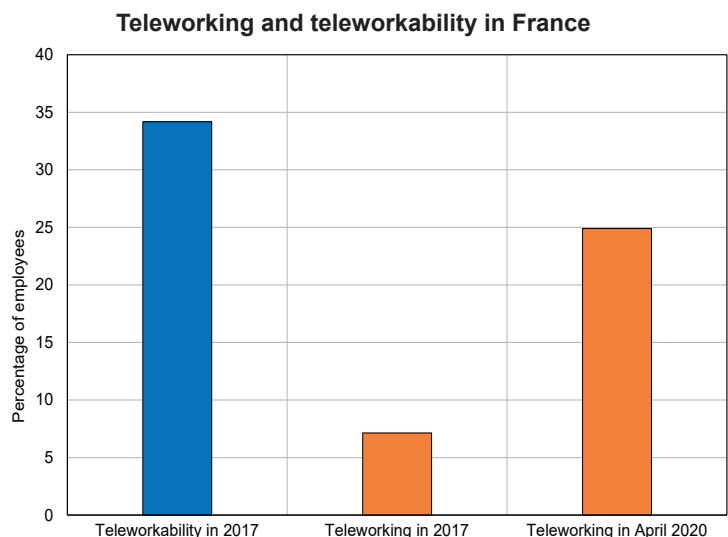


How Effective Was Remote Working for Managing the COVID-19 Pandemic?

Cyprien Batut

- In 2020 and 2021, teleworking was an important part of the French government's public health policy toolkit. Though just a small minority of French employees worked remotely before the COVID-19 pandemic, nearly one in four employees did so during the first lockdown, while one in five teleworked during the second lockdown through to June 2021 (see chart below).
- Teleworking was intended to achieve two goals: mitigate the spread of the epidemic by reducing mobility and employees' contact with others, and maintain economic activity.
- To estimate teleworking's effectiveness in achieving these two goals, we compare changes in mobility indicators, epidemiological variables and short-time work using rates at the end of lockdown periods from region to region and between economic sectors with different probabilities of teleworking, calculated by estimating the share of teleworkable jobs. All else being equal, we expect the epidemic rebound to occur at a slower pace in regions and among economic sectors where it is easier to work remotely.
- According to our findings, teleworkability is correlated with preventing COVID-19 infections and reducing costs related to short-time work schemes. If the proportion of teleworkable jobs had been 10 percentage points higher, mobility would have increased less than what was observed at the end of the lockdowns (by –32 percentage points on average, with the mobility index set at a base value of 100 in early January 2020), and excess mortality when compared with the 2018-2019 period would have risen less (by –4 percentage points). During the lockdowns, the proportion of employees under short-time work schemes would have been 1 percentage point lower than what was observed.



Source: ACEMO-Covid – SUMER 2017 – DG Trésor calculations.

How to read this chart: In the survey, employees are considered teleworkers if they reported working remotely at least on an occasional basis (i.e. a few days or half-days per month).

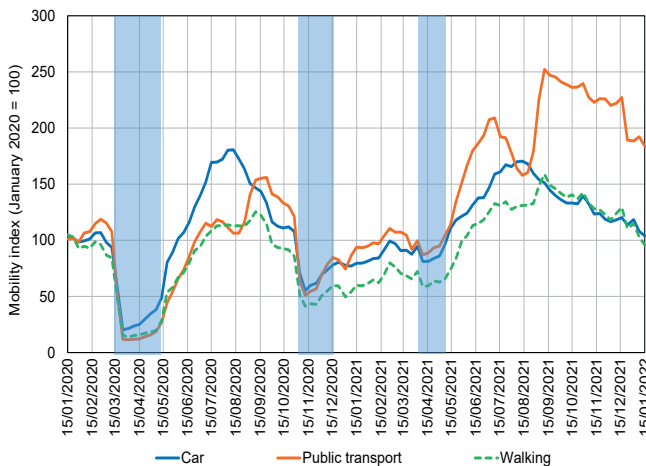
1. Remote work was prevalent during the COVID-19 pandemic¹

1.1 Three successive lockdowns

In 2020 and 2021, three lockdowns were mandated in France: the first lasted from week 12 to week 20 in 2020 (March-May 2020), the second from week 44 to week 51 in 2020 (November until end-December 2020) and the third from week 14 to week 18 in 2021. These three lockdowns were intended to slow the spread of the epidemic by restricting the movement of French employees and limiting their contact with others.

The first two lockdowns significantly reduced commuting and travelling (see Chart 1), but this was much less true of the third lockdown, in 2021.

Chart 1: Timeline of three lockdowns and mobility in France



Source: Apple mobility data.

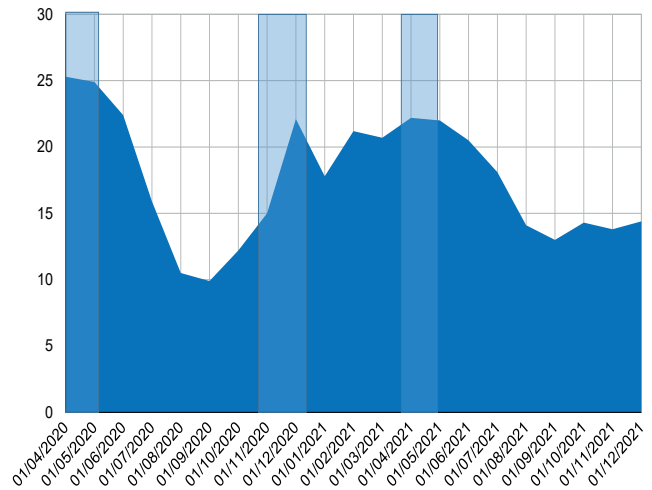
Note: The above chart shows changes in the mobility of the French population, according to mobile phone data tracking the various means of transport used in 2020 and 2021. The mobility index is set at a base value of 100 starting in the second week of 2020. Lockdown periods are indicated by blue bars.

1.2 At the height of the pandemic, nearly three in four employees able to telework did so

Teleworking was an integral part of the French government's response to the pandemic. In March 2020, the government implemented national public health protection measures in the workplace, including a recommendation that all employees able to work from home do so on a full-time basis. According to the firms surveyed, 25% of employees teleworked during the first lockdown. This proportion fell in the summer of 2020

and then rose again to roughly 20% as of the second lockdown and through to June 2021, before levelling off at around 15% thereafter (see Chart 2).

Chart 2: Teleworking rates in 2020 and 2021



Source: ACEMO-Covid, April 2020–December 2021, DARES.

Note: The above chart shows changes in the share of employees reported by firms as teleworking between April 2020 and December 2021. Lockdown periods are indicated by blue bars.

Teleworking has grown considerably since the pre-pandemic period. While the numbers are not entirely comparable,² in 2017 a mere 3% of the employees surveyed reported working from home on a regular basis (i.e. at least once per week), with 7% reporting that they teleworked occasionally (a few times per month).

Drawing on a paper published by Dingel and Neiman (2021),³ and data from the SUMER 2017 survey, which provides information on the working conditions of a representative sample of French employees, it is possible to estimate the proportion of employees with “teleworkable” jobs, e.g. ones that do not involve assembly line work, direct contact with the public or manual labour. Applying such criteria, 46% of jobs in the Greater Paris Region are teleworkable, whereas the percentage falls to 24% in Normandy. Overall, 34% of all French employees have teleworkable jobs. Under this definition, nearly three-quarters of employees who were able to work remotely did so in April 2020 (see chart on cover page).

(1) This issue of Trésor-Economics was adapted from C. Batut (2022), “Télétravail et crise sanitaire”, *Document de Travail de la DG Trésor*, no. 2022/1.
(2) The ACEMO-Covid survey, which tracked the use of teleworking from April 2020 onwards, was conducted with businesses, whereas the SUMER survey, which provides data on the use of teleworking in 2017, was conducted with employees. For more information on the findings of the SUMER survey on teleworking, see S. Hallépée and A. Mauroux (2019), “Quels sont les salariés concernés par le télétravail ?”, *Dares Analyses* no. 051.
(3) J. I. Dingel and B. Neiman (2020), “How Many Jobs Can Be Done at Home?”, *Journal of Public Economics*, 189, 104235.

2. Remote working eased the impact of the pandemic

2.1 An econometric approach to telework effects

Estimating the effect of teleworking on the spread of the epidemic and on short-time work scheme rates poses a number of challenges due to phenomena that skew the relationship between these different variables and make it difficult to establish causality, given that:

- In the regions or sectors where infection and mortality rates increased the most, employers and employees were probably more likely to use teleworking arrangements (reverse causality).
- The regions or sectors that used teleworking arrangements the most exhibit characteristics that may make them more vulnerable to the impact of the pandemic (omitted-variable bias). For example, in cities – where a larger proportion of jobs are teleworkable – population density is higher on average, which facilitates the spread of the virus.

To eliminate the problem of reverse causality, we compare epidemiological variables and short-time work using rates against 2017 data on teleworkability,

as opposed to teleworking data from 2020 and 2021. The teleworkability of jobs in 2017 is independent of the effect of the 2020-2021 pandemic on the entities in question.

This method does not, however, resolve the problem of omitted-variable bias. The regions and sectors that had the largest proportion of teleworkable jobs in 2017 may exhibit characteristics that make them more vulnerable to the impact of the pandemic. To resolve this issue, the various lockdown periods are used in a difference-in-differences model. We assume that if the lockdowns had continued (i.e. if the lockdowns, which significantly reduce the use of all forms of public and private transport, even among non-teleworkers, had been maintained), the units of observation with highly teleworkable jobs would have experienced similar trends as the units with non-teleworkable jobs. Accordingly, our research compares (i) the discrepancies in trends in regions with a larger proportion of teleworkable jobs versus other regions during non-lockdown periods with (ii) differences in teleworkability between these regions (see Box 1).

Box 1: Difference-in-differences estimate

In practice, the effect of teleworkability on epidemiological or economic variables of interest is estimated by the ordinary least squares (OLS) method using a difference-in-differences model, with two sets of fixed effects (one for the unit of observation and the other for the time unit of the panel). The coefficient of interest pertains to the interaction between a standardised score of teleworkability in 2017 and a binary variable equal to 1 during non-lockdown periods and to 0 during lockdown periods. The model includes individual and time fixed effects, which capture respectively the constants of the unit of observation and the changes over time observed nationwide in France that affect the dependent variable. The coefficient of interest measures the effect of an additional standard deviation of teleworkability in 2017 on the dependent variables during non-lockdown periods versus lockdown periods.

Several dependent variables are considered: a mobility index (with a base value of 100 in January 2020), COVID-19 infection rates, test positivity rates, excess mortality compared to that of the 2018-2019 period and the share of employees under short-time work schemes. Infection and mortality data were lagged by one and three weeks, respectively, in order to take into account the lapse of time between exposure to the coronavirus and infection/death.

For the epidemiological and mobility-related dependent variables, the model is estimated on a panel of 18 French regions observed on a weekly basis. For short-time work scheme rates, the panel is made up of 288 sectors^a / regions observed on a monthly basis. Further information on the estimation methodology can be found in Batut 2022.

a. Combined nomenclature (*nomenclature agrégée* – NA), 2008 A17.

2.2 Teleworking's effectiveness at mitigating the spread of the virus and maintaining business operations

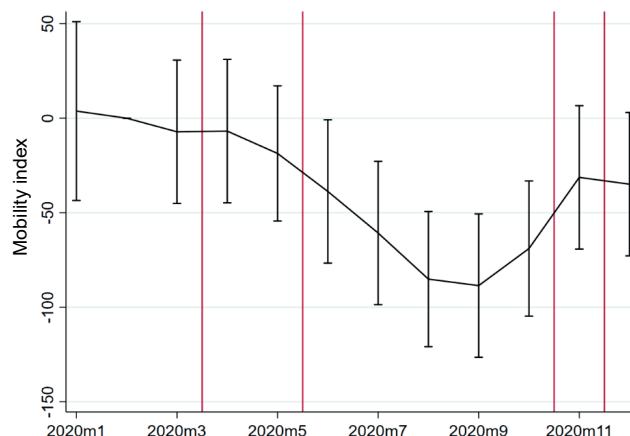
In non-lockdown periods in regions with more teleworkable jobs than others, mobility increased less and the public health outlook improved more dramatically. During lockdown periods, short-time work scheme rates did not rise as much in the aforementioned regions. A 10-point increase in the proportion of teleworkable jobs is thus correlated with:

- a smaller increase in mobility in non-lockdown periods compared to lockdown periods (see Chart 3, by -32 percentage points on average, with a base value of 100 set in early January 2020);
- a larger decline in excess mortality compared to average excess mortality in 2018 and 2019 (by -4 percentage points) during non-lockdown periods;^{4, 5}
- a smaller increase in the proportion of employees under short-time work schemes during lockdown periods (by -1 percentage point).

The results summarised above corroborate the assertion that a higher proportion of teleworkable jobs, which enabled the widespread adoption of teleworking,⁶

helped to reduce the use of public and private transport and the public health impact of the virus, as well as disruption to the continuity of business operations, as evidenced by lower rates of short-time work schemes.

Chart 3: Effect of telework on monthly mobility rates in 2020 (against February 2020)



Source: Apple mobility data, SUMER 2017, DG Trésor calculations.

Note: The above chart shows the estimated effect at each date of a 10-point increase in the proportion of teleworkable jobs on the mobility index derived from Apple mobility data. The first and second lockdown periods are boxed in by red lines.

How to read this chart: In July 2020, a 10-point increase in teleworkability resulted in a roughly 60-point decrease in the mobility index compared to February 2020. The mobility index is set at a base value of 100 for each region in the second week of 2020.

- (4) Testing data is only available from summer 2020 and thereafter, meaning there is no data for the first lockdown period. The variable coefficients for COVID-19 infection and test positivity rates are not entirely comparable with those estimated for other indicators.
- (5) These estimates should be interpreted with caution because the estimation method may not be optimal for analysing epidemiological variables: See G. Gauthier (2021), "On the Use of Two-way Fixed Effects Models for Policy Evaluation During Pandemics", <https://doi.org/10.48550/arXiv.2106.10949>.
- (6) C. Batut (2022), *ibid*.

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Agnès Bénassy-Quéré

Editor in chief:

Jean-Luc Schneider
(01 44 87 18 51)
tresor-eco@dgtresor.gouv.fr

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