly working in the office.

Covid-19 closes
39% of the **7%**
gap between **actual**
and **potential** home
working

Figure 2 shows headline numbers from the question about working from home in the Resolution Foundation survey. They are also broken down by income quintile and it is interesting to note that expectations of home working are markedly higher among the middle and upper quintiles (3-5). This suggests that the workers moving around in response to greater home working opportunities will disproportionately be high earners.

Figure 2:
Proportion of workers currently working from home who expect to work from home more, less following the Covid-19 pandemic than they did before, all workers and by income quintile



This tallies with pre-Covid ONS figures which show that those in managerial, professional, and technical occupations are by far the most likely to work from home,²⁶ and findings from the *Understanding Society: Covid-19 study* that the greatest increases in home working were among those in a similar selection of occupations.

These people tend to be relatively high earners. The impact of their spending on the economies of places they move to will therefore be large. Our previous research suggests that rural and coastal areas – many of which suffer from a lack of economic opportunity – will see the biggest influxes of new residents, so the economic benefits this could yield are significant (although this relocation could cause social challenges in some communities).

2.2 Results

In the spatial model used for the 2019 report *Full fibre broadband: A platform for growth*, we looked at how workers make decisions about where to live, where to work, and whether to mainly work from home or mainly commute to their place of work.

The spatial model was calibrated to 2011 Census data and estimated a ‘digital cost of commuting’ (DCC) based on it. Workers compare the costs (both monetary and non-monetary) of digital commuting with the costs of physically commuting when deciding whether to mainly work from home or mainly work from their employer’s site.

These decisions interact with residential and workplace choices – for example employees are unlikely to choose to live a long way from work unless mainly working from home is a viable option (otherwise they would incur very high physical commuting costs).

Changes to the DCC relative to the calibrated value are used to simulate changes in the cultural and technological costs of home working. These produce new results in terms of the proportion of people who choose to work from home and their residential and workplace location decisions.

Scenarios in this and previous work are based on different reductions in the DCC relative to the model as calibrated to the 2011 Census. and are summarised in Table 2: New scenarios, associated changes in DCC and work from home rates with the corresponding changes to digital commuting cost and the resulting percentages of people working at *or from* home according to the Census measure.²⁷

The scenarios examined include:

- **2019 baseline:** updating the calibrated model to reflect the 1.3% increase in home working between 2011 and 2019 shown by the Quarterly Labour Force Survey;
- **Continued trend:** reflecting a limited impact from full fibre rollout on top of the 2019 baseline;²⁸
- **Accelerated trend:** reflecting a more significant impact from full fibre rollout;
- **39% of gap closed:** an additional 2.7% of workers mainly working from home relative to the 2019 baseline, reflecting the assumptions based on the ONS *Technology intensity and homeworking in the UK* and the Resolution Foundation survey. The impacts of this combined with continued or accelerated trend scenarios are also shown;²⁹
- **100% of gap closed:** for illustrative purposes, figures are included to represent a scenario in which everyone who we class as a potential home worker based on *Technology intensity and homeworking in the UK* was willing and able to work at home. The impacts of this combined with continued or accelerated trend scenarios are also shown.

Some of these scenarios (e.g. 39% of gap closed + accelerated trend) result in a higher rate of home working than closing 100% of the gap. This seems counterintuitive, however the potential home working level identified based on *Technology intensity and homeworking in the UK* is both reasonably conservative and based on pre-Covid home working habits. Therefore, it is possible that with the combined impacts of Covid-19 and full fibre rollout it will be exceeded (as indeed it has been during lockdown).

Table 2: New scenarios, associated changes in DCC and work from home rates

Scenario	Change in DCC	Model WFH rate
Calibrated model (2011 Census)	None	10.7%
2019 baseline	-£1.45	11.9%
Continued trend	-£3.99	14.5%
Accelerated trend	-£5.50	16.2%
39% of gap closed	-£4.11	14.6%
39% of gap closed + continued trend	-£6.65	17.7%
39% of gap closed + accelerated trend	-£8.16	19.7%
100% of gap closed	-£7.53	18.8%
100% of gap closed + continued trend	-£10.07	22.6%
100% of gap closed + accelerated trend	-£11.58	25.0%

On these assumptions, the impact of Covid-19 and resulting change in attitudes towards home working (39% of gap closed) has a slightly larger impact than the continued trend scenario from our 2019 work. Combining this with a further transformative impact (accelerated trend) from full fibre rollout produces a home working rate of 19.7%.

This is 3.5% more than the highest rate estimated from the accelerated trend alone in our previous report. The 100% of gap closed scenarios produce even more dramatic results but are largely illustrative.

Our detailed exploration of these results below focuses on a 39% closing of the gap plus the ‘accelerated trend’. This represents our core scenario for the combined impact of Covid-19 and full fibre rollout.

Comparisons with the 2019 baseline and the accelerated trend alone (i.e. the headline results from the 2019 report) are also included. Results for a 100% closing of the gap plus accelerated trend are also included afterwards to give an upper bound.

Results for home working and residential decisions for the core scenario are shown in Table 3. These results show that, if Covid-19 has closed 39% of the gap between actual and potential home working and nationwide full fibre rollout goes ahead, then:

Nearly 2,000,000 more people will work mainly from home than is the case today. Relative to the headline results from our 2019 report, which showed a change of 1,050,000,³⁰ this is an increase of more than 850,000.

140,000 workers will move out of London, and a further 180,000 will move out of urban areas in the North and Midlands – this nearly doubles the impacts from full fibre rollout alone predicted in the 2019 report.

80,000 workers will move into the rural North and over 50,000 to Wales. This also represents a near-twofold increase on the figures in the pre-Covid work.

Table 3: Spatial model results – 2019 baseline, accelerated trend, 39% closing of gap between actual and potential working from home plus accelerated trend (English regions and Wales)

		2019 baseline	Accelerated trend (2019 headline results)		39% closing of gap plus accelerated trend (Core scenario)		
			Results	Vs. baseline	Results	Vs. baseline	Vs. 2019 results
Mainly working from...	Home	2,901,285	3,958,736	1,057,451	4,813,153	1,911,868	854,417
	Employer site	21,501,794	20,444,343	-1,057,451	19,589,926	-1,911,868	-854,417
% mainly working from home		11.9%	16.2%	4.3%	19.7%	7.8%	3.5%
Resident workers	North East metro	560,779	541,832	-18,947	526,777	-34,002	-15,055
	North East non-metro	462,961	478,757	15,796	491,977	29,016	13,219
	North West metro	1,650,000	1,608,733	-41,267	1,575,684	-74,316	-33,049
	North West non-metro	1,198,350	1,217,022	18,672	1,232,385	34,035	15,363
	Yorkshire & Humber metro	1,397,569	1,399,970	2,401	1,400,995	3,427	1,026
	Yorkshire & Humber non-metro	725,369	734,699	9,330	742,571	17,202	7,872
	East Midlands	1,947,733	1,955,093	7,360	1,961,101	13,369	6,009
	West Midlands metro	1,026,498	987,426	-39,072	956,471	-70,027	-30,955
	West Midlands non-metro	1,260,162	1,281,996	21,835	1,300,343	40,181	18,346
	East	2,763,960	2,791,245	27,286	2,812,295	48,335	21,049
	London	3,710,323	3,634,742	-75,581	3,572,705	-137,618	-62,037
	South East	4,196,698	4,229,615	32,917	4,254,202	57,504	24,587
	South West	2,288,077	2,300,303	12,227	2,311,034	22,957	10,731
Wales	1,214,601	1,241,645	27,044	1,264,539	49,937	22,894	

Due to data limitations, the spatial model covers England and Wales but not Scotland and Northern Ireland. As with the 2019 report, we make high-level estimates of the impacts (for the core scenario of a 39% closing of the gap plus accelerated trend):

- **Over 20,000 more people would move to Scotland**, in line with Yorkshire and the Humber, which has a similar population and urban/rural profile;
- **Over 30,000 more people would move to Northern Ireland**, based on scaling of Welsh impacts for population.

These are necessarily broad, high-level impacts. Inclusion of Scotland and Northern Ireland would also change some of the impacts in the English and Welsh model – for instance some of those people moving out of cities in England and Wales would go to rural Scotland and Northern Ireland (and vice-versa).

Results by model archetype area are shown in Table 4. This shows that in our core scenario nearly 500,000 people would move out of London and high-density areas, compared to roughly 270,000 under the previous headline results.



Table 4: Spatial model results – 2019 baseline, accelerated trend, 39% closing of gap between actual and potential working from home plus accelerated trend (model archetype areas, England and Wales)

		2019 baseline	Accelerated trend (2019 headline results)		39% closing of gap plus accelerated trend (Core scenario)		
			Results	Vs. baseline	Results	Vs. baseline	Vs. 2019 results
Mainly working from...	Home	2,901,285	3,958,736	1,057,451	4,813,153	1,911,868	854,417
	Employer site	21,501,794	20,444,343	-1,057,451	19,589,926	-1,911,868	-854,417
% Mainly working from home		11.9%	16.2%	4.3%	19.7%	7.8%	3.5%
Resident workers	London	3,710,323	3,634,742	-75,581	3,572,705	-137,618	-62,037
	High density – Dist band 1	317,752	315,945	-1,807	314,298	-3,454	-1,647
	High density – Dist band 2	815,794	795,163	-20,630	778,381	-37,412	-16,782
	High density – Dist band 3	662,891	650,252	-12,640	639,824	-23,067	-10,427
	High density – Dist band 4	3,405,518	3,244,145	-161,373	3,116,741	-288,777	-127,404
	Medium density – Dist band 1	1,869,230	1,863,990	-5,239	1,858,564	-10,666	-5,427
	Medium density – Dist band 2	2,754,101	2,826,471	72,370	2,883,659	129,558	57,188
	Medium density – Dist band 3	1,888,854	1,921,985	33,131	1,947,610	58,757	25,626
	Medium density – Dist band 4	7,520,251	7,533,170	12,919	7,538,690	18,439	5,519
	Low density – Dist band 3	123,963	138,802	14,838	151,535	27,571	12,733
	Low density – Dist band 4	1,334,403	1,478,414	144,010	1,601,072	266,669	122,658

In the context of the enormous changes to the economy and society currently being witnessed as a result of Covid-19, an additional 2,000,000 home workers relative to the pre-Covid world (850,000 relative to full fibre rollout alone) may seem like a rather modest change.

The impacts could nevertheless be significant – particularly for the individuals freed from the requirement to live near their workplace and for communities which stand to benefit from an influx of high-earning residents. These are considered in the following section.

The estimated changes to the number of home workers are based on the best available evidence, as discussed in the section above – however there are a few reasons why the changes realised may be even larger, for instance:



The potential number of home workers as a result of Covid-19 may be higher than that suggested by the ONS survey used for *Technology intensity and homeworking in the UK*. There may be people who rarely or never worked at home prior to Covid-19 but are now able to do so.

- Over time, as the economy and society adapt to a greater level of home working, jobs which currently cannot be done remotely may come ‘in scope’.
- The survey evidence may underestimate the change in levels of home working that will occur due to employees’ decisions. As more people work from home, the benefits (both work and social) of going into a workplace may diminish for others – for instance face-to-face collaboration or socialising with others after work is only possible if they are also in the office.
- For some employees, working from home might cease to be a matter of choice – companies which feel it does not harm productivity and wish to save on the costs of commercial space could choose to enforce it.



Table 5 and Table 6 show the results of the upper bound scenario instead of the core scenario. These figures are much more dramatic, approximately tripling the impacts estimated in the pre-Covid report (e.g. from just over 1,000,000 additional home workers to over 3,200,000) – but they are based on highly ambitious assumptions about the cultural impact of home working as a result of Covid-19, rather than on survey or research evidence.



Table 5: Spatial model results – 2019 baseline, accelerated trend, 100% closing of gap between actual and potential working from home plus accelerated trend (English regions and Wales)

		2019 baseline	Accelerated trend (2019 headline results)		100% closing of gap plus accelerated trend (Upper bound)		
			Results	Vs. baseline	Results	Vs. baseline	Vs. 2019 results
Mainly working from...	Home	2,901,285	3,958,736	1,057,451	6,110,964	3,209,679	2,152,228
	Employer site	21,501,794	20,444,343	-1,057,451	18,292,115	-3,209,679	-2,152,228
% Mainly working from home		11.9%	16.2%	4.3%	25.0%	13.2%	8.8%
Resident workers	North East metro	560,779	541,832	-18,947	504,337	-56,442	-37,495
	North East non-metro	462,961	478,757	15,796	512,849	49,888	34,091
	North West metro	1,650,000	1,608,733	-41,267	1,525,977	-124,023	-82,756
	North West non-metro	1,198,350	1,217,022	18,672	1,256,208	57,858	39,186
	Yorkshire & Humber metro	1,397,569	1,399,970	2,401	1,400,991	3,422	1,021
	Yorkshire & Humber non-metro	725,369	734,699	9,330	755,109	29,740	20,411
	East Midlands	1,947,733	1,955,093	7,360	1,970,339	22,606	15,246
	West Midlands metro	1,026,498	987,426	-39,072	910,490	-116,008	-76,936
	West Midlands non-metro	1,260,162	1,281,996	21,835	1,329,424	69,262	47,427
	East	2,763,960	2,791,245	27,286	2,842,534	78,575	51,289
	London	3,710,323	3,634,742	-75,581	3,476,854	-233,470	-157,889
	South East	4,196,698	4,229,615	32,917	4,288,047	91,349	58,432
	South West	2,288,077	2,300,303	12,227	2,328,801	40,724	28,497
Wales	1,214,601	1,241,645	27,044	1,301,121	86,519	59,476	

Table 6: Spatial model results – 2019 baseline, accelerated trend, 100% closing of gap between actual and potential working from home plus accelerated trend (model archetype areas, England)

		2019 baseline	Accelerated trend (2019 headline results)		100% closing of gap plus accelerated trend (Upper bound)		
			Results	Vs. baseline	Results	Vs. baseline	Vs. 2019 results
Mainly working from...	Home	2,901,285	3,958,736	1,057,451	6,110,964	3,209,679	2,152,228
	Employer site	21,501,794	20,444,343	-1,057,451	18,292,115	-3,209,679	-2,152,228
% Mainly working from home		11.9%	16.2%	4.3%	25.0%	13.2%	8.8%
Resident workers	London	3,710,323	3,634,742	-75,581	3,476,854	-233,470	-157,889
	High density – Dist band 1	317,752	315,945	-1,807	311,481	-6,271	-4,464
	High density – Dist band 2	815,794	795,163	-20,630	752,717	-63,077	-42,446
	High density – Dist band 3	662,891	650,252	-12,640	623,635	-39,256	-26,617
	High density – Dist band 4	3,405,518	3,244,145	-161,373	2,928,273	-477,244	-315,872
	Medium density – Dist band 1	1,869,230	1,863,990	-5,239	1,848,295	-20,934	-15,695
	Medium density – Dist band 2	2,754,101	2,826,471	72,370	2,968,197	214,097	141,726
	Medium density – Dist band 3	1,888,854	1,921,985	33,131	1,984,523	95,670	62,538
	Medium density – Dist band 4	7,520,251	7,533,170	12,919	7,538,666	18,415	5,496
	Low density – Dist band 3	123,963	138,802	14,838	172,170	48,206	33,368
Low density – Dist band 4	1,334,403	1,478,414	144,010	1,798,268	463,864	319,854	



Environmental impacts

The estimated environmental impact of an additional 1,911,868 workers mainly working at home is an **annual saving of just over 700,000 tonnes of CO₂** emitted from car commuting trips. This compares to a carbon saving of 310,000 tonnes in the previous report. In total, there would be 230 million fewer commuting trips, of which we would expect 140 million to have been done by car.

This assumes:

- Consistent with the spatial model, each of these people work from home an additional 3 days a week (4 days/week rather than 1), and they work 45 weeks of the year;
- Each day worked from home saves two commuting trips. 61.9% of these are by car or motorbike and the average distance per journey is 15.9km, consistent with Department for Transport (DfT) and RAC figures;^{31,32}
- CO₂ emissions from these journeys would have been 137.7g/km, again based on DfT figures.³³

2.3 Conclusions

Agglomeration effects are productivity benefits associated with increasing employment density and are particularly pertinent in the knowledge-intensive sectors which cluster in big cities. They can be categorised as follows:

Learning



Knowledge spillovers as the proximity of firms in the same or similar industries facilitates the exchange of best practice and skills through business-to-business interaction and the movement of employees between companies.

Sharing



This includes risk and access to intermediate inputs – as suppliers locate closer to clusters of firms which they supply, they will enjoy lower average transport costs.

Matching



A high density of related firms means that, for example, employers can more easily find and hire employees who meet their specific skills requirements. Similar effects also apply with firms and their suppliers or customers.

Centralised, knowledge-intensive city-centre economies rely on workers travelling into a place of employment most days. The result is high productivity but with significant drawbacks:

- **Restricted residential choices for workers** – they need to live somewhere from which commuting into the city centre several times a week is feasible, which makes living in distant or poorly-connected areas difficult, even if they are highly desirable in other respects. The lags between demand for and supply of transport and housing act as a constraint on employment growth and agglomeration. These limits also cause more immediate problems for those living and/or working in cities:
 - **Overheating property markets** – high demand for properties in cities and their immediate commuting radius has led to rapid house price growth and intensifying affordability issues. Affordability has worsened the most in London, which in 2019 contained 8 of the 10 least affordable local authorities in England and Wales (measured by ratio of house prices to earnings). House prices are also high in its commuter belt, and in and around other southern cities with large knowledge-intensive employment centres, like Oxford and Cambridge.³⁴
 - **Congested transport networks** – it is difficult for transport investment to keep up with the growing demand for journeys to and from major employment centres, leading to long, unreliable, uncomfortable commutes for many workers. According to the National Infrastructure Commission, London is the sixth most-congested city in the world once population is taken into account. Other UK cities also have major traffic congestion problems, including Edinburgh, Manchester, Liverpool, Birmingham, and Bristol.^{35, 36}
 - **Lack of economic opportunity outside big cities** – relatively high-earning commuters' spending supports economic activity in commuter areas. More remote or poorly connected places miss out on these benefits, and as it is difficult to live in these places and work in highly skilled city-centre jobs, many of the brightest children growing up in these areas move away.

A more decentralised model without good digital connectivity might avoid these drawbacks and spread economic opportunity more widely, but is not compatible with a high-productivity, knowledge-intensive economy, i.e. economic activity would be spread more widely but also lower overall.

More remote working, however, could allow a new pattern to emerge that represents the best of both worlds. Occasional travel to offices and digital connectivity would replace a daily commute. Reductions in commuting and business travel would yield time, money, and carbon savings.

As workers' residential decisions became less tied to their place of work, problems such as congestion, pollution, and poor housing affordability traditionally associated with growing city-centre employment would recede. In this way, digital connectivity can substitute for some physical proximity and transport connectivity.

The updated conclusions from the spatial model suggest that the cultural change brought about by Covid-19, supported by nationwide full fibre rollout, could lead to nearly two million more people working mainly from home than was the case prior to Covid-19 and a changing pattern of residential decisions, with fewer workers living in big cities, and instead moving to more remote and rural areas. This could deliver benefits to:

New home workers:

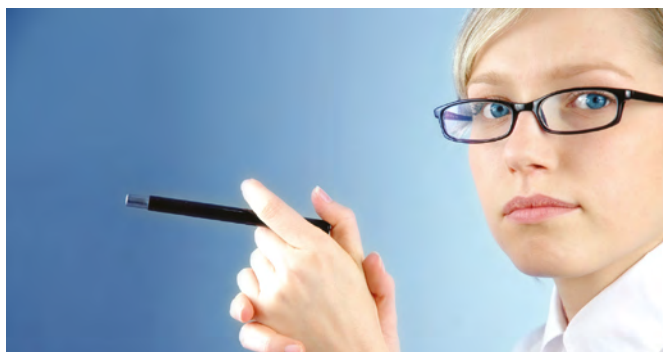
- Working from home rather than in an office is preferable for many people – particularly now that the unexpected benefits of it (and the lack of certain expected costs) have been realised following the ongoing home working ‘experiment’;
- No longer needing to live as close to work, and therefore being able to live in locations they prefer with larger, more affordable housing, more green space, less air pollution and lower congestion;
- Time and money savings from doing less frequent (longer) commutes rather than a daily one. This commute may also be more pleasant and less stressful if the road and rail networks are less congested than they are today as a result of greater home working.

Remote and rural communities:

- New, relatively high-earning residents’ spending on local goods and services will create employment opportunities for existing residents in parts of the country which currently provide few economic opportunities for young people and often have high rates of economic inactivity;
- Increased population may help reinvigorate communities that have lost private and public services (pubs, supermarkets, post offices, GPs’ surgeries) due to insufficient demand, helping to reverse decline and make it easier for residents to access a range of goods and services locally;
- Skilled young people who would otherwise move elsewhere for work may choose to stay and work remotely. Their spending will also support employment for other residents of the area.

National government:

- The creation of economic opportunity in ‘left-behind’ parts of the country is consistent with the government’s desire to address regional economic imbalances (‘levelling up’) through programmes such as the Towns Fund and the recently-announced levelling-up fund to support regeneration and infrastructure projects;
- A reduction in physical commuting, particularly by car, helps to achieve the UK’s ambitious, long-term environmental objectives (net zero by 2050);
- Housing policy challenges will become easier to solve if fewer people want to live in parts of the country where the property market is currently overheating, and instead in places where land and even existing housing stock is under-utilised.



There are, however, potential limitations to the realisation of these benefits. For instance, the emphases of housing and transport policies will need to change in order to support changing residential patterns: providing large houses in rural areas as well as flats in and around cities, and improving connectivity across the country (e.g. through rail restoration and electrification) as well as improving peak-time capacity into big cities.

Working mainly at home also requires a good, reliable internet connection. The urban-rural divide in digital infrastructure persists, and if this is not addressed through nationwide full fibre rollout the ability of certain areas to capitalise on these changes will be limited.

There will also be choices to make about how change is accommodated. The spatial model results in Table 4 imply a more than 20% increase in the number of workers resident in low density areas (from about 1.45 million to 1.75 million). This may not be feasible even with appropriate housing, transport, and digital policy – an alternative is to provide more and better housing, transport infrastructure, and amenities in ‘left-behind’ suburban areas and small towns (i.e. medium-density locations in the model) to expand the range of desirable locations for remote workers to live. The emphasis of policy should be on opening up choice for people and taking the opportunity to resolve longstanding issues of economic geography.



3.0

Workforce impacts analysis

3.0 Workforce impacts analysis

3.1 Context and assumptions

Alongside the shift towards home working, Covid-19 has forced employers and employees to be more flexible about hours and working patterns – in particular, supporting the many workers who have had to juggle work with childcare or home schooling.

A culture of greater flexibility may remain, alongside a greater remote working culture. This could allow for the participation of groups previously excluded from the workforce. These include working-age carers, parents of dependent children, and older workers. In all of these cases there is a gap between actual and potential employment – cultural shifts favouring remote, flexible working should help to close this.

Having to keep to rigid office hours is particularly difficult for those with caring responsibilities (which may include older workers as well as working-age carers and parents). Work that is organised in a way that focuses on outputs and is neutral about where or exactly when these are produced would allow people the flexibility they need to carry out their caring responsibilities, fitting their work around commitments like the school run, hospital appointments, and other duties.

The full fibre rollout can address technological barriers to such ways of working, allowing people in all parts of the country to benefit. The distributional benefits are difficult to predict – while home working opportunities are more common among highly-paid (and high-skilled) occupations, people unable to work as much as they'd like due to caring responsibilities will have suffered financially as a result, so in fact the greatest benefits may accrue to lower income families rather than the richest.

Working remotely and flexibly removes certain costs normally associated with employment for all employees, but these are particularly relevant for people with caring responsibilities: time and money costs of commuting, difficulties of being away from those they need to care for, and inflexible hours which do not fit around their responsibilities. Their labour supply should therefore increase. At present, employees are only allowed to make a flexible working request after working for their employer for 26 weeks, and there is no guarantee that it will be approved. If a culture of remote and flexible working has become more established across the workforce, employers will be more likely to employ people on this basis from day one.

Our previous work was based on assuming incremental improvements made possible by full fibre rollout:

- 10% of working-age carers working 10 more hours per week, with half of these new to the labour force and the other half existing workers increasing their hours;
- An increase in participation by older workers, with the total number of over-65s working at home increasing by 25%. These new workers were assumed to work 15 hours per week;
- A 10% closing of the gap in participation rates between women and men with dependent children, with the new working mothers assumed to be working 15 hours per week.



Based on new and updated evidence, and our view that the cultural shift towards remote and flexible working has been accelerated significantly due to Covid-19, we have reforecast the workforce impacts using more ambitious assumptions. These are based on the idea that remote and flexible working can close much of the gap between actual and potential employment for these groups. Necessarily, the analysis is based on cautious assumptions and previous survey evidence. We do not yet have any evidence of these groups' response to the pandemic – the labour market continues to experience a significant degree of turmoil and very few people are entering work.

Carers

At the 2011 Census, **over 6.5 million people reported that they provided some unpaid care** (i.e., they are informal carers), and **over 4.5 million of these people were of working age**. This is an enormous number of people and clearly any change in their economic participation could produce very significant economic impacts. The Family Resources Survey, produced by the Department for Work and Pensions, includes data on the employment profile of adult informal carers as compared to all adults. Table 7 summarises the relevant data.

Table 7: Adult informal carers and all adults, excluding retirees, by employment status, 2018/19³⁷

	All adult informal carers, excluding retirees	All adults, excluding retirees	Difference
All in employment	68.0%	78.2%	-10.2%
<i>Of which full-time</i>	44.0%	60.3%	- 16.3%
<i>Of which part-time</i>	22.7%	17.9%	+ 4.7%
Economically inactive	29.3%	19.2%	+10.1%

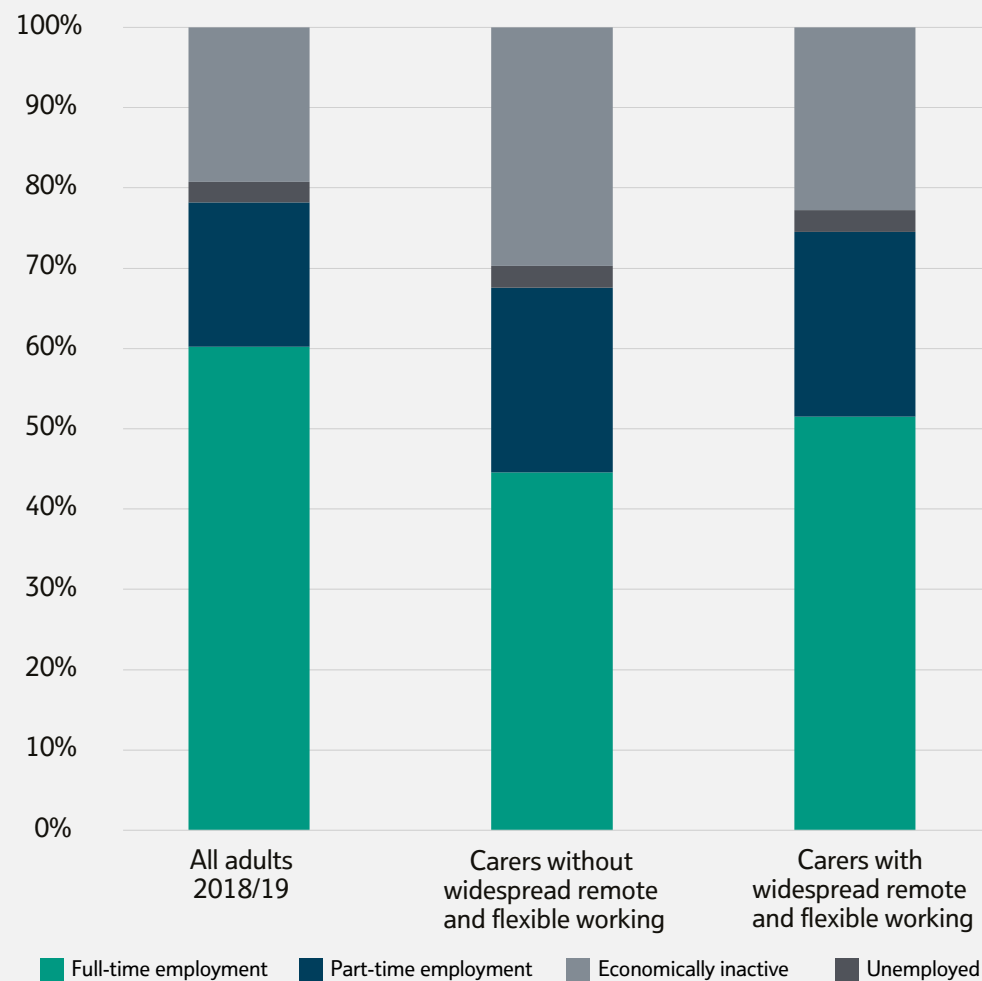
Those with caring responsibilities are noticeably more likely to be economically inactive, and those who are in work are much less likely to work full time. It is unrealistic to think this gap could be closed altogether – those looking after people with more onerous care needs may be unable to work at all, or to increase their hours if they are working already.

Previous Cebr work into the impact of a flexible working culture found that 68% of unemployed or economically inactive people (including carers) would be inclined to start working if given the opportunity to do so flexibly.³⁸ We therefore assume that 68% of the employment gap between carers and the general population could be closed – given that this gap is 10.2% this amounts to **just under 7% of non-retired carers entering the labour force.**

We assume that the same number of carers currently working part-time increase their hours – this is simply a cautious assumption as there is a lack of survey evidence on how many working carers would increase their hours if they could. These carers (both those new to the labour force and those who are not) are assumed to work an additional 10 hours per week on average, in line with the assumption made in the 2019 report. These assumptions do represent a fairly ambitious change, closing a large proportion of the employment gap between working-age people with caring responsibilities and those without. Overall, however, only **14% of working-age carers are assumed to be affected** by two enormous and interlinked changes – the rollout of full fibre broadband and the cultural shift towards home working brought about by the Covid-19 pandemic.

Figure 5 shows how these assumptions alter the employment profile of informal working-age carers relative to the wider population (counting those already in the labour force who increase their hours as moving from part time to full time). On these assumptions **the proportion of working-age carers who are economically inactive would fall from 22% to 17%**, making their employment profile much more similar to that of the wider workforce.

Figure 5: Current employment profile of all adults, informal carers (excluding retired), informal carers' employment profile implied by remote and flexible working assumptions



Older workers

Older workers are already disproportionately likely to work remotely – in 2014 38.3% of workers aged 65 and over used their home as a workplace.³⁹ Remote and flexible working could allow more people to transition into full retirement through part-time working, rather than simply ceasing to work altogether. Like parents and working-age carers, they may also have caring responsibilities which can more easily be accommodated around flexible hours – for partners with health conditions, grandchildren, or their own very elderly parents.

According to Age UK and the Centre for Ageing Better, the single biggest factor that pushes older workers to stop working is ill health, but caring responsibilities are also a key contributor.⁴⁰ Being able to better fit work around other commitments, along with reduced time and money costs of commuting, may help to make working later in life more appealing.

As the UK's population ages, the economic importance of labour market participation by the over 65s will only grow – increasing it can help to mitigate the fiscal effects of an ageing population. For employers, this may mean the opportunity to retain the knowledge of highly experienced employees for longer, increasing productivity.



Estimates for the economic impact of increased participation of over 65s are based on the following:

- The employment rate for over 65s has grown significantly in recent years – from under 5% in 2001 to over 10% today;⁴¹
- There is a lack of survey evidence on how older workers would respond to greater opportunities for remote and flexible working, so we make reasonably conservative assumptions;
- In 2016, nearly 1.2 million over 65s were in work.⁴² Roughly 450,000 of them worked from home (using the 38.3% figure from *Future of an Ageing Population*);
- The number of potential older workers grows in line with ONS forecasts of the population aged 65-74;
- We assume that a more flexible and remote working culture, supported by full fibre rollout, increases the number of over-65s working from home by 50%. This results in an estimated 240,000 additional workers in 2025. This represents a further increase of about 2% in the employment rate of over 65s – in the context of the changes that have occurred already this looks reasonable;
- These additional workers are assumed to each work 15 hours per week on average.

Parents

In 2019, only 75.1% of women with dependent children were in employment, compared to 92.6% of men with dependent children. This is a significant gap, and while some of it will be down to choice, in many cases it will reflect the difficulties of balancing childcare and work – ONS analysis recently confirmed that women continue to spend much more time on childcare than men do.⁴³ As Figure 6: Employment rates for men and women with and without dependent children, 2000-2019 (men and women in the UK aged 16-64) shows, the employment rate of women with dependent children has increased somewhat in recent years, and is now higher than that for both men and women without dependent children – but this significant gap remains.⁴⁴

With a culture of increased acceptance of remote and flexible working underpinned by nationwide full fibre, a significant proportion of the employment rate gap between men and women with dependent children could be closed.

01 The available survey evidence shows that 58% of non-working parents are away from the workforce for longer than they expected to be, and many of them would work if flexible options were available.⁴⁵

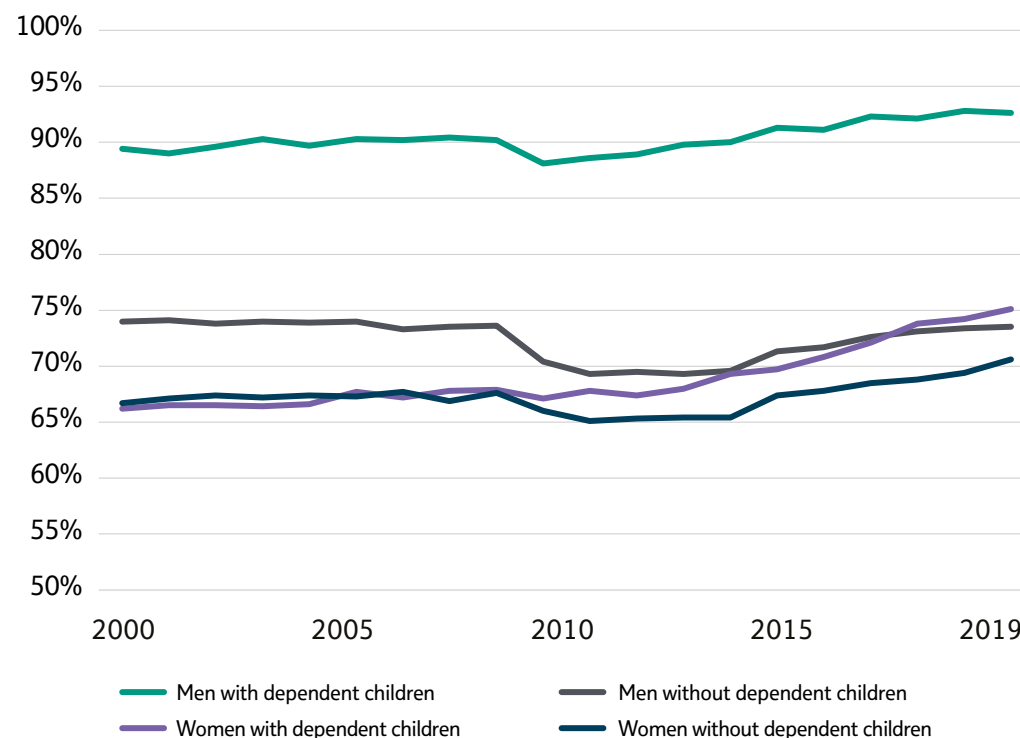
The Department for Education's *Childcare and early years survey of parents: 2019* found that 60% of non-working mothers would prefer to work if they could arrange suitable childcare. Reliable childcare and childcare which fits working hours were important factors among mothers who did go to work;⁴⁶

02 Assuming that half of the mothers away from the workforce for longer than expected are instead working part-time, this amounts to roughly 400,000 additional women in work (equivalent to about 3% of the current female workforce) at any time;

03 These additional workers are assumed to each work 15 hours per week on average;

04 The number of potential additional workers grows in line with ONS forecasts of the female population aged 20-44.

Figure 6: Employment rates for men and women with and without dependent children, 2000-2019 (men and women in the UK aged 16-64)



3.2 Results

Employment and GVA impacts by region, plus the projected number of working-age carers increasing their hours, are given in the below tables. GVA per hour is based on ONS figures extrapolated according to Cebr productivity growth forecasts. All impacts are based on ONS population forecasts for 2025. These estimates assume there are no geographical limitations to take-up of flexible and remote working opportunities – for instance due to poor digital infrastructure in particular areas.

Table 8: Economic participation and GVA impacts, working-age carers

	Entering workforce	Increasing hours	GVA impact (£mn)
North East	14,162	14,162	£435
North West	38,306	38,306	£1,177
Yorkshire and The Humber	27,151	27,151	£834
East Midlands	23,968	23,968	£736
West Midlands	29,855	29,855	£917
East	28,871	28,871	£887
South East	41,067	41,067	£1,261
London	35,104	35,104	£1,078
South West	26,854	26,854	£825
Wales	17,612	17,612	£541
Scotland	24,012	24,012	£738
Northern Ireland	10,439	10,439	£321
UK	317,403	317,403	£9,749

Table 9: Employment and GVA impacts, older workers

	Entering workforce	GVA impact (£mn)
North East	10,356	£239
North West	26,768	£617
Yorkshire and The Humber	20,104	£463
East Midlands	18,378	£423
West Midlands	21,517	£496
East	24,109	£555
South East	34,869	£803
London	21,053	£485
South West	24,394	£562
Wales	12,894	£297
UK	240,896	£5,549

Table 10: Employment and GVA impacts, parents with dependent children

	Entering workforce	GVA impact (£mn)
North East	14,380	£331
North West	42,371	£976
Yorkshire and The Humber	31,863	£734
East Midlands	28,435	£655
West Midlands	34,185	£788
East	38,151	£879
South East	56,194	£1,295
London	58,948	£1,358
South West	34,418	£793
Wales	18,412	£424
Scotland	31,884	£734
Northern Ireland	10,104	£233
UK	399,346	£9,199

Table 11: Economic participation and GVA impacts, total

	Entering workforce	Increasing hours	GVA impact (£mn)
North East	38,898	14,162	£1,005
North West	107,446	38,306	£2,769
Yorkshire and The Humber	79,119	27,151	£2,031
East Midlands	70,782	23,968	£1,815
West Midlands	85,558	29,855	£2,200
East	91,132	28,871	£2,321
South East	132,130	41,067	£3,359
London	115,105	35,104	£2,921
South West	85,666	26,854	£2,180
Wales	48,918	17,612	£1,262
Scotland	76,223	24,012	£1,940
Northern Ireland	26,669	10,439	£695
UK	957,645	317,403	£24,498

3.3 Conclusions

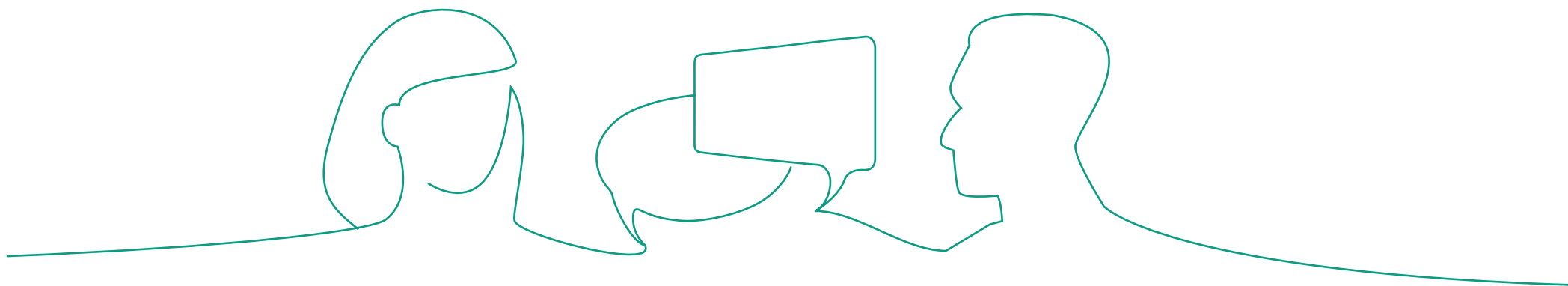
On the assumptions made in the above analysis, the economic impact of a culture of remote and flexible working underpinned by nationwide full fibre rollout could be highly significant.

By 2025, on these estimates, **nearly 1,000,000 more people would be in work**, plus over 300,000 carers increasing their hours, for a **GVA impact of £25 billion** – a significant boost equivalent to just over 1.3% of the baseline forecast; from £1,862 billion to £1,886 billion.⁴⁷

The social and economic impacts of this would be significant and wide-ranging:

- Increased economic participation and earnings will both **lower the government's welfare bill and generate additional tax revenue**. The UK is facing a challenging fiscal environment in the coming years as a result of the extraordinary level of debt accumulated during Covid-19 and its ageing population. Increased participation by these groups could help to offset these challenges and avoid some difficult choices elsewhere;

- Bringing groups previously excluded from the workforce into employment would **lower inequality and poverty**. These people may also experience **improved mental health**;
- **Employers will be able to retain experienced employees** (at least on a part-time basis) whom they would otherwise lose due to their age or caring responsibilities, avoiding some of the disruption to companies associated with, for instance, employees going on extended maternity leave;
- These opportunities would be created right across the UK – provided the digital infrastructure is in place to support them – helping to **address issues of regional inequality**.



4.0

Footnotes

Footnotes

- 1 *Full fibre broadband: A platform for growth*, Openreach, October 2019. [Link](#).
- 2 This refers to the ‘accelerated trend’ scenario relative to the 2019 baseline figure. Relative to the ‘continued trend’ this represents an additional 400,000 home workers.
- 3 The Prime Minister’s advice that people ‘start working from home where they possibly can’ was issued on the 16th of March, a week prior to lockdown on the 23rd of March. [Link](#).
- 4 *Coronavirus: Coping with lockdown on poor broadband*, BBC, May 2020. [Link](#).
- 5 Reported take up of FTTP services at 18.6% and take up of superfast services at 67% in previous BT quarterly results. *BT Raise UK Ultrafast Broadband Cover to 5.81 Million Premises*, ISPreview, July 2020. [Link](#).
- 6 *Home working here to stay, study of businesses suggests*, BBC, October 2020. [Link](#).
- 7 *Workforce Sentiment Survey Insight Report*, CBRE, survey conducted from June 16 2020 to August 7 2020. [Link](#).
- 8 *The effects of the coronavirus crisis on workers: Flash findings from the Resolution Foundation’s coronavirus survey*, Resolution Foundation, May 2020. [Link](#).
- 9 *What’s next for remote work: An analysis of 2,000 tasks, 800 jobs, and nine countries*, McKinsey, November 2020. [Link](#).
- 10 *UK’s internet use surges to record levels*, Ofcom, June 2020. [Link](#).
- 11 *Connected Nations*, Ofcom, December 2020. [Link](#).
- 12 *Ofcom to Help BT Fibre Rollout Reach 3.2 Million Rural Premises UPDATE*, ISPreview, July 2020. [Link](#).
- 13 *Openreach See UK Broadband Usage Double in 2020 to 50,000PB*, ISPreview, December 2020. [Link](#).
- 14 *Business insights and impact on the UK economy: 28 January 2021*, ONS, 28 January 2021. [Link](#). In the 18 June 2020 release, the earliest for which comparable figures are available, 38.5% of employees were working remotely instead of at their normal place of work. [Link](#).
- 15 *UK housing demand soars since end of Covid lockdown*, The Guardian, August 2020. [Link](#).
- 16 *Covid-19 will reshape what prime UK home buyers and sellers want*, Savills, May 2020. [Link](#).
- 17 *Covid led to huge London property exodus, says Hamptons*, Guardian, December 2020. [Link](#).
- 18 *London population set to decline for first time since 1988 – report*, Guardian, January 2021. [Link](#).
- 19 *KPMG 2020 CEO Outlook: COVID-19 Special Edition*, KPMG, August 2020.
- 20 *Technology intensity and homeworking in the UK*, ONS, 1 May 2020. [Link](#).

- 21 *Business Register and Employment Survey*, ONS Nomis, 2018.
- 22 *Workforce Sentiment Survey Insight Report*, CBRE, survey conducted from June 16 2020 to August 7 2020.
- 23 *Homeworking in the UK: before and during the 2020 lockdown*, Alan Felstead and Darja Reuschke, August 2020. [Link](#).
- 24 *The effects of the coronavirus crisis on workers: Flash findings from the Resolution Foundation's coronavirus survey*, Resolution Foundation, May 2020. [Link](#).
- 25 *Half of UK Financial Services workforce want to work from home after COVID-19*, KPMG, October 2020. [Link](#).
- 26 *Coronavirus and homeworking in the UK labour market: 2019*, ONS, March 2020.
- 27 As discussed, this is higher than the measure used in the ONS work due to the inclusion of people who work from home.
- 28 These scenarios do not make any assumptions about when full fibre rollout is achieved, i.e. in 2025 or 2028.
- 29 Changes are relative to the baseline (DCC minus £1.45) rather than calibrated model. Therefore changes to reflect continued and accelerated trend are £1.45 less than might be expected to avoid double-counting of baseline impacts. For instance to reflect the accelerated trend a further reduction of £4.05 is applied to the DCC – £5.50 minus £1.45.
- 30 1,050,000 relative to the 2019 baseline, 400,000 relative to the continued trend.
- 31 Department for Transport, National Travel Survey, Table NTS0412.
- 32 RAC Foundation, *The Car and the Commute: The journey to work in England and Wales*, Table 6, page 11 quotes a figure for the average car commuting distance (in England) of 9.9 miles (15.9 kilometres). [Link](#).
- 33 Department for Transport, Vehicle Licensing Statistics, Table VEH0156 gives 137.7g/km average emissions for cars registered in the UK in June 2020, based on the Worldwide Light Vehicle Harmonised Test Procedure (WLTP). The WLTP was recently introduced, so this is slightly higher than the 121.3g/km used in last year's report. This figure is likely to fall in future years (and as it does the environmental impacts of reducing car travel will as well), particularly as the transition towards electric vehicles continues, although older, more heavily emitting vehicles will continue to be on the roads for some time.
- 34 *Housing affordability in England and Wales: 2019*, ONS, March 2020. [Link](#).
- 35 *Cost of congestion shows need to enable local leaders to tackle the issue*, National Infrastructure Commission, February 2019. [Link](#).
- 36 *Manchester traffic 'worst outside London'*, BBC, September 2018. [Link](#).
- 37 *Family Resources Survey*, Department for Work and Pensions. Table 5.4: Adult informal carers by employment status and gender, 2018/19, United Kingdom.

- 38 *Greater flexible working could add £11.5 billion annually to the UK economy*, Centre for Economics and Business Research, December 2014. [Link](#). A follow-up study in 2019 focusing on the US found a similar figure, of 69%. [Link](#).
- 39 *Future of an Ageing Population*, Government Office Centre for Science, 2016. [Link](#). The corresponding figures reported for other age groups were 5.1% for those aged 16-24, 12.3% for 25-49, and 18.3% for 50-64.
- 40 *Later Life in the United Kingdom 2019*, Age UK, May 2019. [Link](#).
- 41 *Employment rate 65 + People*, ONS, October 2020. [Link](#).
- 42 *Five facts about... older people at work*, ONS, October 2016. [Link](#).
- 43 *Women shoulder the responsibility of 'unpaid work'*, ONS, November 2016. [Link](#).
- 44 *Families and the labour market, UK: 2019*, ONS, October 2019. [Link](#). The lower employment rates of both men and women without dependent children are likely to be explained by age – for instance it will include some full-time students and those who have taken early retirement, whereas people with dependent children are less likely to fall into these groups given their age profile.
- 45 *More Than Half of Stay-at-Home Parents Stop Working Longer Than Planned*, Flexjobs, April 2019. [Link](#). Figure based on a survey of stay-at-home parents, of whom 90% were mothers.
- 46 *Childcare and early years survey of parents: 2019*, Department for Education, December 2019. [Link](#).
- 47 In 2017 £, consistent with figures in the previous report.

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