

Changes down the line: Flattening the curve of public transport use

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Alex Davenport
Peter Levell

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Executive summary

This report looks at normal (pre-lockdown) commuting patterns, what they tell us about who would be affected by continued social distancing on public transport, and what they tell us about how policy can ease public transport congestion in a world of continued social distancing. Our main findings are:

- **Commuting to work via public transport is less common than other means of getting to work but particularly important in certain parts of the country – especially London.** 14% of the workforce use public transport to get to work in the UK, and 49% of workers living in London. However, the nature of jobs in London means that workers there are on average more able to work from home than workers in the rest of the country.
- **Those less able to work from home are much more likely to have taken the bus to work, particularly in London.** 22% of workers in London who are less able to work from home took the bus to work, compared with just 9% of those more able to work from home. Workers who were more able to work from home were, by contrast, much more likely to take the train or tube.
- **Compared with other forms of commuting, public transport use is much more concentrated at particular times, especially in London and the South East.** Between 7:00 and 7:10am, those commuting via public transport accounted for 31% of all commuters in London and the South East. Between 8:20 and 8:30am (a peak commuting time), 44% of those commuting were using public transport. Encouraging workers to work different shifts or make use of other forms of transport will therefore be particularly important in London and other urban areas.
- **Helpfully, workers who can work from home are much more likely to have been commuting on public transport at peak times before the lockdown.** Encouraging home working is therefore likely to be disproportionately effective at reducing public transport congestion. Less helpfully from the perspective of easing congestion, ‘key workers’ who cannot work from home were just as likely to have been commuting on public transport at peak times as other workers before the lockdown.
- **Younger workers are most reliant on public transport to get to work, with almost a fifth of those aged 16–24 using it compared with just 9% of workers aged 55 and over.** The differences are starkest in London, where 63% of working young people commute by public transport compared with 40% of those aged 55 and over. Younger workers were also less likely to work in jobs that could be done from home before the lockdown. Previous work has highlighted how these workers were disproportionately affected by the shutdown of particular sectors, such as hospitality. These figures suggest there would be challenges in getting many younger workers back to work safely even if the businesses that employ them are allowed to reopen.

1. Introduction

Social distancing measures are likely to be with us for some time. Even as lockdown eases, and the economy reopens, there will be changes to both the way we work and the ways we get to work.

This is particularly true for those who commute using public transport; if people using public transport must remain 2 metres apart, there will be far less capacity than in normal times. For example, rail companies have suggested that capacity on trains may be reduced by 70–90% if social distancing is enforced, and Transport for London has said that, even if all services are operating, capacity on London’s bus and tube network will only be 13–15% of what it is normally.¹

Getting to work by public transport, such as buses, trains and trams, is less common than private modes of transport such as driving, walking or cycling which are less affected by social distancing measures. Nonetheless, the scale of the problem affecting public transport is significant. Overall, 13.6% of the UK workforce – around 4.5 million workers – got to work by public transport in the pre-lockdown period.²

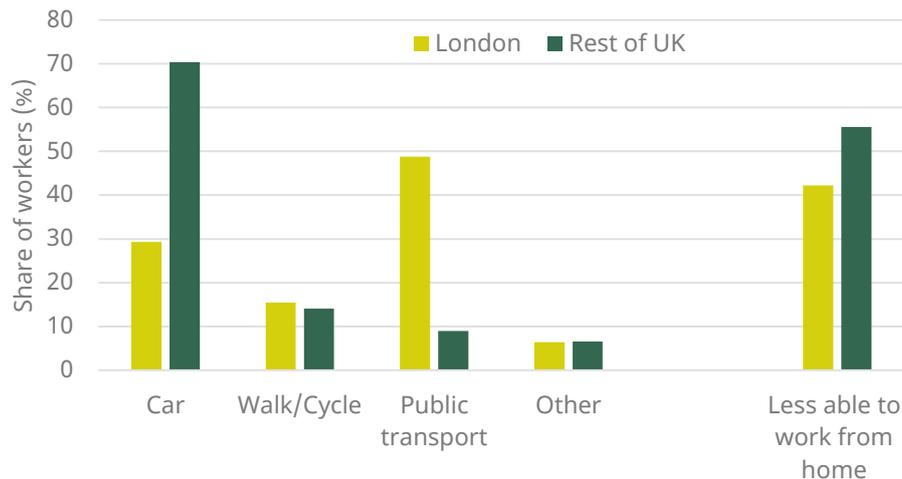
¹ See <https://www.bbc.co.uk/news/business-52394835> and <https://www.standard.co.uk/news/london/tfl-face-masks-worn-london-tube-buses-a4437211.html>.

² Authors’ calculations using the UKHLS wave 8 and an estimate of 33.07 million workers in the UK taken from <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/bulletins/employmentintheuk/april2020>, accessed on 6 May 2020.

2. How do people get to work?

Figure 1 shows how people travelled to work in more normal times. We separate out London from the other main regions of the UK (where means of getting to work are quite similar). Outside of London, around 70% of workers normally get to their jobs by car, 14% walk or cycle and 9% take public transport. However, workers resident in London were far more likely to take public transport. Almost half (49%) of workers in London took trains, trams or buses to work, 15% cycled or walked and 29% travelled by car. Almost half (49%) of workers in London took trains, trams or buses to work, 15% cycled or walked and 29% travelled by car.

Figure 1. Method of travelling to work and ability to work from home



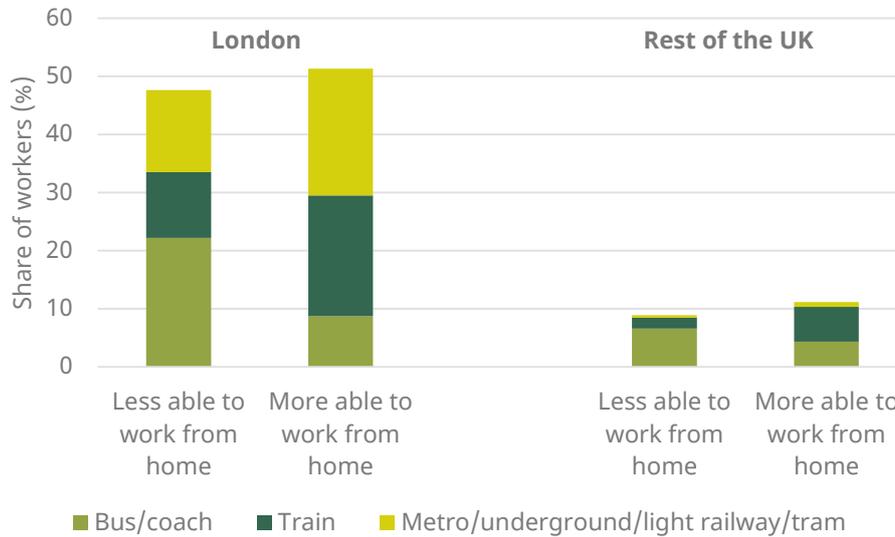
Note: Authors' calculations using the UK Household Longitudinal Survey (UKHLS) wave 8 and the Quarterly Labour Force Survey (QLFS) 2019; measures of whether occupations can work from home taken from J. Dingel and B. Neiman, 'How many jobs can be done at home?', *COVID Economics, Vetted and Real-Time Papers*, 2020, 1, 16-24, <https://cepr.org/sites/default/files/news/CovidEcon1%20final.pdf>. We use the QLFS to calculate shares of workers whose jobs are amenable to home working. 'Car' category includes being given a lift by others. 'Public transport' is defined as those travelling by bus/coach, train and metro/underground/light railway/tram. 'Other' includes travel by motorcycle or taxi and those who usually work from home (and so do not travel to work). Calculations based on region of residence.

As the lockdown eases, it is likely that the government will encourage those workers who are able to work from home to continue doing so, mitigating some of the capacity issues on public transport. The extent to which this is possible for different workers is naturally difficult to assess. To measure whether occupations are amenable to working from home, we take data on the tasks associated with different occupations. Occupations involving work with machinery or outside cannot be done from home, while many desk-based jobs can.³ On the basis of this measure, Figure 1 shows the pre-lockdown shares of workers

³ To produce this, we have applied the approach of Avdiu and Nayyar (2020), which was based on the tasks involved in different occupations in the US and which itself utilised analysis of the O*NET task database undertaken by Dingel and Neiman (2020). In the UK Time Use Survey, where occupations are available at the level of four-digit Standard Occupational Classification (SOC) codes, we class workers as 'less able to work from home' if fewer than 80% of workers in their four-digit occupation heading are able to work from home. In the UKHLS, where occupations are available at the level of three-digit SOC codes, we class workers as 'less able to work from home' if fewer than 50% of workers in their occupation heading are able to work from home (a share calculated in the QLFS). These choices of thresholds give roughly the same proportion of the workforce able to work from home in the QLFS and UKHLS. (B. Avdiu and G. Nayyar, 'When face-to-face interactions become an occupational hazard: jobs in the time of COVID-19', Brookings, 30 March 2020, <https://www.brookings.edu/blog/future-development/2020/03/30/when-face-to-face-interactions-become-an-occupational-hazard-jobs-in-the-time->

whose jobs were less easily done at home, split by whether they live in London or in the rest of the UK. In London, where many more jobs are office-based, just 42% of workers worked in jobs that could not have been done from home, compared with around 56% of workers in the rest of the UK. This leaves significant numbers of workers, both within and outside of London, who are unable to work from home, and who travelled to work by public transport before the lockdown.

Figure 2. Means of public transport and ability to work from home



Note: Authors' calculations using UKHLS wave 8 and QLFS 2019; measures of whether occupations can work from home taken from J. Dingel and B. Neiman, 'How many jobs can be done at home?', *COVID Economics, Vetted and Real-Time Papers*, 2020, 1, 16–24, <https://cepr.org/sites/default/files/news/CovidEcon1%20final.pdf>. We use the QLFS to calculate shares of workers in occupations amenable to home working at the three-digit SOC level (the level of occupation detail available in the UKHLS), and then use the UKHLS to look at how public transport use differs between those more or less able to work from home. Three-digit occupations are deemed not able to work from home if fewer than 50% of workers could work from home. Calculations based on region of residence.

Encouraging home working will reduce congestion on public transport by more if those able to work from home were also more likely to take public transport to work in normal times. Figure 2 shows which forms of public transport use were most common, for those more able to work from home and for those less able to, and for workers living inside and outside of London. Overall, those more able to work from home are only slightly more likely to have commuted via public transport. However, the pattern of the forms of public transport these workers take is quite different from that for other workers. Those less able to work from home are much more likely to have taken the bus to work, particularly in London: 22% of workers in London who are less able to work from home took the bus to work, compared with just 9% of those more able to work from home. Workers who were more able to work from home were, by contrast, much more likely to take the train or tube.

[of-covid-19/](#) and J. Dingel and B. Neiman, 'How many jobs can be done at home?', *COVID Economics: Vetted and Real-Time Papers*, 2020, 1, 16–24, <https://cepr.org/sites/default/files/news/CovidEcon1%20final.pdf>.)

3. How do people travel at different times of the day?

The government has made clear that workers will still be able to use public transport if adequate social distancing can be maintained on buses, trains, trams etc. This will in turn require that fewer people use public transport, particularly given that it already ran at close to capacity during peak hours even without social distancing. Home working, cycling and walking can all help solve the problem, but clearly are only partial solutions. Some people cannot work from home (including many key workers), and cycling or walking is not an option for people who live too far from their work or have mobility or other relevant health problems. Driving is likely to have to take up some of the slack. But spreading out commuting times on public transport, so that they are less bunched at peak hours, will also be very important.

Figures 3a and 3b show the times at which people were travelling to work before the lockdown, both for the whole of the UK and for London and the South East alone. The upper edge of the graph represents the total share of commuters travelling within a given 10-minute period, and each shaded area represents workers who were commuting using different forms of transport. Unsurprisingly, the times at which people travelled to and from work are highly concentrated at the peak times of 7–9am and 5–6.30pm, and a greater proportion of workers travel at this time in London and the South East than in the country as a whole. For example, 15% of workers are commuting between 8:20 and 8:30 in the morning (a peak commuting time), a share that rises to 20% in London and the South East. The proportion of workers commuting at any given time also tends to be higher in London and the South East than elsewhere. This is partly driven by the fact that workers in London spend more time getting to and from work; workers in London and the South East spent on average 53 minutes travelling to and from work per day before the lockdown, compared with 44 minutes per day for workers in the UK as a whole.

The dark green sections of Figures 3a and 3b show the proportion of workers commuting using public transport in each 10-minute interval. In London and the South East especially, those commuting via public transport were more likely to be commuting at peak times in the morning. Between 7:00 and 7:10am, those commuting via public transport accounted for 31% of all commuters in London and the South East. In the far busier period between 8:20 and 8:30am, those taking public transport accounted for 44% of those commuting. Across the country as a whole, where relatively fewer workers use public transport to get to work, public transport use is more evenly spread over the morning rush hour. Encouraging workers who get to work by public transport to change their hours or make use of other forms of transport is therefore going to be particularly important in London and the South East.

Figure 3. Share of workers travelling to work in 10-minute intervals over the course of a weekday, by method of travel



Note: UK Time Use Survey 2014–15. Figure shows the share of workers who report their main activity in a 10-minute interval as commuting. Data are for a randomly selected weekday. Calculations based on region of residence.

One way to help achieve this is to encourage employers to spread shifts out across the day to reduce the peak load, ‘flattening the curve’ of public transport use in Figure 3 and spreading the load across the day.⁴ Another option is to encourage more walking or cycling to work, which is very appealing where it is practicable and can be done safely, but of course there are many people for whom it will not be an option. Figure 1 showed that only 15% of the workforce in London, and 14% of the workforce in the rest of the country,

⁴ BBC News, [Coronavirus: staggered work times considered when lockdown eases](#), 3 May 2020.

walked or cycled to work before the lockdown. It is unclear how much higher that number could be pushed with appropriate investments, of the kind recently announced.⁵

One reason home working is likely to be especially effective at easing public transport congestion is that those more able to work from home were also more likely to commute at peak times. To investigate this, we have decomposed the shares of those commuting on public transport at different times of the day during normal times into those due to key workers and non-key workers who are more and less able to work from home. Helpfully, it turns out that non-key workers who *can* work from home were much more likely to be travelling at peak times before the lockdown. For example, between 7:00 and 7:10am, 24% of those travelling by public transport before the lockdown were non-key workers who could work from home, but this proportion rose to 43% of those commuting between 8:20 and 8:30am. In London and the South East, the differences were even starker: between 7:00 and 7:10am, 10% of those travelling on public transport were non-key workers who could work from home, rising to 38% between 8:20 and 8:30am. This means that encouraging home working where possible will be disproportionately helpful for reducing congestion at peak times. Less helpfully from the perspective of easing congestion, key workers who cannot work from home were just as likely to have been commuting at peak times as other workers before the lockdown.

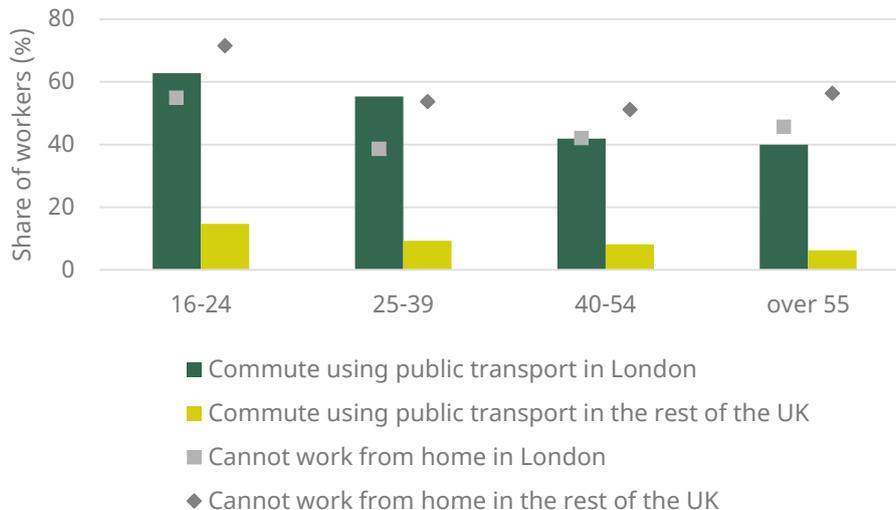
⁵ BBC News, [Government to urge us all to walk and cycle more](#), 9 May 2020.

4. Who is affected by restrictions on public transport use?

We now turn to discuss how public transport use and home working vary across different population groups and industries of employment, to see who may be affected if commuting via public transport remains difficult for some time.

Figure 4 shows how public transport use and workers' ability to work from home vary by age. It can be seen that the youngest workers are most reliant on public transport to get to work, with almost a fifth of those aged 16–24 using it nationally compared with just 9% of those in work who are aged 55 and over. The differences are starkest in London, where 63% of working young people commute by public transport compared with 40% of those aged 55 and over. Figure 4 also shows that the young are much less likely to be able to work from home: around 72% of those living and working aged 16–24 within London, and 55% in the rest of the UK, unable to work from home, compared with around 51% and 42% of those aged 40–54 inside and outside of London respectively. Previous research at IFS has highlighted that the young are among those most affected by the lockdown of the economy.⁶ Figure 4 suggests they may also be among the least able to return to previous working patterns without making use of public transport.

Figure 4. Public transport use and ability to work from home, by age



Note: Authors' calculations using UKHLS wave 8 and QLFS 2019; measures of whether occupations can work from home taken from J. Dingel and B. Neiman, 'How many jobs can be done at home?', *COVID Economics, Vetted and Real-Time Papers*, 2020, 1, 16–24, <https://cepr.org/sites/default/files/news/CovidEcon1%20final.pdf>. We use the QLFS to calculate shares of workers in each age category whose jobs are amenable to home working. Public transport is defined as those travelling by bus/coach, train and metro/underground/light railway/tram. Calculations based on region of residence.

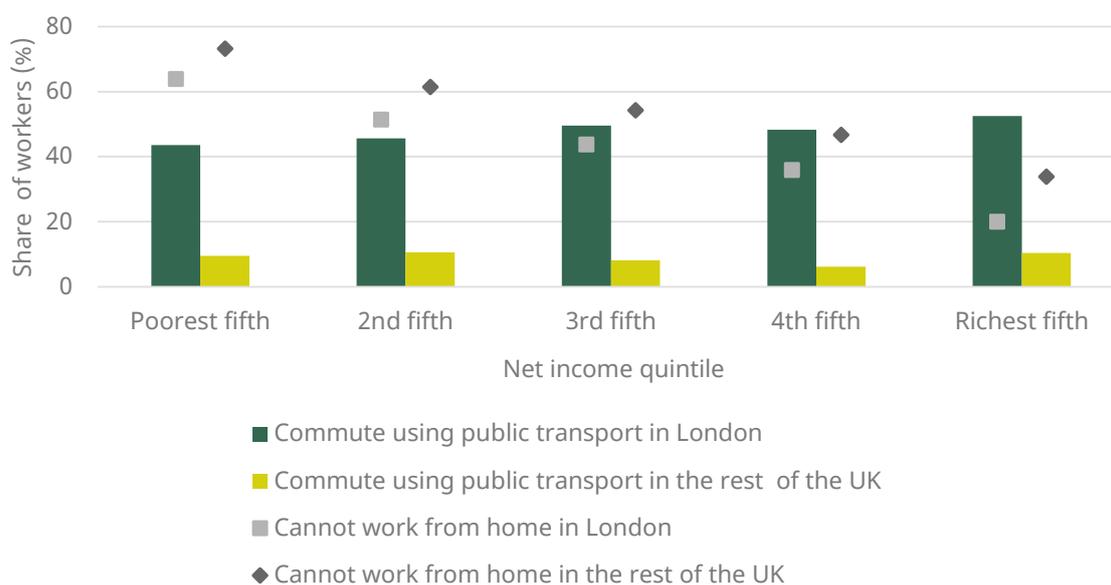
Figure 5 shows how public transport use and ability to work from home both varied by income in normal times. Outside of London, there were not huge differences between the public transport use of the poorest and richest fifth of workers. Within London, it is

⁶ R. Joyce and X. Xu, 'Sector shutdowns during the coronavirus crisis: which workers are most exposed?', IFS Briefing Note BN278, 6 April 2020, <https://www.ifs.org.uk/publications/14791>.

actually the richest individuals who were most likely to use public transport the most before the lockdown, with 52% of workers in the top income quintile relying on it to get to work. This is likely because the highest-paying jobs in London are concentrated in the city centre and Canary Wharf, which most commuters reach by public transport.

Although those with the lowest incomes will be less affected, it remains the case that in London 44% of the poorest fifth of workers commute via public transport. Furthermore, as Figure 5 also shows, those with the lowest incomes are far less likely to be able to work from home than those with the highest incomes: 64% of workers whose incomes put them in the poorest fifth in London, and 73% of such workers in the rest of the UK, would struggle to work from home; the corresponding figures for the richest fifth are far lower (20% in London and 34% in the rest of the UK).

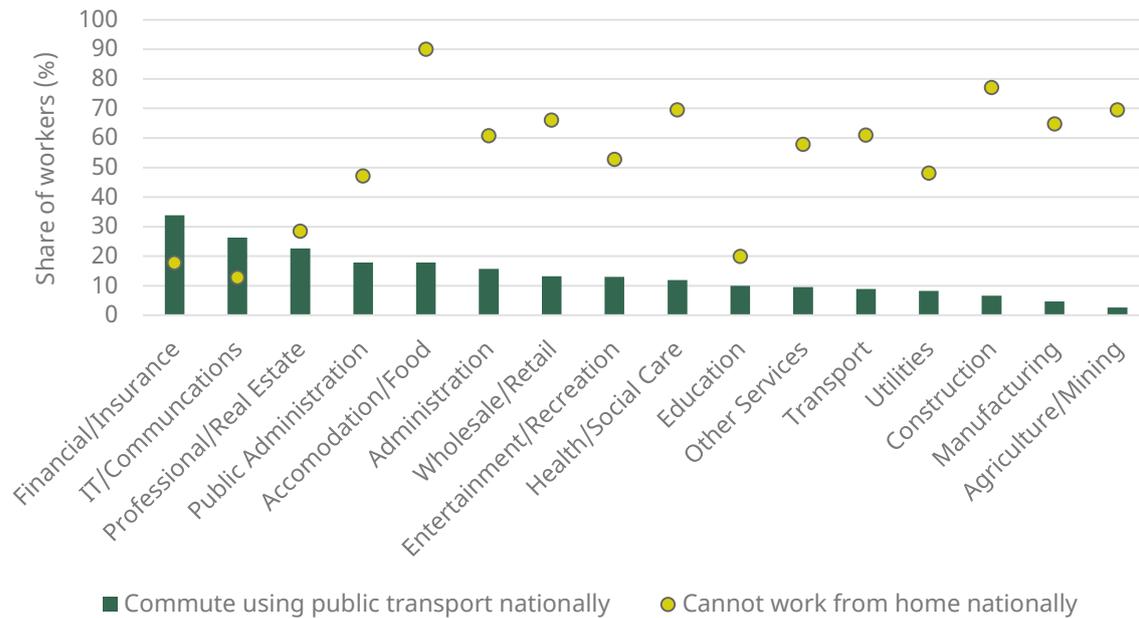
Figure 5. Public transport use and ability to work from home, by income quintile



Note: Authors' calculations using UKHLS wave 8 and QLFS 2019; measures of whether occupations can work from home taken from J. Dingel and B. Neiman, 'How many jobs can be done at home?', *COVID Economics, Vetted and Real-Time Papers*, 2020, 1, 16–24, <https://cepr.org/sites/default/files/news/CovidEcon1%20final.pdf>. We use the QLFS to calculate shares of workers in occupations amenable to home working at the three-digit SOC level (the level of occupation detail available in the UKHLS), and then use the UKHLS to calculate how home working varies across income quintiles. Three-digit occupations are deemed amenable to home working if at least 50% of workers could work from home (measured across all workers, not just those in that income group). Public transport is defined as those travelling by bus/coach, train and metro/underground/light railway/tram. Income quintiles are defined by net monthly individual income. Calculations based on region of residence.

Constraints on public transport use will also have different impacts on different industries. Figure 6 shows that workers in financial and insurance services were most likely to commute via public transport, with over a third of the workforce nationally taking public transport to work (reflecting this industry's concentration in London). However, over 80% of workers in this sector also work in occupations that can be done from home, so social distancing on public transport may be less of a problem. By contrast, fewer than 5% of workers in manufacturing and agriculture/mining commute via public transport, but equally only a third of workers in these industries can work from home.

Figure 6. Public transport use and ability to work from home by industry of employment



Note: Authors' calculations using UKHLS wave 8 and QLFS 2019; measures of whether occupations can work from home taken from J. Dingel and B. Neiman, 'How many jobs can be done at home?', *COVID Economics, Vetted and Real-Time Papers*, 2020, 1, 16–24, <https://cepr.org/sites/default/files/news/CovidEcon1%20final.pdf>. We use the QLFS to calculate shares of workers able to work from home by industry. Public transport is defined as those travelling by bus/coach, train and metro/underground/light railway/tram. Measures are as a share of the entire working population working in that industry.

The accommodation/food sector stands out alongside administration and wholesale/retail as sectors with *both* relatively high public transport use *and* low ability to work from home. Workers in these sectors may struggle to return to their previous jobs until social distancing measures are eased; this is especially true in London, where 66% of workers in accommodation and food commute on public transport but only 28% are estimated to be able to work from home.

Data sources

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