

The Impact of COVID on Productivity and Potential Output

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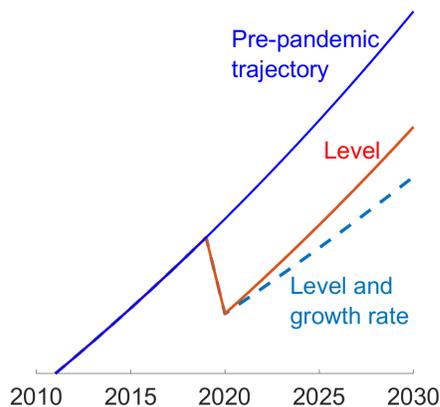
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How has the pandemic affected the level and growth rate of U.S. potential output?

Possible pandemic effects on potential output



- We came into pandemic on a slow-growth path. We look likely to leave on a similar path
- Despite the massive dislocations of the pandemic, productivity has looked surprisingly “normal”
 - Productivity growth followed Great Recession cyclical path (boom then bust)
 - Little evidence of sizeable level effect on productivity
- Industry productivity data suggest winners and losers. Winners are those where it’s easy to telework
- Near-term level effect from reduced labor supply

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Accounting for potential output

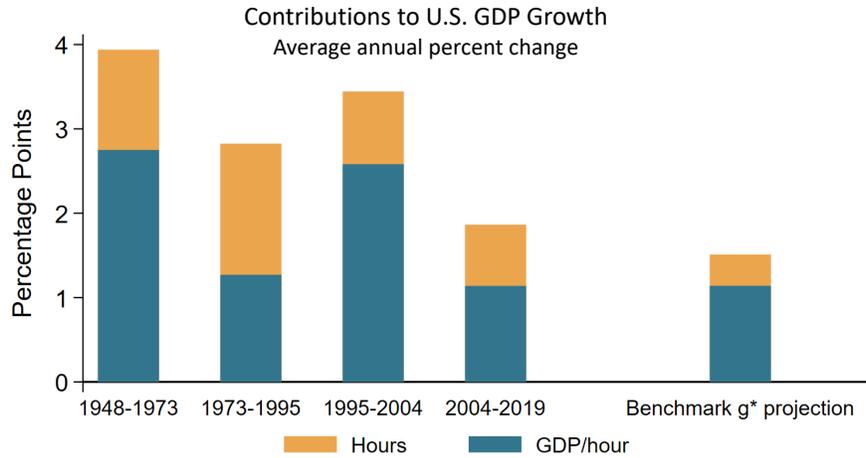
- Potential output: What output would be at “full employment”
 - Depends on full-employment labor as well as potential labor productivity (output per hour)
- Paper discusses full-employment labor. The apparent pandemic shortfall in labor supply is an adverse level effect on potential output
- Rest of this talk focuses on understanding the labor productivity side
 - In the short run, a particular challenge is that productivity is affected by the business cycle
 - In the longer run, labor productivity driven mainly by innovation as well as the education/experience of workers

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Longer-run growth of GDP: A pre-pandemic perspective

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Pre-pandemic future of growth:
Slow productivity regime, weak demographics



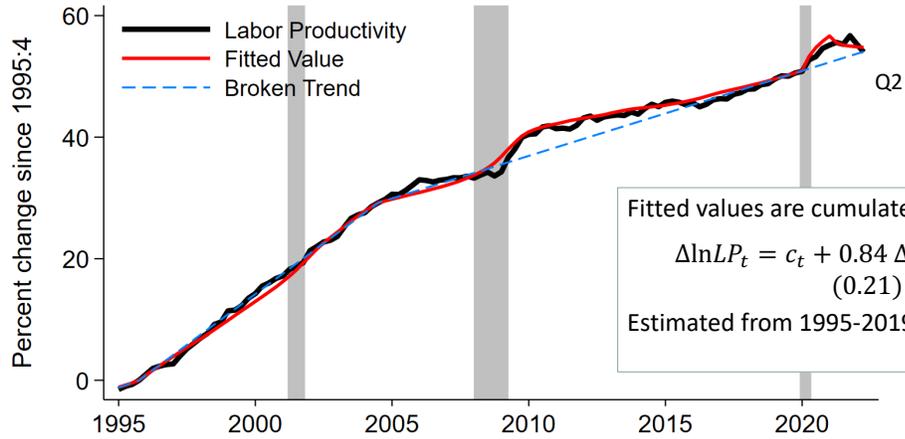
Notes: "GDP" is geometric average of real GDP and real gross domestic income. g^* projection assumes GDP per hour grows at 2004-19 pace, and hours grow at CBO (2022) projected 2027-32 labor-force growth.

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Pandemic productivity growth
consistent with slow trend and small net level effect

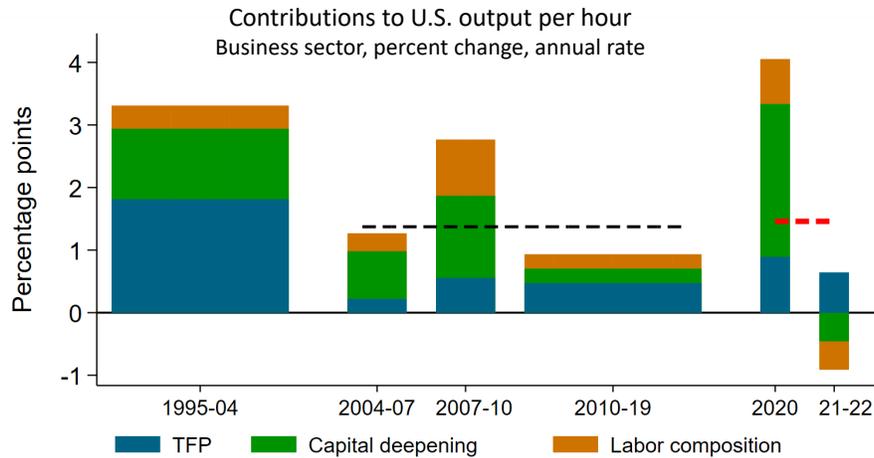
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U.S. labor productivity: Accelerated Great Recession cyclical dynamics, little obvious level effect



Notes: Business sector. Output is geometric average of income and expenditure measures. Regression shown relates labor productivity growth ($\Delta \ln LP_t$) to the four-quarter change in the unemployment rate ($\Delta^4 U_t$) for the pre-pandemic period. Constant term (not shown) changes after 2004:4. 2020-22 fitted values condition on actual unemployment path. 7

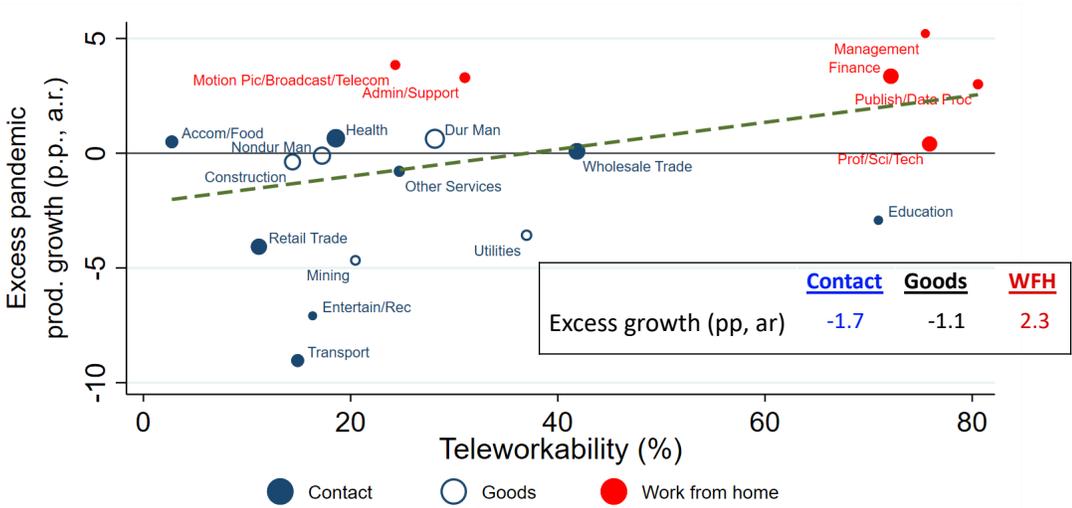
Initial pandemic productivity boom from capital deepening and labor composition, which then reverse



Notes: Source is Fernald (2014). Quarterly data. Output is geometric average of income and expenditure measures. Black dashed line is average labor productivity growth from 2004-19. Red dashed line is average since the end of 2019. 2020 is Q4/Q4. 21-22 is the six quarters ending 2022:2. Capital deepening is contribution of capital relative to composition-adjusted hours. 8

Industry labor productivity shows winners and losers

Work-from-home industries surged, while contact and goods industries did poorly



Notes: Labor productivity from BEA and BLS. Vertical axis is labor productivity growth 2019:4-2022:1 relative to 2006:2-2019:4 (at annual rates). Teleworkability computed from Dingel-Neiman (2020) using industry occupation shares. Industry classifications follow Gordon- Sayed (2022).

Longer-run growth prospects

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Slow-productivity-growth trajectory looks little changed

- Longer-run productivity growth depends on innovation and labor composition
 - Little evidence of big changes in research effort or the “idea production function”
 - Labor composition was already expected to add less in the future (Bosler et al. 2016)
 - Disrupted education a small (but persistent) drag
 - Fernald, Li, Ochse, 2021; see also Fuchs-Schündeln, et al. (2022)
- Some upside possibilities
 - Remote work could lead to better matches of firms with researchers
 - Widespread adoption of video conferencing may facilitate idea creation and spread
 - Apart from pandemic, will we eventually see widespread gains from AI and robotics?

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Takeaways: Productivity behaved in surprisingly normal ways during the pandemic

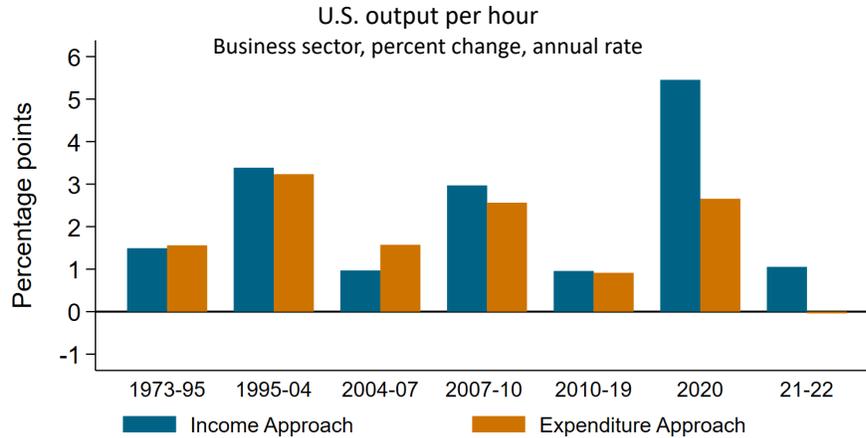
- Productivity growth followed Great Recession cyclical path of boom and bust
 - Data are consistent with slow trend and small net effect
 - Clear industry winners and losers linked to teleworkability
- Continuing slow growth path seems likely
- There are many uncertainties. For example:
 - Measurement: Income-side measures of output have grown much faster than output-side measures. Our default is to average them. But individually, they give different answers
 - How well does home capital substitute for business capital, now and in the future (Eberly et al 2021)?

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Extra slides

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Productivity is much stronger using income than expenditure



Notes: Source is Fernald (2014), based on BEA and BLS. Quarterly data. Income-side measure of business output is calculated from gross domestic income. Data end 2022:1. (Earlier slides used the average of income- and expenditure-side measures of output.)

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Most pandemic productivity growth is within industries.

Reallocations towards high-productivity industries added to growth in 2020 but have substantially unwound

$\Delta \ln y - \Delta \ln h = \sum_i w_i (\Delta \ln y_i - \Delta \ln h_i) + \sum_i (w_i - s_i) \Delta \ln h_i$, where $\Delta \ln y$ is output growth, $\Delta \ln h$ is hours growth, and i indexes industries. w_i is nominal industry GDP share and s_i is hours share.

Decomposition of labor productivity growth for nonfarm private industries

	(1) GDP	(2) hours	(3) GDP per hour	(4) Within industry	(5) Reallocation
1. 2006 – 2019	1.74	0.88	0.86	0.98	-0.13
2. 2020 – 2022	1.27	0.18	1.10	0.91	0.18
3. 2020	-2.61	-5.13	2.52	1.33	1.19
4. 2021 – 2022	4.38	4.43	-0.04	0.58	-0.63

Notes: Units are percent changes, or percentage point contributions, at annual rates using quarterly data over the periods shown. Col. 4 (within) is contribution of $\sum_i w_i (\Delta \ln y_i - \Delta \ln h_i)$. Col. 5 (reallocation) is $\sum_i (w_i - s_i) \Delta \ln h_i$

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