

# C A G E

## **Remote work and the post-pandemic UK labour market**

CAGE Policy Briefing no. 32  
May 2021

Mirko Draca

Emma Duchini

Roland Rathelot

Giulia Vattuone



Economic  
and Social  
Research Council

# **Remote work and the post-pandemic UK labour market**

Mirko Draca, Professor, University of Warwick Economics and CAGE

Emma Duchini, Postdoctoral Fellow, University of Warwick Economics and CAGE

Roland Rathelot, Associate Professor, University of Warwick Economics and CAGE

Giulia Vattuone, PhD Student, University of Warwick Economics and CAGE

*Published by*

CAGE Research Centre, University of Warwick

[warwick.ac.uk/cage](http://warwick.ac.uk/cage)

The CAGE Research Centre at the University of Warwick is funded by the Economic and Social Research Council (ES/L011719/1). We also acknowledge financial support from the ESRC Rapid Response COVID grants scheme. Views expressed in this publication series are the authors' own.

## Key findings

- The post-pandemic period is likely to see an '80:20' or possibly '70:30' split between non-remote and remote work. At the peak of social distancing, around 35% of employees worked solely at home. This fell to around 20% during the most liberal period of restrictions, in September 2020.
- This 20–30% 'ceiling' to the level of remote work in the labour market looks likely to hold, at least in the short run. This is because the expansion of remote work during the pandemic has been concentrated on the professional and managerial occupations, where it was expected that remote work would be more feasible. However, the data does indicate that the 'frontier' of what kind of work can be done remotely has been pushed out in administrative and sales occupations.
- There is an ongoing deficit in administrative and sales vacancies relative to other occupations. The share of these occupations in total vacancies is till 1–2% lower than before the pandemic. Furthermore, the changes have been concentrated in sub-occupations that are directly related to face-to-face office activities. For example, secretarial occupations experienced a 37% decline in the absolute number of vacancies between 2019 and 2020 while the 'other Administrative' group saw a decline of around 27%.
- A key policy focus for the post-pandemic economy will be managing 'restructuring risk' and some of this will be associated with the adoption of remote work. We estimate that, as a labour market segment, low-to-mid level office administrative occupations are similar in size to those occupations at risk of displacement from automation, such as road transport operators (autonomous vehicles) and call centre operators (chatbots).

# Introduction

The ‘forced experimentation’ with remote work since March 2020, brought on by the COVID-19 pandemic, has led to predictions that the UK labour market will feature much higher levels of remote work from now on. As COVID restrictions in the UK are slowly lifted, the key questions are: how much remote work will remain and what will the consequences be for different types of workers?

In this briefing, we provide some insights into the future of remote work in the UK based on recent data, with three main focal points:

- **Upper limits:** The increase in remote work might be less than was expected based on early pandemic hype. In short, we argue that a 20–30% ‘ceiling’ to the level of remote work in the labour market looks likely to hold, at least in the short run. This is because the expansion of remote work during the pandemic has been concentrated on areas where it was expected that remote work would be more feasible: the professional and managerial occupations.
- **Some jobs are changing:** The pandemic has led to a lot of experimentation with how work is done. The data does indicate that the ‘frontier’ of what kind of work can be done remotely has been pushed out in administrative and sales occupations, but there is still a large range of occupations where remote-work feasibility has not shifted.
- **‘Restructuring risks’ are coming into view:** There are early indications that a set of jobs in middle-income administrative and sales occupations face a potential displacement or restructuring risk from the rise of remote work. Specifically, there has been significant drop in the share of vacancies advertised for administrative and sales occupations. It’s not clear how much of this drop is temporary, because government economic support policies have frozen the usual pattern of labour market flows. The economic consequences of a comprehensive displacement of administrative, office occupations are similar in their potential scope to the impact of AI technologies in areas like road transport (e.g., autonomous vehicles) or call centres (e.g., chatbots).

## Upper limits

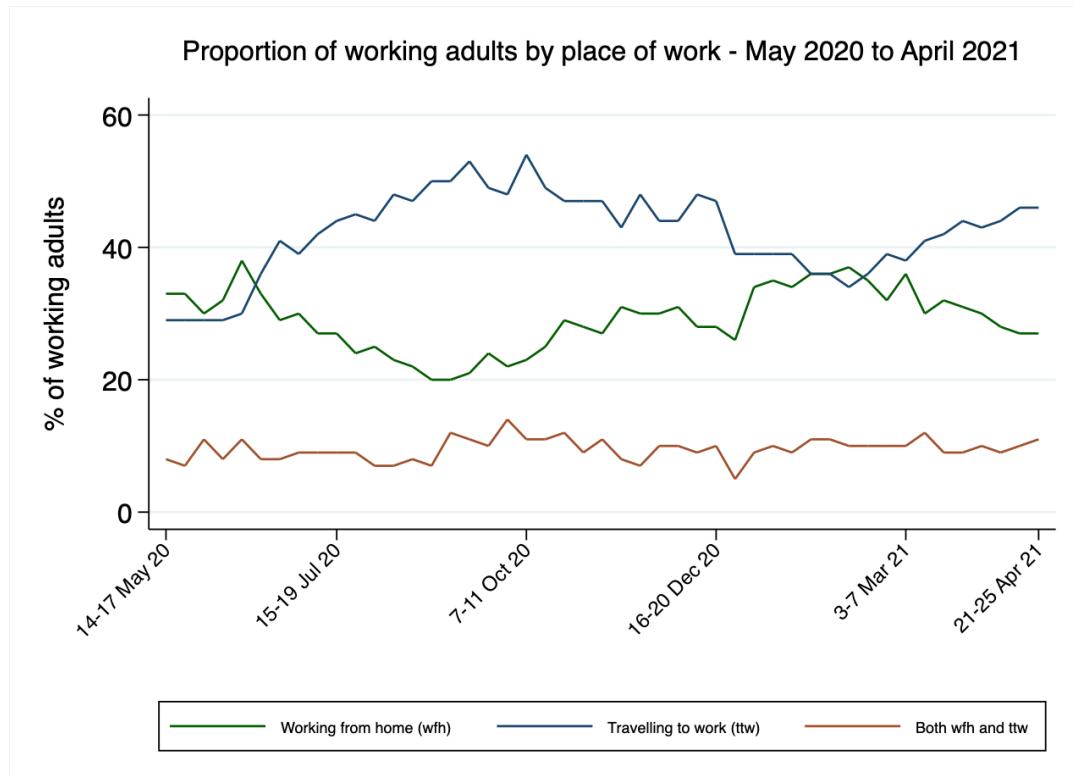
The data collection efforts of the ONS allow us to track work patterns on a weekly basis. Figure 1 shows information from the ONS ‘Opinion and Lifestyle’ (OPN) survey, which collects weekly data on various pandemic-related issues and behaviours. The proportion of working adults who worked exclusively from home has ranged between 20 and 39% over the course of 2020 and early 2021. A further 10% both worked from home and travelled to work, while 40–50% exclusively travelled to work outside their home.

The fluctuations in work patterns seen in Figure 1 bear the mark of social distancing policies. The most ‘open’ period in September 2020 saw the full-time work-from-home (WFH) share fall to 20%, with another 10% of employees in the partial WFH category. Hence, this estimate from September represents our best information for what the near future might look like. Surveys of employee

preferences with regard to remote work indicate that many prefer a hybrid model of work locations (Mizen, Bloom and Taneja, 2021). So, the most likely scenario for a (hopefully) social distancing-free late 2021 or early 2022 would be a shift of some full-time WFH employees into the part-time group. The overall labour market would therefore take the form of an 80:20 (or possibly 70:30) split between non-remote and remote work. That said, note that this is an average – across sectors or firms remote work will be more or less prevalent based on a range of factors.

A striking aspect of the OPN data is that, even at the peak of the implementation of lockdown restrictions, around 50% of employees still travelled to a workplace on a full-time basis. This might surprise those working in the professional or managerial sector, where working remotely currently appears to be the norm. There are still many jobs where working remotely is not feasible. Further to this, other data that we cover in the next section indicates that the scope for adapting these jobs to remote modes is limited.

**Figure 1: Place of work during the pandemic.**



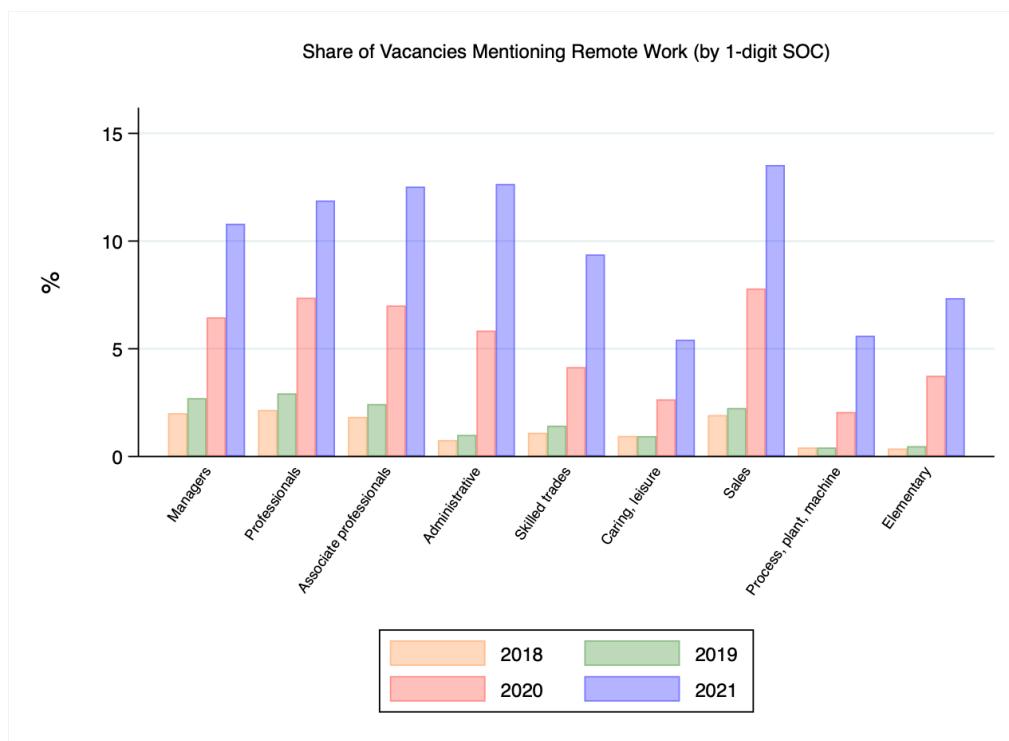
Notes: This figure shows data on place of work from the ONS Opinion and Lifestyle Survey (OPN). The y-axis plots the percentage of working adults according to each place of work: travelling to work always, working from home always and, both working from home and travelling to work.

## The remote-work frontier has been pushed out, but only slightly.

In this part of our analysis, we use online job vacancy data from the information company Burning Glass Technologies (BGT). We provide a summary of the BGT data in Appendix A of this briefing but, in short, the data offers the opportunity to look at labour market trends at a high frequency and with rich information about the detailed occupational structure of vacancies.

Our measure of remote work in this data is based on a text algorithm that searches for phrases associated with remote work and was first developed in Duchini, Simion, and Turrell (2020) (see Appendix A for details). In Figure 2, we plot the share of vacancies offering remote-work opportunities by Standard Occupational Classification (SOC) groups. This shows very large jumps in the share of remote-work vacancies across occupations and, relative to pre-2020 levels, these jumps are most pronounced in administrative and sales occupations.

**Figure 2: Share of remote-work vacancies across 1-digit SOC occupations.**



Notes: This figure shows the share of vacancies by 1-digit SOC occupation and year in the text of the BGT advertisements that contain remote-work keywords. Details of these remote-work keywords are listed in Appendix A.

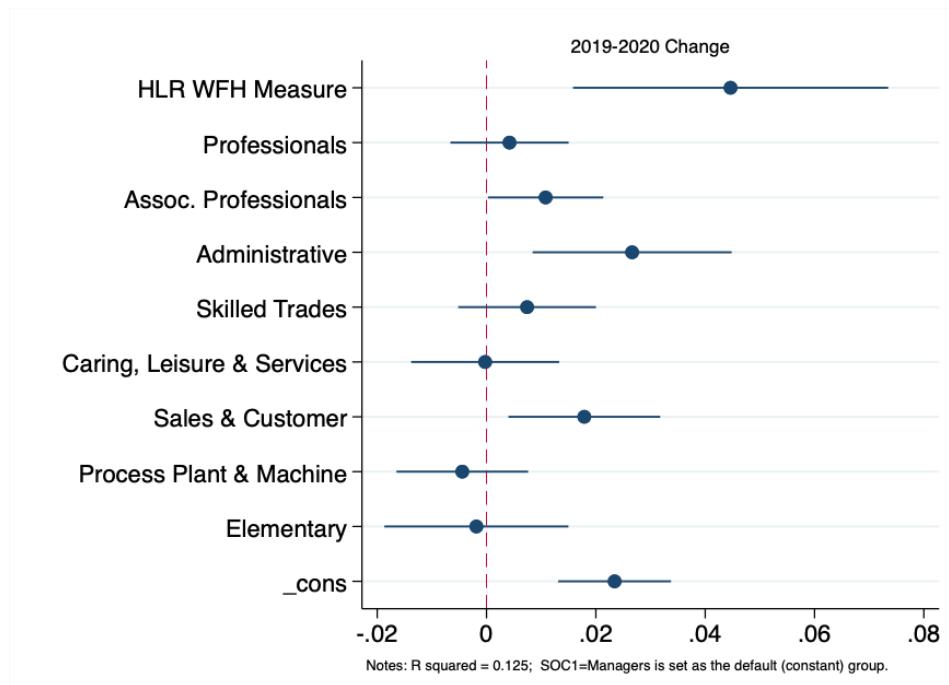
How can we benchmark these changes against the pre-pandemic labour market? In Figure 3, we relate these changes to a measure of the pre-existing potential for remote work at the occupation level. The measure is taken from Hensvik, Le Barbanchon and Rathelot (2020) (hereafter HLR (2020)) and is based on occupation-level data on average hours worked at home from the American

Time Use Survey. Intuitively, it can be thought of as representing the pre-2020 occupational ‘frontier’ for the feasibility of working remotely.

The results in Figure 3 show that this measure of feasibility does a good job of explaining the rise in remote work for most occupations. For example, the estimate for professional occupations indicates that the expansion of remote work in this group was in line with the established feasibility of working-from-home. However, there were significant increases above established feasibility for administrative and sales occupations. The estimates indicate that around 25% of the rise in these occupations was a distinct effect that went beyond what could have been expected based on trends before the pandemic.

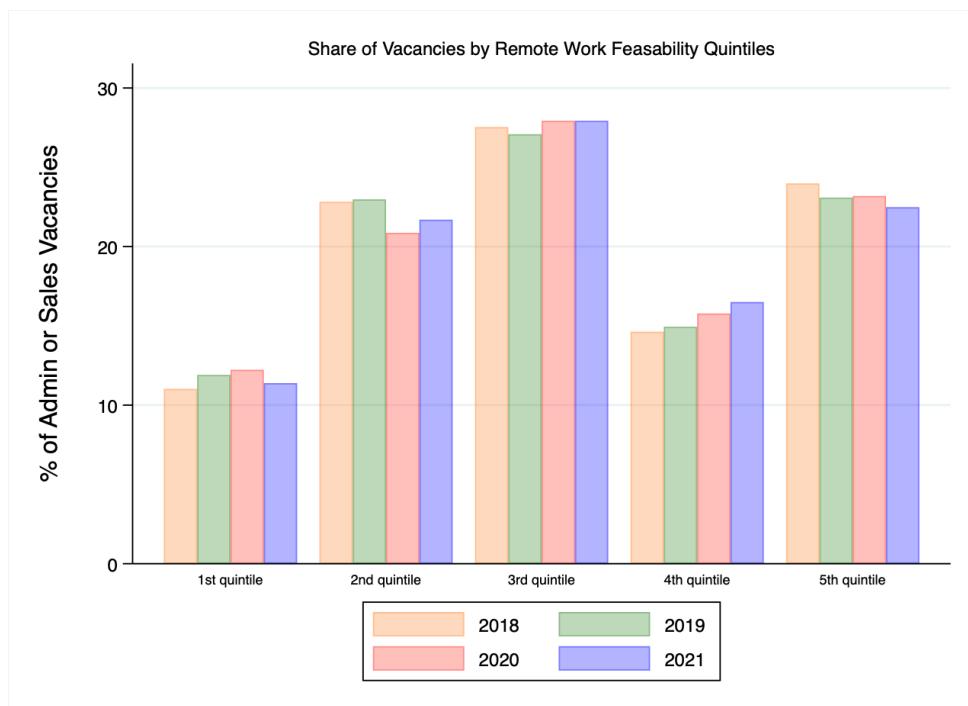
Could this shift in the remote-work frontier for administration reflect a shift in the types of jobs being advertised? For example, an increase in the share of telephone-sales vacancies? This does not seem to be the case. Figure 4 shows the share of all vacancies across five bands of pre-2020 feasibility. That is, we split the 4-digit SOC occupations within administration and sales into five groups according to the level of remote-work feasibility. The fact that the shares are flat across the different years implies that the composition of vacancies has not changed. The frontier of what can be done remotely for administrative and sales occupations has moved out evenly across all the jobs in these groups. In short, there has been a general re-assessment of the feasibility of remote work in administration and sales.

**Figure 3: Conditional change in remote-work shares by SOC1**



Notes: This figure shows the coefficient estimates and 95% confidence intervals on SOC1 dummy variables in a regression of the change in the SOC4-level share of remote-work vacancies between 2019 and 2020. A control for the HLR (2020) work-from-home propensity measure is also included in this regression. The constant reported in this regression represents the effect for the baseline SOC1 group of Managers. The data used is BGT vacancies data collapsed to the SOC4 level. The regression uses robust standard errors.

**Figure 4: Compositional change in administrative and sales SOCs.**



Notes: This figure shows the share of vacancies according to five quintiles of remote-work feasibility for the sample of Administrative and Sales vacancies in the BGT database. The quintiles are constructed by dividing the SOC4 occupations into five groups based on the value of the HLR (2020) measure of remote-work feasibility.

### Early signs of ‘restructuring risk’ are coming into view.

What are the implications of these structural shifts in the use of remote work for employment? Before considering this, we have to recognise that, since March 2020, the labour market has been in an unusual state of ‘suspended animation’.

Figure 5 illustrates this with data from the ONS’ HMRC-PAYE Real Time Information (RTI) release, which is derived from administrative tax data. Before the pandemic, there were around 600,000 inflows and outflows from PAYE employment per month. This literally represents new people joining or leaving employer payrolls and is therefore a good representation of the regular ‘churn’ of the labour market. As Figure 5(a) shows, there was a large spike of exits early in the pandemic (consistent with rising unemployment in mid-2020) and there have been more muted flows since.

In Figure 5(b) we plot the sum of inflows and outflows (‘churn’) to get a better idea of how the fluidity of the labour market has changed. This shows that, since the pandemic, churn is running at around 1.1 million inflows and outflows per month, compared with 1.3 million in 2019 – a 15.4% fall.

A big contributing factor here is the impact of the Job Retention Scheme (JRS) or ‘furlough’. On average, 4 million workers per month have been on furlough since the start of the scheme – about 13.8% of the payrolled workforce in 2019. However, this still leaves a reasonable amount of the fall in churn to be explained and, in any case, the complex rules around partial furloughs make it hard to

conclude that this part of the labour market can be considered to be completely frozen.

This data on labour market flows indicates that a big consequence of the pandemic has been a slowdown in the regular process of reallocation in the economy. A big concern for exiting the pandemic economy is the adjustment that might come as part of 'postponed creative destruction'. However, before considering this, it's worthwhile to consider what kind of reallocation has been occurring during the pandemic.

### **Vacancy trends during the pandemic**

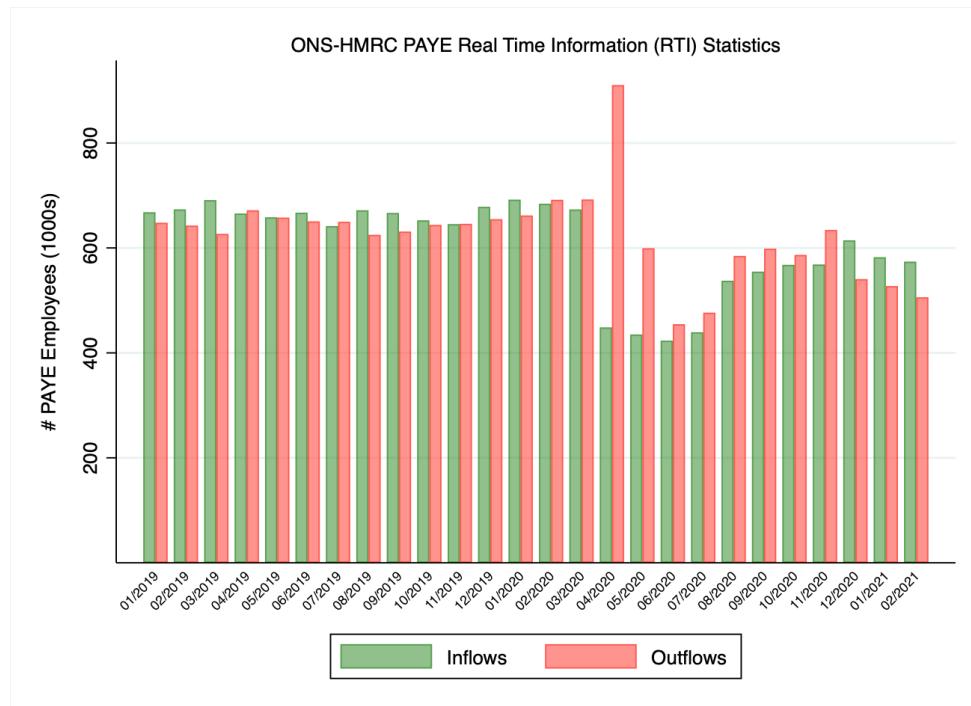
The BGT vacancy data provides a window into where labour market inflows have still been taking place during the pandemic. In Figure 6, we plot vacancy shares per month for three SOC1 occupational categories that summarise the current evolution of this side of the labour market.

The share of managerial vacancies is largely steady but there has been an incomplete recovery in the shares for Administrative and Sales occupations. These groups are still around 1 percentage point lower in terms of their shares, and it must be noted that there has been a general fall in the absolute number of vacancies across occupations. This is in the order of 19% for the official ONS series when comparing the periods February–April 2021 and December 2019–February 2020 (ONS 2021). So in practice this means that there has been a major reduction in the availability of entry and mid-level office work.

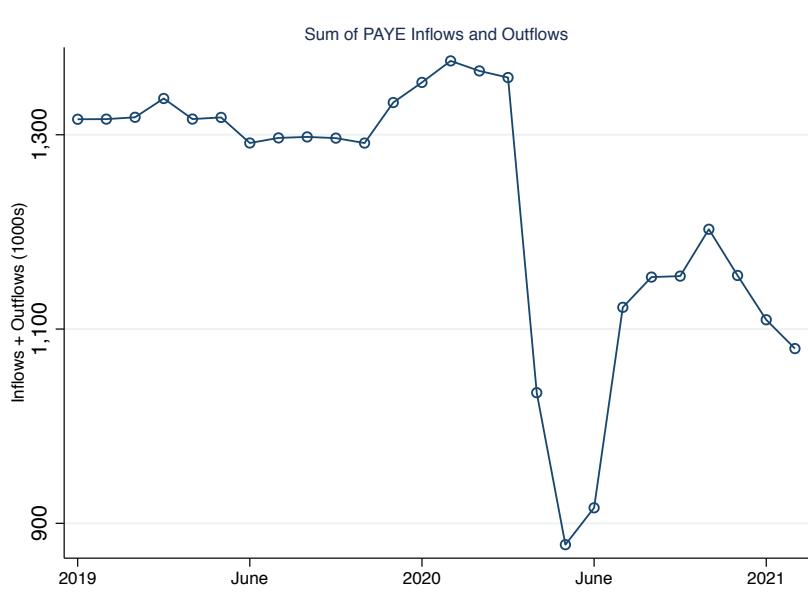
The change in vacancies over 2019 and 2020 within these SOC1 groups is shown in Figure 7. We break them down according to SOC3 occupations and calculate the percentage change in vacancies for each between 2019 and 2020. This shows that Secretarial and Other Administrative occupations have been the hardest hit within the overall Administrative SOC group, with 25–35% falls in vacancies. This pattern of falls would be consistent with firms cutting back on the hiring of the most 'on-site' office workers during the pandemic. Receptionists would be the classic example – there is no demand for such a position if social distancing is in effect and offices are closed.

**Figure 5: Labour market ‘churn’ during the pandemic**

(a) Inflows and outflows to the PAYE system.



(b) Total ‘churn’.



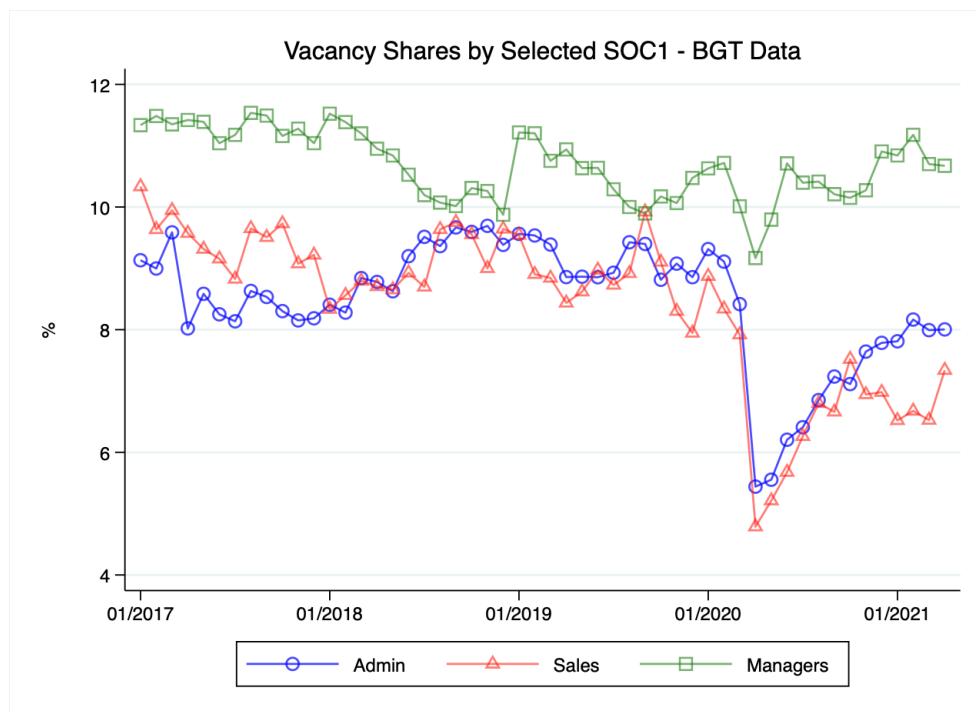
Notes: This figure shows information on labour market inflows and outflows based on the ONS HMRC-PAYE Real Time Information (RTI) release. Figure (5) shows the inflows and outflows broken up separately while Figure 5(b) shows a time series plot of inflows plus outflows.

The fall in vacancies across Sales occupations is more evenly distributed, although managers seem to have been insulated. Notably, there are still large falls in the 'Customer Service' sub-group, which is heavily concentrated on call centre-style operations.

The trends so far in the administrative and sales occupations indicate a potential pattern for post-pandemic labour market adjustments. Specifically, the cutting back of face-to-face office activity through increased remote work is likely to have an impact on the administrative staff whose functions are most complementary to physical office space. Similarly, as e-commerce grows, retail-oriented sales positions will also face re-structuring or elimination.

A key empirical question for the post-pandemic labour market is the extent of the occupational rebalancing that might occur. It is important not to exaggerate the potential scope of this. In Appendix B we show (Figure B.1) that there were small drops in the share of administrative and sales vacancies over both 2020 and 2021. ONS vacancy data shows evidence of a drop in administrative vacancies relative to those for professionals (Figure B.2). However, even if there is minimal change at the aggregate level there is clear potential for concentrated impacts that mirror earlier periods of changes in the labour market.

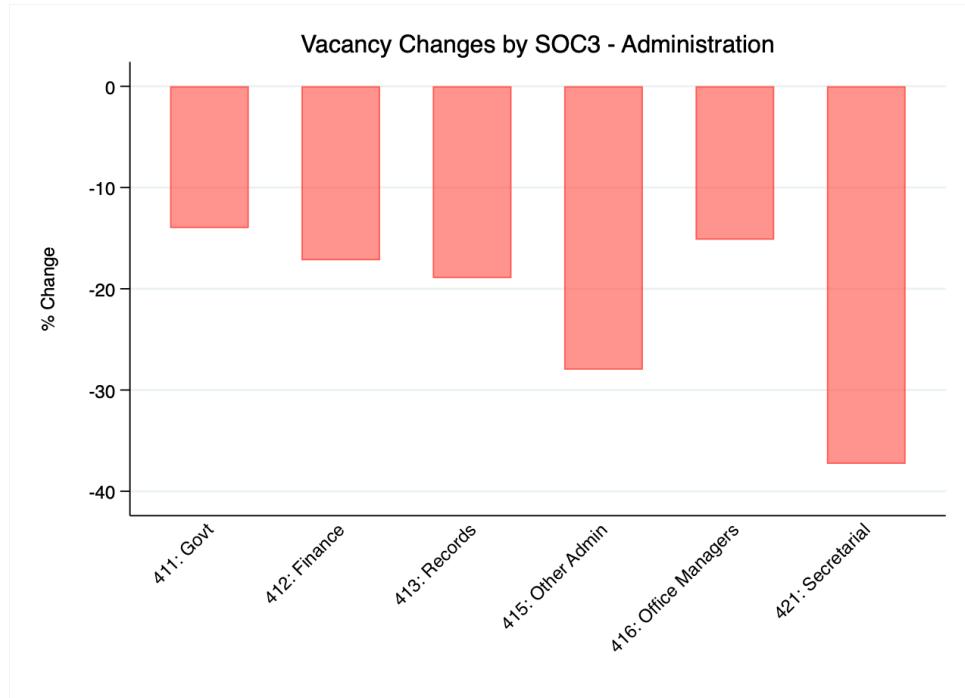
**Figure 6: vacancy shares for selected SOC1 groups – BGT data.**



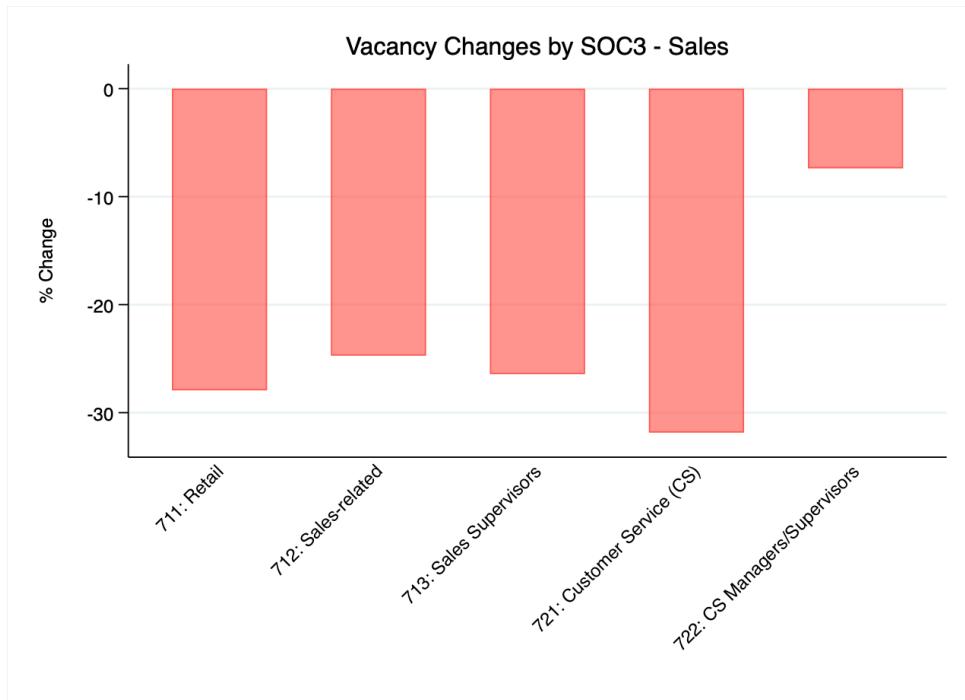
Notes: This figure shows the total share of posted vacancies for three SOC1 groups (Professionals, Administrative occupations and Sales occupations) on monthly basis since January 2017. For example, vacancies for Professional occupations represented 11% of all BGT recorded vacancies in February 2021.

**Figure 7: Percentage change in vacancies by SOC3 – admin and sales, 2020–19.**

(a) Administrative occupations



(b) Sales occupations



Notes: This figure shows the percentage change in vacancies at the SOC3 level between 2020 and 2019 for the BGT database. Calculated based on calendar year total for each year (January–December).

## **Restructuring scenarios for the post-pandemic labour market**

So far during the pandemic, policy has focused on ‘freezing’ the labour market in its 2019 form via policies such as furlough, but re-adjustment when these policies end is inevitable. It is not possible to accurately forecast the extent or speed of this re-adjustment but we can quantify the size of the labour segments that are facing ‘restructuring risk’.

An instructive comparison here is the impact of Artificial Intelligence (AI). A smooth or systematic impact of AI is also hard to accurately predict. But we can work out the parameters of some specific scenarios that involve new technology. In short, there are a range of ‘super-invention’ technologies that we can clearly anticipate. For example, a roll out of autonomous vehicles is likely to take place over the next 5–15 years and this has the potential to affect the (heavily male) driving workforce. Similarly, advances in ‘chatbot’ technology are likely to displace human call centre operators.

In Figure 8 we plot the labour market shares of a range of occupations that can be classed as vulnerable to ‘future shocks’, that is, disruptions due to new technologies or organisational developments such as the rise of remote work. This indicates that the ‘Office Administrative’ group (SOCs 415 and 421) are each comparable in size to the driving workforce (SOC 821 Transport Drivers), which represents about 3% of total employment. The call centre group (SOC 721) represents around 1.5% of employment. We also include a group of ‘Other Transport’ workers in SOC 823. This represents workers in areas like air and rail transport who could plausibly be affected by a general post-COVID reduction in travel (for example, business travel). This is a very small group – around 0.25% and only increases by another 0.15% if we take a generous definition that encompasses other SOCs<sup>1</sup>.

---

<sup>1</sup> For example, SOC 351 Transport Associate Professionals, which includes sub-occupations such Aircraft Pilots and Controllers.

**Figure 8: Employment shares (2019) for selected occupations at risk of ‘future shock’ disruption.**



Notes: This figure shows the employment shares of selected SOC3 occupations calculated from the UK Labour Force Survey (2019).

The practical question for policy in the 2020s is: how quickly might disruption unfold? This will influence the size of the adjustment challenge. For example, the 3% figure for the UK driving workforce physically represents approximately 830,000 workers who are mainly male with an average age of 47. The adjustment of these workers obviously will be easier for the scenario of a 10–20 year transition to autonomous vehicles rather than the sort of swift, decimating disruption that hit industries such as video/DVD retail and newspaper advertising in the 2000s and 2010s.

Brynjolfsson, Rock and Syverson (2019) sketch out scenarios for the roll-out of autonomous vehicles that include benign countervailing effects, that is, increases in overall jobs due to the productivity impacts of the technology. However, the record of technologically driven worker displacements such as the post-1970s decline in manufacturing is not good. Edin et al. (2020) conduct a study of technology-related occupational decline in the US and Sweden and find large, negative lifetime earnings effects (around 8–11%) for those workers at the lower end of the wage distribution.

The suddenness of the pandemic means that remote work has the potential to be a swiftly disruptive force, in this case targeted on an overall labour market segment that represents 4.5% of the workforce. Monitoring the evolution of this part of the labour market is therefore a priority for labour market analyses in 2022 as social distancing is (hopefully) withdrawn.

## References

- Brynjolfsson, E., Rock, D. and Syverson, C. (2019). 'Artificial Intelligence and the Modern Productivity Paradox: A Clash of Expectations and Statistics'. In Agrawal, A; Gans, J and Goldfarb, A (Eds) *The Economics of Artificial Intelligence: An Agenda*. NBER Conference Report.
- Duchini, E., Simion, S. and Turrell, A. (2020) 'Pay Transparency and Cracks in the Glass Ceiling'. *CAGE Working Paper*. No 482.
- Edin, P-A., Evans, T., Graetz, G., Hernnäs, S. and Michaels, G. (2020). 'Individual Consequences of Occupational Decline'. *IZA Working Paper*, no. 12434.
- Mizen, P., Bloom, N. and Taneja, S. (2021). 'What is the Future of Commuting to Work?'. *Economics Observatory*. 12<sup>th</sup> May.
- Hensvik, L., Le Barbanchon, T. and Rathelot, R. (2020). 'Which Jobs can Be Done from Home? Evidence from the American Time Use Survey'. CEPR Discussion Paper, [no. DP14611](#)
- Office of National Statistics (2021). *Statistical Bulletin: Vacancies and Jobs in the UK*, May 2021.

## Appendix A: Measuring remote work in vacancy data

Our main dataset comes from the online job vacancies information maintained by the information company Burning Glass Technologies. BGT are a well-known vendor of online job vacancy information for both commercial and academic usage. They webscrape information across online sources and de-duplicate entries in order to capture the universe of vacancies in a given country as comprehensively as possible.

The UK iteration of the BGT data that we use begins in 2011 and comprises of approximately 30 million vacancies in total. The name of the firm or organisation posting a vacancy can be directly identified for 30% of all vacancies with the remainder being vacancies that are advertised via a third-party recruiter. We therefore use all of the vacancies to construct aggregate and occupation-level datasets but need to restrict ourselves to the subset when doing firm-level analysis.

We take a straightforward approach to characterising vacancies as offering remote-work opportunities. Specifically, we identify 15 keywords or phrases that signal remote work, such ‘work from home’, ‘home-based’, ‘tele-commuting’ or ‘virtual job’. A given vacancy is classified as being remote if at least one of these keywords or phrases is used in the advertisement. We base our search from words found in Timewise and official definition of flexible work arrangements by the Advisory, Conciliation and Arbitration Service (ACAS). We complement this vocabulary with other expressions identified via a data-driven approach (we found these additional expressions in the BGT data).

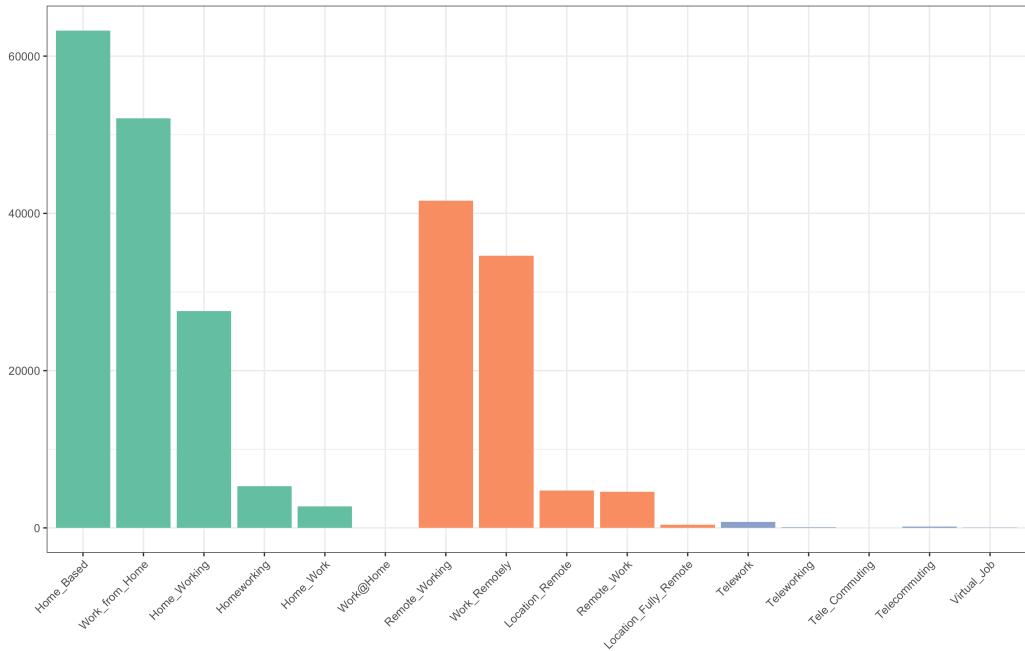
In Figure A.1 we show the frequency of the terms, which are organised into three clusters. The first cluster for ‘home-based’ work represents the largest cluster. As a robustness exercise, we also manually audit a sample of 400 hundred job vacancies with the main objective of testing for ‘false negatives’. That is, vacancies that could be plausibly classified as remote-work positions but were not picked up by our algorithm. We only pick up cases of 2/100 false negatives and 2/100 cases of false positives. On reviewing the algorithm and adding some terms we were able to eliminate false negatives.

What is the share of remote vacancies in total vacancies? We show this in Figure A.2 for both a weighted and unweighted basis. The ‘unweighted’ measure calculates the mean across occupations while the weighted measure pools the vacancies into one aggregate measure before calculating the remote-work shares. Both measures show comparable increases in the share of remote-work vacancies, reaching 11–12% by early 2021.

This is notably lower than the incidence of remote working seen in the ONS’ OPN data that we discuss in the main part of the briefing. In part this will be because the two data sources differ in the qualitative coverage – the OPN covers the existing ‘stock’ of employees while the BGT vacancies data is measuring one aspect of the ‘flow’. That said, the gap is large and a major question for further analysis is whether the availability of remote-work options is going unstated in job advertisement. In principle, this does not affect the basic analysis of remote-work trends as long as ‘stock’ measures are correlated with our vacancy-based ‘flow’ measures at the occupation level. We are currently in the process of

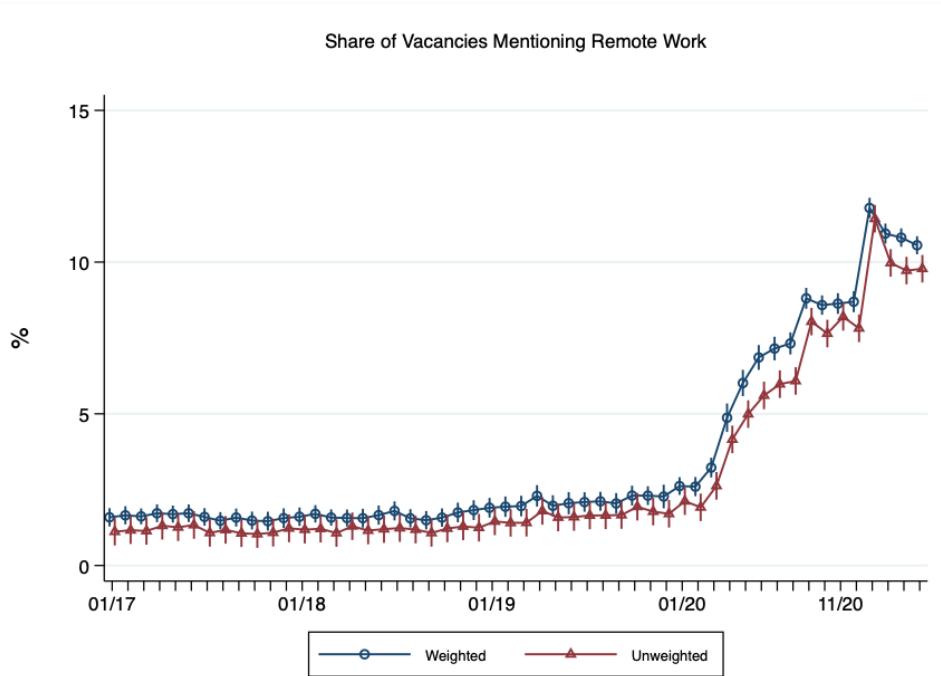
matching the OPN and BGT at the occupation level in order to conduct this validation exercise.

**Figure A.1: Remote-work keywords in BGT data**



Notes: This figure shows the breakdown of the remote-work keywords that we use to classify vacancies. The height of each bar represents the yearly average number of remote-work vacancies in the period 2017–2021. The colour-coding indicates different groupings of words, which are listed on the x-axis.

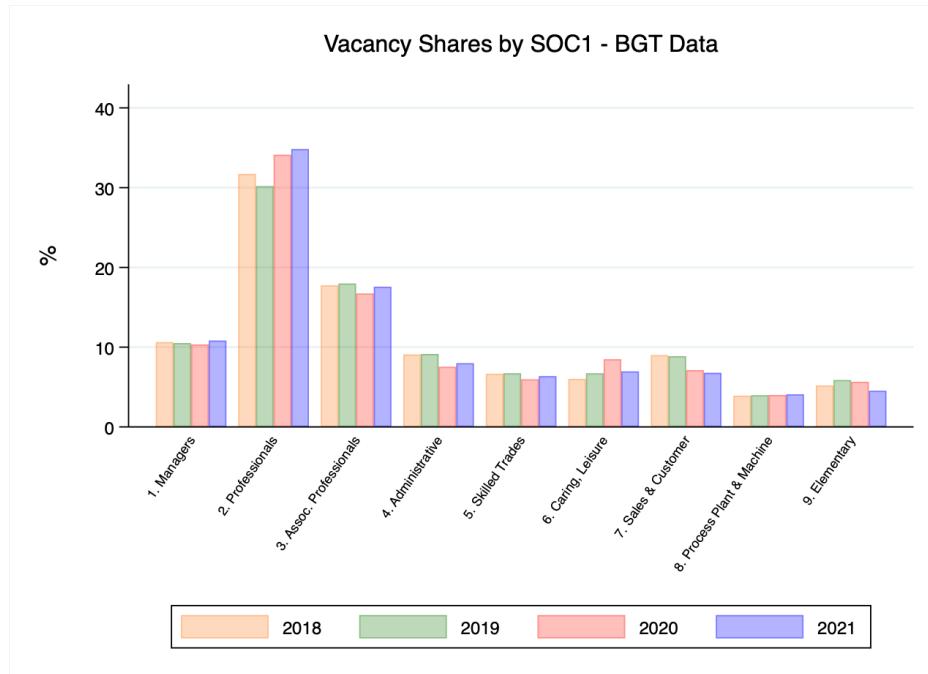
**Figure A.2: Monthly evolution of remote-work vacancies.**



Notes: This figure shows the share of remote vacancies in total vacancies in the BGT data. The weighted measure pools across all vacancies (i.e., it is the weighted aggregate) while the unweighted measure is the mean across SOC4 occupations.

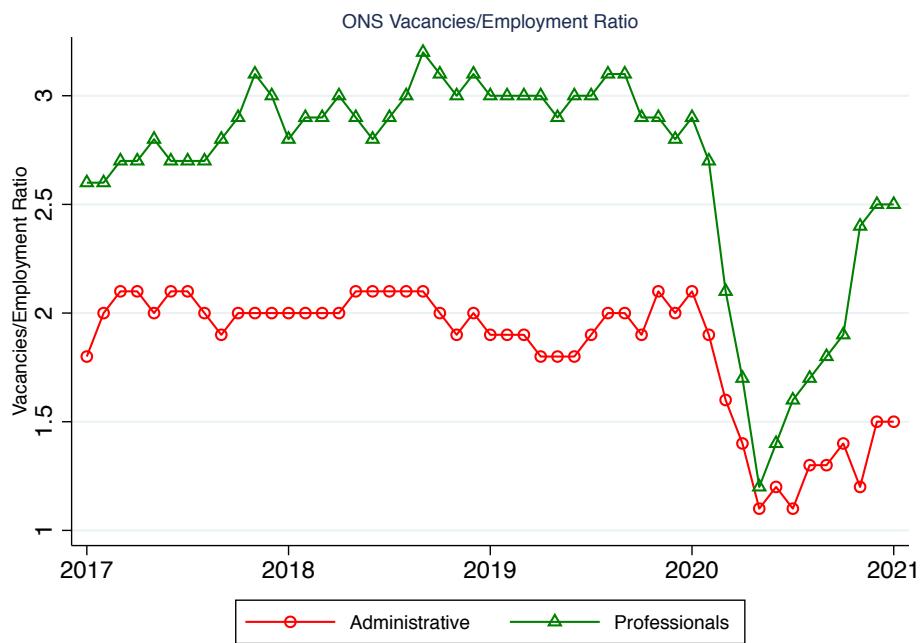
## Appendix B: Other evidence on vacancy trends

**Figure B.1: Vacancy shares by SOC1 and year, BGT data.**



Notes: This figure shows the total vacancy shares of SOC1 groups across years in the BGT data.

**Figure B.2: Evidence from ONS vacancy series.**



Notes: This figure shows the vacancy to employment ratios from the aggregated files for the ONS Vacancy Survey. We present information on the Professionals and Administrative categories as these can be most closely compared to definitions we can construct using BGT data.