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

Longer-run growth of GDP: A pre-pandemic perspective
Pre-pandemic future of growth: Slow productivity regime, weak demographics

Contributions to U.S. GDP Growth
Average annual percent change

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.

Pandemic productivity growth consistent with slow trend and small net level effect
U.S. labor productivity: Accelerated Great Recession
cyclical dynamics, little obvious level effect

Fitted values are cumulated from:
\[ \Delta \ln LP_t = c_t + 0.84 \Delta^4 U_t \]
(0.21)
Estimated from 1995-2019

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.

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.
Industry labor productivity shows winners and losers

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

Longer-run growth prospects

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?
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)?
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.)

Most pandemic productivity growth is within industries.
Reallocation 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**

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

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 \( \sum_i (w_i - s_i) \Delta \ln h_i \). 

Source: Fernald (2014).