

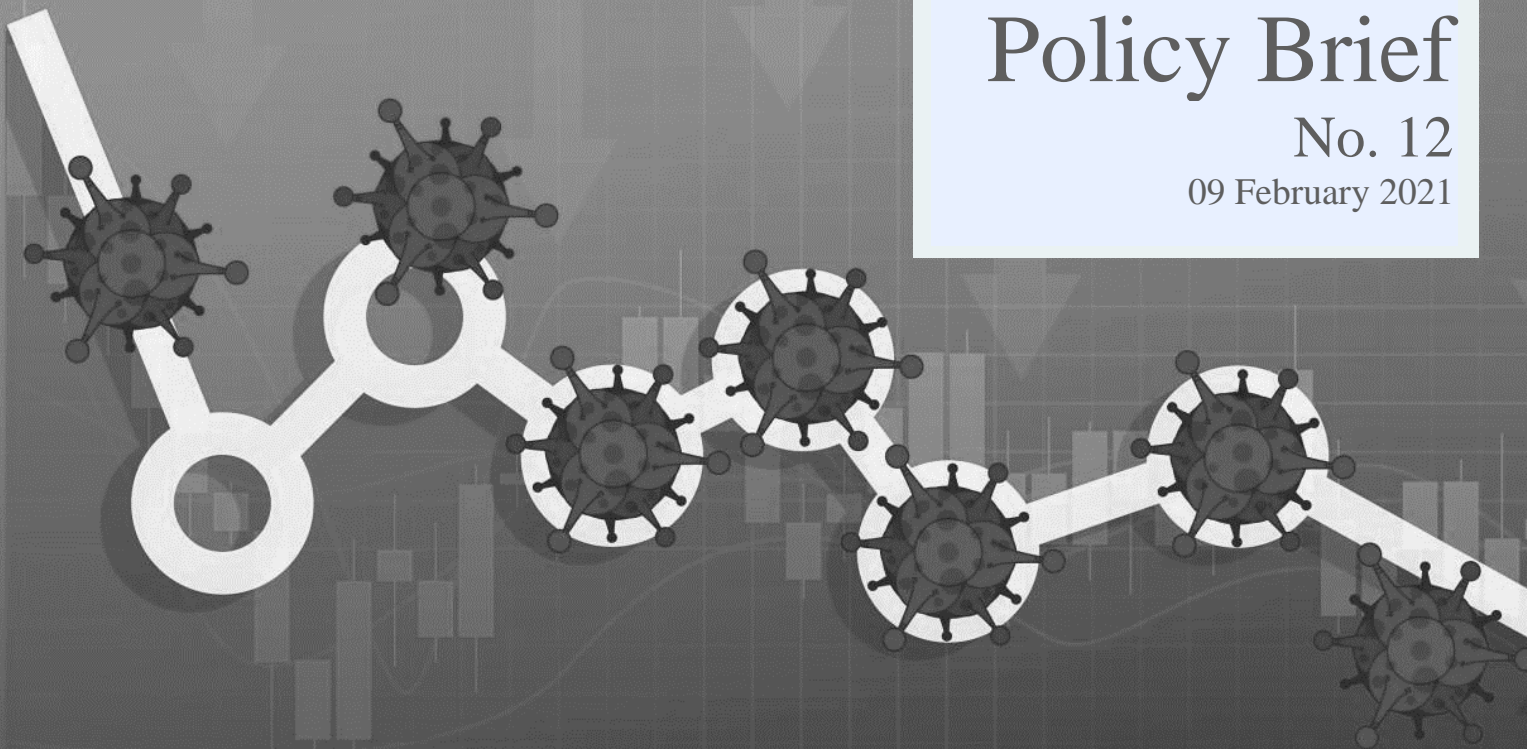
Covid and Productivity one year after: what did surprise us?

Tommaso Bighelli, Sergio Inferrera, Filippo di Mauro (all CompNet) and Chad Syverson (University of Chicago)

Policy Brief

No. 12

09 February 2021



This policy brief presents research conducted within the Competitiveness Research Network (CompNet). The Competitiveness Research Network (CompNet) is a research network originally founded by the European System of Central Banks in 2012 to foster the debate on competitiveness issues among policy institutions and researchers. The Network is the producer of a top standard micro-founded dataset covering productivity indicators for some 20 European countries.

Since 2017, CompNet is an independently funded and regulated network, hosted at the Halle Institute for Economic Research (IWH). Members are contributing to the Network via financial support (Funding institutions) or provision and elaboration of data (Data providers). All Members are engaged in research and policy work related to productivity and are committed to improve granular data and knowledge to understand its drivers.

Acknowledgements:

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Covid and Productivity one year after: what did surprise us?¹

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After one year of COVID pandemic the economic environment is dramatically changed. While many effects of the restrictions on productivity were largely predictable, some have come as a surprise, including the even higher heterogeneity of impacts across sectors, type of firms and countries.

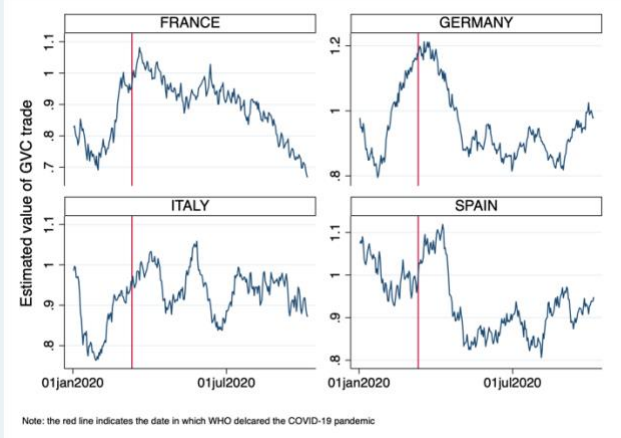
Early on in the pandemic and drawing from conversations within the network, CompNet tried to structure the various impacts to productivity looking at possible changes in the production function and the traditional productivity channels: Within Firm, across firms, across sectors (see di Mauro and Syverson, 2020). This was mostly **guess work** in the absence of data yet to come. In a policy panel organized by CompNet last week (ProdTalk February 2, 2021), we revisited the issue; panelists included Agnés Bénassy-Quéré (Paris School of Economics), Chad Syverson (UChicago), Steven Davis (UChicago), Carolina Villegas Sanchez (ESADE), and Filippo di Mauro (Chairman of CompNet). This blog summarizes in two column format the findings and contrasts what we predicted against what we currently know.

→ **No lack of surprises. But some are positive**

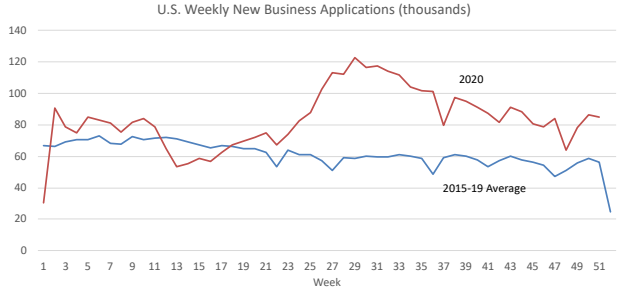
What we expected in April 2020	The situation as of February 2021
1) Within-firm productivity growth	
<p>Intangible capital/Firm exit. We saw the risk that the crisis, by accelerating firm exits, could bring about the destruction of valuable intangible capital (firm-suppliers relationships, organization, marketing, etc.) which are costly to re-build when destroyed.</p>	<p>The reality was that strong Government intervention hampered firm exit: Germany as well as the United States has seen an overall decline of bankruptcies but an increase in the share of big firms going to bankrupt, possibly due to the high level of state aid intervention.</p> <p>Consequently, the short term negative productivity impacts were stronger, in particular on firms populating low-productivity sectors. (Bloom et al. 2021).</p> <p>Balancing these effects there is no evidence of disproportionate loss of intangible capital. However, we don't have as yet good quantitative measures of that saved intangible K and how it stacks up against the productivity effects.</p> <p>→ The net impact on productivity remains uncertain</p>

¹ By Tommaso Bighelli, Sergio Inferrera, Filippo di Mauro (all CompNet) and Chad Syverson (University of Chicago).

<p>Labor constraints (social distancing at workplace) & mobility</p> <ol style="list-style-type: none"> 1) We feared that physical distancing measures could have caused serious disruptions to schooling; 2) Job detachments and persistent unemployment could have caused disruption of workers skills. 	<ol style="list-style-type: none"> 1) Things were probably improved for 2020-21, but it's still well documented that attendance rates are down and especially so for low income households. 2) Distancing appeared on balance to be actually a big positive, via working-from-home (WFH) effects. According to Steven Davis et al. (2020), based on a Survey conducted in the US, for most of the workers WFH was better than expected. Around 40% of them say they are more productive (and only 15% say they are less efficient). 																																																						
<p>Knowledge capital. We thought that the <u>physical capital</u> stock should not see large changes, since the crisis had not destroyed capital, as in a war. Likely additions to the capital stock were seen as coming from coronavirus motivated investments in private and public health infrastructure.</p> <p>However, firms' <u>knowledge capital</u> could have been a critical factor. Would firms innovate and otherwise become 'smarter' as a result of COVID? Could the virus trigger a wave of innovation through the adoption of new technologies, and could they act against the productivity slowdown? We were not sure.</p>	<p>Investment in new technologies was possibly unexpectedly higher, but not homogeneously across countries and firms. Evidence from three studies was presented:</p> <ol style="list-style-type: none"> 1) According to Bloom et al (2021) and Riom and Valero (2020) more than 60% of UK firms has adopted new digital technologies and around 40% invested in new digital capabilities. 2) Carolina Villegas-Sanchez finds similar evidence in Spain. Using data from a survey of the Spanish National Statistical Office, she finds that around 60% of firms did implement change in technology adoption decisions, but mostly by large firms. <div data-bbox="842 1462 1449 1736" data-label="Figure"> <table border="1"> <caption>New Formulas by Firm Size, %</caption> <thead> <tr> <th>Formula</th> <th>less than 10 employees</th> <th>10-49 employees</th> <th>50-199 employees</th> <th>200-999 employees</th> <th>1000 or more employees</th> </tr> </thead> <tbody> <tr> <td>Remote Work</td> <td>~15</td> <td>~35</td> <td>~65</td> <td>~75</td> <td>~85</td> </tr> <tr> <td>E-Commerce</td> <td>~10</td> <td>~15</td> <td>~20</td> <td>~25</td> <td>~30</td> </tr> <tr> <td>Home Delivery</td> <td>~5</td> <td>~10</td> <td>~15</td> <td>~20</td> <td>~25</td> </tr> <tr> <td>New Products</td> <td>~5</td> <td>~10</td> <td>~15</td> <td>~20</td> <td>~25</td> </tr> <tr> <td>New Suppliers</td> <td>~5</td> <td>~10</td> <td>~15</td> <td>~20</td> <td>~25</td> </tr> <tr> <td>Digitalization</td> <td>~10</td> <td>~20</td> <td>~30</td> <td>~40</td> <td>~50</td> </tr> <tr> <td>Process Innovation</td> <td>~5</td> <td>~10</td> <td>~15</td> <td>~20</td> <td>~25</td> </tr> <tr> <td>No Change</td> <td>~55</td> <td>~45</td> <td>~35</td> <td>~25</td> <td>~15</td> </tr> </tbody> </table> <p><i>Source: Author calculations based on Spanish National Statistical Office (INE) survey.</i></p> </div> <ol style="list-style-type: none"> 1) Davis also pointed to the substantial increase of Patent applications to technologies supporting WFH. They conclude that these effects, jointly with 	Formula	less than 10 employees	10-49 employees	50-199 employees	200-999 employees	1000 or more employees	Remote Work	~15	~35	~65	~75	~85	E-Commerce	~10	~15	~20	~25	~30	Home Delivery	~5	~10	~15	~20	~25	New Products	~5	~10	~15	~20	~25	New Suppliers	~5	~10	~15	~20	~25	Digitalization	~10	~20	~30	~40	~50	Process Innovation	~5	~10	~15	~20	~25	No Change	~55	~45	~35	~25	~15
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	<p>the productivity gain from less commuting (mentioned above), may raise (within-firm) productivity up to 2.4 percent.</p>
<p>Disruption of Global Value Chains (GVC). We expected that higher cross-country barriers would be imposed as a consequence of the pandemic, resulting in a decline of movement of goods and labor across borders, as well as an increase in repatriation of activities by firms.</p>	<p>The actual impact on GVC was lower than expected. In the chart below are estimates of GVC participation for 2020 at the country-level through real time world-seaborne trade data, as in Cerdeiro <i>et al.</i>, 2020.</p> <p>→ In most of the EU countries the GVC trade figures rebounded after a short-lived low to the average levels of 2017-19.</p>  <p>Note: the red line indicates the date in which WHO declared the COVID-19 pandemic</p>

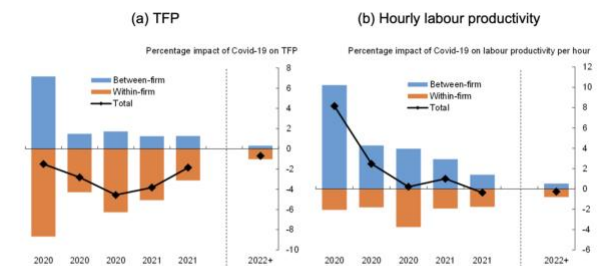
2) Resource reallocation between firms/dynamic efficiency

<p>Cleansing effect. It's was already evident early on in the pandemic that small firms were likely to suffer the most and likely to exit in large numbers. We pointed to the potential that crisis-induced exit and reallocation might actually lead to within-industry productivity gains through compositional changes.</p> <p>We highlighted however some important caveats. It was not clear whether the pandemic would act through the productivity channel as opposed to other firm features that could instead be detrimental to productivity growth. Further, the detailed data available on the interaction between firm size and productivity at the sector and country level raised critical questions about the potential for productivity-enhancing selection early on.</p>	<p>More positive than expected news</p> <p>1) As highlighted by Chad Syverson, during 2020, we faced a higher path of business formation in the US than during the previous years.</p>  <p>1) he also observed a positive reallocation process from less productive firms to more productive firms. These conclusions are based on the UK</p>
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Decision Maker Panel data based on UK survey.

→ **The above could actually have partially offset the negative within-firm impacts (see chart)**

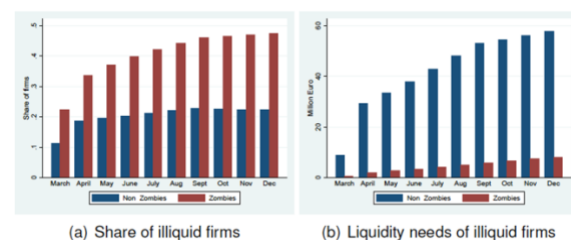
Figure 2 Negative within-firm effects are likely to be partially offset by positive between-firm effects



Notes: Impacts on productivity are estimated as $\Delta \ln y_t = \sum_i \alpha_i \Delta \ln y_{i,t} + \sum_i \beta_i \Delta \ln y_{i,t} / \bar{y}_t$ where $y_{i,t}$ is productivity in firm i at time t , \bar{y}_t is productivity at time t , α_i is the employment share of firm i at time t and a bar over a variable indicates the average of the variables across times $t-1$ and t . Changes between t and $t-1$ are changes due to Covid-19 only. The first term represents the within-firm effects. The second term represents between-firm effects. The impact of Covid-19 on labour productivity for each firm is calculated as $\frac{\Delta \ln y_{i,t} - \Delta \ln \bar{y}_t}{\bar{y}_t}$. The impact of Covid-19 on TFP for each firm is calculated as $\frac{\Delta \ln y_{i,t} - \Delta \ln \bar{y}_t}{\bar{y}_t} - \frac{\Delta \ln M_t - \Delta \ln M_{t-1}}{M_{t-1}}$ where $\bar{y}_t = \frac{\sum_i y_{i,t}}{N}$. The impact of Covid-19 on TFP for each firm is calculated as $\frac{\Delta \ln y_{i,t} - \Delta \ln \bar{y}_t}{\bar{y}_t} - \frac{\Delta \ln M_t - \Delta \ln M_{t-1}}{M_{t-1}}$. TFP is total factor productivity, y is nominal sales, P is the price level, L is labour input, M are non-labour intermediate costs, M^I are intermediate unit costs and K is capital input.

Zombie firms. Drawing from the experience of the GFC, we expected that the unprecedented mass of public support provided to firms could have generated “zombification”, i.e., too many undeserving firms surviving. This could hoard resources in unproductive firms, and limit entry of new firms.

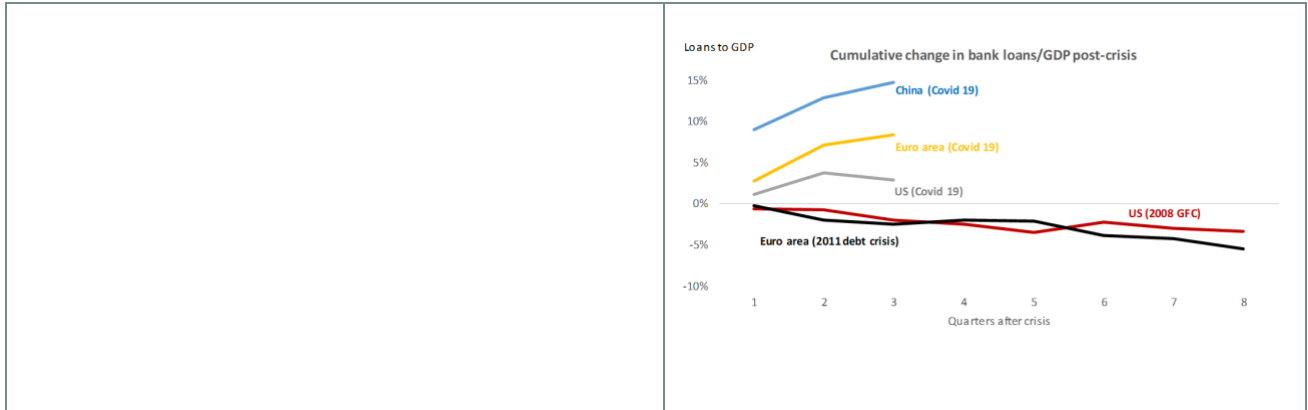
The actual extent of the of “zombification” phenomenon may be exaggerated. Schivardi, Sette and Tabellini (2020) argue that this is a “second order” concern, because the bulk of liquidity needs during the pandemic comes from non-zombie firms.



Credit constraints. We expected that the crisis would have strained the financial system as much as, or possibly even more than, the GFC did.

- 1) Despite several micro-founded sources indicated that financial constraints in Europe may have loosened, particularly after the ECB introduced its Outright Monetary Transactions operations, this trend could have been reversed by the pandemic.
- 2) Also, many government and central bank programs directed at addressing the current crisis targeted small and established firms rather than high-productivity ones.

- 1) Across the globe there is no evidence of financial constraints when comparing bank loans to GDP ratios in the aftermath of this crisis against the two previous ones
- 2) No evidence as yet on the appropriateness of funds destination



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