COMMENT

Telework and Productivity Three Years After the Start of the Pandemic

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Abstract – Since March 2020, the COVID-19 pandemic has caused many companies and employees to turn to telework. The articles by Bergeaud *et al.* (2023) and Criscuolo *et al.* (2023) document the effects of telework on productivity in detail and, more broadly, its effects on the behaviour of companies and employees, both before and during the health crisis. This commentary discusses their findings in terms of the uncertain knowledge that was available on the effects of telework before the health crisis, as well as the technical and conceptual difficulties raised by estimating the consequences of telework. Finally, it examines the apparent paradox whereby, despite its positive effects on both the productive efficiency of companies and the working conditions of employees, teleworking remained rare prior to 2020.

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Previously a relatively rare organization, telework has become much more frequent since the first lockdown linked to the COVID-19 pandemic. In France, 3% of employees worked remotely in 2017 (Hallépée & Mauroux, 2019); in 2021, this proportion was 22% (Jauneau, 2022). The rapid expansion of this work practice to a large number of employees and companies justifies focusing on its consequences, particularly in terms of its effects on productivity. That is what this thematic dossier intends to do.

Bergeaud *et al.* (2023) and Criscuolo *et al.* (2023) approach the issue in different ways, with the former examining only the case of France and the latter covering a selection of 25 countries, but without the possibility of examining findings at national level. In order to measure the use of telework, both articles use survey data, the production of which was largely motivated by the rapid expansion of this work practice, thus circumventing one of the main difficulties encountered by the literature on the effects of telework on productivity. However, the approaches they implement are very different. The former focus on the objective effects of telework on productivity, estimated based on administrative data. In contrast, the latter focus more on the subjective assessment of the consequences of telework made by managers and employees.

These two articles agree on the essence of their findings: on average, the use of telework has positive effects on productivity and its effects are thought to be maximised in the context of an intermediate level of telework, which is more or less in line with what company managers consider to be the ideal amount of telework. The remainder of this commentary attempts to put these findings into perspective. In particular, it seeks to clarify the question those articles aim to address, the difficulties encountered in doing so and the possible consequences of their findings.

What Was Known about the Effects of Telework on Productivity Prior to 2020?

While the start of the COVID-19 pandemic meant that a large number of employees and companies encountered telework for the first time, it should be noted that it was difficult at that time to use the available literature to anticipate the effects of the mass adoption of this work practice. Of course, some work, such as that by Bloom *et al.* (2015), was able to estimate the effects of telework on productivity, which in this case were positive, in a very thorough and convincing manner. However, the widespread application of these findings, and hence their use to estimate the effects of the mass adoption of telework on productivity, posed real difficulties (Pora, 2020). This is because, even ignoring the endogenous nature of the adoption of telework:

i. the telework arrangements evaluated were quite different from each other and, in particular, they were different from the full remote experience during the lockdowns: ranging from one day a month to four days a week, or even just the ability to access the company information system remotely (Monteiro *et al.*, 2021);

ii. the existing work focused on fairly specific populations – students (Dutcher, 2012), employees of a travel agency (Bloom *et al.*, 2015) and telephone operators of the Manchester Police (Battiston *et al.*, 2021) – which are difficult to compare to all employees involved in telework during the health crisis;

iii. the estimated effects were fairly heterogeneous from one task to another (Dutcher, 2012), from one sector to another or from one category of employees to another (Artnz *et al.*, 2022). Consequently, the findings of these local experiments did not naturally extend to all organisations that adopted telework from March 2020 onwards.

Therefore the findings compiled in this dossier and, more generally, the significant growth in the number of studies on the effects of telework over the past three years, should be compared to how uncertain our knowledge of the effects of the mass adoption of telework on productivity was in 2020.

Which Statistical Source Should Be Used to Measure Telework?

A major difficulty when investigating on telework and its consequences lies in the possibility of quantifying the use of telework and the determination of the appropriate level to be used to assess its effects. Thus, in France, the resources available for quantifying the use of telework were rather meagre until 2020: the inclusion of a question on telework in the 2019 *Conditions de travail* (Working Conditions) survey. This survey, which is key to studying the way in which work is organised, therefore does not make it possible to determine the proportion of employees involved prior to that date. Some other sources allow this shortcoming to be overcome for the very recent period, such as the Sumer (*Surveillance médicale des expositions des salariés aux risques professionnels* – Medical Supervision of the Exposure of Employees to Occupational Risks) and Reponse

(*Relations professionnelles et négociations d'entreprise* – Professional Relations and Company Negotiations) surveys used by Hallépée & Mauroux (2019), for example. Nevertheless, estimating the proportion of employees who were working remotely prior to 2015 remains very difficult, unless we simply say that it was probably lower than the 3% estimated for 2017.

The mass rollout of telework from March 2020 onwards has greatly changed the situation from this point of view. This is due, first of all, to the fact that the crisis situation has caused the very quick launch of *ad-hoc* surveys that have incorporated the use of telework into their questionnaire, whether they target establishments, such as the Acemo Flash (*Activité et conditions d'emploi de la main d'œuvre pendant la crise sanitaire Covid-19* – Labour Force Activity and Employment Conditions during the COVID-19 Crisis) survey conducted by DARES (*Direction de l'animation de la recherche, des études et des statistiques* – Directorate of Research, Economic Studies and Statistics), or individuals, such as the EpiCov (*Epidémiologie et Conditions de vie liées au Covid-19* – Epidemiology and Living Conditions Linked to COVID-19) survey conducted by DREES (*Direction de la recherche, des études, de l'évaluation et des statistiques* – Directorate of Research, Studies, Evaluation and Statistics) and INSERM (*Institut national de la santé et de la recherche médicale* – National Institute of Health and Medical Research). The former made it possible, from April 2020, to estimate that at the end of March 2020, a quarter of salaried employees in France were working remotely.

These *ad-hoc* surveys, or very quick adaptations of pre-existing surveys, pretty much form the basis for the two articles in the dossier. Thus, Bergeaud *et al.* (2023) make good use of the very quick adaptation of the questionnaire of the *Utilisation des Facteurs de Production* (Utilisation of Production Factors) survey conducted by Banque de France. Since 2020, this survey has included a set of questions concerning the use of telework, not only during the health crisis, but also before it. Criscuolo *et al.* (2023), for their part, analyse the findings of a survey launched by the OECD in October 2020 among company managers and employees in 25 countries. This international survey focuses specifically on the use of telework and on the perception of this work practice among both employees and company managers.

In France, the collection of statistical information on telework now goes beyond just the framework of these very quick adaptations to the health crisis. Thus, its 2021 redesign provided an opportunity for questions on this subject to be incorporated into the *Emploi en continu* (French Labour Force) survey. Telework is therefore no longer disregarded by the most important French statistical survey on the labour market. This incorporation of telework into the *Emploi en continu* survey resulted in a publication by INSEE (Jauneau, 2022), which provides an opportunity to reiterate some important descriptive elements for the debate and, in particular, the very clear over-representation of management among remote workers: 60% of remote workers are managers, while only 22% are non-management employees. The proliferation of questions about telework in recurrent surveys, which may include the census surveys in the near future, gives hope that the future will bring increasingly robust findings regarding the consequences of telework.

What Is the Relevant Concept of Productivity?

Once the difficulty of deciding which source to use to quantify the use of telework has been overcome, it is still necessary to determine the relevant level at which its consequences should be investigated or, which is partly the same thing, which concept of productivity to use. Asking whether employees are more or less productive when they work remotely is not the same as asking whether companies are more or less productive when they use telework. Thus, telework affects not only employee productivity, but also and in particular the way in which companies use office real estate (Bergeaud & Ray, 2021). In other words, examining apparent labour productivity and total factor productivity is not the same thing.

When examining activities of which the output is easily quantifiable at the worker level, using individual employee productivity or apparent labour productivity allows an estimation of the effects of telework that is based on very few assumptions. This may take the form of effects on the number of telephone calls made by employees of a travel agency (Bloom *et al.*, 2015), on the number of calls made to the Manchester Police that result in a resolution (Battiston *et al.*, 2021), on the number of calls handled by call centre employees (Emanuel & Harrington, 2023) or on the number of changes made to a project on GitHub (Shen, 2023).

However, this approach neglects the fact that this work practice also allows the company to

use its capital differently, especially real estate. This may therefore only give a rather partial view of the effects of telework at the level of the company as a whole. This oversight is compounded when it comes to addressing the macroeconomic consequences of telework. Thus, Bloom *et al.* (2015) estimate, based on very detailed data from the firm in which their random experiment took place, that the effects of telework on total factor productivity exceed 20% for this firm. The positive effects of telework on employee productivity explain only a small part of this considerable effect. Nevertheless, in general and when using company-level data, such an estimate requires a preliminary step of estimating a production function. Such an estimation comes with many intricate issues (De Loecker & Syverson, 2021).

In their work to estimate the objective effects of telework on productivity, Bergeaud *et al.* (2023) illustrate this difference particularly well by comparing the effect of telework on apparent labour productivity with its effect on total factor productivity. Intuitively, it seems that a higher proportion of remote workers within the company increases total factor productivity more than it does apparent labour productivity. Indeed, their estimate is consistent with telework having zero impact on apparent labour productivity, while it rejects the hypothesis of it having zero impact on total factor productivity.

When it comes to the subjective assessment of the effects of telework on productivity, by company managers on the one hand and by employees on the other hand, which is the subject of the work by Criscuolo *et al.* (2023), the aforementioned distinction can be somewhat less clear. Company managers view both higher employee productivity and lower office real estate costs as significant benefits of telework. In both cases, expressing a positive opinion regarding these benefits is positively correlated with the desire to make greater use of telework after the health crisis. Many employees also note that it makes it easier for them to work on tasks that require concentration.

Short-Term Effects or Long-Term Effects?

A natural question raised by the findings relating to the effects of telework on company productivity is the duration of these effects. In slightly exaggerated terms, are companies that embrace telework more productive because they are now able to perform certain tasks more efficiently, and because they have reduced the cost of office real estate, or is it because they are more able to engage in innovation than others? Answering this question seems essential, given the key role that innovation plays in long-term growth (Aghion & Howitt, 1992). At this stage, the empirical literature remains rather quiet on this question. In this dossier, Bergeaud *et al.* (2023) show that the companies that most express a desire to increase their use of telework in the future also want to increase their investment in IT, which could accelerate the digitalisation of their business. These findings are consistent with those of Criscuolo *et al.* (2023), which highlight the investments in training that could accompany these investments in IT equipment.

Some earlier work provides reasons for hope, as creative tasks are often best performed at home (Dutcher, 2012). Some psychological studies also suggest that collective brainstorming actually works better at a distance (Gallupe, 1991). It is claimed that this is because telework allows some employees to better express their ideas, while their opinions are more often ignored in person. Electronic exchanges may therefore lead to the exchange of more diverse views.

However, this optimistic outlook is counterbalanced by regional economics studies, which show the importance of human capital clustering and spatial concentration effects on innovation (Moretti, 2021). Thus, physical proximity between potential innovators has a positive effect on the quantity and quality of innovation. This likely explains the existence and success of particularly innovative geographical clusters. If this is indeed the case, then the future will depend on how telework can reshape the geography of cities (Batut & Tabet, 2020) and on the ability of organisations to replicate online the mechanisms that generate these clustering effects. In a very recent study, Emanuel *et al.* (2023) suggest that physical proximity has a significant positive effect on the feedback that more experienced employees can give to their colleagues, not only, as is natural, in face-to-face settings, but also when they interact online. There would then be a trade-off between the short-term productivity gains made possible by telework and the accumulation of human capital within companies.

Beyond Productivity

These comments lead to a discussion of the consequences that can be expected from the mass use of telework beyond by its effects on productivity. As mentioned in the previous paragraph, this new work practice could eventually have significant effects on spatial inequalities.

Neither the non-management employees nor the company managers interviewed in the survey analysed by Criscuolo *et al.* (2023) fail to note this, with the former commenting that telework gives them greater flexibility in choosing their housing and the latter recognising the possibility of employing employees who are geographically distant from the company. This lower cost of geographical distance in the process of matching employees and employers could, in the long run, transform labour markets. Indeed, it broadens both the panel of potential employers for employees able to work remotely and the panel of potential employees for employers offering telework jobs. The question then is whether this reduction in the cost of geographical distance would be incident on employees or companies, or, in other words, whether it would generate a rise or fall in wages.

In fact, the issue here goes beyond the question of physical distance alone. Indeed, many employees believe that there are genuine advantages to telework, especially in terms of the flexibility and working conditions it offers. Employee responses to the survey analysed by Criscuolo *et al.* (2023) are very telling in this regard. In addition, in a study of candidates for a job in a call centre, Mas & Pallais (2017) sought to quantify the monetary value of these advantages. They show that employees are willing to reduce their wage demands by an average of 8% in order to be able to work remotely. In other words, from the point of view of the employees themselves, telework constitutes an improvement in their working conditions, to which they attribute a positive monetary value.

Why Was Telework So Rare Prior to 2020?

Such results immediately raise a new question: if telework reduces salary costs and office real estate spending, why was it so rare at the time when Mas & Pallais (2017) did their work? Having estimated the distribution of the willingness to pay for being able to work remotely and the actual frequency of telework, they propose using them to determine the implicit cost of telework for the company. They interpret this cost as the result of telework inducing a decrease in productivity. Such an interpretation is not entirely convincing, however, because it requires very negative effects on productivity caused by telework, which are apparently incompatible with the direct estimates of these effects available in the literature. Emanuel & Harrington (2023) thus show that neither the slightly negative effects on employee productivity caused by telework, nor even the particular appeal of telework for the least productive employees, which pushes the most productive to distinguish themselves from them, are sufficient to explain the very low use of telework before the health crisis.

There is therefore a considerable gap between the estimated effects of telework on productivity and the very low use of this work practice prior to the health crisis. This suggests a misperception among company managers as to the actual benefits of telework. The forced experience of telework since the beginning of the pandemic might correct this misperception (Barrero *et al.*, 2021). The findings of Criscuolo *et al.* (2023) in this dossier are telling in this regard. Firstly, the majority of non-management employees and company managers have a positive view of the experience of telework during the health crisis. Secondly, there is a positive correlation between this positive experience and the desire to make greater use of telework in the future.

Understanding what could generate this biased perception among companies as to the effects of telework is the remaining issue. Bloom *et al.* (2015) suggest two explanations for this. The first relates to the structure of incentives for companies to experiment, for a process innovation in relation to which it is impossible to file a patent. The second relates to incentives for innovation within the company: they argue that the career structure imposes the burden of the potential costs of experimentation largely on managers, while paying little for successful experimentation.

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Productivity measurement, human capital accumulation, spatial inequalities, working conditions, wage setting, competition between firms, and career structure within the firm: despite its innocuous appearance, studying the effects of telework requires an investigation in many economic issues. The two articles in the dossier, with their very different approaches, illustrate this particularly well. The much greater frequency of the use of telework three years after the onset of the health crisis calls for further exploration. □

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