

WHY WORKING FROM HOME WILL STICK

Jose Maria Barrero^a Nicholas Bloom^b Steven J. Davis^c

^aITAM Business ^bStanford ^cChicago Booth & Hoover Institution

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RESEARCH QUESTIONS

How much working from home (WFH) will there be after the end of the COVID-19 pandemic?

What economic mechanisms are facilitating a persistent shift to WFH?

What consequences will the persistent shift to WFH bring?

- ▶ For workers
- ▶ For productivity
- ▶ For dense city centers

THIS PAPER

1. Survey 48,250 working-age Americans earning $> \$20k$ in 2019 about monthly since May 2020
2. Full paid days WFH: **50%** during, **20 to 25%** after COVID-19
3. Reasons why WFH will (partly) stick:
 - ▶ Mass experimentation & learning \Rightarrow re-optimization
 - ▶ Investments by workers & firms
 - ▶ Attitudes: diminished stigma, continued social distancing
 - ▶ Technical change (not in this talk, see Bloom, Davis, & Zhestkova, 2021)
4. Consequences of persistent WFH post-COVID: benefits higher earners most, **4.6%** higher productivity, spatial reallocation away from cities

OUTLINE

Survey and methodology

WFH during & after COVID

Why WFH Will Stick

Consequences

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SURVEY OF WORKING ARRANGEMENTS AND ATTITUDES (SWAA)

13 waves (repeated cross sections) using commercial survey providers

- ▶ 48,250 responses collected between May 2020 and June 2021 (ongoing)

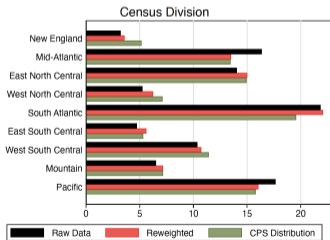
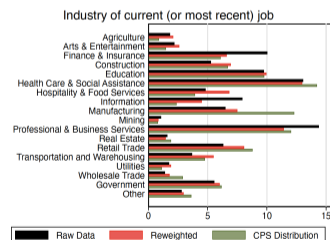
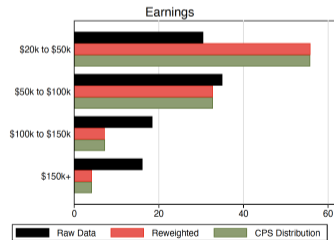
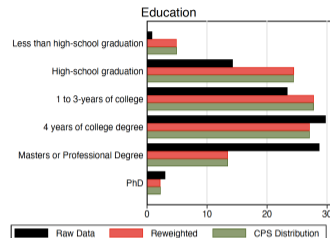
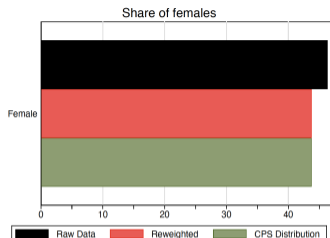
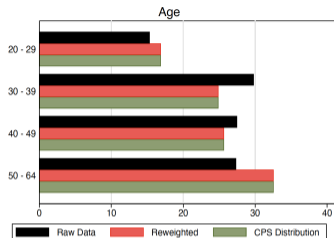
Target population: persons aged 20 to 64, earning $>$ \$20K in 2019

- ▶ Re-weight to 2010-2019 CPS pop. by {age \times sex \times education \times earnings}

40-60 questions per wave:

- ▶ Demographics, earnings, hours worked, commuting time, spending
- ▶ Extent of WFH during COVID, **desires/plans** for after COVID
- ▶ Experiences, perspectives on WFH

SURVEY RESPONSES VS. CPS



Notes: Notes: Each figure shows the distribution of raw survey responses, survey responses reweighted to match the share of persons aged 20 to 64 in a given age x sex x education x earnings cell in the 2010 – 2019 CPS (focusing on those who earned more than \$20,000 a year), and the corresponding distribution in the CPS. Data are from 33,250 survey responses collected between May 2020 and March 2021.

SAMPLE SURVEY QUESTION

After COVID, in 2022 and later, how often *is your employer planning* for you to work full days at home?

Never

About once or twice per month

1 day per week

2 days per week

3 days per week

4 days per week

5+ days per week

My employer has not discussed this matter with me or announced a policy about it

I have no employer

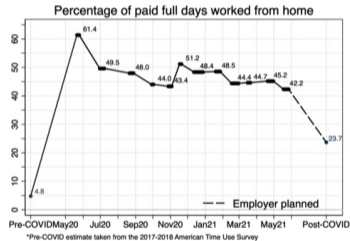
CODE AND DATA (ANONYMIZED) ARE AVAILABLE AT WWW.WFHRESEARCH.COM



ABOUT US ▾ MEDIA RESEARCH AND POLICY DATA METHODOLOGY ▾

WORKING FROM HOME BEFORE, DURING, AND AFTER COVID

DOWNLOAD



OUTLINE

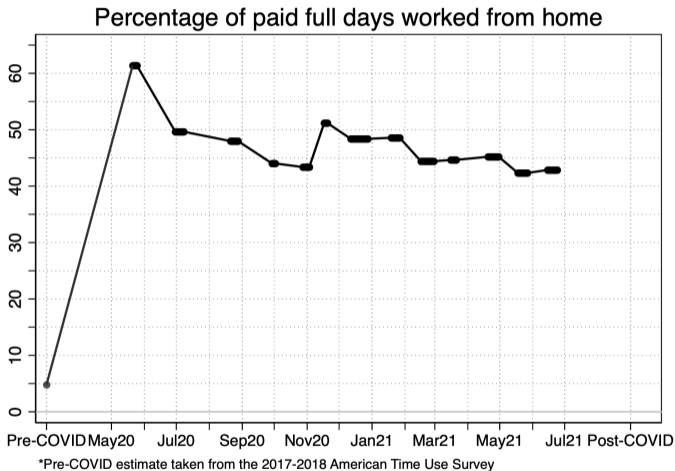
Survey and methodology

WFH during & after COVID

Why WFH Will Stick

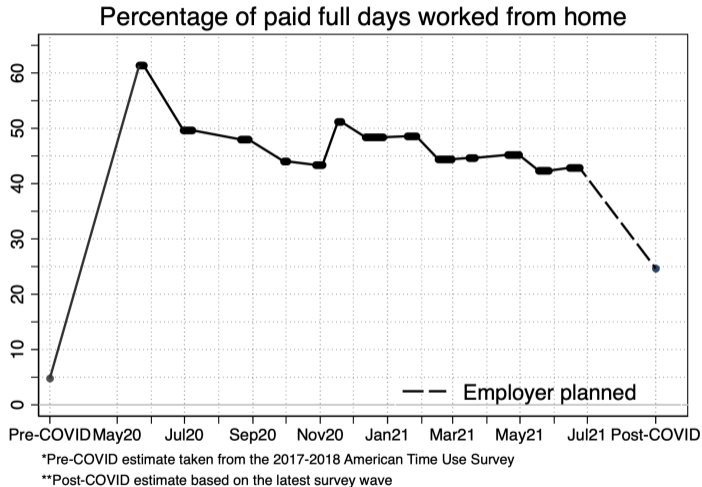
Consequences

DURING COVID, 10-12× PRE-COVID WFH



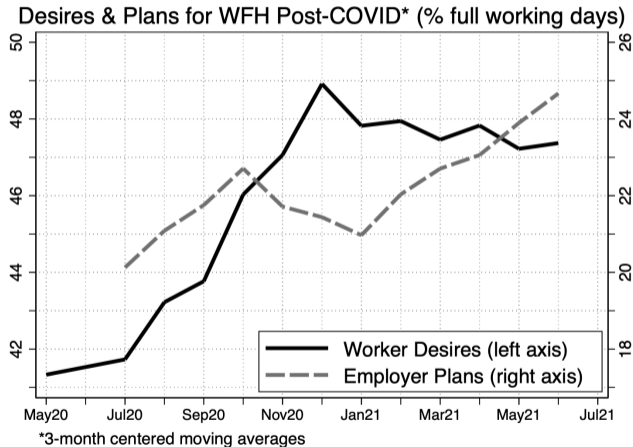
Notes: Data are from 48,250 survey responses collected between May 2020 and June 2021. We re-weight raw responses to match 2010-2019 CPS pop. by {age × sex × education × earnings} cell. Prior to November 2020, we asked respondents to classify themselves: “Currently (this week) what is your work status?” Since November 2020 we ask them for the number of days worked in the current week and the number of days WFH.

POST-COVID, 4-5× PRE-COVID WFH



Notes: Data are from 48,250 survey responses collected between May 2020 and June 2021. We re-weight raw responses to match 2010-2019 CPS pop. by {age × sex × education × earnings} cell. Post-COVID projection from June 2021 responses to “After COVID, in 2022 and later, how often is your employer planning for you to work full days at home?”

WORKERS & FIRMS INCREASINGLY EMBRACE POST-COVID WFH



Notes: Data are from 48,250 survey responses collected between May 2020 and June 2021. We re-weight raw responses to match 2010-2019 CPS pop. by {age × sex × education × earnings} cell. [▶ Month-by-month average](#)

OUTLINE

Survey and methodology

WFH during & after COVID

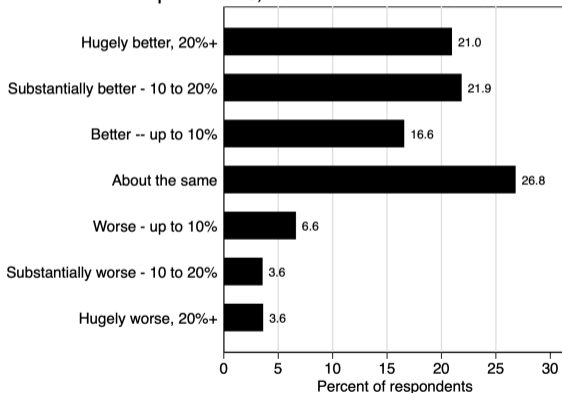
Why WFH will stick

Consequences

1. FORCED EXPERIMENTATION AND LEARNING

OVERCOME INERTIA

Relative to expectations, how has WFH turned out?



Compared to your expectations before COVID (in 2019), how has working from home turned out for you [in terms of productivity/efficiency]?

▶ Time series

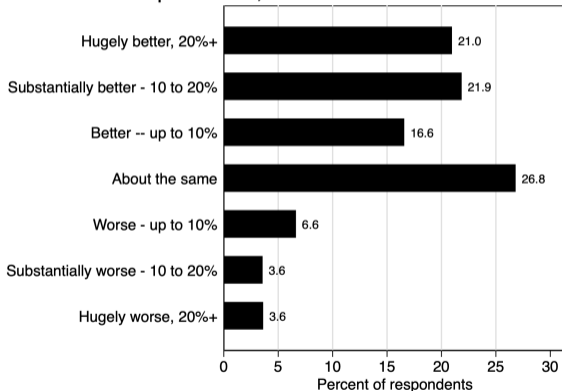
▶ 2-armed bandit argument

Notes: Data are from 48,250 survey responses collected between May 2020 and June 2021. We re-weight raw responses to match 2010-2019 CPS pop. by {age × sex × education × earnings} cell.

1. FORCED EXPERIMENTATION AND LEARNING

OVERCOME INERTIA

Relative to expectations, how has WFH turned out?



Two effects:

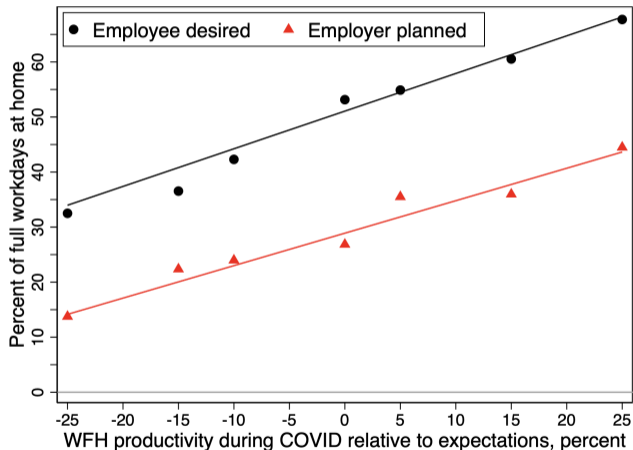
- ▶ **A tail effect:** high realized payoffs under WFH for some
- ▶ **A bias elimination effect:** experimentation reveals pessimistic priors about WFH

▶ Time series

▶ 2-armed bandit argument

Notes: Data are from 48,250 survey responses collected between May 2020 and June 2021. We re-weight raw responses to match 2010-2019 CPS pop. by {age × sex × education × earnings} cell.

DESIRED AND PLANNED POST-COVID WFH INCREASE WITH WFH PRODUCTIVITY SURPRISES



Notes: Data are from 48,250 survey responses collected between May 2020 and June 2021. We re-weight raw responses to match 2010-2019 CPS pop. by {age × sex × education × earnings} cell.

2. INVESTMENTS ENABLING WFH

Investment into WFH adds up to 0.7% of GDP

How many hours have you invested in learning how to work from home effectively (e.g., learning how to use video-conferencing software) and creating a suitable space to work?

▶ **Mean:** 15.0 hours (SE = 0.2)

How much money have you and your employer invested in equipment or infrastructure to help you work from home effectively – computers, internet connection, furniture, etc.?

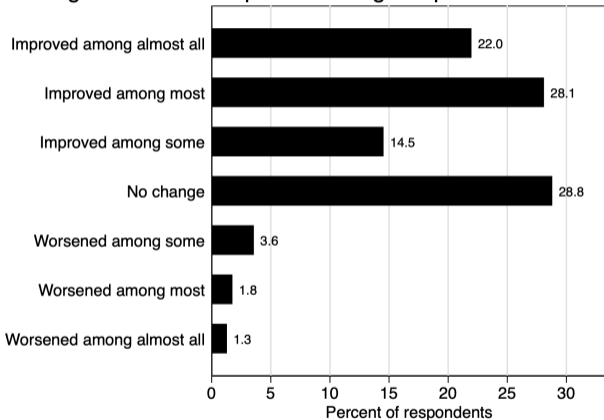
▶ **Mean:** \$561 (SE = 9)

Additionally, firms have made investments on business premises

▶ NIPA Investment

3. WFH STIGMA HAS DIMINISHED

Change in WFH Perceptions Among People You Know

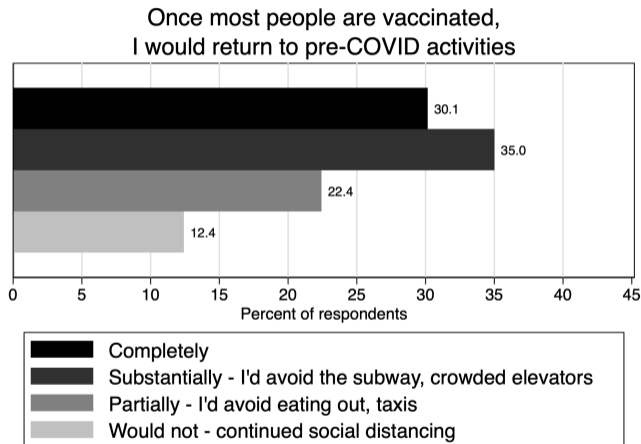


Since the COVID pandemic began, how have perceptions about working from home (WFH) changed among people you know?

▶ Time series

Notes: Data are from 48,250 survey responses collected between May 2020 and June 2021. We re-weight raw responses to match 2010-2019 CPS pop. by {age × sex × education × earnings} cell.

4. PERSISTENT FEARS OF SOCIAL PROXIMITY



Once most of the population has been vaccinated against COVID, which of the following would best fit your views on social distancing?

- *Complete return to pre-COVID activities...*
- *Substantial return to pre-COVID activities...*
- *Partial return to pre-COVID activities...*
- *No return to pre-COVID activities...*

▶ Time series

Notes: Data are from 48,250 survey responses collected between May 2020 and June 2021. We re-weight raw responses to match 2010-2019 CPS pop. by {age × sex × education × earnings} cell.

OUTLINE

Survey and methodology

WFH during & after COVID

Why WFH will stick

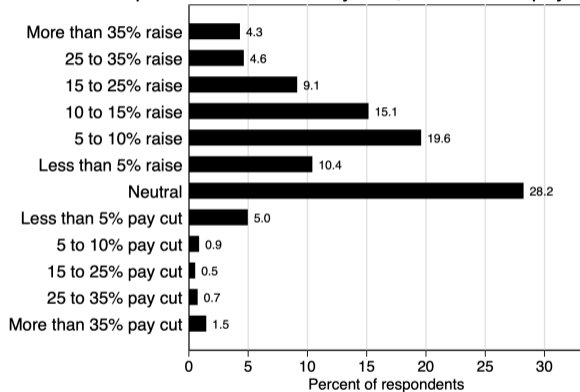
Consequences

WORKING FROM HOME IS A PERK

Value of WFH (% of earnings)

This paper	7.2 (0.1)
Mas & Pallais (2017)	8

Value of the option to WFH 2 - 3 days/wk, % of current pay?



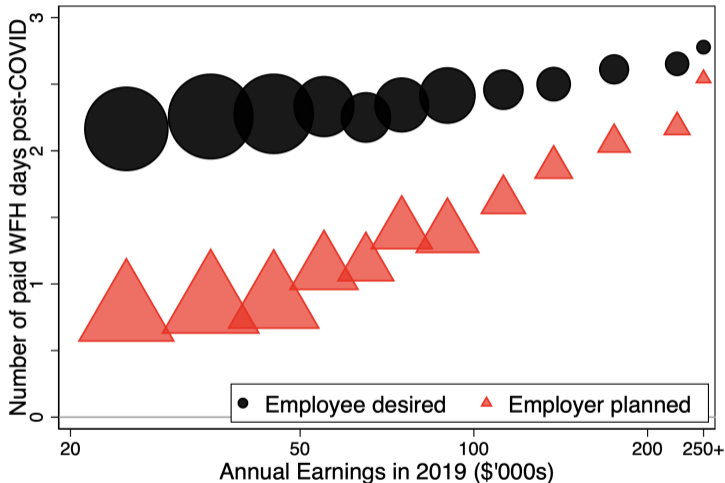
Notes: Data are from 48,250 survey responses collected between May 2020 and June 2021. We re-weight raw responses to match 2010-2019 CPS pop. by {age × sex × education × earnings} cell.

Part 1: After COVID, in 2022 and later, how would you feel about working from home 2 or 3 days a week?

- ▶ *Positive - I would view it as a benefit or extra pay*
- ▶ *Neutral*
- ▶ *Negative - I would view it as a cost or a pay cut*

Part 2: How much of a pay raise [cut] (as a percent of your current pay) would you value as much as the option to work from home 2 or 3 days a week?

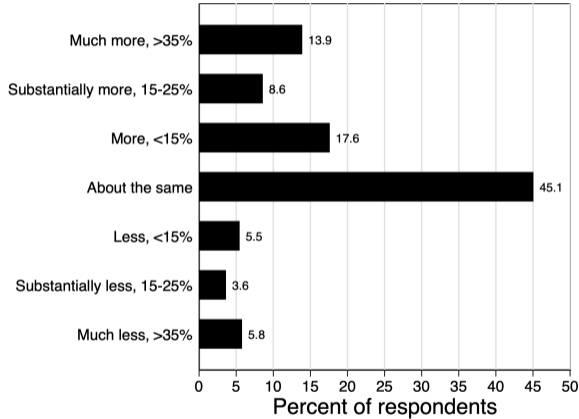
PERK OF WFH WILL BE UNEVENLY DISTRIBUTED



Note: Marker size is proportional to the number of respondents per income level.

40% REPORT HIGHER EFFICIENCY WHILE WFH

Relative efficiency of 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: Data are from 48,250 survey responses collected between May 2020 and June 2021. We re-weight raw responses to match 2010-2019 CPS pop. by {age × sex × education × earnings} cell.

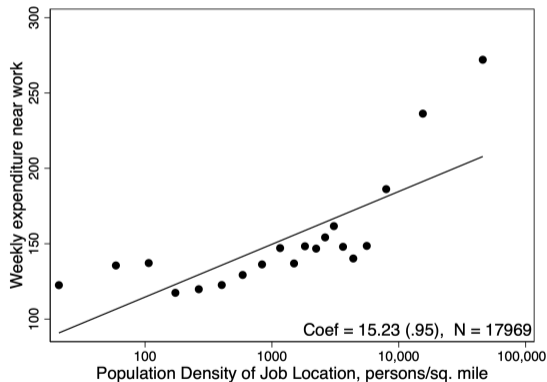
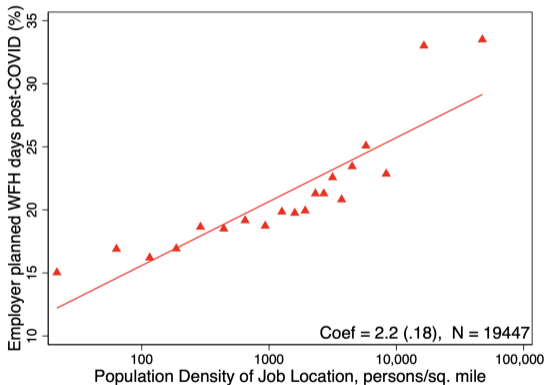
SHIFT TO WFH COULD RAISE PRODUCTIVITY 4.6%

Productivity gains from the persistent shift to WFH (%)

Description	Earnings-weighted	Details
Commuting time savings + relative WFH efficiency	4.6 (0.12)	▶ Details
Commuting time savings only	2.2 (0.05)	▶ Details
Conventional (excluding commuting time savings)	1.2 (0.04)	▶ Details

Notes: Standard errors in parentheses. For each respondent who worked 35 or more hours per week in 2019, we obtain commuting time savings from their one-way commuting time, the amount of working from home their employer is planning after COVID, and the amount of commuting time not reallocated to working. The combined commuting time savings and relative efficiency while working from home is based on the survey question “How does your efficiency working from home during the COVID-19 pandemic compare to your efficiency working on business premises before the pandemic?” We impute relative efficiency to zero for workers who have no work-from-home experience during the pandemic, since they are likely unable to. We then scale relative efficiency by the respondent’s increase in working-from-home between the pre- and post-COVID periods. Finally, we add commuting time savings to these responses for workers who report that their relative efficiency excludes commuting time savings.

SPATIAL REALLOCATION OF JOBS & SPENDING AWAY FROM DENSE CITY CENTERS



Notes: Data are from 48,250 survey responses collected between May 2020 and June 2021. We re-weight raw responses to match 2010-2019 CPS pop. by {age × sex × education × earnings} cell.

CONCLUSION

WFH days: **5%** pre-COVID, **50%** during COVID, predicting **24%** post-COVID

Mechanisms behind a persistent shift to WFH:

1. Experimentation and learning to overcome inertia & biased expectations
2. Investments enabling WFH
3. Diminished stigma
4. Lingering concerns about health risks post-COVID
5. Technical change (not in this talk, see Bloom, Davis, & Zhestkova, 2021)

Consequences:

- ▶ Uneven benefits for workers
- ▶ Higher productivity
- ▶ Spatial reallocation away from dense city centers

RELATED LITERATURE

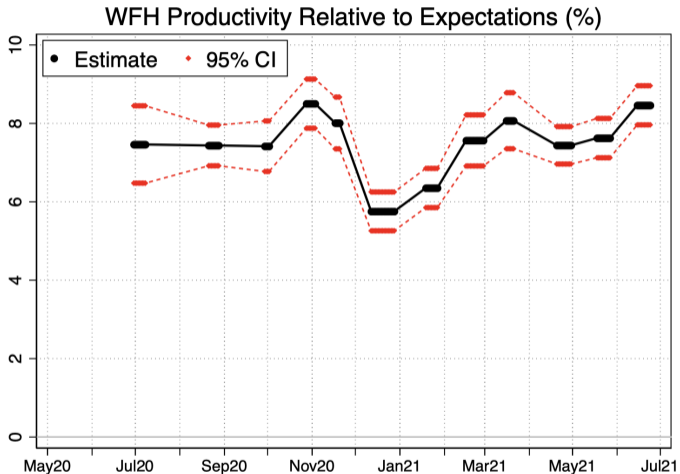
Working from Home before COVID: Bloom, Liang, Roberts, Zhichun, & Ying (2013), Song and Gao (2020), Emmanuel and Harrington (2020)

Working from Home during COVID: Bai, Brynjolfsson, Jin, Steffen, & Wan (2020), Barrero, Bloom, and Davis (2020), Bick, Blandin, and Mertens (2021), Brynjolfsson, Horton, Ozimek, Rock, Sharma and TuYe (2020), Cicala (2020) Möhring, Naumann, Reifenscheid, Wenz, Rettig, Krieger, Friedel, Finkel, Cornesse, Blom (2020), Ozimek (2020) Papanikolaou & Schmidt (2020)

Pandemic-induced shift toward technologies that support WFH: Bloom, Davis and Zhestikova (2020)

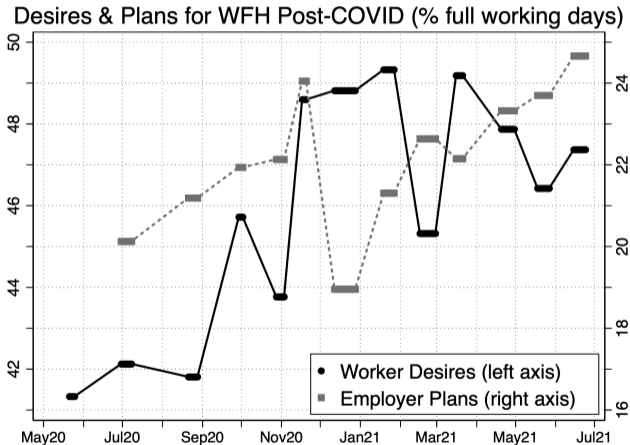
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EVOLUTION OF THE PRODUCTIVITY SURPRISE



Notes: Responses to the question “Compared to your expectations before COVID (in 2019), how has working from home turned out for you [in terms of productivity/efficiency]?” Data are from 48,250 survey responses collected between May 2020 and June 2021. We re-weight raw responses to match 2010-2019 CPS pop. by {age × sex × education × earnings} cell.

WORKERS & FIRMS INCREASINGLY EMBRACE POST-COVID WFH



Notes: Data are from 48,250 survey responses collected between May 2020 and June 2021. We re-weight raw responses to match 2010-2019 CPS pop. by {age × sex × education × earnings} cell. [▶ Back](#)

1. FORCED EXPERIMENTATION AND LEARNING OVERCOME INERTIA

Before **COVID** firms operate on business premises, known payoff distrib. $F^T(\cdot)$

Firms may access *remote technology (WFH)*, for a one-time cost

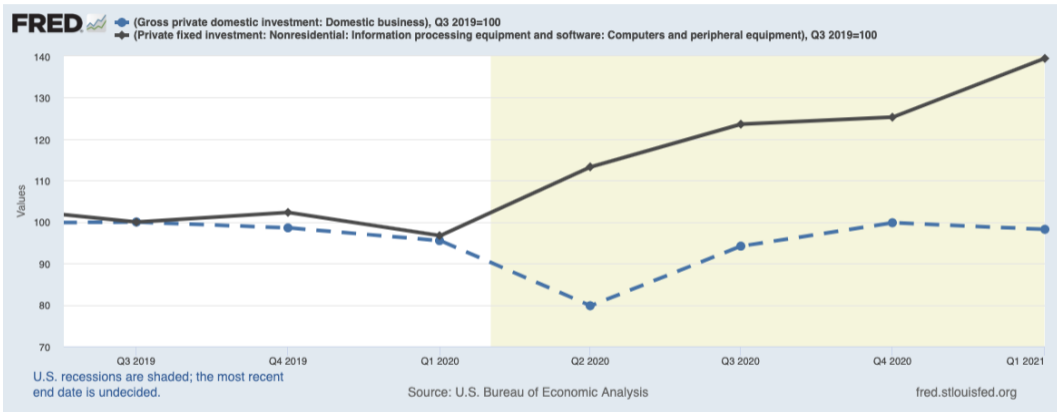
- ▶ Payoffs follow $F_\mu^R(\cdot)$ with unknown mean μ
- ▶ Firms have a prior over the value of μ
- ▶ ≈ 2 armed bandit problem

COVID forces firms to pay the cost of trying out working from home

Working from home sticks due to:

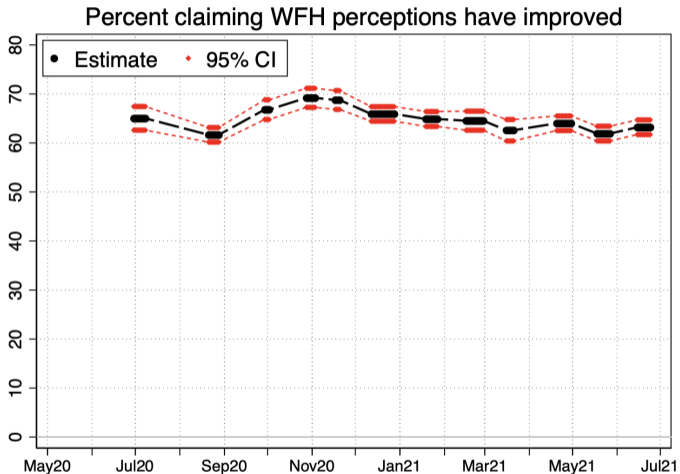
1. A tail effect: high realized payoffs under $F_\mu^R(\cdot)$ for some
2. A bias elimination effect: experimentation reveals priors over μ were too pessimistic

BUSINESS INVESTMENT IN NIPA DATA



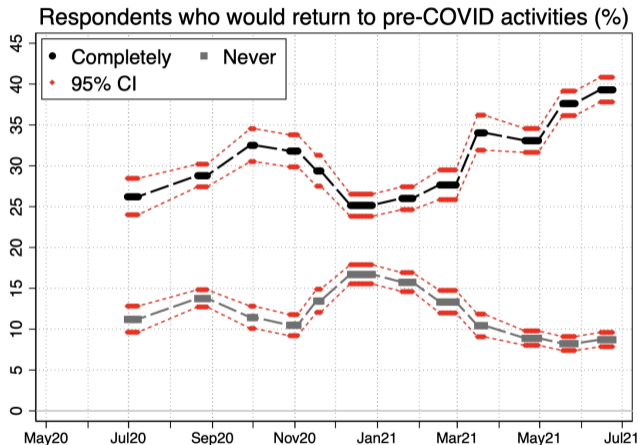
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EVOLUTION OF PERCEPTIONS ABOUT WFH



Notes: Responses to the question “Since the COVID pandemic began, how have perceptions about working from home (WFH) changed among people you know?” Data are from 48,250 survey responses collected between May 2020 and June 2021. We re-weight raw responses to match 2010-2019 CPS pop. by {age × sex × education × earnings} cell.

4. FEARS OF SOCIAL PROXIMITY OVER TIME



Notes: Data are from 48,250 survey responses collected between May 2020 and June 2021. We re-weight raw responses to match 2010-2019 CPS pop. by {age × sex × education × earnings} cell.

Once most of the population has been vaccinated against COVID, which of the following would best fit your views on social distancing?

- Complete return to pre-COVID activities...
- Substantial return to pre-COVID activities...
- Partial return to pre-COVID activities...
- No return to pre-COVID activities...

[▶ Back](#)

COMMUTING TIME SAVINGS: DETAILS

Weekly time savings from greater WFH post-COVID:

$$TS_i = (WFH_i^{Plan} - WFH_i^{Pre})(1 - f_i)C_i$$

C_i = weekly round-trip commute time in hours

f_i = fraction of commute time reallocated to work

Implied productivity gain in percentage terms

$$Gain_i^{Imp} = 100 \cdot TS_i / L_i = 100 \cdot \frac{(WFH_i^{Plan} - WFH_i^{Pre})(1 - f_i)C_i}{H_i^{Pre} + C_i(Days_i^{Pre} - WFH_i^{Pre})}$$

L_i = weekly work hours (incl. commute time)

H_i^{Pre} = conventional measure of weekly work hours pre-COVID

$Days_i^{Pre}$ = no. of full days the respondent works in the survey week

WFH_i^{Pre} = pre-COVID WFH days

WFH_i^{Plan} = planned post-COVID WFH days

TRUE PRODUCTIVITY GAIN: DETAILS

True productivity gain (including commute time savings):

$$Gain_i^{True} = PrDiff_i \left(\frac{WFH_i^{Plan} - WFH_i^{Pre}}{Days_i} \right) + \chi_i Gain_i^{Imp}$$

$PrDiff_i$ = relative productivity of WFH (equals zero if i is unable to WFH)

WFH_i^{Pre} = pre-COVID WFH days

WFH_i^{Plan} = planned post-COVID WFH days

$Days_i$ = no. of full days the respondent works in the survey week

$\chi_i = \mathbf{1}(PrDiff_i \text{ excludes commuting time savings})$

In our preferred specification, we impute $Gain_i^{True} = 0$ when $Gain_i^{True} < 0$ on the view that individuals for whom WFH is a negative won't.

CONVENTIONALLY-MEASURED PRODUCTIVITY GAIN

Conventionally-measured productivity gain (excl. commute time savings):

$$Gain_i^{Conv} = (1 - \delta_i) PrDiff_i \left(\frac{WFH_i^{Plan} - WFH_i^{Pre}}{Days_i} \right)$$

$PrDiff_i$ = relative productivity of WFH (equals zero if i is unable to WFH)

WFH_i^{Pre} = pre-COVID WFH days

WFH_i^{Plan} = planned post-COVID WFH days

$Days_i$ = no. of full days the respondent works in the survey week

δ_i = fraction of $PrDiff_i$ that the respondent attributes to reduced commuting time