



The macroeconomics of teleworking

As containment measures against Covid-19 gradually ease, one of the major structural hysteresis effects of the current crisis increasingly appears to be the spread of teleworking. The Covid-19 crisis saw a massive and forced use of teleworking as a way of ensuring the continuity of some activities, mostly in the service sector. While most countries have progressively ended the lockdown measures and allowed workers to come back to their offices, it is more than likely that 2020 will represent a major turning point in the development of teleworking over the long run, with major implications for the demand for corporate real estate.

Antonin Bergeaud
Simon Ray*

Microeconomic and Structural Analysis Directorate
External Trade and Structural Policies Research Division

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*At the time of writing of this paper, Simon Ray was a macroeconomist at the Banque de France. He has since moved to another institution.

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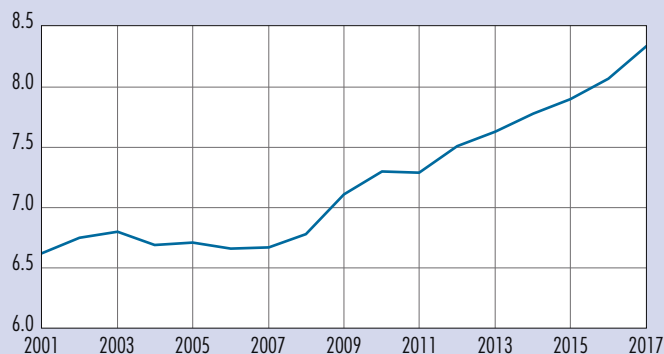
6.6%

share of value added spent by the median French firm on rental expenses in 2001

8.3%

share of value added spent by the median French firm on rental expenses in 2017

Rental expenses over value added over time
(%)



Source: Banque de France, FIBEN company database.



1 Trends in the use of teleworking

Teleworking has existed for years but did not become widely spread until 2020, even though new technologies have long since decreased the cost of implementing flexible work arrangements. As noted by the International Labour Organization (ILO), the concept of teleworking suffers from a definitional problem. For the sake of simplicity, we rely on a simple definition proposed in the 2002 European Framework Agreement on Telework, and define teleworking as the use of technology to organise and perform a professional task away from the employer's premises, where this task could have been performed in the workplace. This broad and generic definition arguably explains the lack of a comparison of the prevalence of teleworking across countries. In the United States, the Bureau of Labor Statistics (BLS) reports that around 25% of employees worked at home on an average day in 2019, a number that reaches 40% for workers with an advanced degree. However, this definition includes workers that supplement their office hours by working from home. Mas and Pallais (2020) explore different variations of existing flexible work arrangements and find that up to 30% of workers have some kind of flexible work arrangement in the United States, but no more than 10% declare that they work from home on a regular basis. Using the Census Bureau's America Community Survey, the employment agency FlexJobs reports that the proportion of workers that work from home for at least half of their working time was 3% of the US workforce in 2017. In France, a recent analysis from the Ministry of Labour's statistical division (DARES) shows that in 2017 a similar proportion of people worked from home at least one day a week on average. In the United Kingdom, according to the Office for National Statistics (ONS), 1.7 million people declared that they mainly worked from home in 2019, accounting for around 5% of people in employment, while 4 million declared that they worked from home for at least a few hours in the week.

The numbers differ depending on the definition used and whether or not it includes workers that occasionally work from home during the year, those that are self-employed, etc. Still, the common trend across these different definitions is that teleworking has been growing robustly since the early 2010s (Abrams, 2019).

The Covid-19 health crisis and the associated physical distancing measures and lockdowns have forced many organisations to find ways to operate, at least partially, in full remote mode. In light of this episode and despite some obvious flaws, anecdotal evidence (Google, Facebook, Peugeot) and recent survey data show that many employers and employees consider that the advantages associated with teleworking tend to outweigh the drawbacks, paving the way for a spread of this practice.¹ Several recent studies have attempted to quantify the pace of the spread of teleworking and describe the consequences for workers. Among these, Dingel and Neiman (2020) estimate that 37% of American jobs could switch to full teleworking (see also Gottlieb et al., 2020; Hensvik et al., 2020 and Mongey and Weinberg, 2020). In this article, we look at an additional, usually overlooked impact of the massive development of teleworking: its effect on corporate real estate.

Teleworking can be seen as a way of outsourcing (at least partly) to employees the task of finding and setting up a workspace. The direct effect on profit margins (that is, ignoring the impact of teleworking on productivity for now) will be determined by the employees' bargaining power and by the share of the costs saved by the firm that the employees will be in a position to secure to finance new costs, namely the possible need for extra space, extra use of energy, heating, etc. In such a bargaining process, firms will outline the gains for workers associated with saved commuting time and the associated welfare gains. Mas and Pallais (2017) design an experiment in collaboration with a firm and show

¹ According to *TheConversation.com*, which quotes various surveys, 86% of white collars declare that they are willing to continue teleworking but only 5% want to do it full-time. Among other workers, 56% are willing to continue teleworking and 26% want to do it full-time.



that there are a significant number of employees that value working from home at the moment of hiring, and that they are willing to give up 8% of their salary to be allowed to do so. Because working from home is likely to increase the utilisation rate of residential real estate assets and lower mobility costs, if it had no impact on productivity, it could potentially both improve corporate profit margins and workers' welfare.

In this analysis, we explore the potential effect of teleworking by documenting the channels through which corporate real estate can have an impact at the macro level.

2 Teleworking and firms' production function

In a recent article, Bergeaud and Ray (2020) analyse the effects of firms' real estate adjustment costs on labour market dynamics. The idea of the paper relies on the complementarity between a firm's premises and its workforce. Because of this complementarity, the adjustment costs of office space have adverse economic effects on the demand for labour. The authors show that firms affected by productivity shocks may be reluctant to adjust their workforce, and in particular to hire new workers, because of space constraints that would entail large fixed costs, notably taxes.

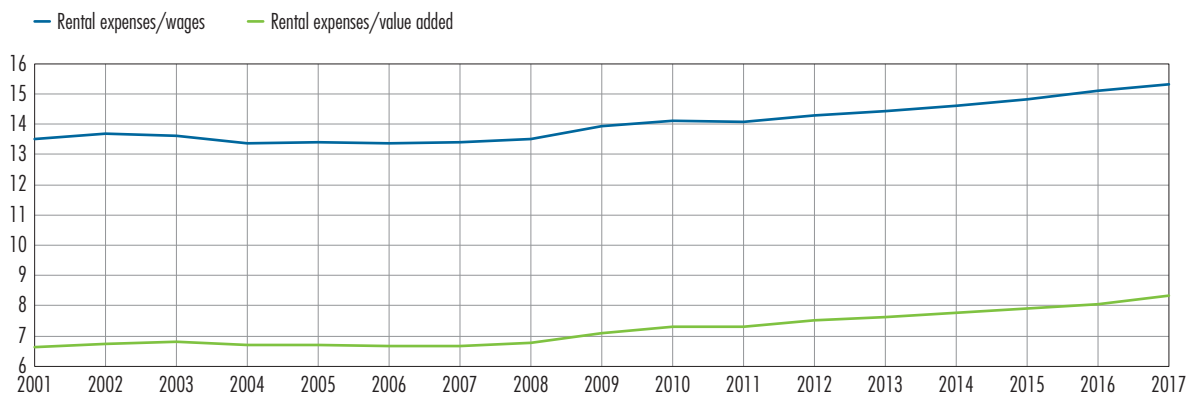
The massive development of teleworking and other types of flexible work arrangements could alleviate these constraints, as the complementarity between real estate and the workforce would significantly decrease. This corresponds to a change in the production function that can have important consequences for firms, especially in the service industry, even more so since, as we shall see below, real estate is becoming an increasingly heavy burden for firms.

To get a quantitative sense of how teleworking could alter firms' cost structure and the nature of their assets, we document recent trends in the role of real estate for corporates at the aggregate level.

In France, land and structure expenditures account for a large and growing share of firms' operating costs. Such information is not readily available in the national accounts but we can estimate it from 2001 onwards using balance sheet data. Specifically, Chart 1 plots the median ratio of rental expenses over value added and of rental expenses over wages based on a set of 430,000 French firms that do not own real estate. For the median firm, the ratio of rental expenses over wages has jumped from 13.5% in 2001 to around 16% in 2017, a trend that is notably fuelled by rising real estate costs.

C1 Median ratio of rental expenses over wages and value added (2001-2017)

(%)



Source: Banque de France, FIBEN company database.

Sample: 430,000 firms that did not report any real estate assets on their balance sheet over the period under consideration.

Note: Rental expenses covers rental payments for land and buildings.



In 2017, real estate assets accounted for 66.7% of the value of non-financial assets and 22.2% of the value of all assets in French non-financial corporations' (NFCs) balance sheets. As shown in Chart 2, this share grew substantially in the early 2000s due to the sharp rise in land prices. These dynamics are also reflected in corporate real estate market flows. In France, total corporate investment in real estate reached a record EUR 39.2 billion in 2019, with an average growth rate of 66% over the past 5 years; the majority of these investments are in urban offices (Knight Frank, 2020).

The importance of real estate for firms has therefore been trending upwards, although there are significant disparities across sectors and across regions. Charts 3a and 3b look at this geographical heterogeneity and map, respectively, the share of real estate-owning firms and the average ratio of rental expenses over value added for non-real estate-owning firms by French *département*.² Bergeaud and Ray (2020) show that real estate-owning firms are usually more constrained in their

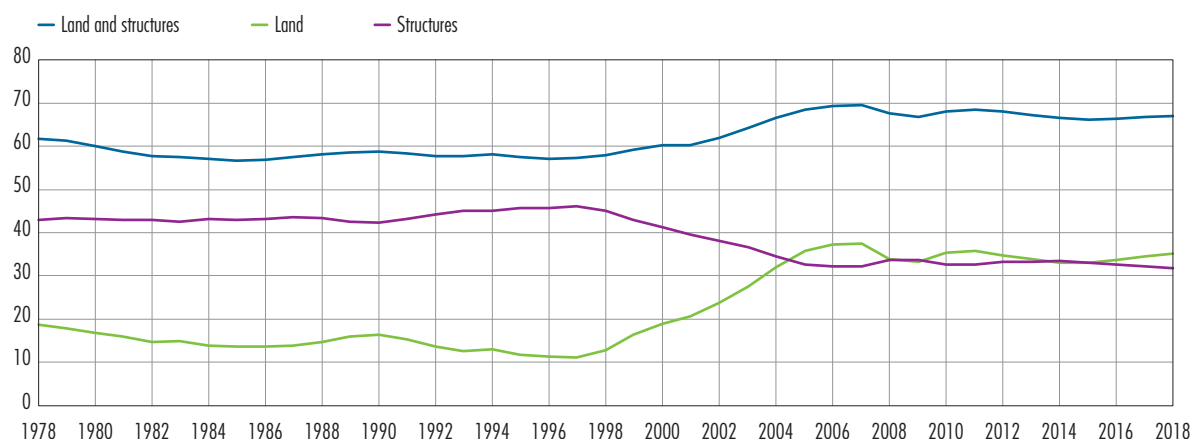
dynamics by the costs associated with adjusting their premises, and we see that they can represent more than half of the population of single-establishment firms in some areas, usually those that are less dense. In other areas where the majority of firms rent their premises, this rental cost can amount to more than 15% of value added, especially in dynamic urban areas (in particular Paris, Toulouse and the French Riviera).

These stylised facts on the significant and growing share of real estate for firms suggest that the spread of teleworking could potentially significantly alter the cost structure and balance sheet of non-financial corporations and be relevant at the macro level. The validity of this observation varies across sectors, not least because of obvious disparities in the share of tasks and occupations within each sector that can be performed remotely (see Dingel and Neiman, 2020 for a list of such occupations).

Finally, for all firms, real estate is a major obstacle to growth. Charts 4a and 4b show that real estate becomes

C2 Share of real estate assets in the balance sheet of French NFCs (1978-2018)

(%)



Sources: INSEE, authors' calculations.

Note: The chart plots the share of the value of real estate assets (land and structures) in the balance sheet of French non-financial corporations (excluding financial assets).

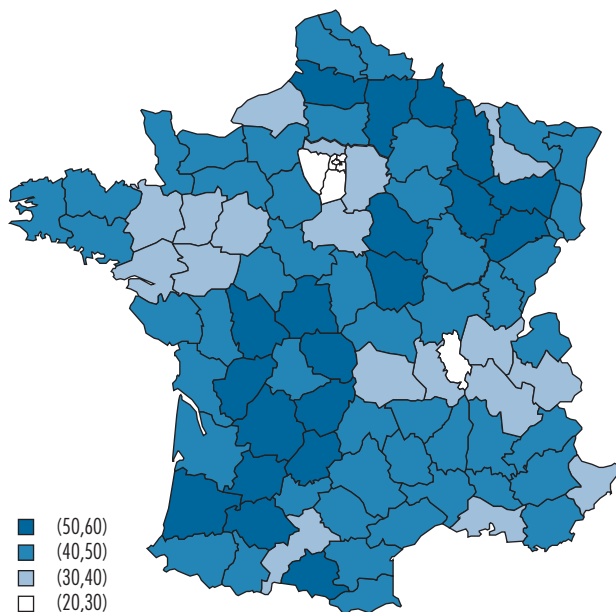
2 We restrict our focus to single establishment firms with fewer than 250 employees; see Bergeaud and Ray (2020) for more details.



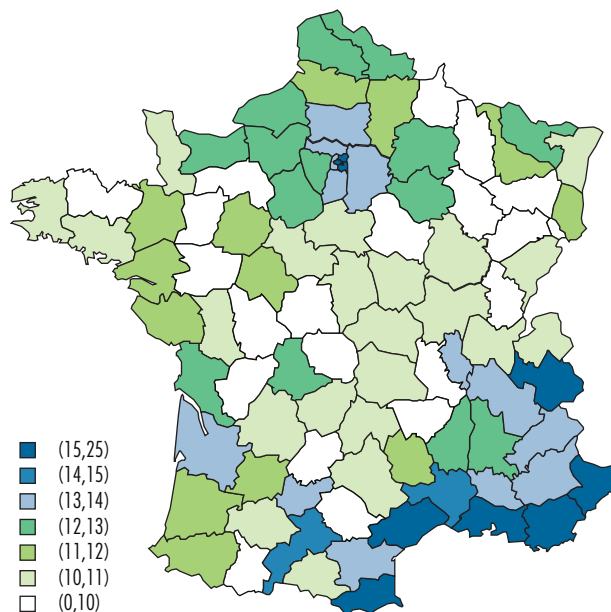
C3 Firms owning and not owning real estate, by *département*, 2015

(%)

a) Share of real estate-owning firms



b) Non-real estate-owning firms: average ratio of rental expenses over value added



Source: Banque de France, FIBEN company database.

Sample: Single establishment firms, metropolitan France.

Note: Chart 3a shows firms that declared they own real estate. Chart 3b shows the average ratio of rental expense over value added for firms that did not hold any real estate in 2015.

an increasingly heavy burden for firms as they age, and can potentially limit the growth in their workforce. Aghion et al. (2018) show that French firms are smaller than US firms at the same age, suggesting that they have been impeded in their growth dynamics, although factors other than real estate are also arguably at play.

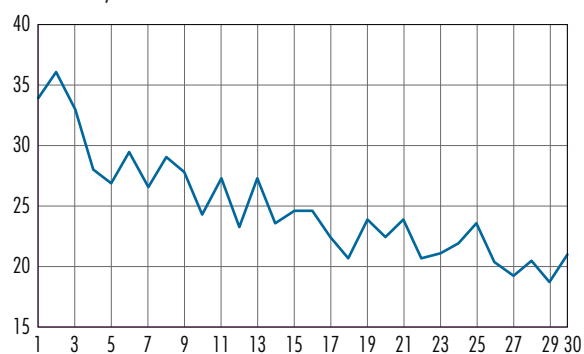
Thus, if teleworking could relax the constraints posed by real estate, this could have significant effects on business dynamism. In addition, other macroeconomic effects of changing corporate balance sheet composition are also potentially far-reaching and can be studied by focusing on the specificities of real estate assets.

C4 Firms' real estate holdings and age

(x-axis: number of years for which firm has been in existence)

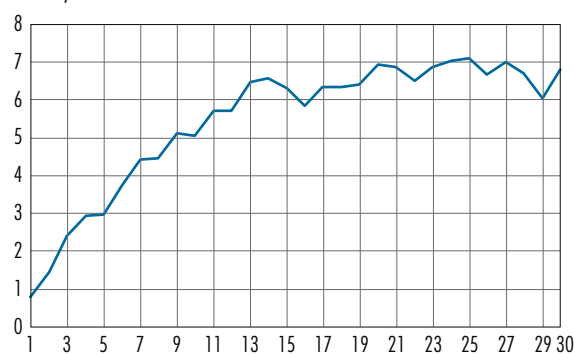
a) Average surface area per employee

(y-axis: in m²)



b) Average ratio of book value of real estate over sales

(y-axis: %)



Sources: Banque de France, FIBEN company database; authors' calculations.

Sample: Single establishment firms aged up to 30 years; metropolitan France.



3 Some macroeconomic implications of the decline in real estate assets in corporate balance sheets

Since they are easy to redeploy and have a long lifespan, real estate assets make up the bulk of firms' pledgeable assets (see Beck et al., 2008 for a cross-country analysis). Their market value plays a central role in the financing capacities of NFCs. Over the past decade, various authors have studied the causal relationship between the market value of real estate assets and firms' investment capacities using firm-level data from different countries (Gan, 2007; Chaney et al., 2012 and Fougère et al., 2018). By reducing the share of real estate assets in corporate balance sheets, teleworking can alter firms' borrowing capacity and lower the share of financial debt financed through bank loans. It is likely to lower the share of tangible physical assets in firms' balance sheets, and to exacerbate the financing challenge associated with such a transition.³

In addition, real estate assets are subject to large market price fluctuations that propagate to aggregate economic activity. Davis and Heathcote (2007) document that real price series for land are 2.8 times more volatile than real GDP. Building upon this literature, recent macroeconomic contributions have shed light on the role of shocks specifically affecting land prices in explaining the co-movements and relative volatilities of land prices, investment and unemployment (Liu, et al., 2013, 2016 and Kaas et al., 2016). If firms own less real estate, these transmission channels are likely to be significantly dampened.

Another specificity of real estate assets is that adjustment costs are typically high, especially relocation costs. These adjustment costs may be a source of frictions that impede the efficient allocation of resources across firms (Bergeaud and Ray, 2020), as adjustment frictions are at the root of the misallocation of resources across firms

(Hsieh and Klenow, 2009 and Bartelsman et al., 2013). In particular, recent empirical studies (Duranton et al., 2015) have shown that the misallocation of land is particularly large, which weighs on productivity. By reducing the complementarity between real estate and the workforce in firms' production function, teleworking is also likely to dampen these sources of factor misallocation in the long run.

Finally, we have mostly discussed the effect of teleworking on the quantity of real estate. The dramatic change in the demand for corporate real estate is expected to lead to a decline in prices. However, the supply side can also adjust by converting some corporate premises into residential buildings, making the price effect difficult to anticipate, especially in areas where the residential real estate market is very tight.

4 A big question mark: the long-term productivity issue

The impact on productivity is arguably the main question associated with the development of working from home.⁴ Relatively few studies consider the effect of teleworking on productivity. This is likely due to an identification issue: there is a considerable selection bias since teleworking corresponds to situations where both the employer and the employees see a potential mutual gain.

The short-term impact on productivity is mostly internalised by firms that are likely to assess whether employees working from home are productive enough to justify the practice. It is, however, worth noting that firms should be wary of a possible short-term bias as teleworking can intuitively induce a short-term reduction in expenses while also leading to some medium-run productivity damage. The medium- and long-term impacts are more interesting from an economic perspective as they may result from externalities, notably associated with where individuals and firms settle.

³ See the Voxeu column by Cecchetti and Schoenholtz (2018).

⁴ Of course, a reduction of firms' real estate capital has a direct accounting effect on Total Factor Productivity through the reduction of capital deepening.



Since Marshall (1890), we know that the relative attractiveness of geographical areas arises from the spatial heterogeneity in agglomeration economies, that is to say localised increases in aggregate returns. For Duranton and Puga (2004), the micro-foundations of agglomeration economies can be classified into three categories. First, those resulting from sharing mechanisms; for example, the sharing of indivisible facilities or of the gains from a wider variety of inputs. Second, those stemming from an improved probability (and expected

quality) of matching between employer and employee. Third, those linked to learning, through the enhanced diffusion of knowledge. Working from home and its expected corollary of a widely geographically dispersed workforce, could reduce the positive effects of the first and the third mechanisms. It could, however, improve the positive effects of the second mechanism. The long-term structural impact of working from home on productivity is an open question that could become an important research topic over the coming years.⁵

⁵ Microeconomic findings are yet to converge. Bloom et al. (2015) report a very positive impact of working from home in cases where employees have at least six months of tenure, broadband access and a private room at home in which they can work. However, other studies have reported adverse results (see, for example, Morikawa, 2020; Bergeaud et al., 2020; Cette 2020).



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