

The Big Shift to Remote Work

Steven J. Davis

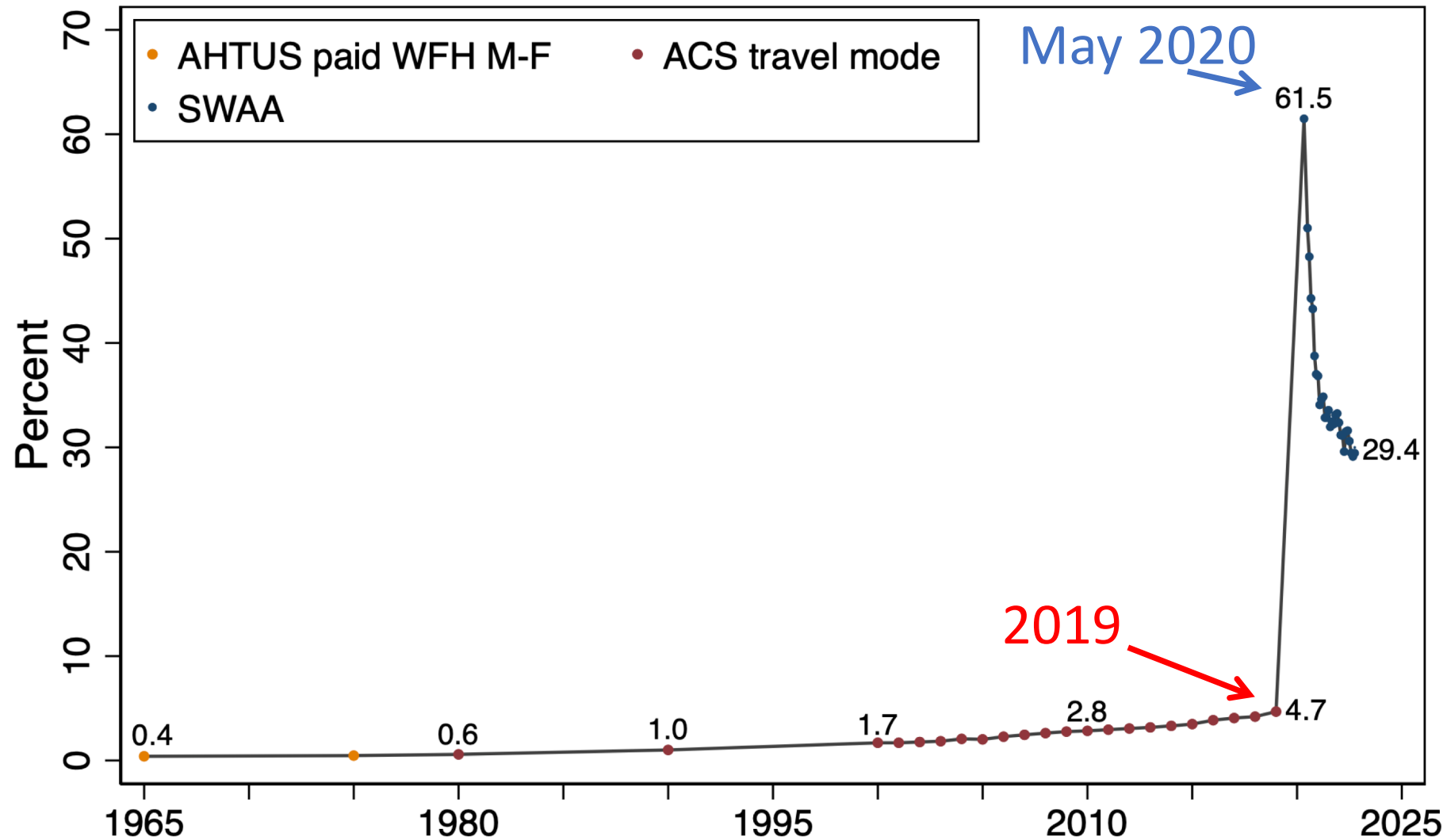
Prepared for the Federal Reserve Bank of Boston Conference on
Labor Markets During & After the Pandemic

18 November 2022

Preview

- 1. The big shift to remote work**
- 2. Why the shift will stick**
 - And how it was catalyzed by the pandemic
- 3. Some benefits**
- 4. Good or bad for productivity?**
- 5. Challenges for cities and civic leaders**

Percent of Full Paid Workdays Performed at Home in the United States, Workers 20-64, 1965 to October 2022



AHTUS =
American
Historical Time
Use Survey

ACS =
American
Community
Survey

SWAA = Survey
of Working
Arrangements
& Attitudes

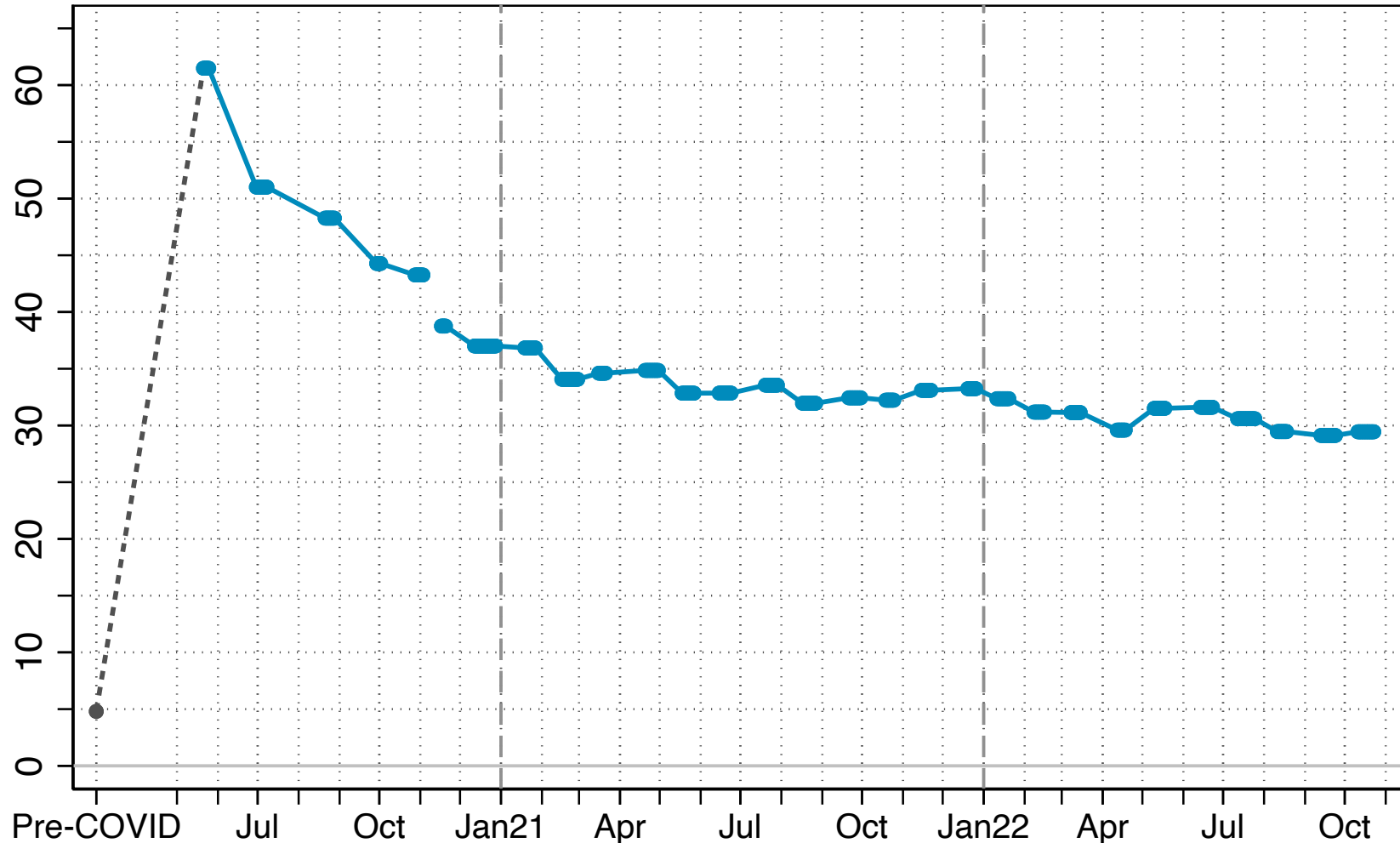
1965-1975 uses data from the American Historical Time Use Survey.

1980-2019 uses data from American Community Survey.

May 2020 - October 2022 uses data from the Survey of Working Arrangements and Attitudes.

Zooming into the period covered by the SWAA – May 2020 to October 2022

Percentage of paid full days worked from home



*Pre-COVID estimate taken from the 2017-2018 American Time Use Survey

*The break in the series in November 2020 reflects a change in the survey question.

Why the big shift to WFH will stick, and how the pandemic catalyzed a lasting shift

- 1. Mass experimentation → learning and revision of prior views → re-optimization of working arrangements**
2. Investments in time, equipment, systems, processes, and management practices that enable WFH
3. Attitudinal shifts:
 - Stigma around WFH has plummeted
 - Infection risks are now greater and more salient, leading some people to prefer WFH (more so than before the pandemic)
- 4. A surge in innovation that supports WFH**
5. Stricter, longer lockdowns during the pandemic → higher levels of planned WFH after the pandemic

The rise of the internet, emergence of the cloud, and advances in two-way video technologies before the pandemic created the conditions that made possible an abrupt, big shift to remote work.

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*

Quotation from Cutter (WSJ, 2020)

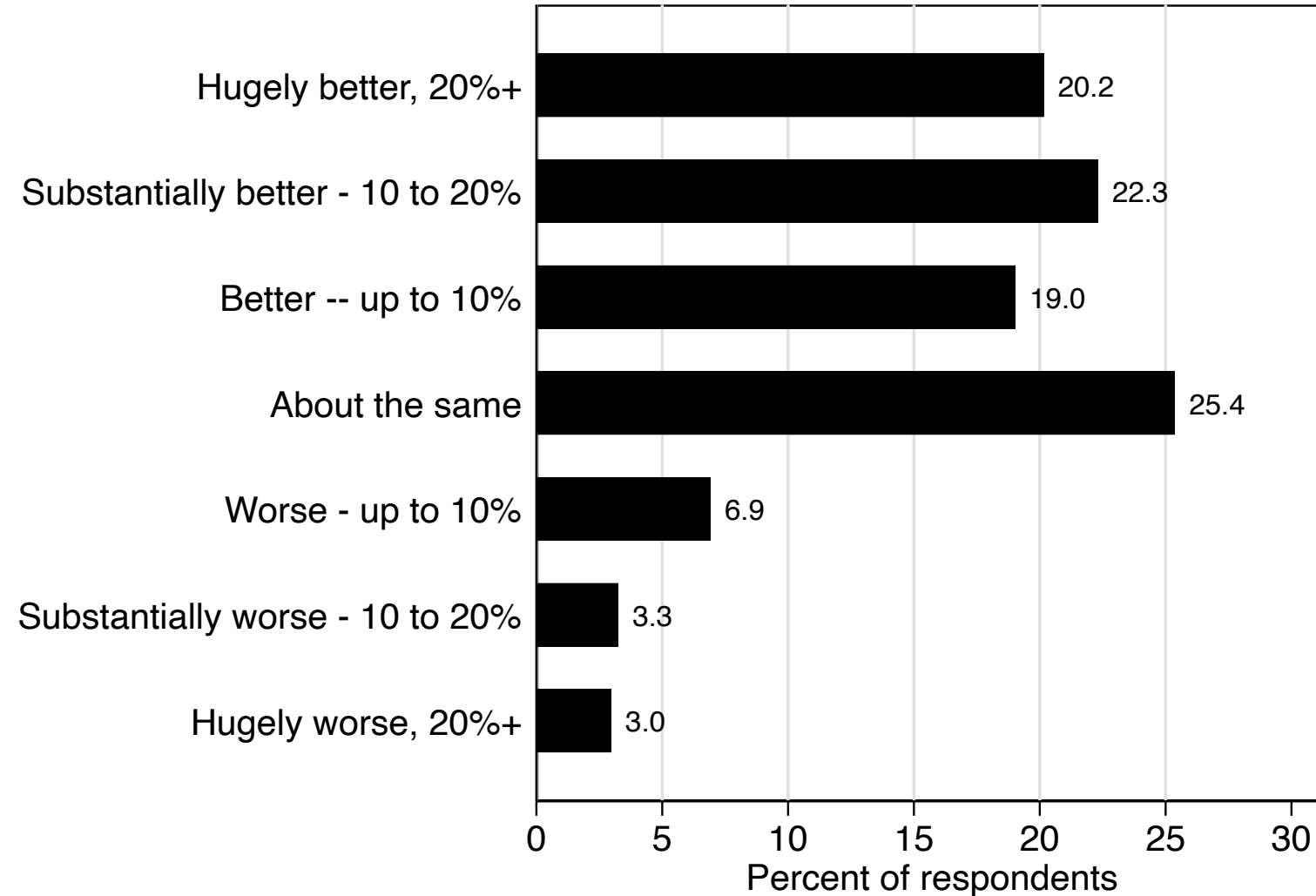


James Gorman

PHOTO: AL DRAGO/BLOOMBERG NEWS

Forced Experimentation: WFH productivity during the pandemic exceeded expectations

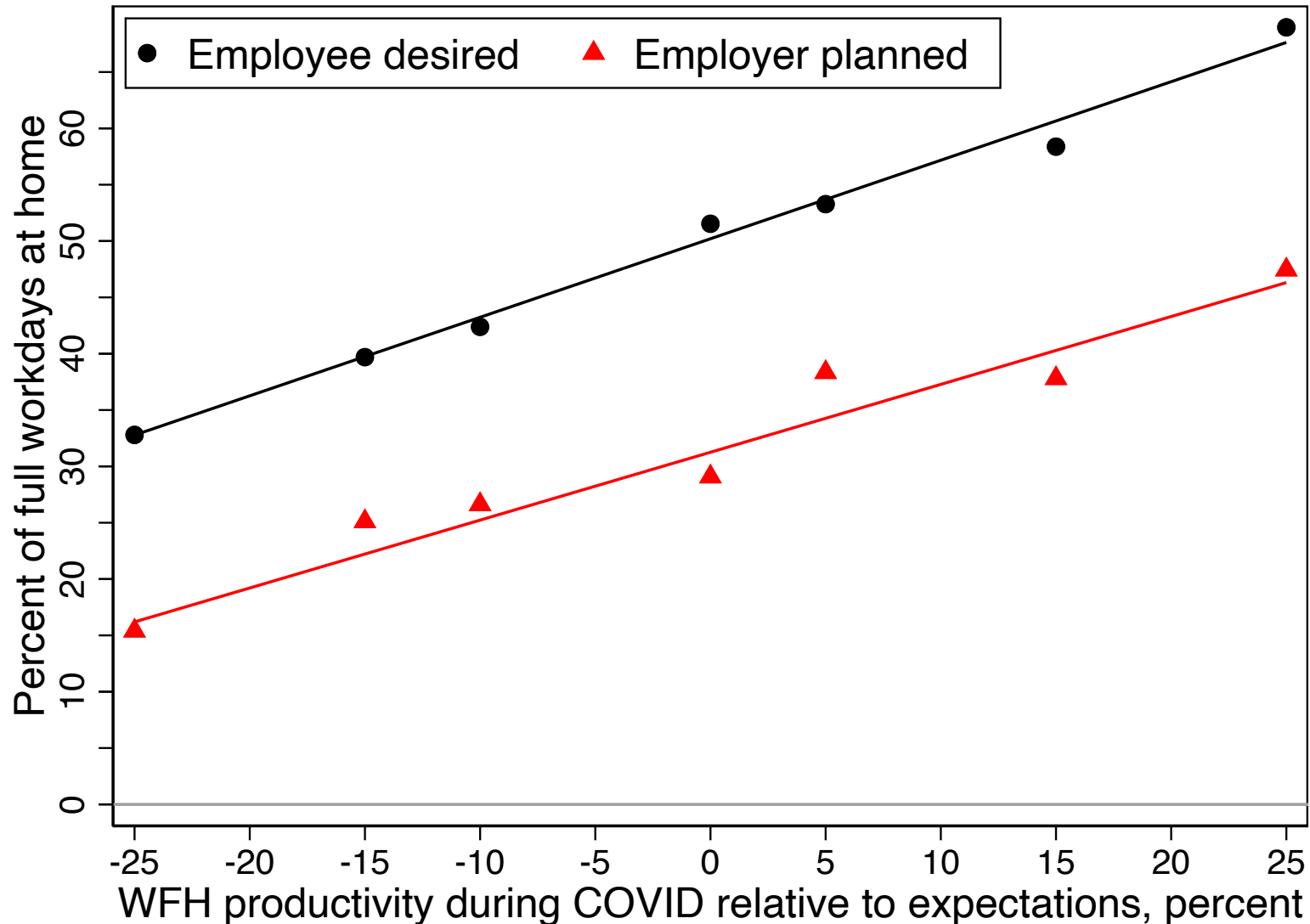
Relative to expectations, how has WFH turned out?



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

- Hugely better -- I am 20%+ more productive than I expected*
- Substantially better -- I am to 10% to 19% more productive than I expected*
- Better -- I am 1% to 9% more productive than I expected*
- About the same*
- Worse -- I am 1% to 9% less productive than I expected*
- Substantially worse -- I am to 10% to 19% less productive than I expected*
- Hugely worse -- I am 20%+ less productive than I expected*

Desired and planned levels of WFH after the pandemic increase with WFH productivity surprises during the pandemic



Source: Response to the questions:

After COVID, in 2022 and later, how often would you like to have paid workdays at home?

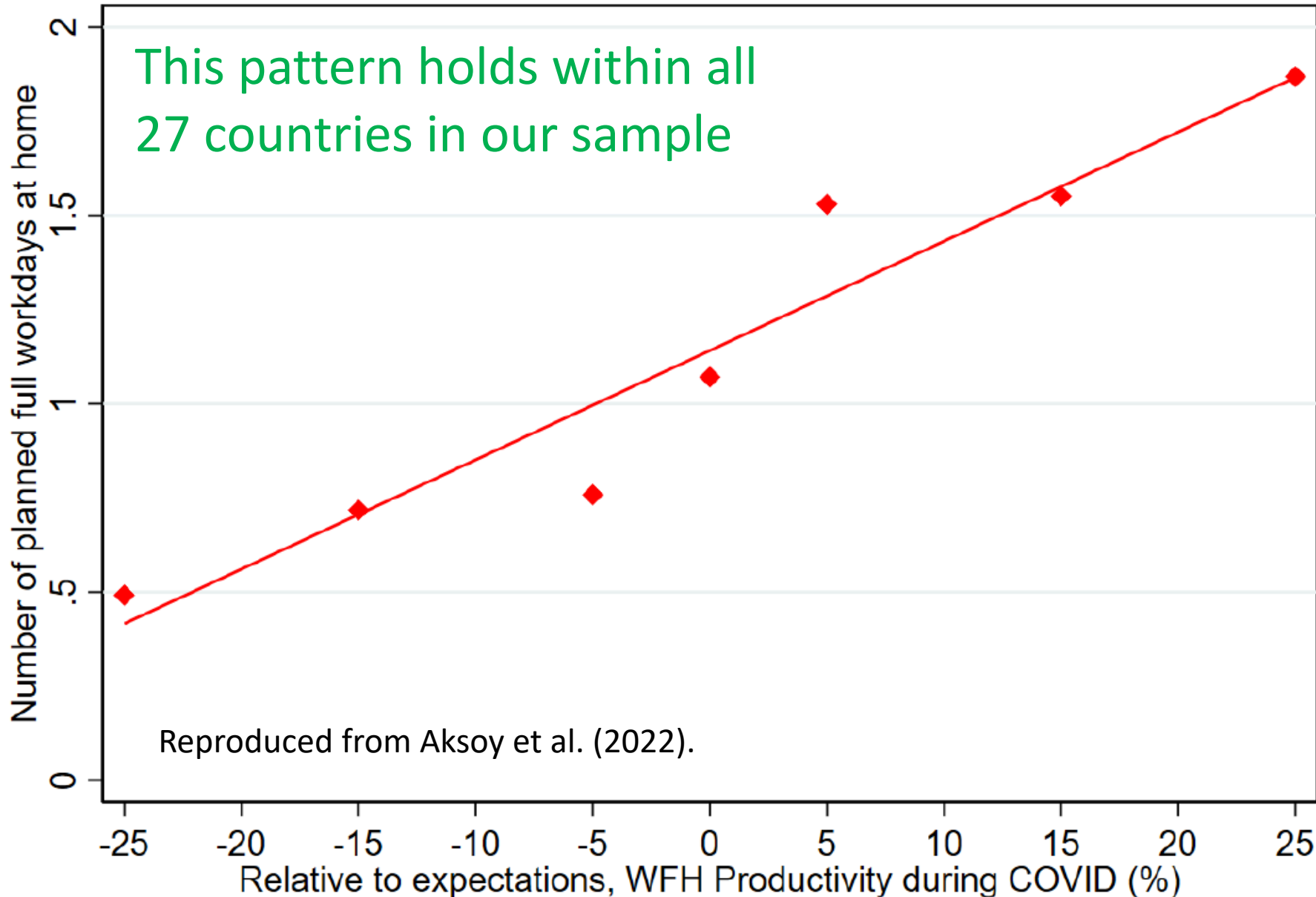
After COVID, in 2022 and later, how often is your employer planning for you to work full days at home?

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

Notes: This figure shows bin scatters of worker desires and employer plans for WFH after the pandemic against WFH productivity surprises during the pandemic.

Data are from 30,750 survey responses collected from July 2020 to March 2021 and reweighted to match the share of working age respondents in the 2010-2019 CPS in a given {age x sex x education x earnings} cell. We did not ask about productivity relative to expectations in May 2020.

A Similar Pattern Holds in a 27-Country Sample

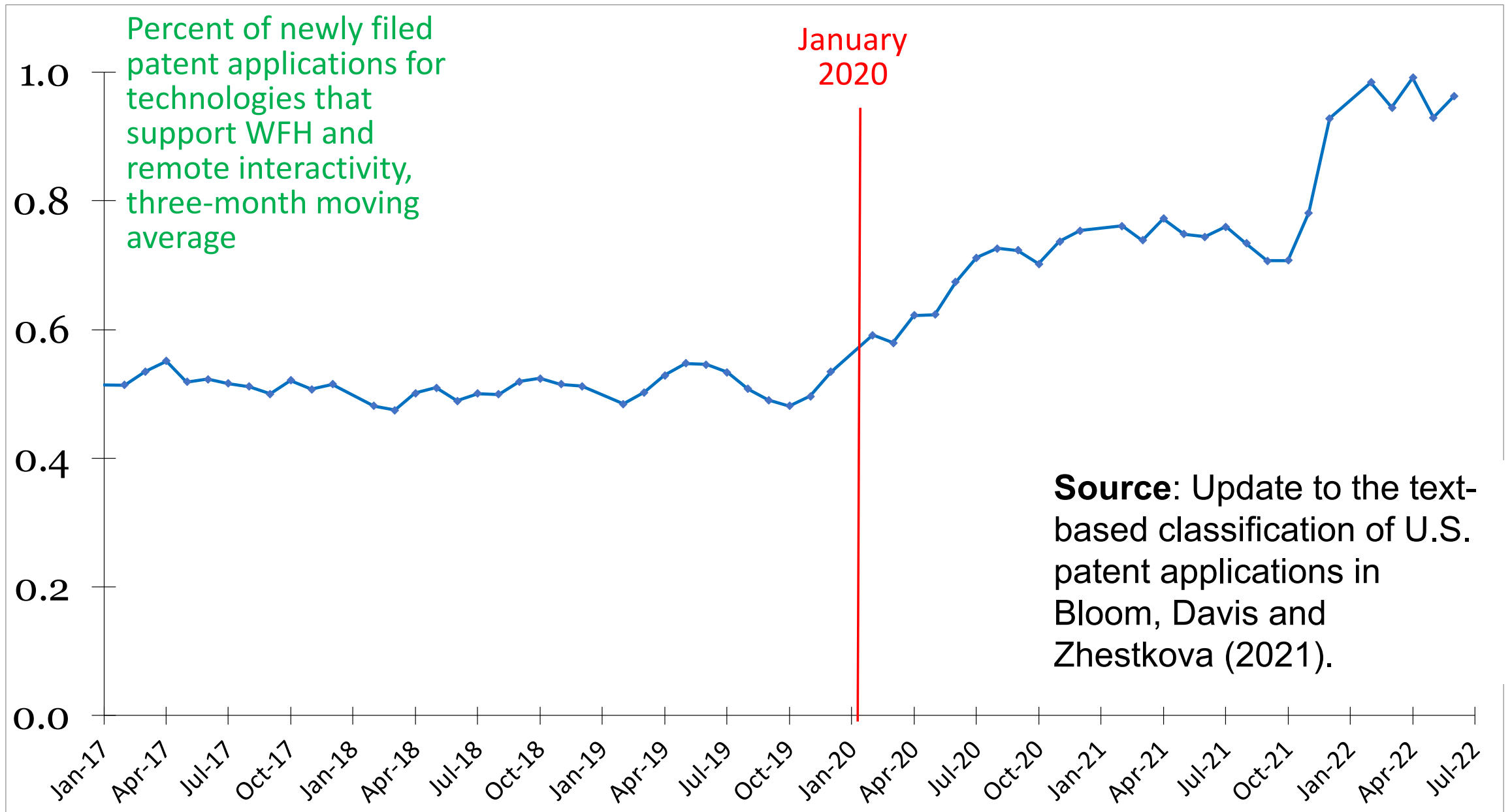


Source: Global WFH Dataset, a multi-country version of the SWAA fielded across 27 countries in July-August 2021 and January-February 2022. See Aksoy et al. (2022).

Most countries are in Europe, but the sample includes Australia, Brazil, China, Egypt, India, Japan, Malaysia, South Korea, Taiwan, and Turkey. The chart at left uses the pooled sample. Vertical scale: How many days per week, on average, employers plan for respondents to WFH.

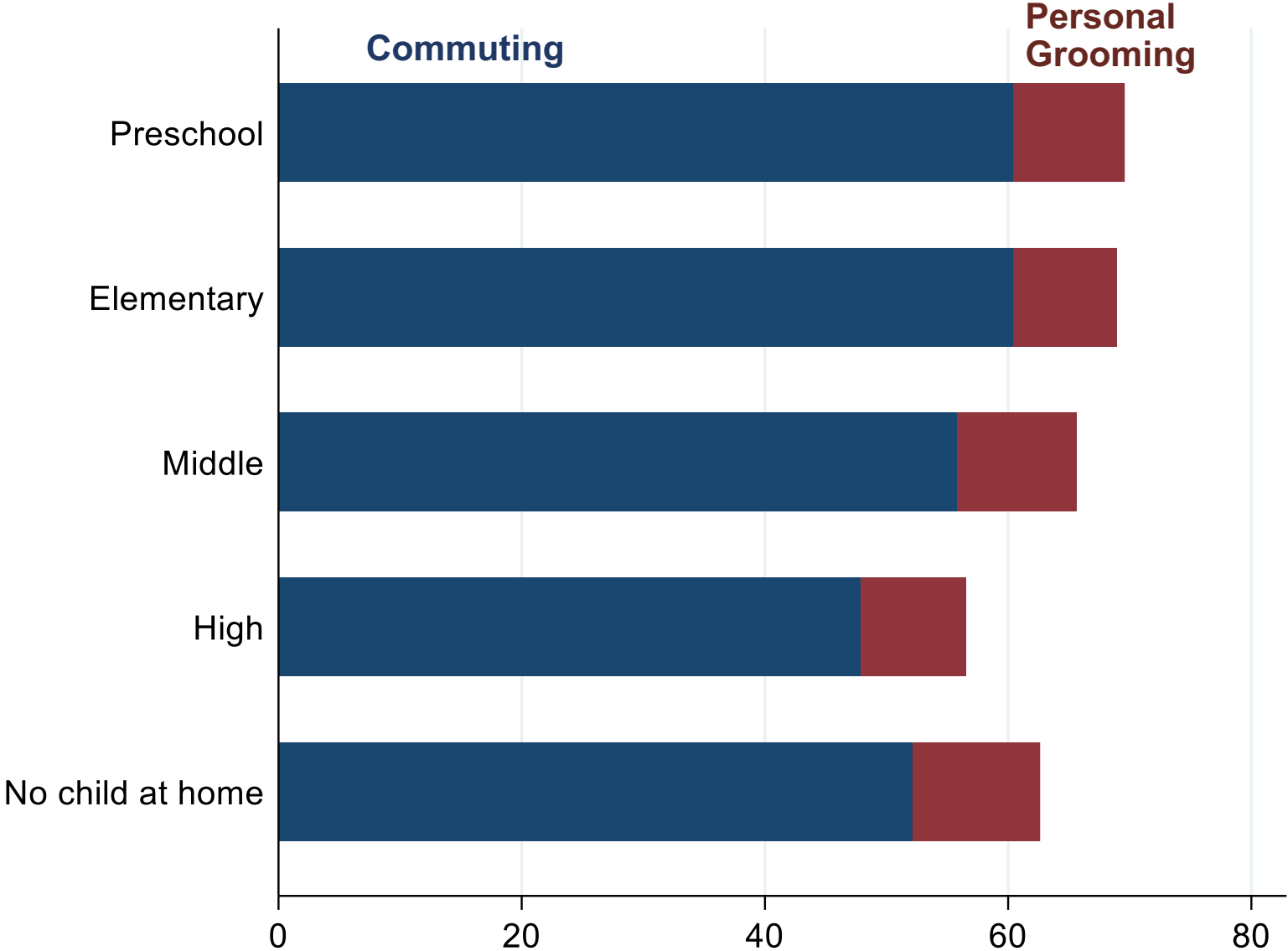
N=18,455 observations, from 27 countries.

COVID-19 Shifted Patent Applications to Technologies that Support WFH



Some Benefits of Remote Work

Average Daily Time Savings When Working from home, Breakdown by Schooling Age of Youngest Child



When employees work from home, they save an average **65 minutes per day** by not commuting and taking less time to get ready for work. The chart shows time saved by age of youngest child.

Source: Data from 8,313 SWAA respondents who can work from home. Reweighted to match the US population. See <https://wfhresearch.com/>.

The Structure of Preferences Around WFH

Average willingness to pay for WFH option = 5% of pay (G-SWA)

WFH option is more highly valued by:

- Women than otherwise similar men: differential = 1% of pay
- People with children under 14: 1% of pay for both men and women
- More educated: Advanced degree holder vs. HS = 2.5% of pay
- Those with longer commutes: Differential exceeds 2% of pay for RT commute > 1 hour compared to < 20 minutes

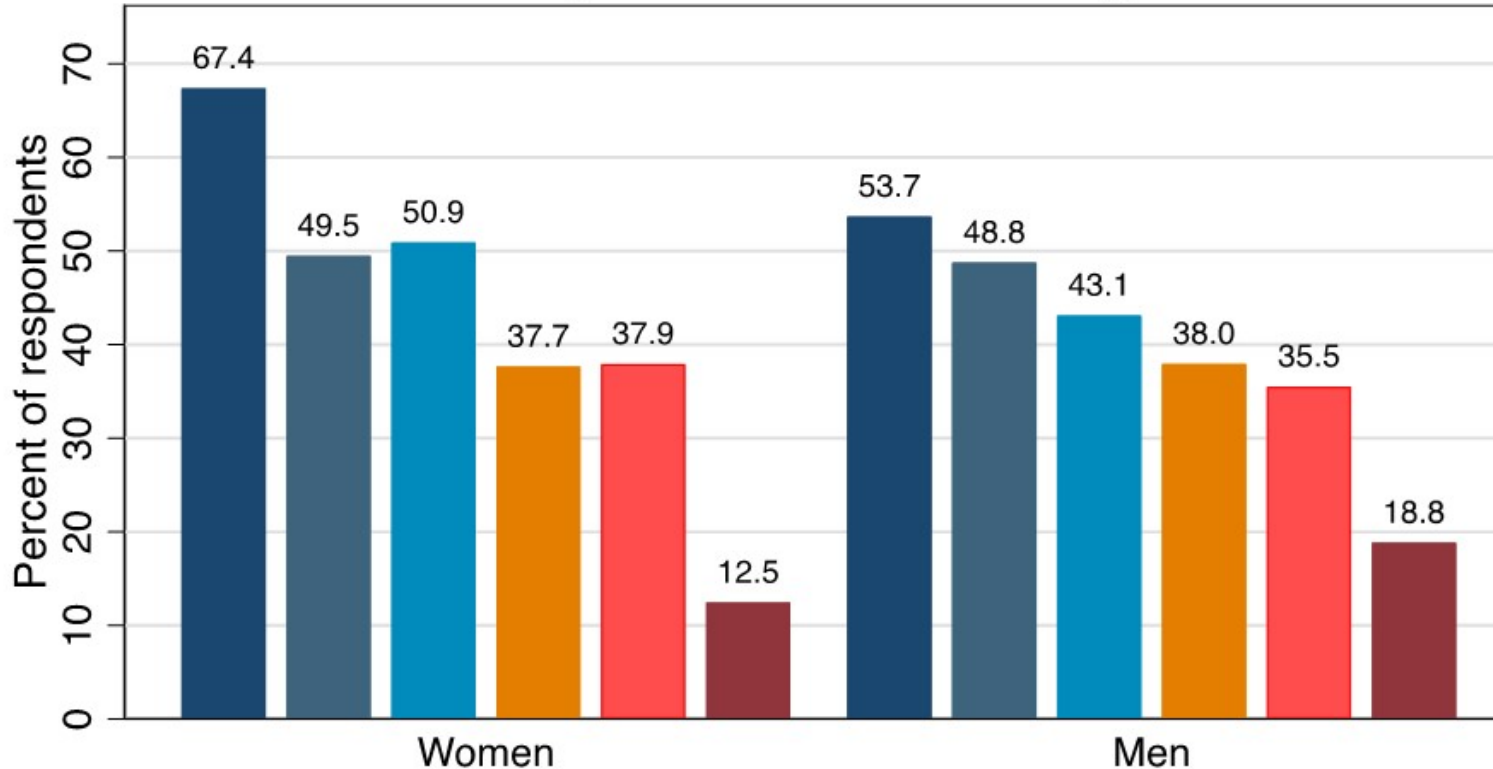
As an illustration, compare (a) married woman with graduate degree, children under 14, and a 45-minute one-way commute to (b) single, college-educated man who lives five minutes from the office → Differential WTP for option to WFH 2-3 days per week = 5.8% of pay.

****People will sort by desired working arrangements & across employers** ¹²

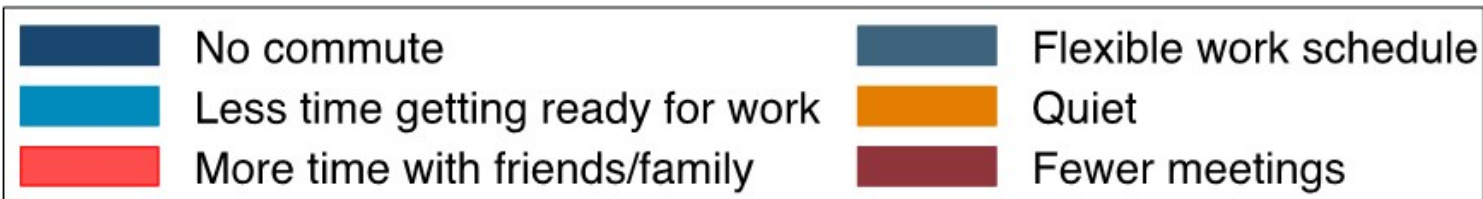
What People Like about WFH

Saved time particularly important for women

What are the top 3 benefits of working from home?

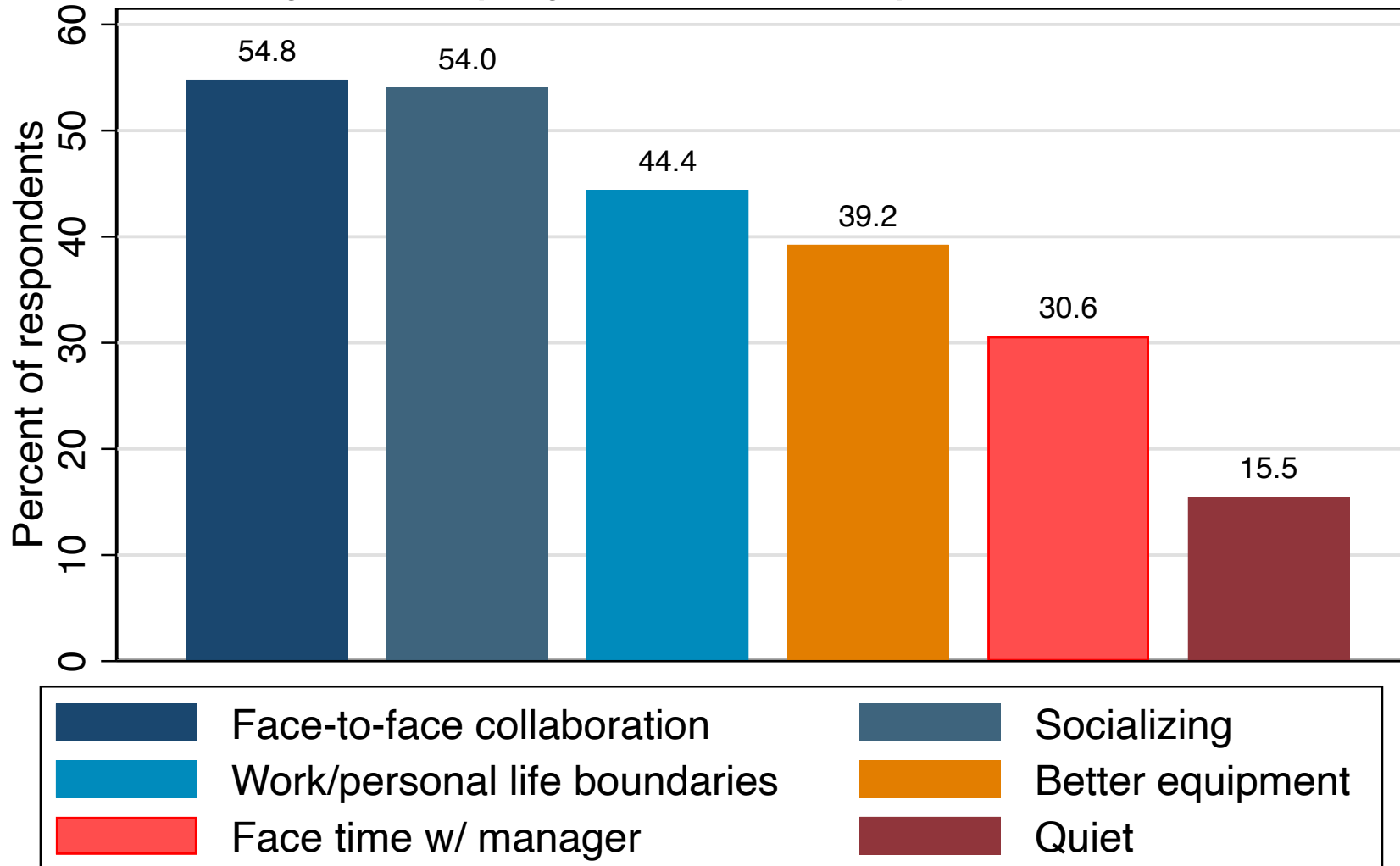


Notes: The sample includes respondents to the February 2022 SWAA who passed the attention check questions and worked from home at some point since the start of the COVID-19 pandemic. The SWAA samples US residents aged 20 to 64 who earned \$10,000 or more in 2019. **N = 2,973.**



What People Like about the Worksite

What are the top 3 benefits of working on your employer's business premises?



Notes: The sample includes respondents to the February 2022 SWAA who passed the attention check questions and worked from home at some point since the start of the COVID-19 pandemic. The SWAA samples US residents aged 20 to 64 who earned \$10,000 or more in 2019. **N = 2,973.**

The Benefits of WFH Will Be Realized Mainly by the Well Paid and the Highly Educated

As a Percent of Earnings

| Value of Planned Post-COVID WFH | Value of Option to WFH 2-3 Days a Week |
|---------------------------------|--|
|---------------------------------|--|

| | | | | |
|----------------------------------|-----|-------|------|-------|
| Ann. Earnings of \$20 to \$50K | 1.5 | (0.1) | 6.8 | (0.2) |
| Ann. Earnings of \$50 to \$100K | 3.0 | (0.1) | 8.2 | (0.2) |
| Ann. Earnings of \$100 to \$150K | 4.8 | (0.2) | 9.6 | (0.2) |
| Ann. Earnings over \$150K | 7.3 | (0.2) | 12.2 | (0.3) |
| Goods-producing sectors | 2.6 | (0.2) | 7.1 | (0.3) |
| Service sectors | 2.4 | (0.1) | 7.8 | (0.1) |
| No children | 1.8 | (0.1) | 6.6 | (0.2) |
| Living with children under 18 | 3.2 | (0.1) | 8.8 | (0.1) |

To obtain the “Value of Planned Post-COVID WFH” for a given person, we multiply “Value of Option to WFH” by $\frac{1}{2}$ if their employer plans for one WFH day per week after the pandemic, by 1 if the plan is for multiple WFH days per week, and 0 otherwise. We then average over persons in the indicated group.

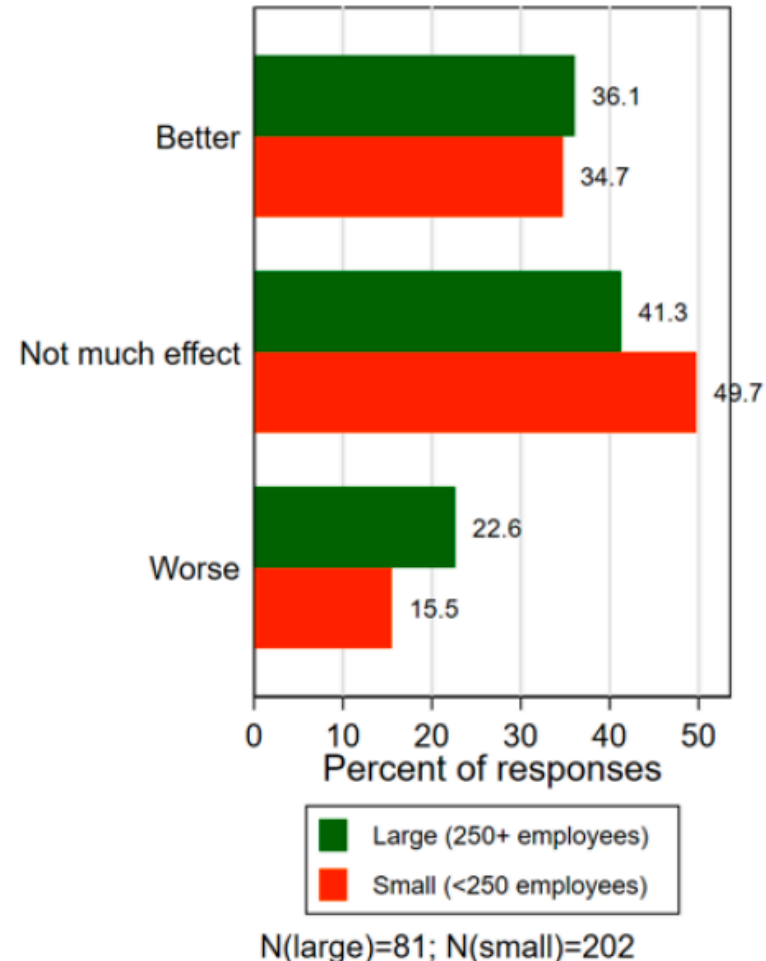
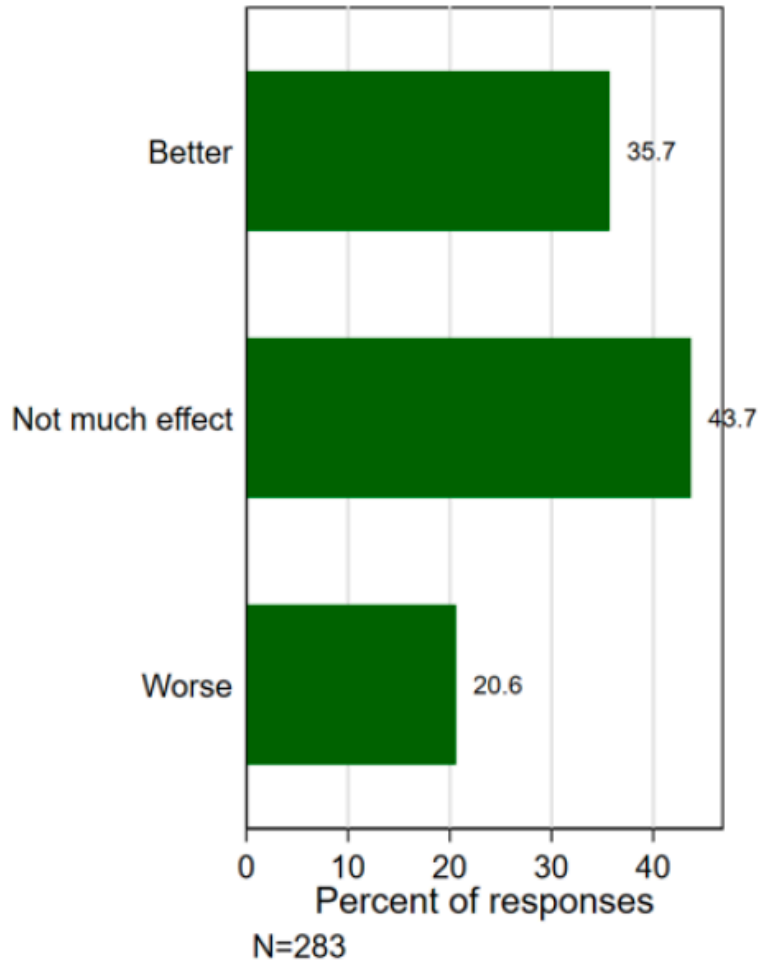
Collecting Several Points

1. Large direct benefits, on average, for workers and families:
 - Savings in time and money costs of commuting and grooming
 - More flexibility in managing time and the household
 - Greater personal autonomy and more comfortable surroundings
2. Direct benefits flow mainly to the college-educated, who are a larger share in richer countries.
3. Not everyone benefits: Persons who highly value daily in-person encounters with colleagues, reside in cramped living quarters, have lousy internet connections, or who lose out on learning and networking opportunities may be worse off. Others (e.g., immobile urban poor) may be hurt by equilibrium effects on jobs and local public goods. More on this below.
4. Obvious, but important: WFH is not suitable for all persons, jobs, tasks and organizations.

Is Remote Work Good or Bad for Productivity?

A plurality of managers think work from home has little impact on their firm's productivity, but more managers see a negative impact than a positive one

Consider your full-time employees who currently work from home at least one day per week. On average, how do you think it would affect their productivity if they work at your business premises five days a week?



Source: Survey of Business Uncertainty, October 2022

Note: Results are weighted by firm size.

Managers think work from home has small negative productivity effects, on average. That result holds across broad industry groups and firm size categories.

Question 1: Consider your full-time employees who currently work from home at least one day per week. On average, how do you think it would affect their productivity if they work at your business premises five days a week?

a. Better b. Not much effect c. Worse

Question 2 (if selected “Worse”): How much less productive would they be if working on business premises five days a week?

Question 2 (if selected “Better”): How much more productive would they be if working on business premises five days a week?

| How much less/more productive would employees who WFH 1+ days per week be if they were instead working on business premises five days a week? | N | Mean Productivity Loss, Among those who WFH 1+ Days Per Week | Mean Productivity Loss, Averaging over all employees by adjusting for the share who do not WFH |
|---|------------|--|--|
| Total | 282 | 3.5 | 0.9 |
| <50 employees | 103 | 5.2 | 1.3 |
| 50-99 employees | 46 | 3.4 | 1.8 |
| 100-249 employees | 53 | 2.2 | 0.1 |
| 250+ employees | 80 | 3.8 | 1.0 |
| Construction, Real Estate, Mining and Utilities | 37 | 5.9 | 1.4 |
| Manufacturing | 46 | 2.8 | 0.3 |
| Retail and Wholesale Trade | 27 | 9.6 | 1.5 |
| Business Services | 146 | 1.4 | 0.8 |
| Other Services | 26 | 5.2 | 0.9 |

Note: Using responses to Q1 and Q2 from the October 2022 Survey of Business Uncertainty, with “Not much effect” assigned an effect of 0. All means are weighted by firm size. The results in the rightmost column are adjusted for the share of the firm’s employees that works from home 1+ days per week. Those shares were calculated from special questions we asked in the October 2021 survey wave.

What Do Workers Think?

1. Using SWAA data – and accounting for whether and how much they work from home – employees perceive that WFH raises their productivity by 3 percent, on average.
 - So, there's a gap between managerial and employee perceptions.
2. Workers attribute about 2/3 of the perceived productivity gain to a savings in commuting time. Managers are unlikely to include those time savings in their productivity assessments.
3. Disregarding worker productivity perceptions, Davis (2022) estimates that the big shift to remote work reduced the sum of paid work time and commute time by nearly 2 percent.
 - Points 2 and 3 → Netting out the role of commute time savings shrinks the gap between managerial and employee perceptions by half. The remaining difference in perceptions, about 2%, is modest.

What about the Pace of Innovation?

Historically, many forms of invention, innovation, and entrepreneurship were highly concentrated in space. This empirical regularity gives rise to concerns that the big shift to WFH will slow the pace of innovation.

Here's why I am less concerned in this regard than many:

1. Many highly innovative firms operate across multiple cities and countries. So, workforce dispersal *per se* is an unlikely killer of innovation and productivity growth.
2. Key developments that facilitated the big shift – e.g., the rise of the internet, better broadband, better video technologies, the emergence of the cloud – also created greater reach and higher quality in communications at a distance.

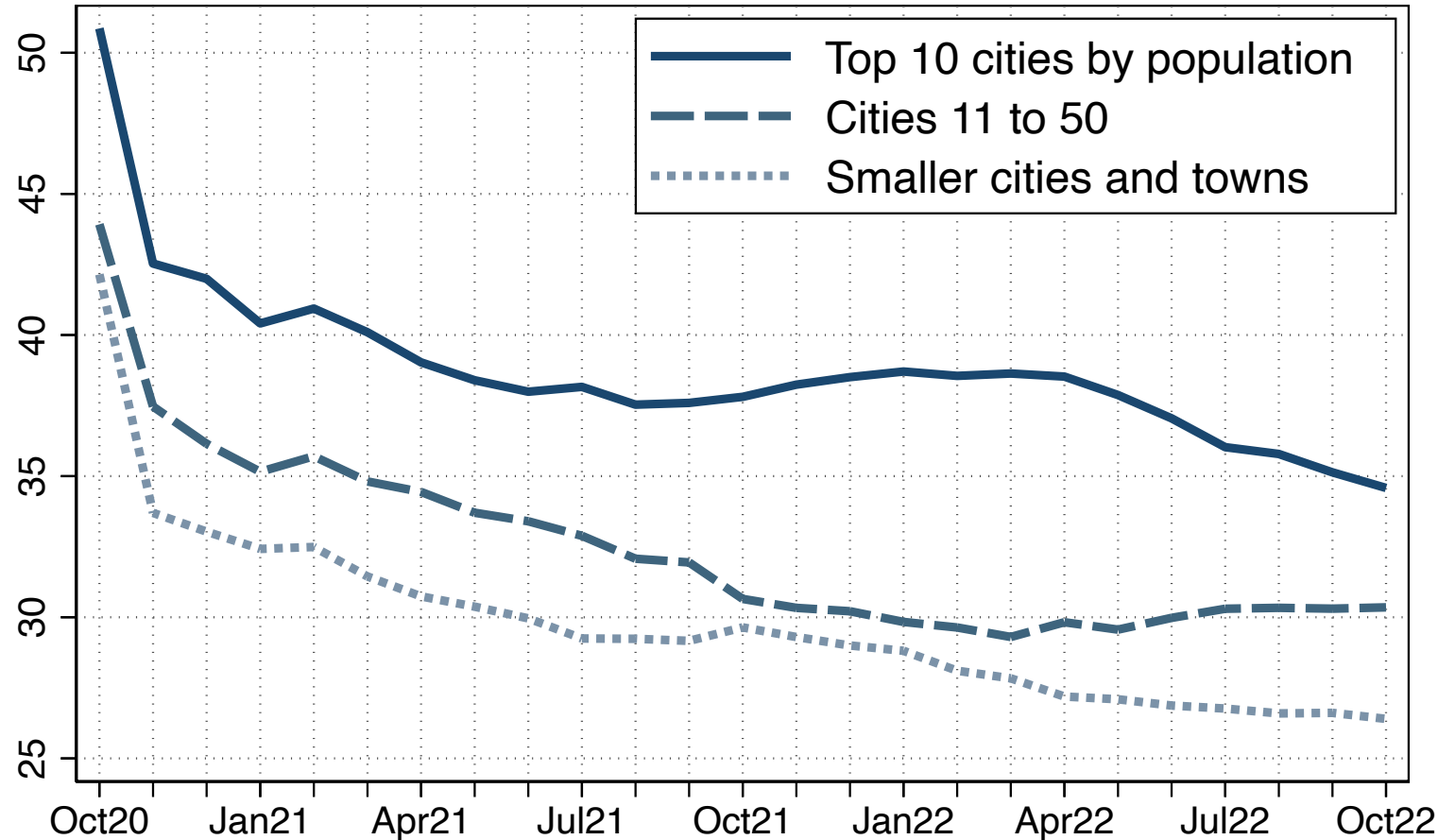
What about the Pace of Innovation?

3. The big shift is itself stimulating further advances in technologies that facilitate productive interactions at a distance, as we saw in the evidence on patent applications.
4. The rise of remote work and professional interactions at a distance during the pandemic prompted a re-think of many customs and practices that, before the pandemic, impeded the flow of ideas and prevented a fuller realization of virtual agglomeration benefits.
5. Business and managerial practices will continue to adapt to a world of remote work and better technologies for communication at a distance. Adaptation is still very much underway.

City-Level Variation in Remote Work

Working From Home is More Common in Major U.S. Cities than in Smaller Cities and Towns

Percent of paid full days worked from home



*We define cities using Combined Statistical Areas and use the location of the respondent's current job.

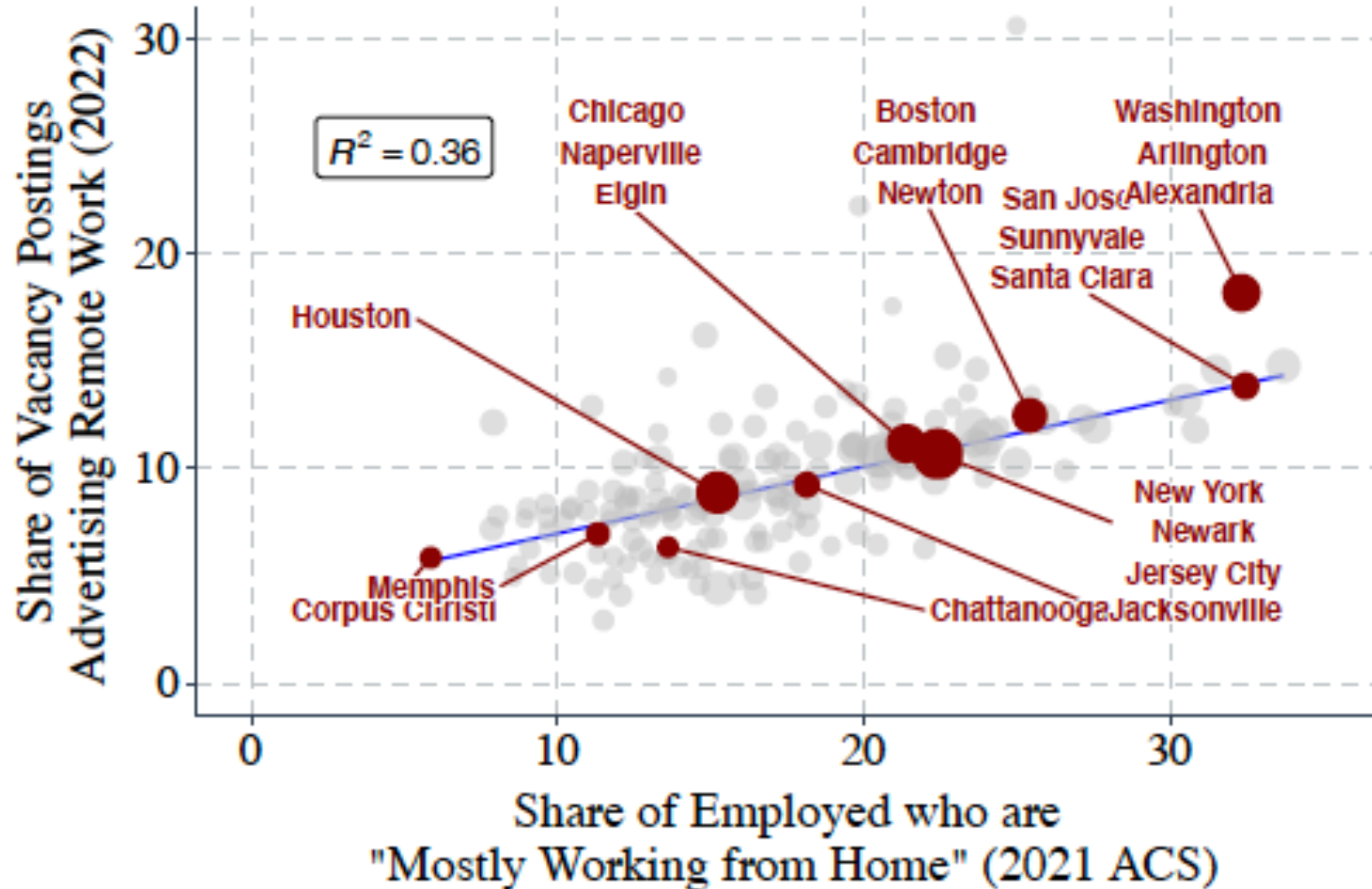
Source: Responses to the questions:

- **Currently (this week)** what is your work status?
- For each day last week, did you **work a full day (6 or more hours)**, and if so **where?**

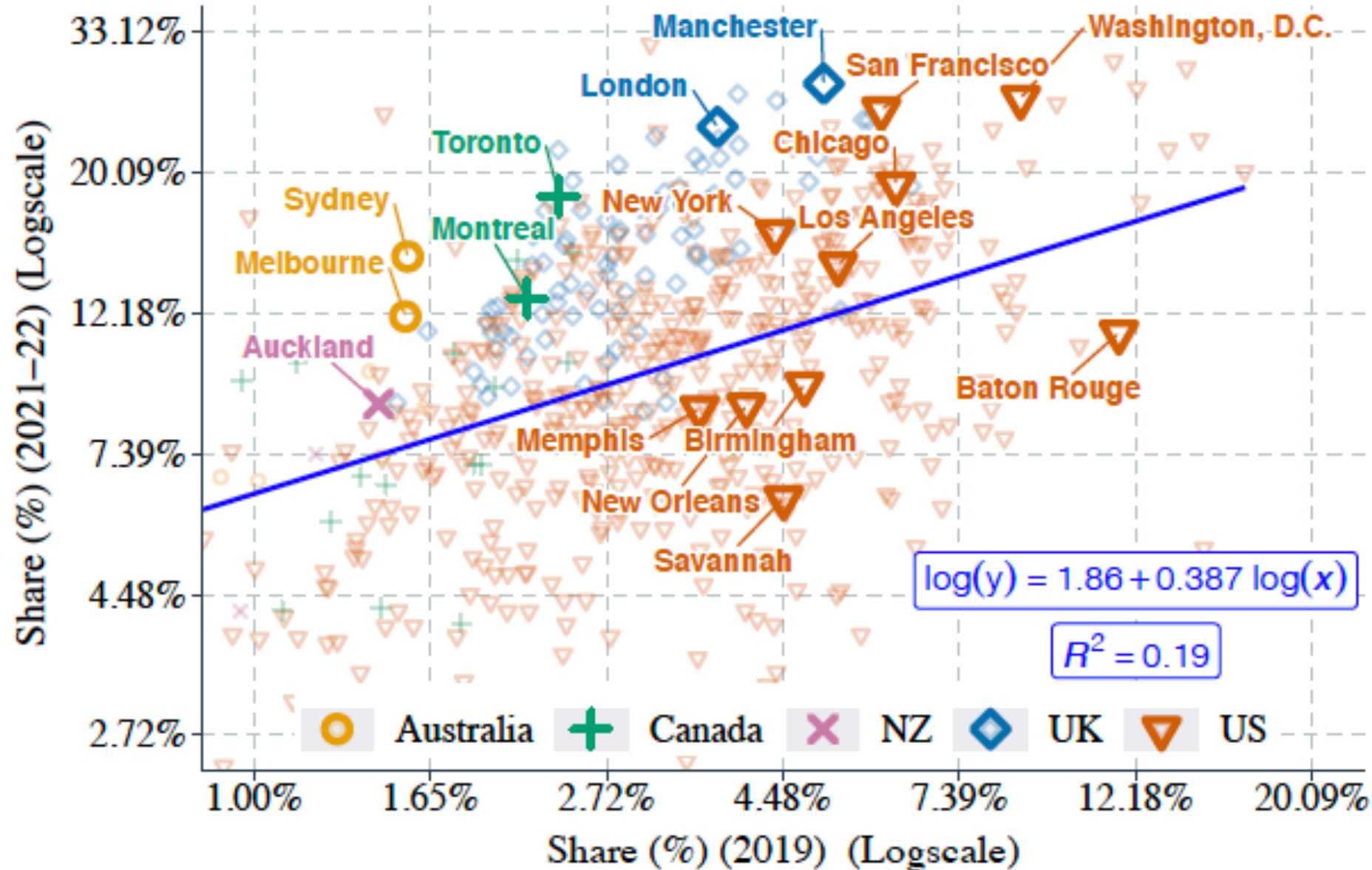
Notes: The chart plots 6-month moving averages where available and 3-month moving averages prior to November 2020. For each wave, we compute the percent of paid full days worked from home and plot it on the vertical axis, after sorting respondents into cities (i.e., Combined Statistical Areas) by the location of their current job's business premises. Before November 2020, we asked the first question above. Since November 2021, we have asked the second question. From November 2020 to October 2021, we back-cast responses to the current question using a regression model that relates the current-question responses to the responses to another question (not shown). We re-weight the sample of US residents aged 20 to 64 earning \$10,000 or more in 2019 or 2021 to match CPS shares by age-sex-education-earnings cells.

N = 91,751

Remote Work Vacancy Posting Share Compared to Percent of Full Paid Days Worked from Home in American Community Survey



City-Level Share of Online Vacancy Postings in 2019 and 2021 that Say Job Allows 1+ Days Per Week of Remote Work



Reproduced from Hansen et al. (2022), who train and apply the BERT Language Model to classify vacancy postings in the Lightcast/Burning Glass database for five English-speaking Countries.

Challenges for Cities and Civic Leaders

My remarks here are tailored to the U.S. context. The issues are somewhat different in developing economies and in rich countries with smaller roles for local governments and local tax revenues.

1. The big shift to WFH presents acute challenges for urban centers that, before the pandemic, organized themselves to support high-volume inward commuting and a high spatial concentration of commercial activity.
2. The big shift eroded their local tax bases: (a) Fewer inward commuters → a drop in sales tax and transit revenues; (b) in some cities, an outflow of residents drove a further drop in sales tax revenues; (c) commercial property values fell; and (d) less business travel means smaller lodging and sales taxes.

Challenges for Cities, 2

- 4. The big shift has increased the elasticity of the city-level tax base with respect to governance quality – more so in cities like San Francisco where many well-paying jobs are amenable to remote work.**
5. This increase in the tax base elasticity creates sharper incentives for sensible, efficient local governance.
6. But it also creates more scope for a downward spiral in city fortunes, whereby poor governance drives outmigration and a loss of commuters and businesses, eroding the local tax base and undercutting the fiscal capacity to supply local public goods, which leads to more outmigration and less inward commuting, and so on.

Challenges for Cities, 3

- Cities that fail to control crime, offer good schools, and levy taxes commensurate with services are now more exposed to residential outmigration, drops in inward commuting, and a business exodus. They face greater risks of a downward spiral in local tax revenues, local public services, and other urban amenities.
- By similar logic, attracting “good jobs” will do less to boost urban fortunes when employees work remotely much of the time.
- The flip side of these observations is that cities that offer good schools, low crime, and pleasant places to live, work and play will be even more attractive now than before the pandemic.

Thus, we can anticipate much diversity in city-level fortunes in the coming years, including the possibility of major failures.

**End of
Presentation
Materials**

**Notes on Key
Sources +
More Evidence**

The Survey of Working Arrangements and Attitudes



- Monthly online survey since May 2020. Currently, about 10,000 individual respondents per month; > 100,000 since inception.
- We (Barrero, Bloom and Davis) design the survey instrument.
- Target population: U.S. residents, 20-64, who meet a prior-year earnings requirement.
- The SWAA is fielded by market research firms that rely on wholesale aggregators (e.g., [Lucid](#)) for lists of potential survey participants.
- After dropping “speeders” (~16% of sample), we re-weight to match 2010-2019 CPS worker shares in age-sex-education-earnings cells. Dropping those who fail attention checks (roughly another 12%) sharpens some results.
- Median response time: 7 to 12 minutes, after dropping speeders
- Results, micro data, survey instruments, and more are freely available at www.WFHresearch.com.

Representativeness

- By design, we focus on persons who exhibit some attachment to the workforce, as evidenced by prior earnings.
- No respondents are recruited based on an interest in our topics.
- Since respondents take the survey using a computer, smartphone, iPad or like device, we miss people who never use such devices.
- Before re-weighting, the SWAA under samples the less educated, particularly those who did not finish high school.
- Even after re-weighting, we may over sample those who are more tech and internet savvy, especially among the least educated.

Attention check question #1

In how many big cities with more than 500.000 inhabitants have you lived?

Please note that **this question only serves the purpose to check your attention.**

Irrespective of your answer, please insert the number 33.

Continue

Attention check question #2

What color is grass?

The fresh, uncut grass, not leaves or hay. Make sure that you select purple as an answer so we know you are paying attention.

Magenta

Green

Purple

Brown

Black

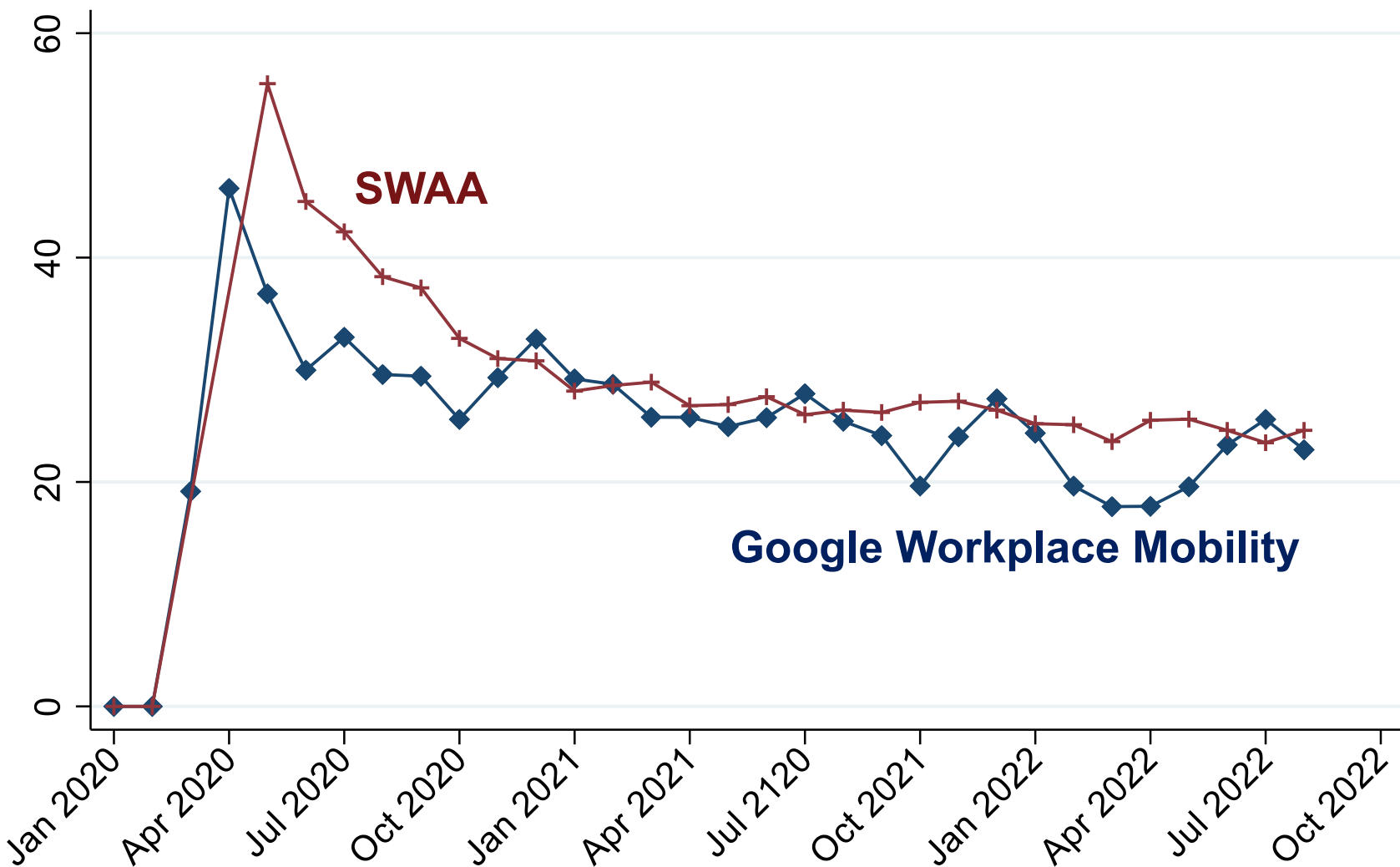
White

Blue

Continue

Change in Full Paid WFH Days Since Pandemic's Onset Compared to Google Workplace Mobility Drop

Change in Percentage Points

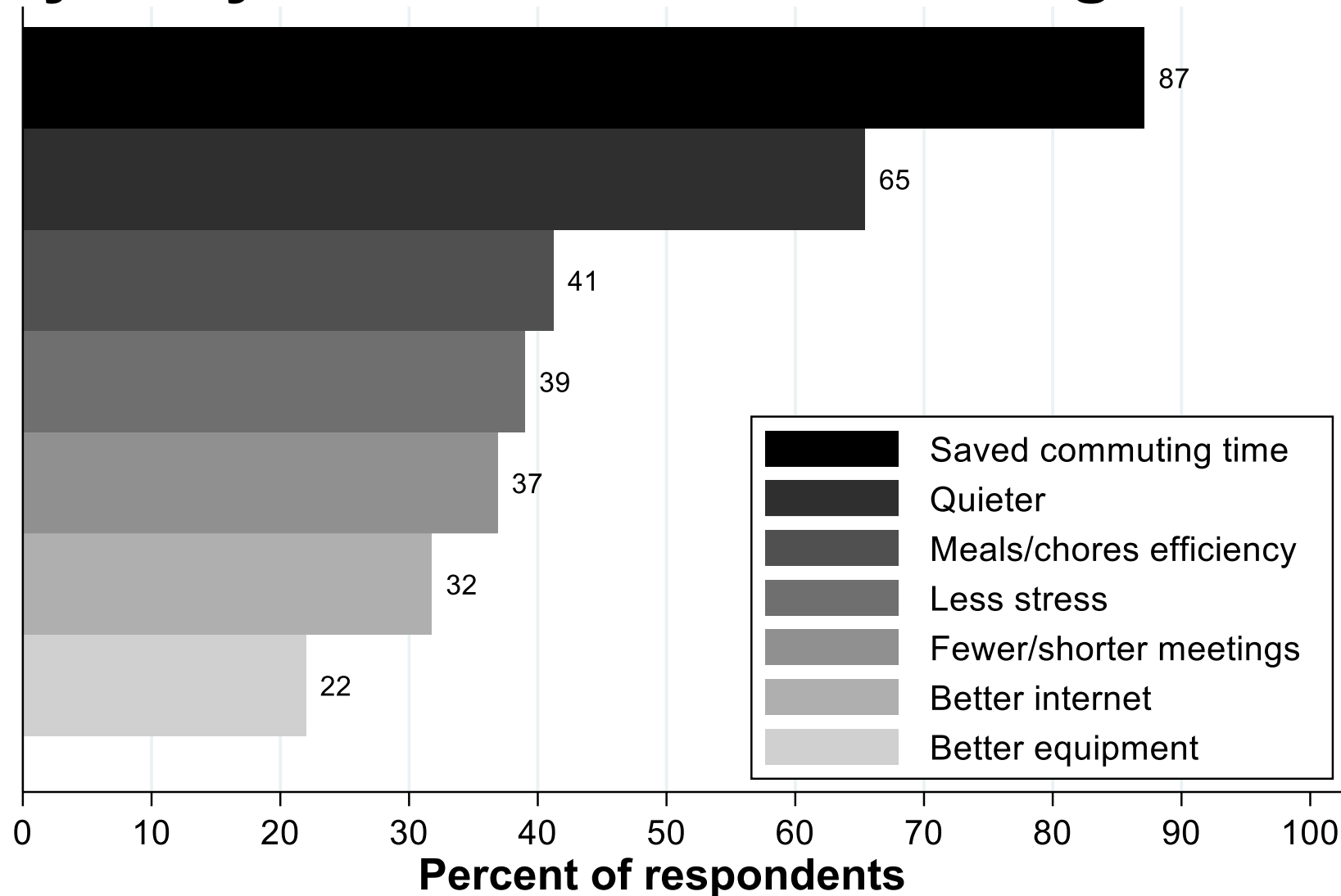


Red = Change in WFH Share computed as SWAA measure of WFH Days as percent of all workdays minus 5 pts

Blue = Percentage point drop in Google Workplace Mobility Index from before the pandemic

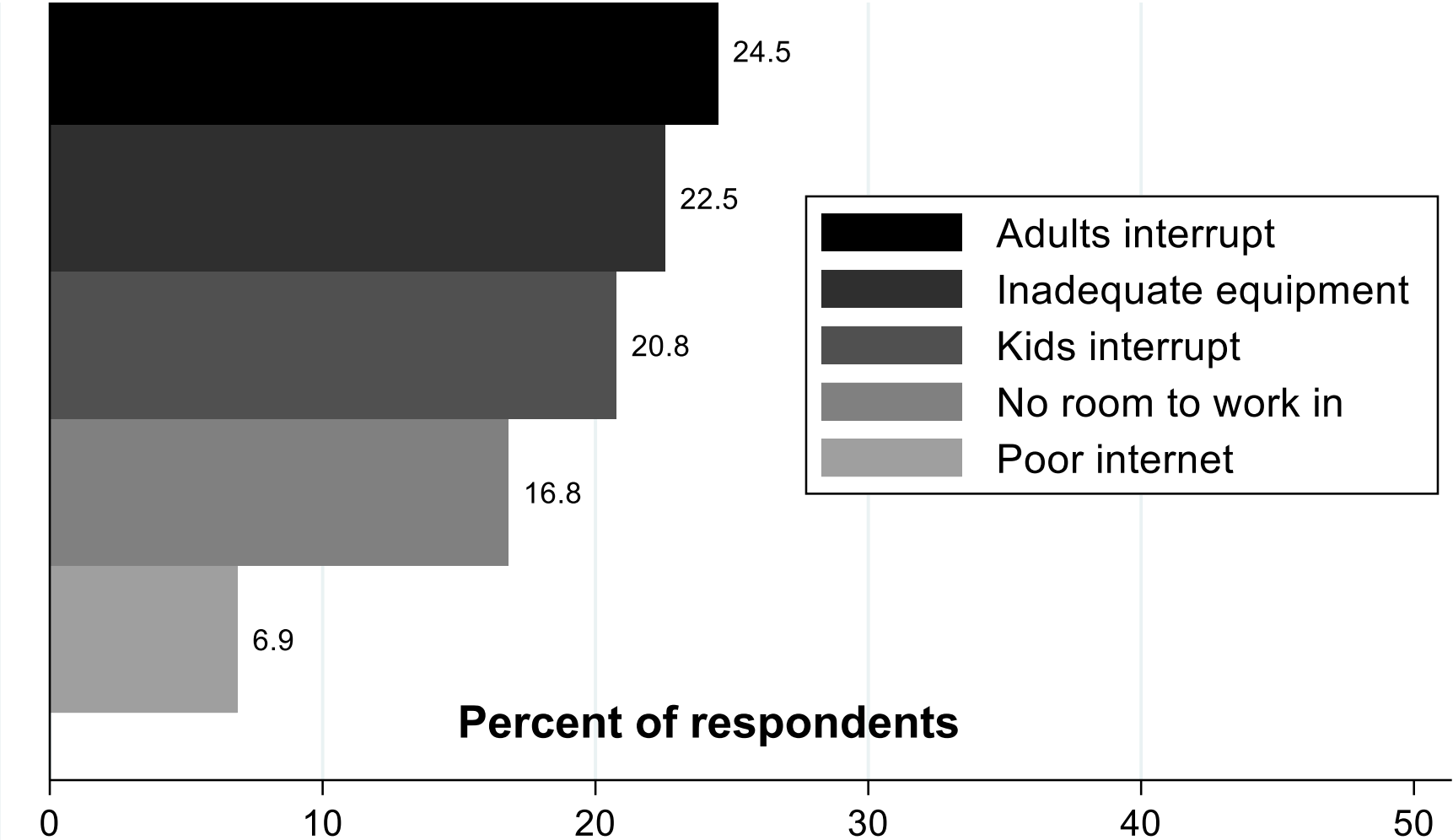
From revision to "Why Working from Home Will Stick" by Barrero, Bloom and Davis.

Why are you more efficient working from home?



Source: Data from 7,902 respondees who can work from home in 2021, reweighted to match the US population. Details on <https://wfhresearch.com/>

Why are you less efficient working from home?



Source: Data from 7,902 respondees who can work from home in 2021, reweighted to match the US population. Details on <https://wfhresearch.com/>

Global Survey of Working Arrangements (G-SWA)

Target Population: Full-time employees, aged 20-59, who finished primary school in 27 countries around the world.

Survey Design: We design the G-SWA instrument, adapting many questions from the US-focused SWAA developed by Barrero, Bloom and Davis (2021).

Implementation: [Respondi](#), a professional survey firm, fields the G-SWA as an online survey in cooperation with its external partners. Two waves:

- Wave 1: July-August 2021, 15 countries, N= 12,229 (after drops)
- Wave 2: January-February 2022, 25 countries, N=23,849 (after drops)

Quality Control: We drop “speeders,” defined as the bottom 5% of the completion-time distribution in each country. In addition, we drop the roughly 15% of respondents who fail an attention-check question.

More on the G-SWA and How We Use It

Median Response Times: 7.3 to 9.5 minutes, after drops.

Representativeness: (1) Respondents take the survey on a computer, smart-phone, iPad or like device, so we miss persons who don't use such devices. (2) ***Our samples have too few less-educated persons, more so in less-developed economies.*** We do not try to create representative samples by country. Instead, we estimate conditional mean outcomes at the country level in making our ...

Cross-Country Comparisons: We use coefficients on country-level dummies in OLS regressions, treating the raw U.S. mean as the baseline. These regressions control for age (20-29, 30-39, 40-49, 50-59), sex, education (Secondary, Tertiary, Graduate), 18 industry sectors, and survey wave (or time period).

Survey of Business Uncertainty



About the Survey

The Survey of Business Uncertainty (SBU) is fielded by the Federal Reserve Bank of Atlanta. It was designed, tested, and refined in cooperation with Nick Bloom of Stanford University and Steven Davis of the Chicago Booth School of Business and the Hoover Institution. Bloom and Davis received research support from the Sloan Foundation and the U.S. National Science Foundation. Davis also received research support from Chicago Booth.

Our monthly Survey of Business Uncertainty (SBU) goes to about 1500 panel members (as of August 2022), who occupy senior finance and managerial positions at U.S. firms. We contact panel members each month by email, and they respond via a web-based instrument.

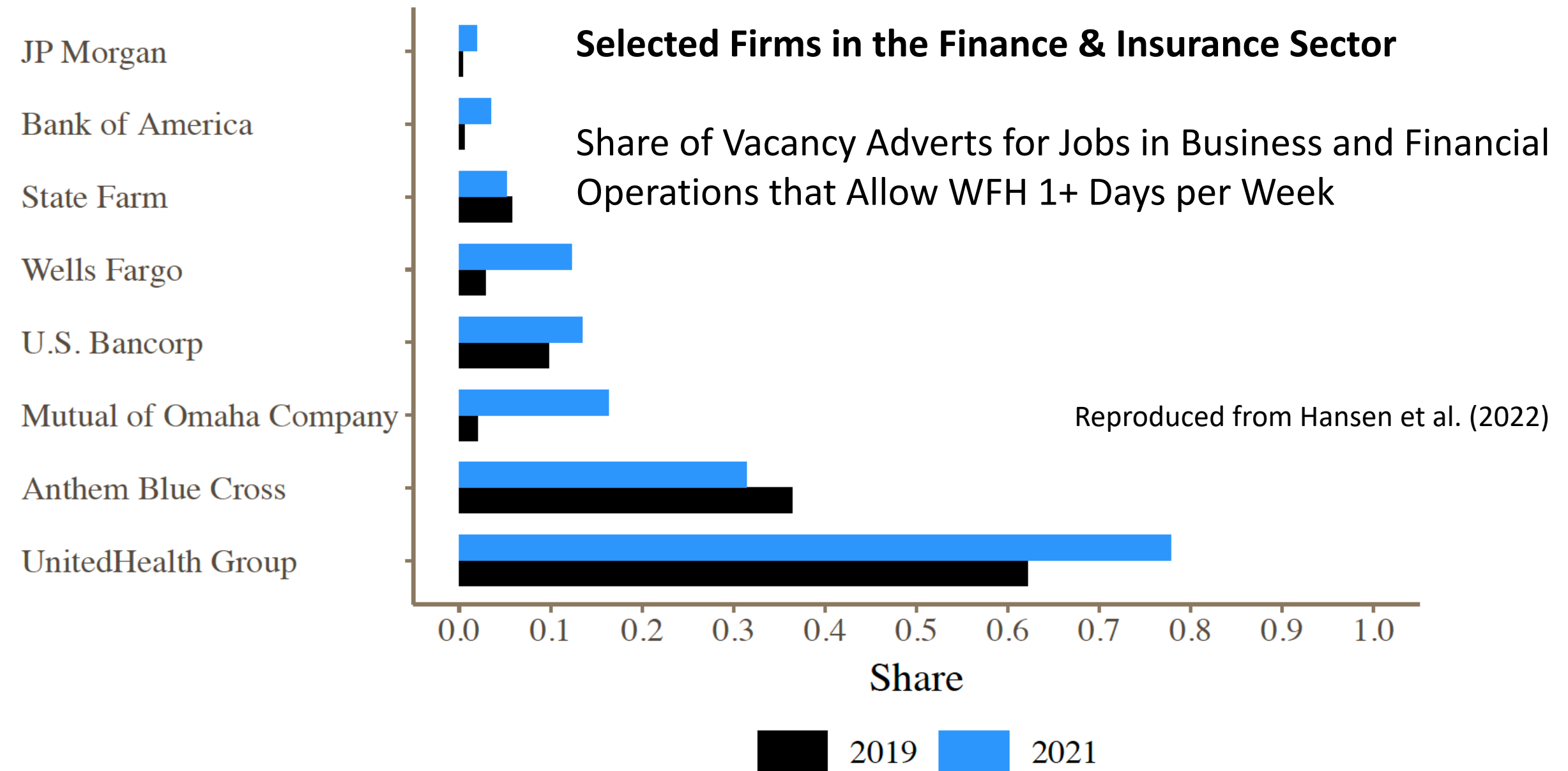
Survey questions pertain to current, past, and future outcomes at the respondent's firm. Our primary objective is to elicit the respondent's subjective forecast distributions over own-firm future sales growth rates and employment levels. We also ask special questions on many timely topics, including work from home.

For more information on survey design and methodology, please refer to the resources on the [SBU page](#) and "[Surveying Business Uncertainty](#)," published in the *Journal of Econometrics* and also available as NBER Working Paper [25956](#).

Measuring Remote Work In Job Vacancy Adverts

- In Hansen et al. (2022), we use a state-of-the-art NLP approach to classify job vacancy adverts as to whether the job does or does not allow 1+ days per week of remote work. We start from a “DistilBERT” model (Sanh et al., 2020), pre-train it on a portion of the Lightcase/Burning Glass corpus, then train it on human-classified text sequences extracted from 60,000 job adverts. We audit the model-based classifications to check performance and refine the model.
- We apply our model to 350+ million job vacancy adverts posted online and collected from 2014 to the present.
- Currently, our dataset covers the United States, United Kingdom, Canada, Australia, and New Zealand. We plan to extend our measurement and analysis to other countries as well.

The Shift Is Highly Non-Uniform, Even Across Firms in the Same Industry Recruiting in the Same Occupational Category



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