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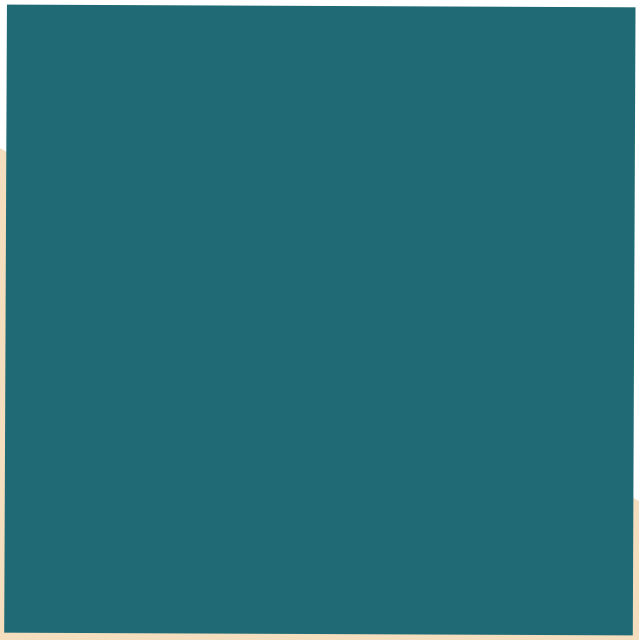
The impact of Covid-19 on work: telemigration, relocation, environment



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The impact of Covid-19 on work: telemigration, relocation, environment

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Foreword

According to an article published in The Economist at the end of March 2020, while in 2008-2009 crisis CEOs and boards of directors turned to their financial managers, the Covid-19 pandemic crisis forced them to turn to human resources managers when, until then, they had been considered «payroll and party managers».

In March 2020, as governments resigned themselves to enforcing forms of forced social distancing, thousands of companies found themselves from one day to the next changing working conditions of millions of employees. Many of them were neither technically nor managerially ready. Because telework requires specific infrastructures but, above all, another way of conceiving the working relationship. Telework requires that we stop measuring work performance in terms of hours spent at the office. Gone are the days of punching in the clock and well-defined schedules for supervising employees and monitoring their work. It may seem trivial, but it's a paradigm shift. And that's why some companies, and unions too, have resisted the greater deployment of telework so far. The same goes for workers who, for some of them, saw telework as a way of improving the work-life balance and who, overnight, had to find a corner at home to work without having the appropriate tools, with their eyes glued to small screens, uncomfortable chairs, and above all, with the closure of schools, divided between work and family tasks.

What will be the consequences of this telework experience? In this paper, Cyprien Batut analyses three of great importance and interest: the impact on the environment, the risk of relocation of skilled jobs and the reduction of spatial inequalities. But in the future there will be other aspects that economists and sociologists will have to study because the few elements we know about the effects of telework on productivity and workers' well-being is based on the world before, the world where telework consisted, at best, of one or two days a week. This time around, it has been telework in absolute emergency. The system seems to have held together, but the consequences for workers on isolation and productivity are likely to be different from before Covid-19..

Will the post-crisis world be characterized by the end of usual routines and the beginning of work on demand? No, it will not. Already because, as this paper reminds us, only some of the jobs can be done remotely. Most jobs (and especially essential jobs, we have learned this in this crisis!) are based on interactions with other people or the use of specific machines and tools. But also because work is a relationship, an exchange. Canteens, corridors, coffee machines are also places for non-programmed exchange, sometimes carrying new ideas and solutions. And the collective organisation of workers and their legitimate demands, whether through a trade union or a staff association, is more difficult to achieve at a distance.

The daily routine of commuting is not over, but in the world after Covid-19 certain taboos will have been broken and discussions on the organisation of work may abandon certain caricatures linked to a conception of work from past centuries. As this paper shows, this could bring benefits not only to companies and their employees but also to the environment and our territories. But there will not only be winners...

Summary

One of the consequences of containment may be, through the creation of new habits rather than a technological revolution, the widespread adoption of telework. However, this revolution will only be that of a minority of workers, mainly managers and relatively well-paid profesionnals.

This note is a prospective exercise which tries to consider the consequences of this evolution :

- They are primarily environmental. We can expect a reduction in daily or one-off trips for professional reasons. The immediate result would be a reduction in greenhouse gas emissions, of which the effect of confinement on air quality in European cities is a foretaste. Cautions is however necessary in this regard, teleworking is not environmentally neutral, network infrastructures that make this form of work possible are also sources of pollution.
- The emergence of telework then has the potential to introduce a new player in the labour market: the «tele-migrant» in the words of economist Richard Baldwin. While skilled workers have hitherto been protected from the effects of globalisation, the situation could change, as many skilled freelancers, particularly from the South, are now able to compete with them. But this opening up may be an opportunity, as the French and European economies are structurally short of skilled workers in many fields. Telemigrants are an opportunity to democratize access to certain services that are still not available to all, especially in smaller companies: programming, accounting, training, etc. If telemigrants increase the size of the pie faster than they reduce the number of slices, then their arrival will be a boon rather than a tragedy.
- Finally, by disconnecting living and working spaces for part of the population, telework could change the very shape of cities and the dynamics of spatial inequalities, with ambiguous effects. On the one hand, telework represents for part of the urban settings the possibility of relocating to places where life is cheaper and probably more pleasant. On the other hand, the maximum size of a city depends on the size of its labour market and then to some extent on the answer to the question: «How many jobs can I access in an hour's journey?Teleworking abolishes this limit and could therefore, on the contrary, increase the concentration of activity in a few cities. The precedent of the Internet revolution in the United States goes along these lines.

Due to time constraints, many other aspects have been set aside but are equally important. A future telework policy, which may or may not encourage its development, will have to take these multiple elements into account.

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The impact of Covid-19 on work. Telemigration, relocation, environment

The coronavirus crisis affects our economies in many ways. It not only severely disrupts economies but also changes our habits. For example, a major culture shock could transform the way we work. The period of containment triggered by most governments in developed countries has forced some workers to change their work habits. For those who were able to do so, ensuring the continuity of activity rhymed with teleworking.

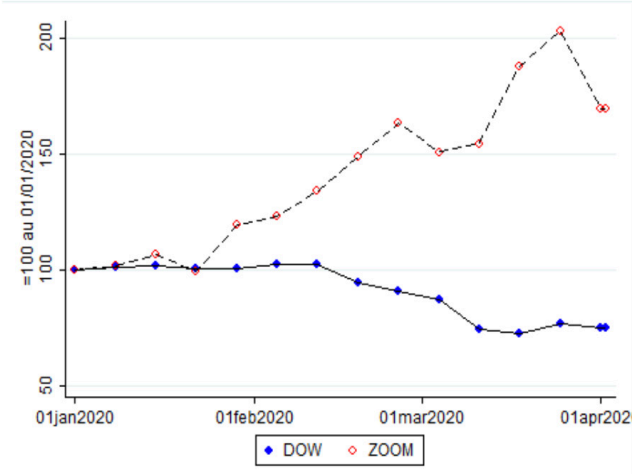
Although it has been technically possible for years, telework has never become widespread. According to a recent study[1] by the French Ministry of Labour, only 3% of employees (mostly managers) were teleworking at least one day a week in 2017 in France (7% if we take a broader definition). Using the work organisation supplement of the Current Population Survey in the US, Mas & Pallais (2020)[2] report that only 9% of respondents said they had worked more than 2 hours at home the previous day, a figure only slightly up from the mid-2000s (6% in 2004).

But the situation is likely to change. Confinement has forced many workers to change their working hours. Either because their companies have organized this change to respect the lockdown, or because school closures have forced them to stay at home to look after their children.

A recent OFCE policy brief[3] estimates the number of employees potentially affected in France at more than 8.4 million. Jonathan Dingel and Brent Neiman, two American economists from the University of Chicago, estimate in a recent report[4] from the Becker Friedman Institute that 37% of American jobs could be done from home.

If such estimates are realistic, then what prevented many workers and employers from adopting telework are more cultural than technical reasons. Hence the importance of the current moment: all over the world, many workers may be starting to get used to new tools and ways of working. Adopting lockdown measures may then represent a culture shock that will lead to an increasing proportion of jobs being done remotely. This observation is shared by investors: while the DOW Index (which summarizes the stock market performance of the 30 largest companies registered in the United States) has fallen by almost 25% since January, the share price of ZOOM Video Communications Inc, the company responsible for the now famous eponymous software was multiplied by two at the end of March.

Figure 1 : Zoom in perspective of the global economy



Series normalized to be equal to 100 as of January 1, 2020. Source, finance, yahoo. com historical data

This note ambitions to trace the contours of what could be a world where telework is more widespread. What happens when the relationship between the workplace and home weakens?

First of all, it is necessary to go back to the limits of telework: what kind of activity is or is not likely to be affected. Indeed, the limits of telework are not only technical: employers on the one hand and workers on the other may not wish to generalise telework for many reasons. Taking this into account, this note then aims to understand what the consequences of widespread telework would be. For the sake of brevity, we will limit ourselves to exploring three important avenues. First, we will see what the environmental consequences of a decrease in worker mobility could be. Second, we will ask how this could change our ways of working and in particular the effect on the

1. Quels sont les salariés concernés par le télétravail ?, Dares Analyse, Novembre 2019 N°051, Sébastien HALLÉPÉE, Amélie MAUROUX.
2. Mas, Alexandre, and Amanda Pallais. Alternative work arrangements. No. w26605. National Bureau of Economic Research, 2020.
3. COVID-19 et des mesures de confinement en France, Policy brief N°65, 30 Mars 2020, Département analyse et prévision de l'OFCE.
4. How Many Jobs Can be Done at Home?, White Paper Becker Friedman Insti

«offshoring» of the most qualified jobs. Finally, the question of deeper urban changes and in particular their effects on the dynamics of spatial inequalities will have to be asked.

The frontiers of telework

Telework is defined as work carried out in whole or in part at a distance from the place where its result is expected. Are considered teleworkers those workers home one day a week to work, even if it is for a specific task as well as the person who spends the whole week there. So there are different degrees of teleworking. On the one hand, telework may be the result of the invasion of personal life by work life or family constraints which force people to bring work at their home for felxibility reasons. In this case telework coexists with on-site work. On the other hand, telework can replace on-site work and even completely supplant it. Whatever the degree of telework, it must first be said that it is still not very widespread: in 2019, the DARES estimated[5] that only 7% of workers used it in France. In 2017, a report of the International Labour Organization[6] reported that, on average, 17% of European workers were teleworking to varying degrees of intensity.

What activities can be done at home? To assess this, Brent Neiman and Jonathan Dingel, in their recent report[7] proceed by elimination. They use the results of two surveys[8] on working conditions to identify which occupations cannot be done at home. For example, if X% of respondents in a trade say that their work involves spending time outdoors every day or operating machinery or being in contact with the public then X% of people in that trade cannot be considered teleworked[9]. Thus, they estimate that 63% of jobs could not reasonably be done from home (and therefore 37% could). The OFCE policy brief[10] uses the same methodology, using the French Labour Survey, to estimate the number of French workers potentially concerned by telework. It arrives at a proportion of the workforce (32%, or 8.4 million workers) comparable to that of Neiman and Dingel in the US. These two studies therefore agree that a significant proportion of jobs could be done by telework, but not a majority. That said, only a fraction of teleworkable jobs are actually teleworked (7% compared to 32% in France, for example). Why is this?

The reason is that these two studies only measure an order of magnitude of the technical frontiers of telework but do not take into account the willingness of employees and companies to adhere or not to adhere to this practice (this is a limit which is moreover assumed in the work of the OFCE). Even if telework is possible, this does not mean that it is desirable. At the end of the lockdown, millions of workers who have tried teleworking will leave it without regret.

To the technical frontiers of telework, there are cultural but also effectiveness limits for both employees and employers. It is therefore not primarily for technical reasons that telework is not more widespread. In synthesising the literature on non-traditional forms of work, Mas & Pallais (2020)[11] report for example that, contrary to popular belief, their frequency has not really increased over the last twenty years. How can this be explained?

On the workers' side, what do we know about their willingness to adopt telework? For them, telework has clear advantages: greater flexibility of working time, less control and direct pressure from the employer, the possibility of combining family and professional life more easily, less travel between work and home, etc... But it also has a cost: exclusion from the company's social networks and therefore perhaps lower chances of advancement, more difficult coordination with colleagues, more unstable working hours and a more difficult separation between professional and personal life. If it is technically possible to telework, it may be for a combination of these reasons why employees do not wish to telework. In an experimental situation, Mas & Pallais (2017)[12] find that most subjects do not seem to place any particular value on the possibility of working from home. However, they also note that there is still a significant margin of employees who do. In the end, the average employee would be willing to sacrifice 8% of his or her salary to have the possibility of teleworking. But even if employees want to and it is technically possible, it does not mean that they will be able to telework, it lacks the agreement of their employer.

On the employer side, telework also has clear advantages: it saves square metres of office space, part of the costs related to the organisation of business life and operations, makes it easier to hire, etc. But here again, it also has costs: teleworking employees are likely to be less productive because their cooperation is more difficult and it is also harder to control their progress: teleworking requires a thorough reorganisation of the chains of command. If these costs are greater than the benefits the company expects from telework, then the company may delay its adoption. A report almost twenty years ago, Bailey & Kurland (2002)[13], noted then that the main obstacle

5. Ibid.
6. Eurofound and the International Labour Office (2017), Working anytime, anywhere: The effects on the world of work, Publications Office of the Euro-pean Union, Luxembourg, and the International Labour Office, Geneva. http://eurofound.link/ef1658/
7. Ibid.
8. O*NET studies "Work Activities" and "Work Context".
9. This is not an exhaustive list of the criteria considered, please refer to Appendix A of the article by Dingel and Neiman for more information.
10. Ibid.
11. Mas, Alexandre, and Amanda Pallais. Alternative work arrangements. No. w26605. National Bureau of Economic Research, 2020.
12. Mas, Alexandre, and Amanda Pallais. «Valuing alternative work arrange-ments.» American Economic Review 107.12 (2017): 3722-59.
13. Bailey, Diane E., and Nancy B. Kurland. «A review of telework research: Findings, new directions, and lessons for the study of modern work.» Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior 23.4 (2002): 383-400.

to telework was on the side of the companies. On the one hand, teleworking may not be at their advantage and, moreover, in order to be generalised, it requires considerable investment.

The working hypothesis that will be made now, however, is that lockdown by forcing companies to adapt in order to continue their activity and by giving employees a taste of the benefits of telework, brings the current boundaries of telework closer to its purely technical element. We then want to understand what the consequences would be if 20 to 30% of employees worked from home. What follows is of course to be taken with caution as it is impossible to envisage anything here without a considerable margin of error.

What to expect from changes incured by telework ?

There are more or less three main long-term consequences of widespread deployment of teleworking. First of all, there are environmental consequences: more telework means a non-negligible reduction in car travel, but also in air travel, etc....

However, this is compensated by an increase in internet traffic, which is not ecologically neutral. Secondly, the generalisation of teleworking in certain professions may increase their «offshorability», i.e. the possibility they are being carried out abroad. This form of digital offshoring which would affect highly skilled jobs, is a risk, but we shall see that it is also an opportunity. Finally, telework opens up the possibility of a decorrelation between the workplace and the place of living and could lead to a transformation of cities and a change in the dynamic of territorial inequalities.

Telework : a means to end commuting and save the planet?

The majority of French employees commute on a daily basis. An INSEE study[14] reported that only 36% of French people live and work in the same municipality in 2013. Another study[15] also reveals that according to census figures more than 7 out of 10 French people go to work by car every day. Only 7% of working French people live close enough to their work to walk to work and 3% work at home. In addition, many professionals are obliged to make many more trips across the country and the world to attend meetings, seminars, etc... According to a national air passenger survey, 28% of air travel is conducted for professional reasons. The 2008 Mobility Survey (the report of the 2018 edition was delayed by the coronavirus) estimated that almost half of the trips made by French people had work-related reasons.

In the end, the most immediate possible consequence of teleworking is therefore a drop in the demand for transport and, consequentially, a similar pattern for greenhouse gas emissions. The emergence of telework would mean more breathable air now and in the medium term would have beneficial effects on the health of the general public.

The European Environment Agency makes it possible for everyone to monitor the evolution of the concentration of many pollutants in the air of European cities following containment. This can be considered as a first experience of the effect of teleworking on pollution, even if it leads to over-estimations since transport is not just used for professional reasons. In Milan, the concentration of nitrogen dioxide (NO2) at the end of March was 21% lower than at the same time last year, in Madrid 41%. The European Environment Agency estimates in its latest report on air quality in Europe that almost 450,000 premature deaths can be attributed to air pollution in 2016 in Europe with 28%. Lavy et al. (2014)[16] also argue that air pollution affects cognitive performance. They compare the results of high school students in Israel as a function of air pollution at the time of national examinations. Those who were in the most polluted areas had lower grades and were less likely to get their school certificate, Bagrut. It is therefore possible that the advent of teleworking would have beneficial effects on the health and cognitive performance, and thus productivity, of the whole population by reducing air pollution.

Less demand for transport also means in the medium term less investment in transport networks, with more ambiguous effects. This means fewer roads built, fewer cars bought, less time spent in transport, etc. This is still a step in the right direction if our aim is to reduce greenhouse gases, for example. But it also means less maintenance of existing networks, or even the disappearance of the least used networks. This can contribute to the isolation of certain places and reinforcement of territorial inequalities[17].

In addition, these road and transport networks are being replaced by other networks that allow people to telework, telecommuting. Traffic jams on the roads are being replaced by virtual traffic jams, Netflix and Youtube having been forced to reduce the quality of their videos in order not to overload existing networks in several European countries. In addition, virtual networks require an infrastructure which is also a source of pollution.

According to some etimates[18], digital activities accounted for almost 3.7% of global greenhouse gas emis-

14. De plus en plus de personnes travaillent en dehors de leur commune de résidence, Maud Coudène et David Levy, INSEE Première, N°1605 Juin 2016.
15. Sept salariés sur dix vont travailler en voiture, Armelle Bolusset et Christophe Rafraf, INSEE Focus, N°143 Février 2019
16. Lavy, V., Ebenstein, A. and Roth, S., 2014. The impact of short term exposure to ambient air pollution on cognitive performance and human capital formation (No. w20648). National Bureau of Economic Research.
17. See below for developments on this issue
18. The report « Pour une sobriété numérique » of the think tank The Shift Project.

sions in 2018 and a generalisation of teleworking would only increase this figure. The net effect of telework on air quality should therefore be considered, and not only what is explained by reduced transport use. Few evaluations exist at present, however. Giovannis (2018) reports that Swiss cities where teleworking has developed the most from 2002 to 2013 have seen a decrease in traffic and an improvement in air quality[19].

Teleworking or the exposure of most-qualified jobs to globalization ?

In 2013, Blinder & Krueger published an important article[20] on offshorability of jobs. By combining qualitative and quantitative data, the aim was to estimate what percentage of jobs could technically be relocated to another country if the employer was willing and able to do so. To do this, the authors proceeded in much the same way as the articles cited above to estimate the percentage of jobs that are potentially teleworkable[21], they asked questions to the workers. Using the survey's data, they asked whether their work has to be done in a particular location in the United States or whether it can be carried out remotely from the location of its product without loss of quality. Based on the respondents' answers, Blinder & Krueger estimate that between 21 and 27% of jobs in the USA can be relocated. But their most interesting result is the following: the more qualified and well-paid the jobs are, the more offshored are relocatable (between 35 and 40% of the jobs in jobs requiring a diploma).

This simple fact is striking. Skilled jobs, although more relocatable, are precisely not those that have been relocated since the 1980s, on the contrary. In their now famous article, Autor et al. (2013)[22], report that competition with China has probably led to the loss of 2.5 million jobs in the United States and explains a significant part of deindustrialization in that country. Those jobs are mostly low-skilled jobs. The level of qualification of a job, despite the higher average «offshoring», provides additional protection against offshoring for two reasons. On the one hand, the the supply of low-skilled foreign labour at relatively low offshorability much greater than the supply of skilled foreign labour at relatively low labour costs.

As skill levels fall, wage differentials between countries increase. This makes it more attractive for companies to relocate low-skilled jobs relative to skilled jobs. On the other hand, offshoring has a cost: offshored tasks must be controlled and coordinated with those still performed locally. Skilled jobs are probably more likely to be offshored, but in general also require greater control and are more difficult to coordinate. This is why companies prefer to import skilled workers rather than export jobs requiring skilled workers. A recent study, Signorelli (2019)[23] has shown, among other things, that firms are willing to incur significant costs to hire skilled foreign workers when they face recruitment difficulties. In short, skilled jobs are protected from globalization because of a lack of supply and the cost of offshoring them. This is where the spread of telework («teleworkability» and «offshorability» are linked, one could call it digital offshoring could make a difference, as it significantly reduces the cost of offshoring skilled jobs.

A digital globalisation that would emerge from lockdown measures could usher in a new era in which skilled jobs are no longer sheltered from global competition. This is a scenario already partly imagined by Richard Baldwin in his 2019 book: The Globotics Upheaval: Globalization, Robotics and the Future of Work. The generalisation of telework raises the fear that «telemigrants» will increasingly take up service jobs at the expense of national white-collar workers and their wages.

Is this scenario realistic ? It is pessimistic to say the least. As mentioned above, teleworking has only a limited scope. Second, it only makes sense if we consider that the stock of jobs is fixed and that a telemigrant will therefore steal the work of a local employee. This is not necessarily true and a more optimistic picture can be drawn. When a telemigrant works for a national company, he or she does not automatically replace a native worker, but can complement him or her. The recruitment of a telemigrant is self-refunding if it increases the productivity of domestic workers (and thus increases the employment stock). Many businesses are constrained in their growth because they are short of skilled workers, whose recruitment costs may be prohibitive in a market where there is a shortage, particularly for SMEs, e.g. for training tasks, programming or even certain accounting jobs. In this case, the recruitment, even temporary, of a telemigrant can increase rather than reduce local employment.

Signorelli (2019)[24] estimates that the number of native employees in companies benefiting from recruitment facilities for foreign skilled workers increases after the agreement of these recruitment facilities. Similarly, it is not said enough, but the consensus in economic literature is rather towards a lack of competition between migrant and national workers, see for example Dustmann et al.(2013)[25].

19. Since the location of digital infrastructure is unknown, this does not rule out the possibility that pollution lost in one place may be transferred to another.
20. Blinder, Alan S., and Alan B. Krueger. «Alternative measures of offshorability: a survey approach.» Journal of Labor Economics 31.S1 (2013): S97-S128.
21. Dingel et Neiman (2020) et le policy brief de l'OFCE s'inspirent en réalité de l'approche de Blinder et Krueger (2013) qui a fait date dans la littérature.
22. David, H., Dorn, D. and Hanson, G.H., 2013. The China syndrome: Local labor market effects of import competition in the United States. American Economic Review, 103(6), pp.2121-68.
23. Signorelli, S., 2019. Do Skilled Migrants Compete with Native Workers? Analysis of a Selective Immigration Policy (No. halshs-01983071).
24. Ibid.
25. Dustmann, C., Frattini, T. and Preston, I.P., 2013. The effect of immigration along the distribution of wages. Review of Economic Studies, 80(1), pp.145-173.

In a more optimistic scenario[26], the generalisation of teleworking should be a positive shock for employment by making it possible to democratise access to qualified work for many companies and thus support their growth. By opening up the possibility of relatively better-paid jobs in developed countries to skilled workers from the global South, it could also have beneficial secondary effects in developing countries.

Telework and the reduction of territorial inequalities ?

We're coming to the last chapter of this analysis. The development of telework makes it possible to disconnect the workplace from the place where we live. What are the consequences of this dynamic for territorial inequalities and the shape of cities?

As already mentioned, one of the consequences of the development of telework is a likely decrease in the demand for transport and, therefore, a lower investment in related infrastructures: road networks, public transport but also car parks. This is already a small revolution if we consider the importance of such infrastructures in cities.

The table below is extracted from the Old Urbanist blog by Charlie Gardner, in which he attempted, using Google Maps, to categorize the share of city space occupied by buildings, road infrastructures and parks.

BUILDING FOOTPRINTS BY CITY

	Built	*Streets*	*Parks/Plazas*
New York, NY (*St. Nicholas Houses*)	10%	22%	68%
Chicago, IL (*Cabrini Green*)	27%	44%	29%
Savannah, GA	51%	44%	6%
Boston, MA (*Back Bay*)	51%	44%	6%
Portland, OR	52%	47%	1%
Washington, DC	54%	43%	3%
Chicago, IL	58%	42%	0%
Washington, DC (*Georgetown*)	59%	41%	0%
Houston, TX	59%	40%	1%
Phoenix, AZ	62%	37%	1%
Toronto, ON	64%	35%	1%
Memphis, TN	64%	34%	1%
New York, NY	66%	28%	6%
Barcelona, Spain (*Eixample*)	73%	27%	0%
Paris, France	74%	25%	1%
Vienna, Austria	75%	23%	2%
Boston, MA (*North End*)	75%	24%	1%
Tokyo, Japan	80%	20%	0%
New Orleans, LA (*French Quarter*)	82%	17%	1%
Buenos Aires, Argentina	85%	15%	0%
Verona, Italy	90%	9%	1%
Fes, Morocco (*Medina*)	98% (?)	2%	0%

Source : Old Urbanist, 28/06/2011, Charlie Gardner

In another blog post, he also takes into account the space taken up by car parks. Some cities such as Houston devote more than 60% of their space to transport. European cities, which are more compact, devote between 30 and 40%. A city where people travel less could reallocate some of this space to other uses.

But a potentially more important development is that resulting from the weakening of work-related constraints on the location choices of teleworkers. If I can work remotely, why would I do it in the city? One of the reasons we live in the city is that it is easier to find a job and the commute is shorter.

With teleworking, this reason disappears. To generalize, we can say that people want to live in cities because they have agglomeration gains: simplified access to services, employment, housing, wider social networks, etc. But it also implies costs: higher prices, pollution, congestion, promiscuity, etc...

It is then conceivable that teleworking may reduce what one earns from living in the city, especially in the labour market. To give an example, the generalisation of teleworking allows a Parisian manager to relocate outside Paris where he or she wishes and where the air is cleaner, property prices are lower and neighbours are less noisy. In this scenario, the generalisation of telework leads to a redistribution of the population over the territory and thus reduces territorial inequalities. But here again, nothing is less certain and telework could on the contrary reinforce the advantages of larger cities and metropolises. Let us see why.

Many economists and urban planners consider that the primary nature of cities is to be a labour market. (Berteaud, 2014)[27]. The size of a city, an urban agglomeration, depends on the size of its labour market. At first glance, this seems to militate in favour of a decrease in territorial inequalities with the generalisation of telework. But there are two reasons to temper this. First, cities are also secondarily places which concentrate services, schools, the most influential networks, shopping centres, etc... These are sufficient motivations to live there beyond employment considerations. Second, only a minority of jobs are actually teleworkable, personal services, for example, are not.

Above all, the size of a labour market is itself dependent on the costs and time of transport within it. The most relevant question in determining the size of a city is therefore: how many jobs can I access in an hour's travel time? Teleworking completely explodes this limit. By taking transport out of the equation and freeing up space

26. And probably more in line with what we know today.

27. Bertaud, A., 2014. Cities as labor markets. Marron Institute on Cities and the Urban Environment, New York University.

that can be reused for housing or services, it can instead favour the development of larger cities to the detriment of the rest of the territories. The relevant question then becomes: how many services can I access in one hour of transport? However, services of all kinds are more concentrated both in quantity and quality in cities. This study from the Center For Cities[28] in Great Britan highlights this point: "cities are places to play as well as to work".

while approximately 1.6% of the English population lives in the city centre, 10% of daily service businesses (hairdresser, general practitioner, etc...) and 19% of specialist services (wine merchant, lawyer, otorhinola-ryngologist, etc...) are located there. A qualified worker, uncertain about whether or not his job will require physical presence, will prefer to live in Paris where he knows that the employment pool will be the largest, his close friends, cultural consumption more diverse and the best schools for his children around the corner. This scenario of increasing territorial inequalities is probably as uncertain as the first, but it does highlight the uncertainty surrounding the effects of a generalisation of telework.

This is why looking back at history is also important in determining which path is most likely. A technological revolution has made today's teleworking tools possible. If today we can hold meetings on video conferencing platforms and share files almost instantaneously to coordinate with colleagues and work from home, it's because of a series of innovations that have drastically reduced the cost of communicating over the Internet. We can therefore think that the effects of the development of Internet networks prefigure those of the emergence of telework. Has the fall in the cost of communications and the development of Internet networks increased or decreased the concentration of wealth and people in large cities?

The answer lies somewhere in between, at least for the United States: the concentration of wealth has increased but not the concentration of people. Hsieh et Moretti (2019)[29] report that from 1960 to the present day, the concentration of people in the three largest metropolitan areas (and which have also benefited most from this technological revolution, San Francisco, San Jose and New York) has declined slightly, but the concentration of wealth has risen sharply. The authors argue that it is the result of an inelastic housing supply that has constrained the growth of the most productive agglomerations. For us, it is a sign that telework may not be expected to magically solve the problem of spatial inequalities.

Conclusion. Which telework policy ?

In this note, I tried to anticipate the implications of widespread telework. The first step was to try to understand how much of the population might be affected. If we look at the technique alone, probably 30 to 40 percent of the of the labour force, mostly managers and middle professions, could be affected.

If we add to this the fact that telework is inefficient for a significant proportion of these people and therefore will not last beyond the lockdown, then telework has the potential, without further technical revolution, to become a sustainable reality for only 10 to 20% of the population at best. It is difficult, however, to do better than these rough estimates at this stage.

Given that in France and in most European countries the share of the population teleworking is 3 to 4 times lower, this is already a small revolution. We have tried to imagine some of its consequences.

- From an environmental perspective, the development of telework can only reduce the demand for daily transport to the workplace and thus move in the direction of improved air quality.

- Secondly, telework has the potential to open up a new phase of globalisation and to expose the most skilled jobs to competition from «tele-migrants». It must be stressed, however, that on the one hand the consensus in the economic literature is that flows of migrant workers have no effect on wages and employment of domestic workers. On the other hand, the market for skilled workers is characterized by significant recruitment difficulties that constrain the growth of firms, especially smaller ones. Even if «telemigrants» and national skilled workers are in competition, telemigrants also create new opportunities. In this sense, recruiting «telemigrants» is likely to increase the size of the pie faster than it divides the slices.

- Finally, teleworking by deconnecting the place of living and the place of work could change the very shape of cities. An optimistic scenario sees the opportunity to reduce territorial inequalities by allowing an urban exodus of qualified executives to medium-sized cities and the countryside. A pessimistic scenario goes in the opposite direction, telework explodes one of the constraints on the size of an urban agglomeration, i.e the size of its labour market, while not changing the current concentration of services. The precedent of the Internet revolution in the United States is rather along the lines of the latter scenario.

The question of public intervention in telework remains. Should states encourage or hinder telework development? In the context of lockdown developed countries have strongly discouraged the use of telework as the ideal

28. Rebecca McDonald, Lahari Ramuni and Lizzy Tan, What's in store? How and why cities differ for consumers, 2019, Centre for Cities.
29. 30. Hsieh, C.T. and Moretti, E., 2019. Housing constraints and spatial misallocation. American Economic Journal: Macroeconomics, 11(2), pp.1-39.

compromise between maintaining activity and protecting people. Facilitating the future transitions from normal work to telework in crisis situations can be seen as a public health and worker protection policy.

Should we go further and facilitate teleworking, for example through tax incentives, beyond crisis situations? From an environmental point of view, yes certainly, even if we should not underestimate the pollution linked to digital infrastructures. The argument of this note is also that any digital protectionism that would restrict the use of telemigrants would be misplaced. On the contrary, telework is probably an unsuspected source of wealth creation, especially for smaller companies which face the most difficulty in recruiting.

But what about more down-to-earth issues that have not been addressed to date?31 Telework must also be treated with caution and its widespread use will inevitably bring misfortune for some. Its development can have profound societal consequences. I tried to explain how it can change the very shape of cities. The separation of the workplace and the home also has the advantage of protecting workers. Protection of privacy to begin with. But also, working at home entails the loss of a certain sociability that may be important for people's mental health. Finally, teleworking puts some of the cost of work organisation back on the worker and makes him/her lose the many material advantages of working in a company. Access to a company canteen or a good quality photocopier, for example. Finally, the workplace also helps to overcome certain inequalities. Is it possible to compare the productivity of an employee in a 20m² studio with that of an employee in a 120m² house with a dedicated office? These are important questions because to reduce costs, some companies could impose teleworking on employees who do not wish to do so. The generalisation of telework will have to be accompanied by a regulation which will take these different problems seriously. ◄