Hours of Work during the COVID-19 Pandemic: Implications for Labor Productivity Measures

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Disclaimer: All views expressed in this paper are those of the authors and do not necessarily reflect the views or policies of the U.S. Bureau of Labor Statistics.

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How are Hours Measured for Productivity?

- Employee hours come from the Current Employment Statistics (CES) survey.
  - ▶ Adjusted to hours worked
    - Annual paid-time-off (PTO) ratio
    - Off-the-clock (OTC) ratio—new in November 2022
- Hours worked by the unincorporated self-employed and unpaid family workers from the Current Population Survey (CPS).

Changes in the Labor Market and Work Arrangements during COVID

■ Surge in remote work

|	% of Full Workdays Worked From Home
2019	7.9%
May 10–Dec 31, 2021	28.5%
2021	24.4%

Source: American Time Use Survey

■ Paid furloughs through Paycheck Protection Program (PPP loans)

Changes in the Labor Market and Work Arrangements during COVID

- Jobs losses, especially in industries with limited paid leave

- Increase in work absences (paid and unpaid)
  - ▶ Rise in illnesses
  - ▶ Schools and daycares closed

- First national paid sick leave policy (Families First Coronavirus Response Act)
  - ▶ 2 weeks full pay April 1 – Dec 31, 2020
    - – Own illness or care of child when school is closed
 - ▶ Partial pay for 10 weeks

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Percentage of Wage and Salary Employees Who were Absent from Work in the Prior Week and Who Were Paid for Time Off in the Private Nonfarm Sector, 2017–21, Not Seasonally Adjusted
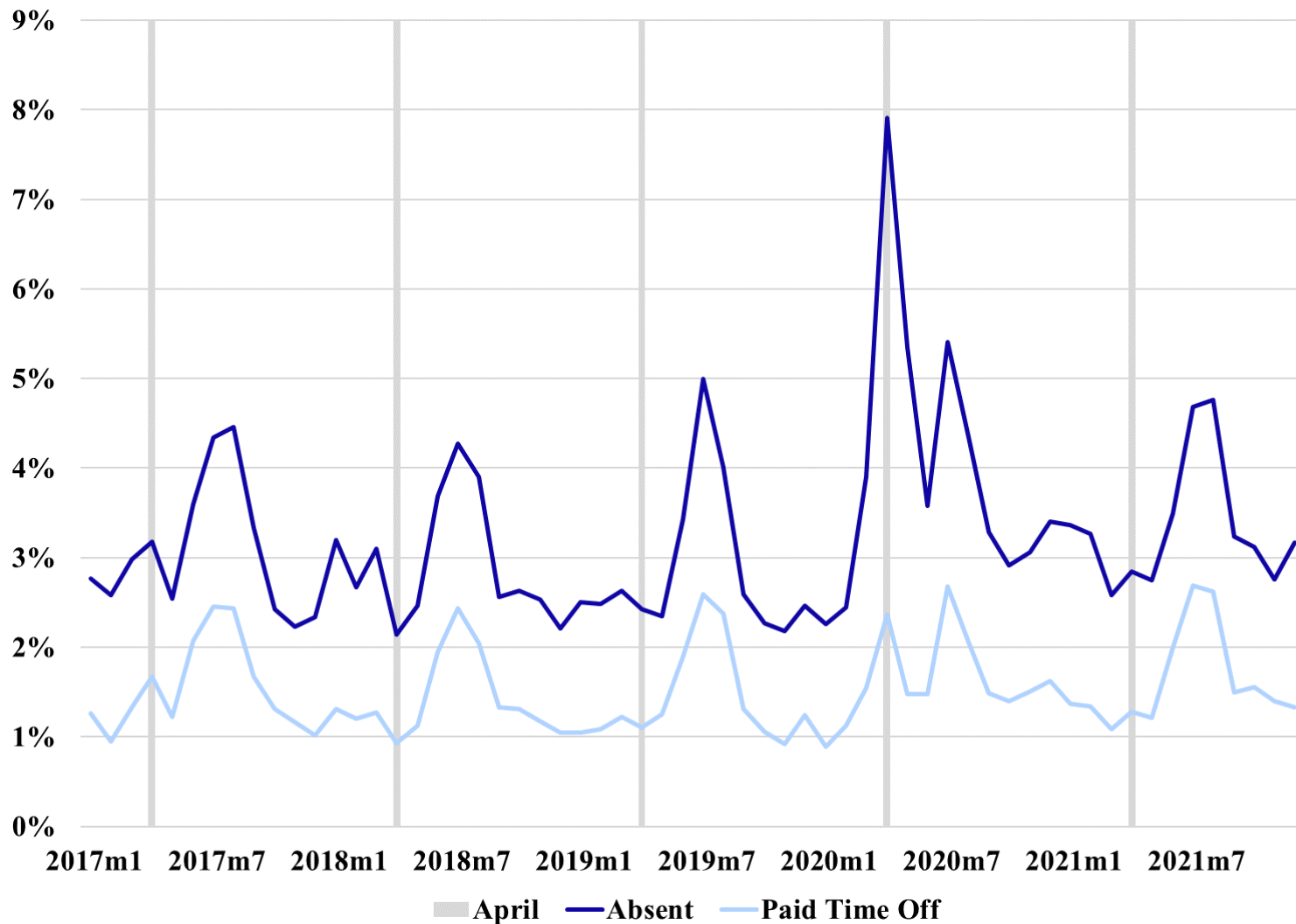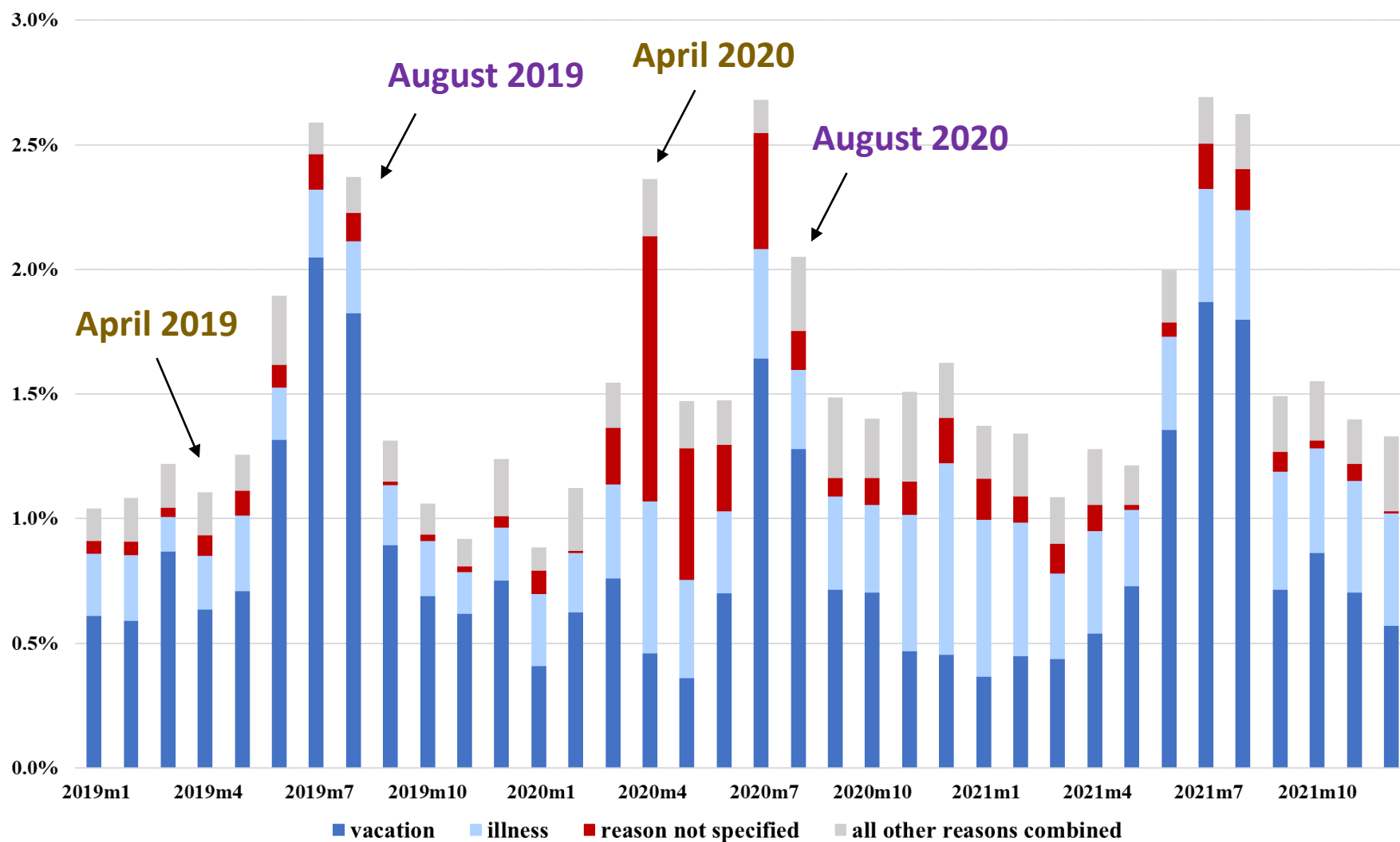

Source: Current Population Survey Outgoing Rotation Groups

Percentage of Wage and Salary Employees Who were Absent from Work in the Prior Week in the Private Nonfarm Sector, by Paid Leave Status, 2019–20, Not Seasonally Adjusted

☐ Paid Leave ☐ Unpaid Leave
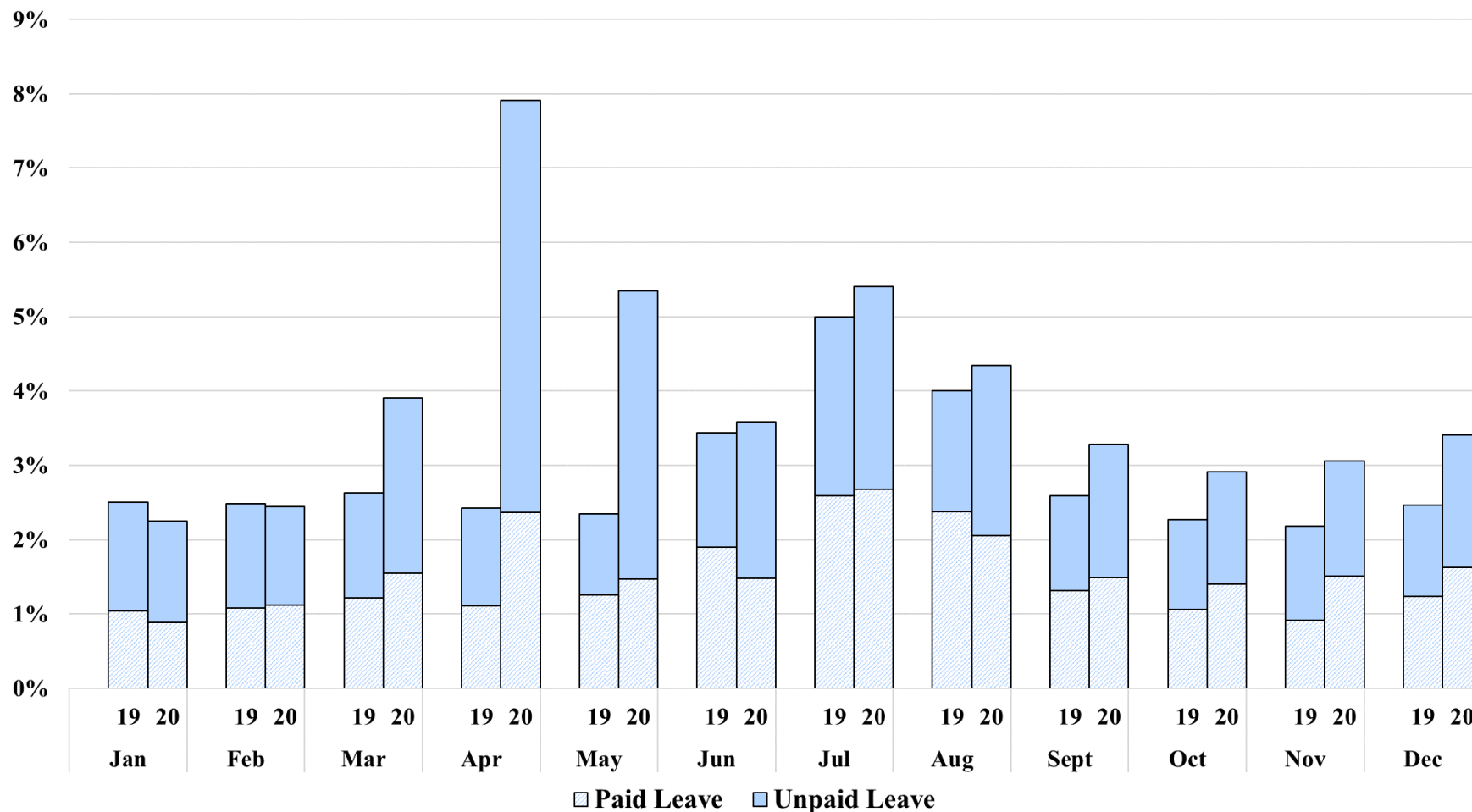
Source: Current Population Survey Outgoing Rotation Groups

Percentage of Paid Absences and Reasons, Wage & Salary Workers in the Private Nonfarm Sector, 2019–21

Source: Current Population Survey Outgoing Rotation Groups

Research Question

- What is the impact on hours and productivity of adjusting for quarterly variation in paid leave?

  - ▶ Construct a new quarterly paid-time-off ratio

  - ▶ Focus on the pandemic period

  - ▶ Consider changes around the Great Recession

    - – Use less leave and put forth more effort to keep jobs

    - – Use more leave when less work needs to be done

      - • Less costly to employer to grant leave

    - – Firms may restrict leave usage in an expansion if hiring doesn't keep up with customer demand

New Method for Measuring Hours Worked for Productivity (Nov 2022)

$$Hours\ Worked = Hours\ Paid^{CES} \times PTO\_ratio^{NCS} \times OTC\_ratio^{CPS} \times 52$$

$Hours\ Paid^{CES}$ - quarterly average of all-employee weekly hours paid from the Current Employment Statistics (CES) survey

PTO_ratio^{NCS} - an annual paid-time-off ratio constructed from the National Compensation Survey (NCS)

OTC_ratio^{CPS} - an off-the-clock hours ratio constructed from the Current Population Survey (CPS)

NCS Paid-time-off Ratio Adjustment

$$PTO\_ratio^{NCS} = \frac{Hours\ Paid - Hours\ of\ Paid\ Time\ Off}{Hours\ Paid}$$

Denominator

Hours Paid = $\begin{cases} \text{hours worked + hours of paid time off if hourly worker} \\ \text{standard workweek if salaried worker} \end{cases}$

Numerator

Paid Hours Worked = $\begin{cases} \text{hours worked if hourly worker} \\ \text{standard workweek} - \text{paid time off if salaried worker} \end{cases}$

NCS asks about annual leave earned and usual sick leave taken

- ▶ No information on actual leave taken
- ▶ Use 4th quarter ratios (sample is refreshed, response rate high)
- ▶ Ratios tend to be constant over time
- ▶ Unclear how respondents would report "usual" sick leave for 2020

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CPS Captures Actual Leave Taken

- Replicate NCS PTO ratio using CPS to capture quarterly variation in leave

- CPS reference week was chosen to avoid holidays so paid time off may be understated
  - Evidence from time diaries suggests people report more hours of work in non-reference weeks (Frazis & Stewart (2004)

- Apply changes in the CPS ratio to the NCS level

CPS Paid-time-off Ratio

$$PTO\_ratio^{CPS} = \frac{\sum \Big(\big(AHW \times (1 - MFN) \big) + \big((UHP - PTO) \times MFN \big) \Big)}{\sum \Big(\big((AHW + PTO) \times (1 - MFN) \big) + (UHP \times MFN) \Big)}$$

AHW = actual hours worked

UHP = max(usual hours worked, 40)

PTO = probability(PTO) × max(0, UHP − AHW)

MFN = I(Main job) × I(Full-time worker) × probability(Non-hourly), where $I(\cdot)$ is an indicator function

Assumptions:

1. Hourly and PT workers and those on second jobs are paid for hours they work and can be paid for hours of time off.

2. Full-time, salaried workers are paid for standard workweek and can be paid for hours of time off.

- We estimate probability (PTO) for partial-week workers and probability(non-hourly) using random forest models.

  ▶ We only know PTO if the respondent is absent the entire week and hourly status in outgoing rotations and we want to use the full CPS.

Hybrid Paid-time-off Ratio

$$PTO\_ratio^{Hybrid} = PTO\_ratio^{NCS} - (Trend - PTO\_ratio^{CPS})$$

1. Seasonally adjust the PTO_ratio^{CPS}
2. Estimate the trend PTO_ratio^{CPS}
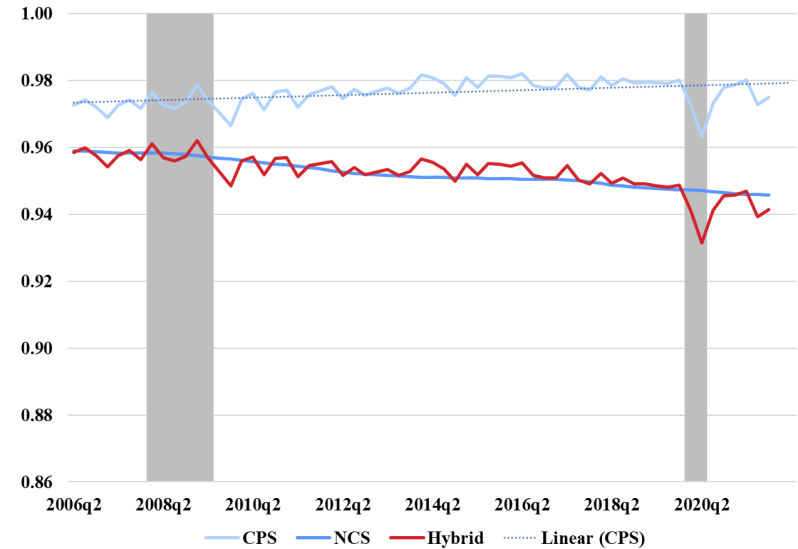3. Calculate deviations from trend
4. Add deviations to the NCS level

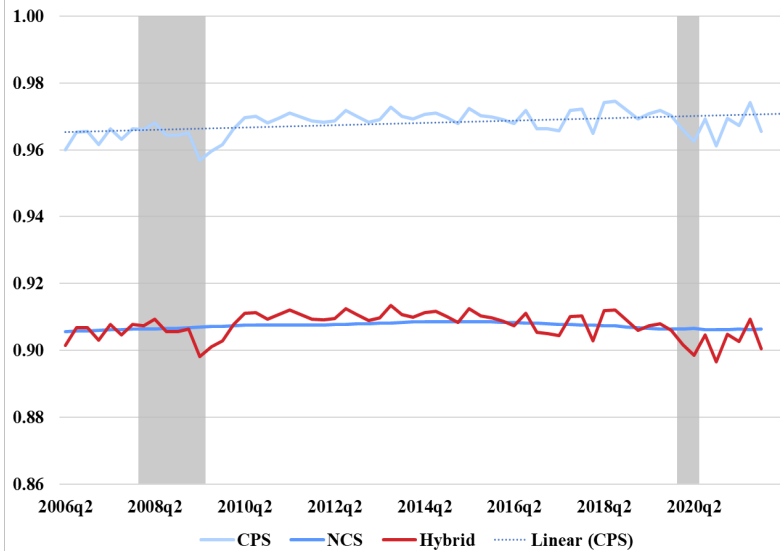# PTO Ratios in Goods-producing Industries
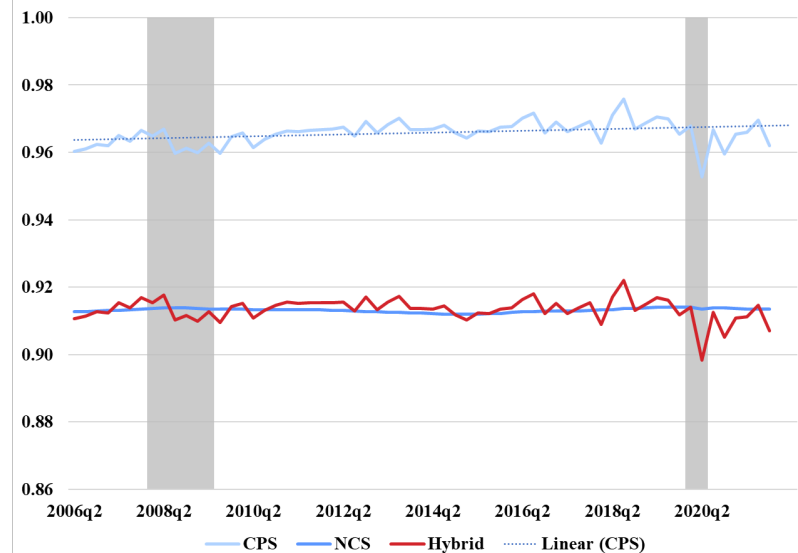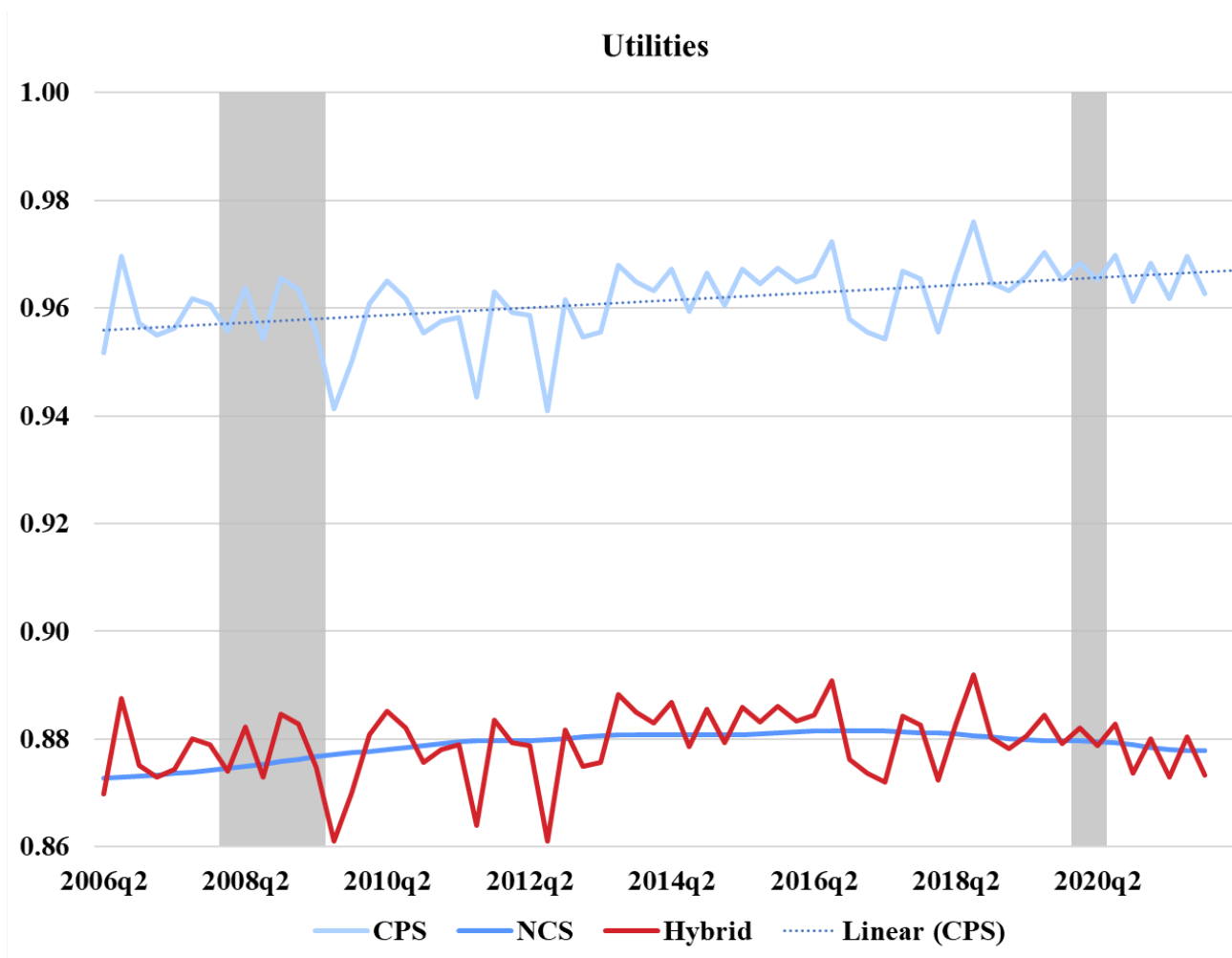

Nonfarm Natural Resources
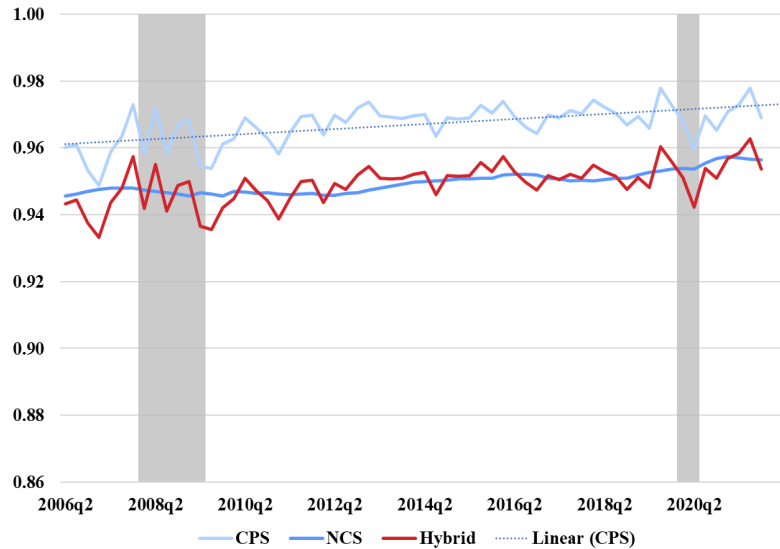
Construction

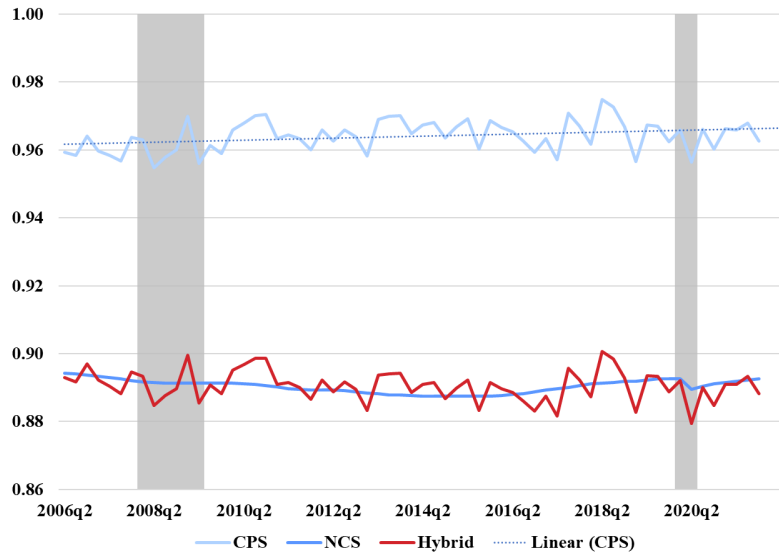**Durable Goods Manufacturing**

Nondurable Goods Manufacturing

PTO Ratios in Goods-producing Industries

Utilities

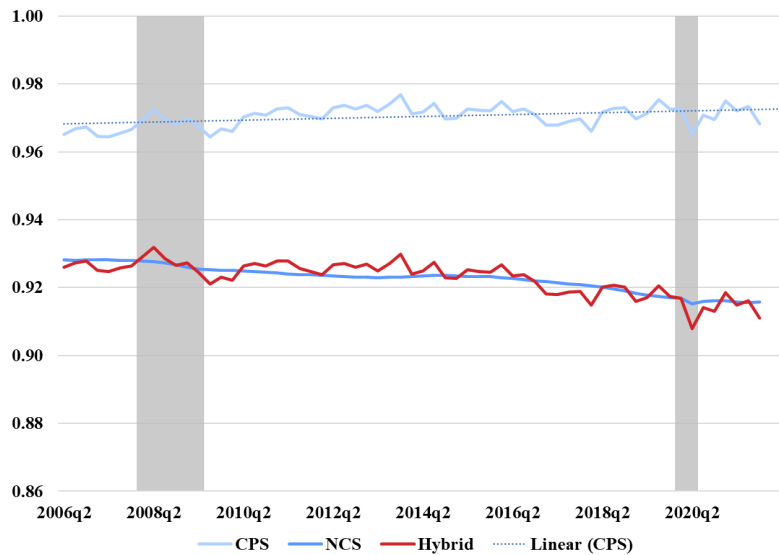# PTO Ratios in Work-at-home Service Industries
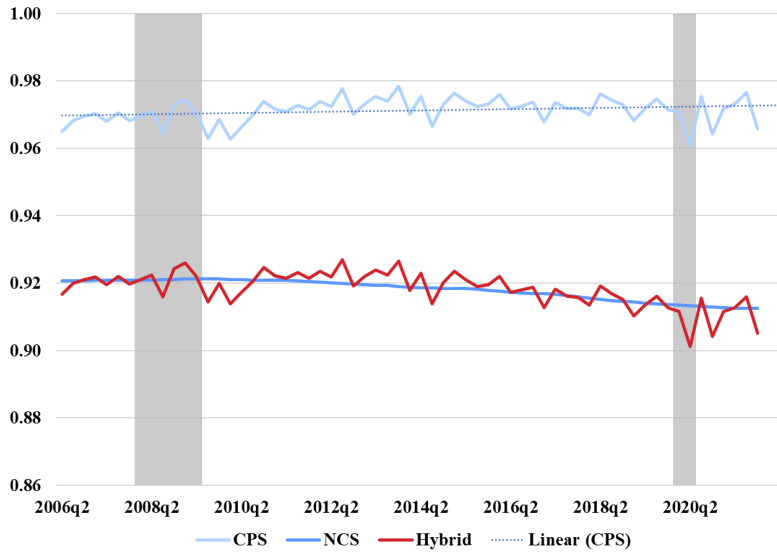

Information

Financial Activities
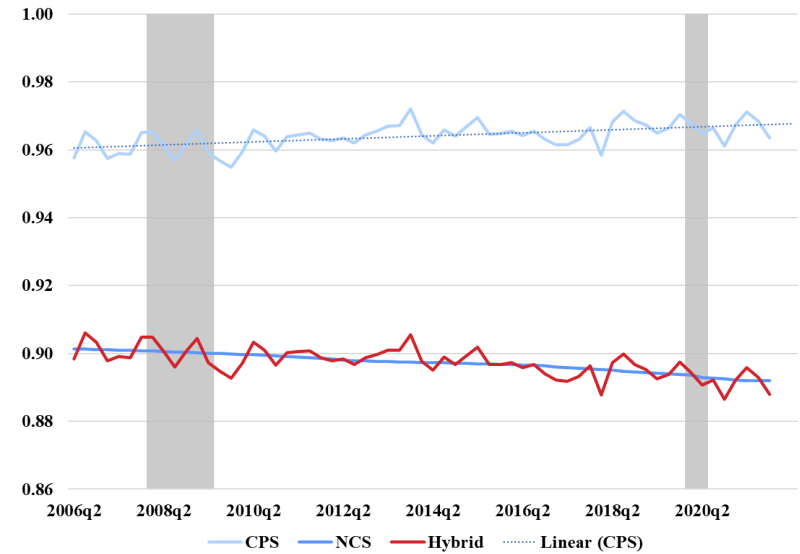
Professional and Business Services

PTO Ratios in Contact-intensive Service Industries

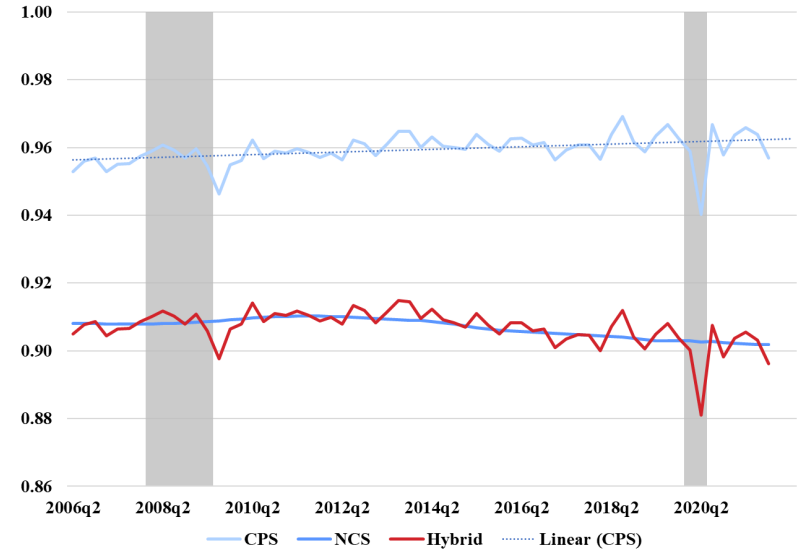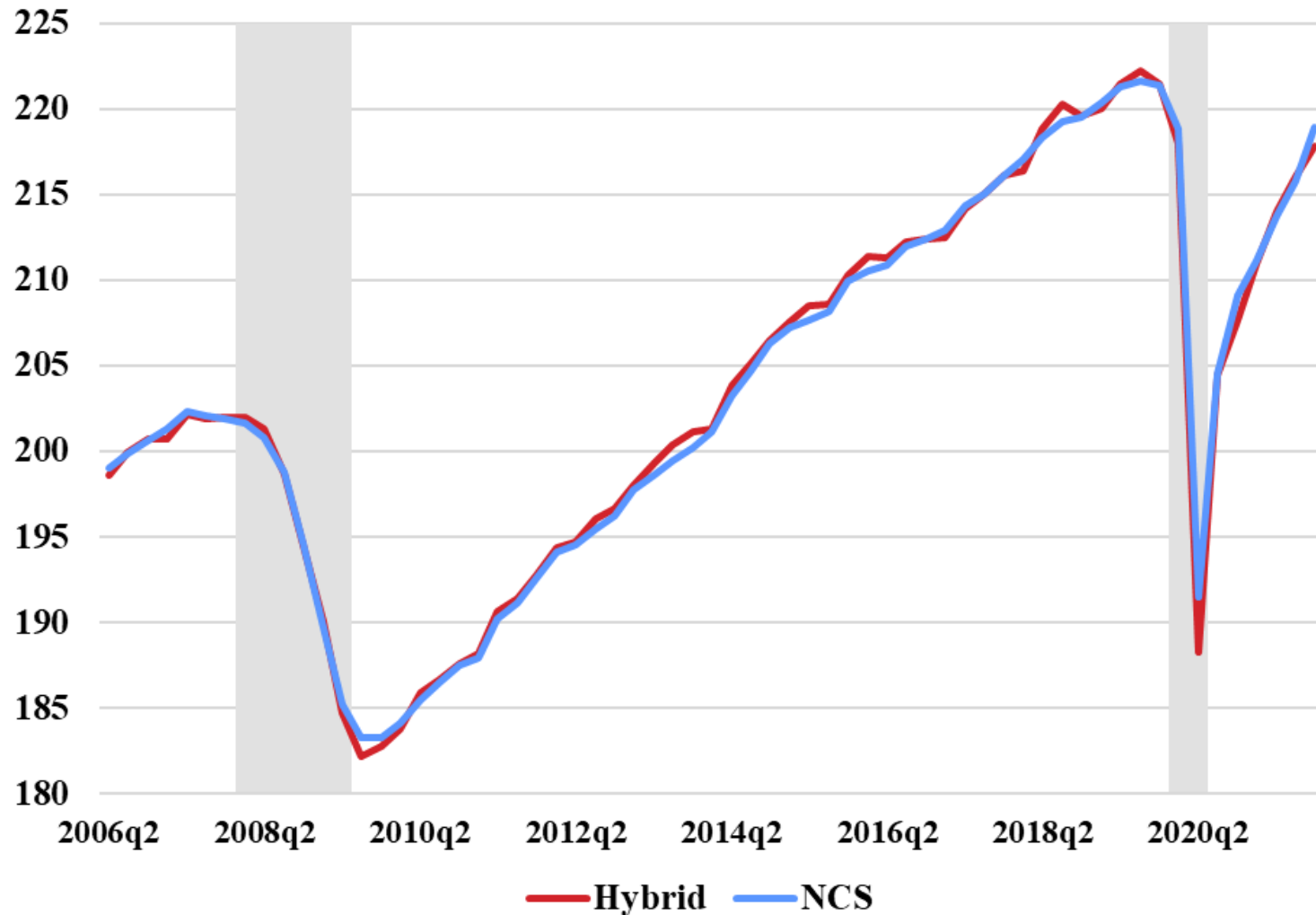# PTO Ratios in Contact-intensive Service Industries
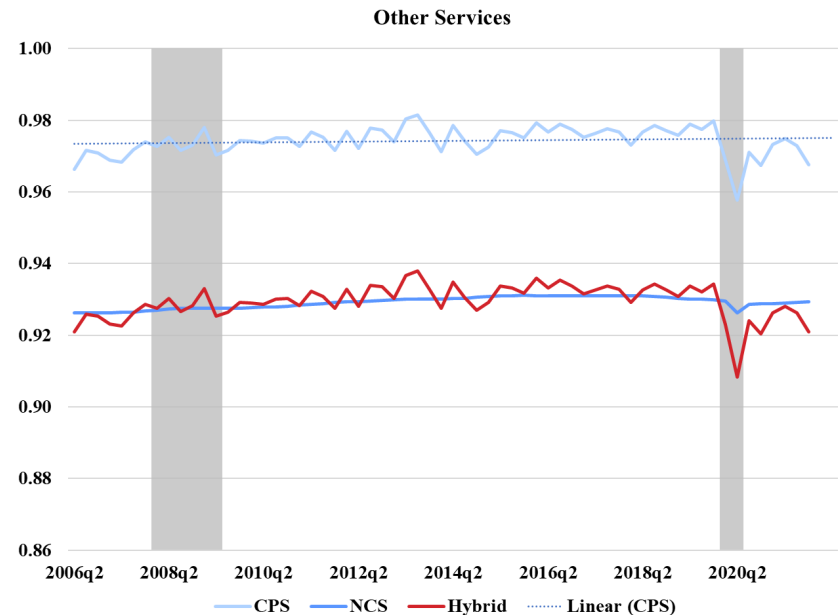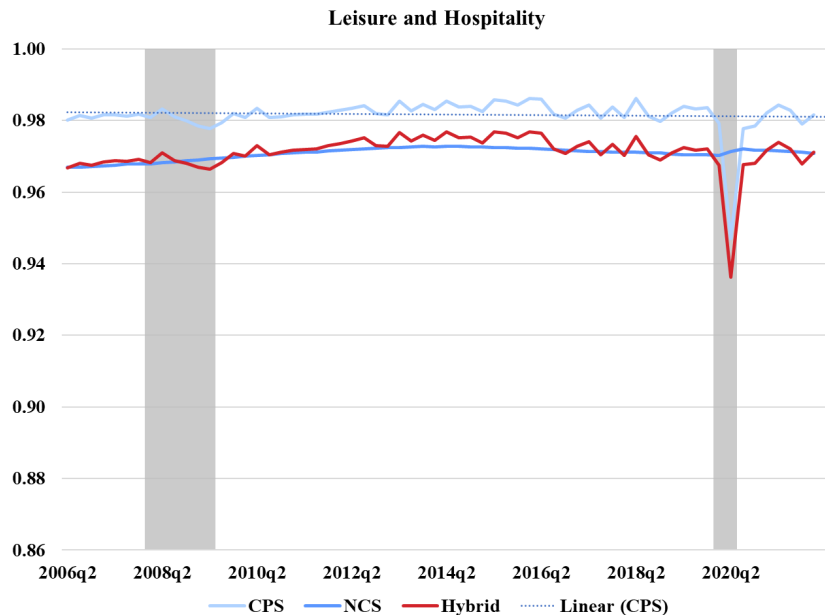
Employee Hours Levels, by Paid-time-off Ratio (Private Nonfarm Sector)

Billions of hours

Legend: ── Hybrid ── NCS

Labor Productivity
(Nonfarm Business)

Index
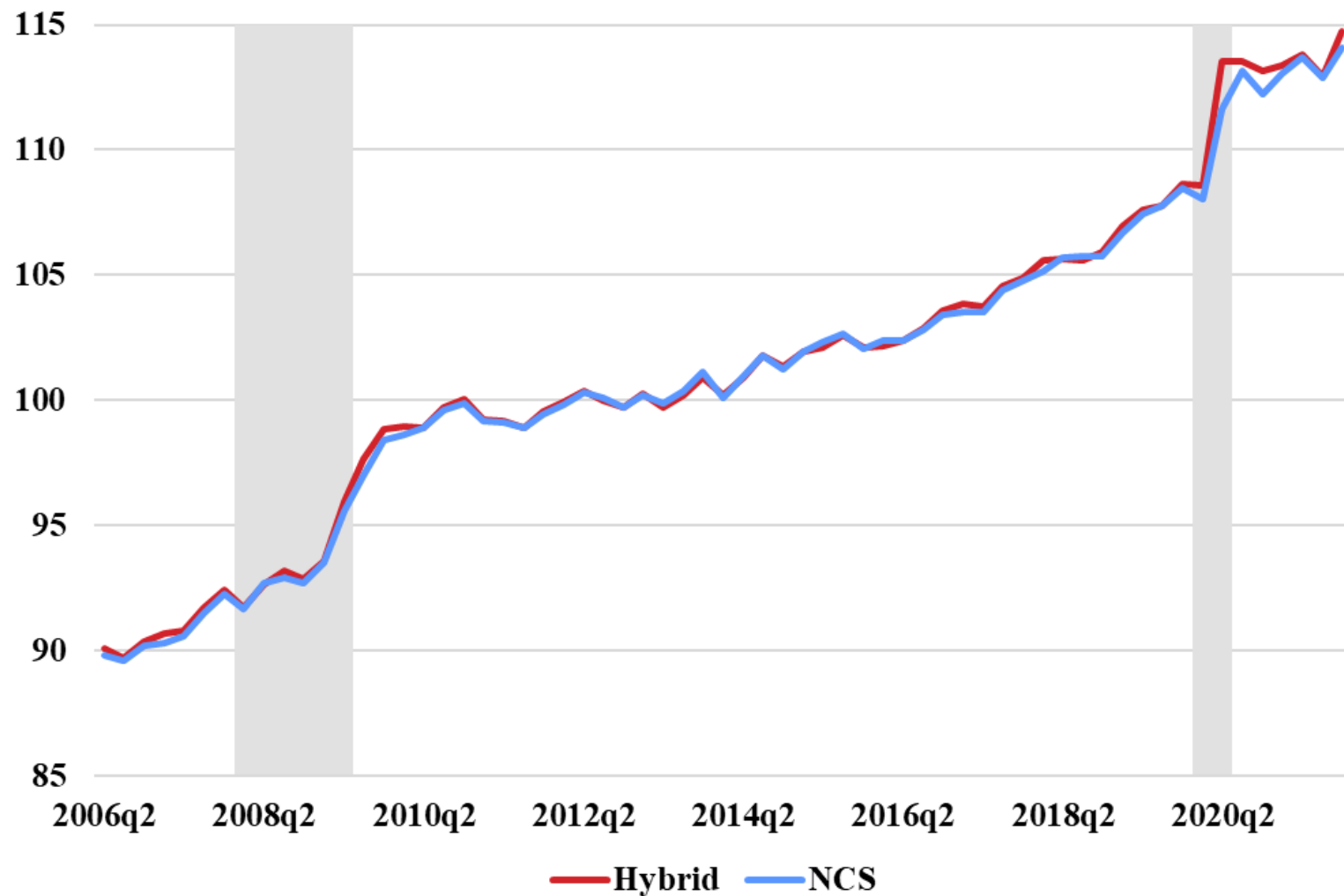
Comparison of Using Alternative Paid-time-off Ratios on Productivity Growth in the Nonfarm Business Sector during the COVID-19 Pandemic

	Hybrid	NCS	Difference (Hybrid–NCS)
2020q1	-0.2	-1.7	1.5
2020q2	19.4	14.1	5.3
2020q3	0.0	5.6	-5.6
2020q4	-1.3	-3.2	1.9
2021q1	0.8	2.9	-2.1
2021q2	1.6	2.3	-1.3
2021q3	-3.0	-2.9	-0.1
2021q4	6.4	4.3	2.1

Note: Percentage change from the previous quarter at an annual rate.

Conclusion

- There was greater quarterly variation in leave during the COVID-19 pandemic than before.

- A quarterly PTO ratio shows a large increase in paid leave in the second quarter of 2020 for many industries.

- Hours fell faster in 2020q2 and increased faster in 2020q3 than the research hours series.

- Labor productivity growth was higher in 2020q2 and lower in 2020q3 than the research hours series.

- The difference in growth rates varied considerably throughout the pandemic, with the hybrid series exhibiting less volatility after 2020q2.

Conclusion

- At the end of the Great Recession when the unemployment rate peaked, the PTO ratio dipped, though less dramatically.
  - ▶ More leave was taken than annual ratios suggest.
  - ▶ Labor productivity rose more quickly.

- This finding is consistent with the hypothesis that employees take more leave when there is less work to do.

Contact Information

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