

The Impact of COVID on Productivity and Potential Output
Discussion by Janice Eberly
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I first want to thank President George and our hosts from the Federal Reserve Bank of Kansas City for welcoming us back and inviting me to discuss this careful and thought-provoking paper.

As we gather again, still with some shadows of the impact of COVID, this paper asks about its impact on productivity and potential output going forward.

This is an important question, both with the immediate need to assess how much “slack” there is in the economy, but also to assess how the economy may have changed given the huge disruptions associated with the pandemic. As noted in the paper, the fact that we ask this question, and even wonder about the sign of the impact, indicates how much ambiguity still persists and that we are in early days of data collection and analysis.

My remarks are in three parts:

- First, the paper finds little evidence of a change in the trajectory of productivity, which was weak before the pandemic and appears to remain so. This is a very clean result, with well-developed methodology in estimating total factor productivity (TFP).
- Second, the paper then departs from traditional TFP measurement and delves into industry analysis, which is very appropriate given the vastly different experiences of industries during the pandemic. These are intriguing and I want to both delve deeper and push the authors a bit further.
- Finally, I will present in some speculation, since the data are limited and still in process: if potential output were to deviate from its historical path, where would we look and why?

First, on the trajectory of productivity, the paper finds little to suggest a change from recent slow growth experience. While I expect this is right, and certainly so based on current data, I have to say that while this is hardly good news, I was a little relieved that in a world of so much change, some stability is welcome. I was a little worried, however. It reminds me of when I would ask my children and their friends to clean up the basement. Eventually, they would show me a tidy room, so no residuals at all. But all of the interesting things were hiding in the bins – soccer uniforms, single shoes, the missing Christmas sweater. So while it is good not to step on the residual Lego at night, *we do want to check what is hidden in the bins*, and not just focus on the residuals.

Fortunately, John Fernald has provided a public good by providing and updating all of the inputs into the TFP residual calculation on his website and starting this work in the paper. Figure 4 in the paper shows that TFP remains low except for 1995-2004, but there is cyclical variation in labor productivity, but much of it is accounted for by changes in factor composition. That is, in order to calculate the residual productivity measure, the “bins” extract much of the cyclical variation that arises from changes in capital and labor. These are important in their own right, especially given the large changes in employment and capital use during COVID-19.

Figure 1 shows the annual time series of three components of the TFP residual. The Red is the raw TFP measurement, Orange/yellow is the adjustment for factor utilization, and Green is the difference between the two, or the final TFP estimate.

The time series endorses the view that overall in the intermediate years from 2011 to 2018, TFP growth remains between zero and one percent, with variation in the global financial crisis (GFC) and COVID-19, resulting from changes in factor input utilization.

This is especially evident in the quarterly data in Figure 2., where TFP spikes in the GFC (on the left side of the chart) as output recovered more quickly than utilization grew.

But most striking in the quarterly data are the cyclical variations in TFP and factor utilization. Many of these movements cancel out the big changes in raw TFP, though some exacerbate them. Using annual data smooths over these variations, as makes sense when thinking about long run trends. But if we are asking about the effect of COVID, then it bears looking into the cyclical variation. That is, what can we learn from these extreme gyrations? In particular, in the GFC, TFP spiked because factor utilization *rose* slowly. During COVID factor utilization rose quickly, and then fell, which led to surprisingly high TFP in late 2020 and 2021..

To see this more clearly, it helps to break down the measure of total hours – into weekly hours per employee and total number of employees. Figure 3 shows this decomposition for the private sector overall. The GFC on the left shows the typical pattern: both employees and their hours fall steadily over the course of the recession, and recover slowly thereafter, with hours rising first. This is the “jobless recovery” which we know so well.

However, during COVID, hours per worker fell a bit in 2019, but then rose -- even as the number of employees crashed. This is the opposite of the GFC, when both hours and employment fell together. In COVID, the intensive margin (hours) and the extensive margin (workers) moved in opposite directions – on average, those who were employed, worked *more*.

Looking at the sectoral data helps to make sense of this reversal.

Table 2 in the paper shows the GDP per hour, or labor productivity data (no utilization or other corrections), by three groups of industries. The WFH industries show annualized labor productivity growth of more than 4 percent from 2020-22, higher than before COVID and higher than other industries, even accounting for unmeasured hours and utilization. The center column shows the horrible experience of Contact industries, like leisure, hospitality, food and accommodation. GDP per hour fell almost 2 percent per year 2020-22. , which earned the adjective “atrocious” from the authors. The big surprise is goods industries, where output/hour declined about a percent per year compared to the pre-COVID period.

Is the differing performance related to working from home? The scatter plot (Figure 7) in the paper suggests a positive relationship between WFH capability and excess labor productivity growth. I think the effect is actually stronger than the scatter suggests. The Dingel-Nieman measure looks at telework capability by mapping jobs to industries. Figure 4 shows actual work

from home data in the UK, where the furlough program required firms to document what workers were doing, and if working, from where. The top bar shows the main contact industry – accommodation and food, which had 80% of workers furloughed about 20% working from home. It is not surprising, but still sobering to recall, how the pandemic decimated contact industries. The high work from home industries tended to be information and communication services, finance and insurance, professional and scientific – essentially the components of the Professional and Business Services sector, which I will study below – where 60-75% of workers worked from home. The most illuminating data are from the Production, or Goods, sectors, which had the largest share working on premises – and this was in May 2020 – together with about 30% working from home. This may represent the mixed nature of work done in production – office staff, say HR and marketing, can work from home, while production staff could be at least partially on premises.

With the actual data (though from the UK) in mind, all of the red-dot industries with high productivity in the paper’s scatter plot are high WFH industries – with 50-75% of employees WFH – strengthening the association between productivity and working from home.

This does raise the question of why WFH industries seem to do so well. It could be that working from home is directly more productive than work-from-premises, as suggested by surveys of workers and the work of Barrero, Bloom, and Davis. But these industries are different in other ways: they have more highly educated workforces and higher intangible capital – such as software, intellectual property, and so on, as shown in the UK data in Figure 5. In the standard growth accounting, higher capital contributes to output as it grows alongside other factors. We show that industries with *existing* capacity in intangibles like information and communications technology (for example), had more working from home. For this to affect productivity requires threshold effects, in which the capabilities associated with work from home were essential – the adaptability, nimbleness, creativity – associated with a more highly educated workforce comfortable with technology enabled the shift to WFH with alacrity. This is consistent with the effect of WFH on productivity arising from a combination of selection and hysteresis effects, in addition to any direct benefits.

Finally, I want to connect this industry perspective back to the productivity estimates at the beginning of the paper. Why did some industries appear to do relatively well in the crisis, and can it persist?

In Goods-producing industries in Figure 6, hours and employees both fell in the GFC and rose thereafter. Roughly the same occurred in COVID in a more compressed way. In fact, hours fell more than they did over the GFC. These industries followed the previous pattern of cutting workers and hours, and then brought them back. Gordon and Sayed emphasize this swing in total hours as key to cyclical swings in productivity. Here it produced a 4 percentage point increase in output per hour in 2020, but a decline of almost 3 percentage points in 2021 and 2022 as workers were brought back and output flattened.

Compare this to Professional and Business Services (PBS) in Figure 7, which shows the strongest growth in GDP per hour of any category. This is where the contrast to the GFC is also the sharpest. Over the GFC, PBS employment and hours fell together, and then rose together, as

n other sectors. However, during COVID, employees fell, but hours *increased immediately*. It is not a large increase, but the point is that they never fell. Utilization rose and then employment caught up.

Hence, PBS did not have the extreme swing in productivity by reducing utilization and capacity during the downturn, and then rebuilding it thereafter. Instead, the WFH sectors maintained capacity, and labor productivity rose by over 4% in each year.

This different dynamic may be unique to Covid, where substituting worker hours was difficult. Alternatively, WFH industries' success may not just be one of continued labor supply, but also uninterrupted real output growth. One thought to consider is whether these industries may have had a continuing benefit from their initial resilience – that is, not being disrupted was itself a benefit to maintain growth.

Finally, let me make some broader speculations about the future.

While the paper argues that there is little evidence so far of long run changes in productivity – even if so, potential output may change, since output includes factor inputs in addition to TFP.

The most obvious concern is labor supply, where the continuation or exacerbation of negative labor supply trends – aging, retirements, immigration – could undermine potential output..

There is some evidence of higher labor productivity in WFH industries – whether this is a causal benefit of WFH is not yet clear, given measurement of hours and selection issues.

These industries are not just curiosities; the three main low-contact service sectors: information, finance, insurance, and real estate (FIRE), PBS – contribute 40% of GDP by VA, and 45% of private sector GDP. We should understand this sector better – much of our measurement and analytical apparatus is built around production models, with shift changes and physical capital, when goods production accounts for less than 20% of VA and even less of employment.

One potential contribution to potential output is that WFH necessarily changes business capital. Essentially, WFH capability led to an asset “discovery” in peoples’ homes. This should raise the value of homes that have this asset and lower the utilization and price of this asset in existing locations – like office buildings. They have. This naturally leads to questions about future asset values:

1. People are not currently using more office space, though WFH has “increased” available office space. For example, WFH employees on average use 1-2 days at home and 3-4 days at work. But what happens when a new employee is hired? If the office is not at capacity, the firm does not need to add office space - it may now have overhang capacity (lower utilization) due to WFH. This could raise TFP – but we don't have data yet to measure it.
2. Alternatively, a reconfiguration of the capital stock itself may reduce measured productivity, just as costs to reconfigure the capital stock after high oil prices in the 1970s lead to years of low productivity growth.

3. This highlights the importance of measuring utilization in services more directly, since this is one of the “bins” used to adjust the data to obtain TFP residuals.

Finally, while COVID disrupted the global economy in particular ways – isolating people from each other and their work for example – there are likely to be future disruptions, whether they be different pandemics, natural disasters, climate shocks or other unanticipated disruptions. We need to learn *from* the COVID crisis – not just *about* the COVID crisis – to be better prepared for the future disruptions we will face.