COVID and Productivity: One Year After

Remarks by Steven J. Davis

Based on work with Jose Maria Barrero, Nick Bloom, Yulia Zhestkova and others.

CompNet and Banque de France

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COVID Affects Productivity in Many Ways

1. A mass social experiment in working from home (WFH)
   → New knowledge → Re-optimization of working practices
   → post-pandemic productivity ↑ due to re-optimization
2. Less commuting time → effective productivity gain
3. Re-directed technical change → WFH and other forms of remote interactivity will get better for many years.
4. Whether and how well economies adjust to the reallocative aspects of COVID-19 will matter a lot for medium-run productivity developments
5. Many other channels …

Here, I offer evidence on 1-3 but make no claim they are the only ways in which COVID affects productivity. See Barrero, Bloom and Davis (2020b and 2021a) on item 4 and Mauro and Syverson (2020) for discussion of a broad set of factors.
COVID-19 Compelled Firms and Workers to Experiment at Scale with Working from Home

“If you’d said three months ago that 90% of our employees will be working from home and the firm would be functioning fine, I’d say that is a test I’m not prepared to take because the downside of being wrong on that is massive.”

– James Gorman, CEO of Morgan Stanley*

*Cited in Cutter (2020)
Post-COVID Working Arrangements: Less WFH than Now, But Four Times as Much as Pre-COVID

Notes: Data are from an original survey of our design, fielded by QuestionPro and IncQuery in May, July, August, September/October, November, and December 2020, with 5,000 responses in August and December, 2,500 in other months. We re-weight raw responses to match the share of working-age respondents in the 2010-19 CPS in each industry X state X earnings cell.

Chart reproduced from “Why Working From Home Will Stick,” by Jose Maria Barrero, Nick Bloom and Steven J. Davis.
Experimentation: For most, WFH exceeded expectations

Relative to expectations, how has WFH turned out?

- Hugely better, 20%+ 19.0%
- Substantially better -- 10 to 20% 21.2%
- Better -- up to 10% 20.8%
- About the same 26.2%
- Worse - up to 10% 6.9%
- Substantially worse - 10 to 20% 3.1%
- Hugely worse, 20%+ 2.7%

Compared to your expectations before COVID (in 2019) how has working from home turned out for you?

Notes: Data from four survey waves carried out by QuestionPro and IncQuery in May, July, August, and September/October 2020 with 2,500 responses in the first two and the last, plus 5,000 in August. We re-weight raw responses to match the share of working age respondents in the 2010-2019 CPS in each \{industry x state x earnings\} cell.

Chart reproduced from "Why Working From Home Will Stick," by Jose Maria Barrero, Nick Bloom and Steven J. Davis.
40% of workers say they are **more** productive when WFH

How does your efficiency working from home *during the COVID-19 pandemic* compare to your efficiency working on business premises *before the pandemic*?

**Notes:** From August to October 2020, we surveyed 7,500 Americans aged 20-64 with labor earnings > $20,000 in 2019. We re-weight raw responses to match the industry-state-earnings shares of working-age persons in the CPS from 2010 to 2019. The right chart also uses responses to questions about employment status (selection), pay levels (for earnings weights) and, for the blue bar, how much their employer plans for them to work from home after the pandemic ends. **Source:** "Working from Home Will Stick" by Jose Maria Barrero, Nick Bloom and Steven J. Davis, October 2020.
Re-optimizing over working practices after the pandemic will boost labor productivity by 2.3%, according to our survey data.

Notes: From August to October 2020, we surveyed 7,500 Americans aged 20-64 with labor earnings > $20,000 in 2019. We re-weight raw responses to match the industry-state-earnings shares of working-age persons in the CPS from 2010 to 2019. This chart uses responses to questions about productivity while working from home relative to business premises, as well as about employment status and ability to work from home (selection), pay levels (for earnings weights) and, for the red and blue bars, how much their employer plans for them to work from home after the pandemic ends.

Calculations detail
Back-of-the-envelope calculation

1. Paid full work days at home: 5% pre-pandemic → 23% post-pandemic
2. Average commute time per day: 54 minutes (0.9 hours)
3. 40% of commute time is spent on work-related activities
4. Time savings = (0.18)(0.9 hours)(1 - 0.4)(5 days) = 0.5 hours per week
5. Effective labor productivity gain = 0.5/(40 hours) = 1.2%

Share of patents that advance WFH technologies more than doubled from January to September 2020 and is on an upward trajectory.

Reproduced from Bloom, Davis and Zhestkova (2021).
Tremendous Dispersion in Firm-Level Stock Price Reactions to COVID News

IQR is 15 standard deviations greater than average IQR in 2019

Classifications from Baker et al. (2020)

Figure 1: Value-Weighted Mean and Cross-Sectional IQR of U.S. Equity Returns, Daily for 2019 and for Large Daily Jumps in 2020

From Davis, Hansen and Seminario-Amez (2020)
Equity Markets Think the Shift to WFH Is a Big Deal

Firms outside "Critical Industries" sorted into quartiles based on the fraction of workers in their industry that can feasibly work from home.

This chart is from https://sites.google.com/site/lawrencedwscmidt/covid19 and is based on work by Schmidt and Papanikalaou (2020).
Relative Employment Growth Trends Have Shifted towards Industries with High Work-from-Home Capacity Since COVID Struck

**Source:** Barrero et al. (2021a) using data from the Survey of Business Uncertainty and measures of teleworkable employment shares at the industry level from Dingel and Neiman (2020).

**Notes:** For each industry group we compute the aggregate growth rate implied by firms’ growth in the past 12 months and their expected future growth in the next twelve months, separately for the pre-COVID (9/2016–2/2020) and COVID (3/2020–12/2020) periods. We sort industries by the share of employment that is teleworkable in ascending order from top to bottom. Then we plot the average growth rate for each industry in the two periods. The figure note also reports the correlation of past + expected future industry employment growth during versus before COVID with the share of teleworkable employment by industry. The sample period covers survey waves from 9/2016 to 12/2020, inclusive.
References


Barrero, Jose Maria, Nicholas Bloom and Steven J. Davis, 2021b. “Why Working from Home Will Stick,” working paper.


Our Ongoing Survey of Working Arrangements and More

Eight survey waves since May 2020: 27,500 worker respondents so far
  • May (2,500 respondents), July (2,500), August (5,000), September (2,500), October (2,500), November (2,500), December (5,000)
  • January 2021 (5,000) – data not yet included in this slide deck

Random sample of US residents aged 20-64, earning $20K+ in 2019
  • Re-weight respondents to match the distribution of workers in the 2010-2019 CPS at the level of \{earnings category \times industry \times state\} cells.

About 40 questions per wave on:
  • Demographics
  • Extent of WFH \textit{during} COVID and \textit{desires/plans} \textit{after} COVID
  • Experience, perspectives on WFH, contagion fears, vaccines, etc.
  • Location of workplace, residence, commuting time, etc.

See Barrero, Bloom and Davis (2021) for survey details.
Past + Expected Future Excess Reallocation Rates, Monthly with One-Year Look-Back and Look-Ahead

Source: Barrero et al. (2021a) using data from the Survey of Business Uncertainty.

Notes: In each month $t$, we add firm $i$’s realized employment and sales growth rates over the past year to its forecast for the next year, obtaining the cumulative growth rate for months $t-12$ to $t+12$. We then compute the excess reallocation rates associated with these growth rates. The excess job reallocation rate is the sum of gross job creation and destruction rates less the absolute value of the net aggregate employment growth rate. The excess sales reallocation rate is defined in an analogous manner.

The sample period covers survey waves from 1/2017 to 12/2020, inclusive.
24-month (Realized + Expected) Reallocation

To study the persistent effects of COVID-19, we add:

- Firm $i$’s realized employment/sales growth rate from $t - 12$ to $t$
- Firm $i$’s forecast employment/sales growth rate from $t$ to $t + 12$

The resulting growth rate $g_{it}^{24}$ covers 24 months: $t - 12$ to $t + 12$

We then compute implied 24-month (realized + expected future) reallocation rates:

$$X_t^{24} = \sum_j \frac{z_t}{Z_t} \| g_{tj}^{24} \| - \sum_j \frac{z_t}{Z_t} g_{tj}^{24}$$

Job/Sales Creation + Destruction  Abs. Net Employment/Sales Growth

where $\frac{z_t}{Z_t}$ are appropriate activity weights.