Fear of Going back to work (FOG) and Work from Home (WFH): employment dynamics under pandemic

Jacques Bughin (McKinsey) & Michele Cincera (ULB)

We build a stylized model of employment choice under pandemic that accounts for direct health, and other induced (such as revenue loss, or social exclusion) risks on the supply side (FOG) while accounting for remote working opportunities offered by firms on the demand side (WFH). Noting that the Covid-19 shock led to major lockdown, we estimate a quantity constrained employment model for France during the first wave of the Covid-19 crisis. Besides pure social restriction, we find that pandemic factors have impacted the labor market dynamics, warranting more policy scrutiny than currently applied during crises.

Since its inception, the Covid-19 pandemic has been a significant health shock, with about 220 million infected worldwide by the end of the summer of 2021 and more than 4.5 million official fatalities[1]. In a recent study for Europe, Bughin et al. (2021) demonstrate that those collateral damage has reduced citizens' welfare as much as the effect from pure health risks. Also, it has brought additional negative consequences in terms of job/finance/social, and personal well-being (Brooks et al., 2020). Trougakos et al. (2020) illustrate the material psychological effects of the Covid-19 crisis on employee productivity. A survey we use later in this research during mid-year of 2020 (Neurohm, 2020) confirms that for the average French citizen worried about her health, another 1.3 also had expressed concerns of not being able to meet with family or friends, while another 0.7 was worried about her financial situation.

The set of risks perception should shape the work environment and productivity, not only from the supply-side of participation, but as well from the demand side, with companies in need of figuring out how many, and under what organizational configuration, to use workers during major crises (Baek et al. 2020). Regarding the former, the fear of going back to work (on-site) (or FOG) has been shown to be prevalent among 70% of US tech professionals (Ieee Spectrum, 2020). As a result, Coibion et al. (2020) documented a shrinkage of up to 10% in the US labor supply. Regarding the latter, companies have expanded the opportunity to work from home (WFH). More than 40% of workers have been working from home in the US and Europe in the first six months of the pandemic (Dingel and Neiman, 2020 and Eurofound, 2020). When WFH is not possible (e.g., for workers fulfilling face-to-face critical missions), companies have sometimes resorted to financial incentives to lure enough workers to come back to work. US retailers, for example, have increased wage compensation by 7% in 2020 for frontline workers.[2]

There seems to be little attempt to present a comprehensive logic of those pandemic effects on the labor market despite all those effects. This study objective aims at trying that. It develops a simple stylized model of the labor market that accounts for the diversity of risks associated with the Covid-19 pandemic

---

and how they jointly affect changes in the labor market, such as changes in WFH, wage changes, or lower labor participation.

Our study significantly borrows from Eichenbaum et al. (2020). It develops a simple model with SIR contagion dynamics that reveals how multiple risk perception types affect each side of the labor market and its equilibrium outcome.[3] If markets were allowed to adjust usually, the wage clearing equilibrium would suggest that the pandemic would reduce employment in most circumstances, resulting in pandemic risks not being fully hedged. Evidently, under lockdown, the market is further quantity-constrained in aggregate. Looking beyond this aggregate, one may also anticipate a likely distribution of market constraints outcomes linked to occupations (consider those critical versus not, consider those that have extensive versus limited social interactions) and skills (think of those that can lead, or not to autonomy and productivity even if WFH).

The theoretical model we develop can be found in Bughin and Cincera (2021a). The model leads to 5 propositions that are summarized in Table 1.

Table 1 : Theoretical prediction of the high stylized model

Proposition 1: « Under pandemic, the worker labor participation is reduced by the extent of viral diffusion, and otherwise shifts towards WFH for either sufficiently attractive salary or low costs of remote collaboration.»
Proposition 2a: « Under pandemic, labor demand may shrink with increased viral diffusion and otherwise shifts towards more WFH. »
Proposition 2b: « Under pandemic, labor demand is more wage elastic, to the extent of extra costs of WFH, such as lower workers' productivity. »
Proposition 3: « During a pandemic, equilibrium wage inflates under viral diffusion, and when work at premises is extensive. »
Proposition 4: « Under pandemic, equilibrium employment is reduced by viral diffusion, especially under limited WFH and high health and alternative wage costs. »

To corroborate these theoretical propositions, we resort to estimating a quantity constrained model of employment on the French market, considering pandemic induced risk, firm shift to WFH, and controlling for a large set of occupations and socio-demographics of the working population. Our

---

[3] Our research is one additional contribution to the literature of labor economics in a SIR model. Eichenbaum et al. (2020) embeds a SIR model with a dynamic agent framework to study optimal policy responses to a pandemic. Alvarez et al. (2020) and Piguillem and Shi (2020) study optimal lockdowns. Kapicka and Rupert analyse the labor market dynamics in the context of a job matching model. Bughin and Cincera (2020b) look at labor participation, but in the context of a wage bargaining equilibrium labor market model.

empirical findings demonstrate that employment dynamics are consistent with the underlying logic of labor market behavior change under the pandemic. But they also show that a) those changes can be material, b) risks are broader than only health risks, and c) employment dynamics may be largely different across population segments, pending their socio-demographic and risk perception clusters.

Employment dynamics under pandemic: empirical evidence from the Covid-19

While highly stylized, the model suggests that employment is greatly affected by the pandemic. This is because market constraints are building up under severe social lockdown and because the pandemic affects demand and supply. How large are those effects in reality? This section aims to estimate a reduced form of those effects on French employment using data from a survey conducted in May 2020 by a private marketing research firm, Neurohm. We first discuss the sample, then our empirical strategy and finally the results.

The survey was originated by Neurhom, a marketing company from Poland, as part of its actions to build transparency on the possible effects caused by the Covid-19 pandemic. The first country of analysis was France and was then expanded later on to various countries by Neurohm. The peculiarity of the French sample is that it also collected specific data on the employment status of its interviewees. Further, France is a good case for studying employment dynamics, given the large shock driven by the Covid-19 pandemic and the resulting lockdown measures imposed on the economy.[4] The data collection was made in May of 2020, about three months after the first official case of Covid-19 was made official in France. The pandemic was diffusing quickly, with a high risk of healthcare congestion leading the countries to impose significant lockdown restrictions. France was such a country with heavy restrictions imposed on the whole population, especially regarding up to 20 million non-essential activities, which were only softened by President Macron, after May 11th, 2020 (Le Monde, 2021).

Incidentally, by May 2020, about 1% of the French population were officially contaminated (for about three extra points of the people claiming to have had the symptoms but did not get tested). The lockdown has led to a 13.8% decrease in the French GDP2020 in the second trimester or a significant economic shock in the country.[5] Unemployment shot up by 8% by April 2020, as well. There was also no vaccine to prevail at that time of the survey data collection.

The sample was designed to be representative of the age structure of the French adult population, as well as its high-level socio-demographics. The survey was collected online, and the final sample size is n = 1305 individuals and concerns individuals only above 18 years old. In total, the sample removes people above 64, or declared to be retired, as our focus is on employment choice. In the end, the sample size is n'= 1080 individuals in metropolitan France. As the data is survey-based, the data was also adjusted to account for uncertainty in the answers. In particular, responses were corrected by the response time, as collected through the iCode Smart test (Ohme et al., 2020). The procedure amounts to re-center the response, as too quick or too long response time may reduce the credibility of answers given by the respondent.

---

[4] We thank Neurohm to allow us access to the dataset. The authors have got access to the French data freely, and have not received any financing or are constrained by the use of those data with respect ot Neurhom.

[5] This drop was 11% for the private consumption, but investment shrank by 18% and exports by as much as 26% according to the National Institute of Statistics in France, INSEE. See « L'économie française s'est effondrée au deuxième trimestre » (Le Monde, 2021).

We first have collected data for employment, infection status, and socio-demographics and confirm sample representativeness. Regarding virus infection, the survey reports 0.8% of the sample population being Covid-19 infected, or close to the official contamination rate reported for France by May at 1%.[6] Comorbidity prevalence is significant, affecting 1 out of 5 French citizens, but in line with official health statistics.[7]

Regarding employment, we collected status based on a multi-discrete choice question in the survey as follows:

  0: don't work anymore due to the lockdown (25%)
  1: teleworking (52%)
  2: working on site (23%)

By May 2020, close to 25% of the active working population was not working. This both includes reduction of voluntary work participation as well forced unemployment. Based on official statistics, the split is likely 50/50 between both types of non-employment as, by the same time, French statistics had reported that 13% of workers were put unemployed. In comparison, another 15% of workers did not supply work due to illness, vacation, or retirement.[8] In the survey, also WFH had become the dominant practice (52% out of 75% = 70% of the working portion), while in April, about 25% of workers indeed worked on-site in France, according to the same official statistics.

Table 2 further zooms at the socio-demographics of the sample, demonstrating good representativeness (average family dependence is just above two kids, median salary is in the 3000 gross revenue per month, education is, however, biased towards the high education side). Table 3 emphasizes the perception of pervasive health risks attached to the Covid-19 virus, but it also clearly illustrates other side risks, such as social exclusion and/or financial worries. Risks perceptions are large and in line with other studies, e.g., Dryhurst et al. (2020).

Table 2 : High-level socio-demographics, sample France, May 2020

	Mean		Mean
Income		**Age**	
Less than 1,000€	3.2%	Under 18	0.2%
1000-2500€	32.1%	Between 18 and 25 years old	9.2%
2500-5000€	49.2%	Between 26 and 35 years old	22.6%
5000-7500€	7.2%	Between 36 and 49 years old	30.9%
More than 7500€	1.7%	Between 50 and 64	25.0%
I don't know	6.7%	65 and over	12.1%
Family size (number of kids)		**Educational Degree**	
0	36.3%	Primary education	3.4%
1	17.3%	Lower secondary education	6.4%
2	33.0%	Upper secondary education	16.9%
3	10.1%	Bachelor's or equivalent level	20.6%
4 or more	3.3%	Master's or equivalent level	21.2%

---

[6] See Worldometers, Covid-19

[7] This again is in line with general health statistics. Regarding co-morbidity occurrences with covid,-19 infection in the first wave of the pandemic, Bajgain et al. (2020) report that the major ones in overall population were cardiovascular diseases (9%), hypertension (27%), and Diabetis (17%).

[8] See Travail-emploi (2020)

		Doctoral or equivalent level	31.5%
Professions			
Workers, employees	27.6%	Traders, farmers, artisans	3.2%
Intermediate professions	16.3%	Retirement	15.6%
Managers and intellectual professions	28.1%	Without professional activities	9.2%

Table 3 : Risk associated with Covid-19, sample France, May 2020

	% agree		% agree
Health		**Social exclusion**	
Easy to get the virus	49%	Worried not to see friends and family	52,4%
Virus is everywhere	66%	Leaving in isolation will deplete my well being	41%
Worried of getting infected	93%	Being isolated at home is fun	22.6%
Worried about own health	51%		
Virus is dangerous for my health	71%		
If infected, I will go through it smoothly	65%		
We will overcome the virus soon	27%		
Financials		**Psychological**	
Worried about my professional future	27.8%	I have negative thought	23%
Worried about my financial situation	32.3%	I feel calm	41%

Estimated results are displayed in Table 4, where the effects are recast in terms of percentage points. We have adjusted the original equation (25) at two levels. First, if our dependent variable is binary, our preferred strategy is to use the response time corrected variable, implying that the procedure also leads to building "more continuity" in the responses. We thus resort to simplicity to linearized regression results. Second, salary (measured by revenue class), WFH acceptance, and UN are all endogenous, so we resort to instrumentation techniques for estimation, in particular, generalized method of moments (GMM) two-stage least-squares (2SLS). As a robustness check, we also implemented limited-information maximum likelihood (LIML), with similar results [9]. We use our CONTROL vector as instruments, as all established demographics (age, gender, education, location, family size, work revenue) are pre-established to employment behavior.

A few results stand out. First, our proxy of forced unemployment is clearly negative, confirming that the covid pandemic has created a regime of large excess unemployment. The effect is less than 100%, and in the spirit of work by Sneessens (1987) and others, it means a coexistence of 100-78=22% of excess demand. This figure is close to the estimates of essential front line workers during the covid-19 pandemic (Kane and Tomer, 2021).

---

[9] Those are available to the authors upon requests.

Table 4 : Marginal effect employment under pandemic, basis point

Variables	Dimensions	Effects	s.e
WFH		55,1***	2,31
UN		-78***	11,2
INFECTED		12,9***	1,14
HEALTH	worried infected	-2,42***	0,41
	comorbidity	-22,3***	4,45
SOCIAL	worried not seeing friends	-5,44**	2,57
	fun to stay home	-18,8***	1,83
PSY	negative thoughts	-6,75*	4,12
	feel calm	2,1	1,62
FINANCE	worried about prof future	-9,95***	3,55
DURATION	pandemic over soon	5,71**	3,23
REVENUE 1	1000/2500 Euro per month	37,9***	8,74
REVENUE 2	2500/5000 Euro per month	39,6***	8,75
REVENUE 3	5000/7500 Euro per month	38,5***	8,88
REVENUE 4	5000/7500 Euro per month	38,3***	9,64
REVENUE 5	>7500 Euro per month	25,0**	9,77

Notes: 1) *: 10% significance, **: 5%; ***:1%, 2) WFH, UN, REVENUE are endogenous; controls include age, occupation, home and family size, morbidity, 3) Revenue reference is <1000 euros, 4) constant not reproduced, 5) Fit statistic, F >0***, R=square: 62,9%, 6) s.e= heteroscedastic consitent standard error

Second, work from home is the primary practice (55% of marginal work is linked to WFH). Third, being infected makes you no longer susceptible and increases work participation. Fourth, and central to this research, we see that, regarding the group of the susceptibles, it is clear that health, social, psychological, and financial risks play a role in shaping employment.

Those effects are also material, as Table 5 shows the impact of those "depressive" factors on the sample mean. They imply a reduction of about 20% in work participation due to the pandemic. The estimates are larger than what was estimated, for example, for the US (about 10%, see Coibion et al., 2020). Still, the estimates here are considering all risks, and not only health, with health taking only 37% of the total, or possibly, 7 points in participation reduction. Note as well that the estimates imply a further Balkanisation of the work participation. Contrast for example two extreme "persona," with, on the one hand, a young worker, highly educated, no comorbidity risk, and limited risk, and the other hand, a 56 years old, low educated, high comorbidity and serious worries linked to the pandemic. Based on the sample data, the first persona has an 80% chance of WFH, risk perception that reduces voluntary (non-WFH) participation by 5%, or a crisis effect of less than one point. The second "persona" is, however, becoming a "stranger" to the labor market: it has 18% of forced unemployment, 30% of WFH, and risk perception that can reduce non-WFH participation by 50, or a reduction in voluntary labor supply by 35%, and with an unemployment rate 18%/(1-35%)=27% forced unemployment.

Table 5 : Estimate on employment at the sample mean

Variables	Dimensions	Effects (points)
HEALTH	worried infected	- 2.18
	comorbidity	- 4.01
SOCIAL	worried not seeing friends	- 2.85
	fun to stay home	- 4.14
PSY	negative thoughts	- 1,89
	feel calm	
FINANCE	worried about prof future	- 2.79
DURATION	pandemic long	- 2.40
TOTAL		- 20.25
Relative contribution of factors		
HEALTH		37%
SOCIAL		39%
PSY		11%
FINANCE		13%

Conclusions

Using a simple SIR-augmented model of the labor market, this research has informed how a set of risk linked to a pandemic can materially affect the labor market. A reduced form equation of employment under Covid-19, that accounts for forced unemployment, but also for how various risks linked to the pandemic can affect workers' participation, and estimated for France, during the pandemic explosion, demonstrates material effects on the labor market. Policy responses may thus not only try to limit the pandemic, but they also need to accommodate for radical reallocation in markets, especially as the interaction of pandemic with markets may lead to balkanization, and reinforce in this case, the exit of the old generation out of work practice.

This work is a work in progress. In particular, the estimation needs to test for cross-effects, possible selection bias, etc. Further, the sample captures only information at the supply side; it would be relevant to have data on the demand side to better capture the logic of how firms support WFH, on top of other practices. Finally, the risk perception could have been magnified in the first months of the pandemic explosion; with time, workers may have adjusted their perception and are possibly less risk-averse. All those extensions are left for further research.

References

Alvarez, F, D Argente, and F Lippi (2020), A simple planning problem for COVID-19 lockdown. Technical report, University of Chicago.

Baek, C, McCrory, P B, Messer, T, & P Mui, (2020), « Unemployment effects of stay-at-home orders: Evidence from high frequency claims data », *Review of Economics and Statistics*, 1-72.

Bajgain KT, S Badal, B B Bajgain, M J Santana, Prevalence of comorbidities among individuals with COVID-19: A rapid review of current literature. Am J Infect Control. 2021 Feb;49(2):238-246. doi: 10.1016/j.ajic.2020.06.213. Epub 2020 Jul 10. PMID: 32659414; PMCID: PMC7351042.

Brooks, S K, R K Webster, L E Smith, L Woodland, S Wessely, N Greenberg, et al. (2020), The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet* 395, 912–920. doi: 10.1016/s0140-6736(20)30460-8

Bughin, J, M Cincera, R. Ohme, D. Reykowska, M. Żyszkiewicz (2021), The great employee divide: Clustering employee ""well-being" " challenge during Covid-19. Covid Economics 66: 58-88

Bughin, J, M Cincera (2021a), "Fear of Going back to work (FOG) and Work from Home (WFH): employment dynamics under pandemic", mimeo.

Bughin, J, M Cincera (2021b), "Fear of Going back to work (FOG) and Work from Home (WFH): employment dynamics under pandemic", mimeo.

Coibion, O, Y Gorodnichenko, M Weber (2020), "The cost of the Covid-19 crisis: Lockdowns, macroeconomic expectations, and consumer spending", *Covid Economics*, 20: 1-51.

Dingel, J et B Neiman (2020), "How Many Jobs Can be Done at Home?", *Covid Economics*, Vetted and Real-Time Papers 1: 16-24

Dryhurst, S, C R Schneider, J Kerr, A L Freeman, G Recchia, A M van der Bles, D Spiegelhalter, & S van der Linden (2020), « Risk perceptions of COVID-19 around the world », *Journal of Risk Research.*

Eichenbaum, M S, S Rebelo, M Trabandt (2020). "The Macroeconomics of Epidemics", NBER Working Paper Series, Working Paper No. 26882. http://www.nber.org/papers/w26882

Eurofound (2020). Living, working and Covid-19 data set. April 2020. https://www.eurofound.europa.eu/data/Covid-19

Kapicka, M, & P Rupert (2020), Labor markets during pandemics. *Manuscript, UC Santa Barbara*.
Ohme, R, M Matukin, P Wicher (2020), Merging Explicit Declarations With Implicit Response Time to Better Predict Behavior. In Chkoniya, V, A O Madsen, & P Bukhrashvili (Ed.), Anthropological Approaches to Understanding Consumption Patterns and Consumer Behavior (pp. 427-448). IGI Global.

Piguillem, F and L Shi (2020), The optimal COVID-19 quarantine and testing policies. Technical report, EIEF.

Sneessens, H (1987), "Investment and the inflation-unemployment tradeoff in a macroeconomic rationing model with monopolistic competition," *European Economic Review*, 31, 781– 815

Trougakos, J P, N Chawla, J M McCarthy (2020), "Working in a pandemic: Exploring the impact of COVID-19 health anxiety on work, family, and health outcomes", *Journal of Applied Psychology,* (105):11.