

The Big Shift to Work from Home

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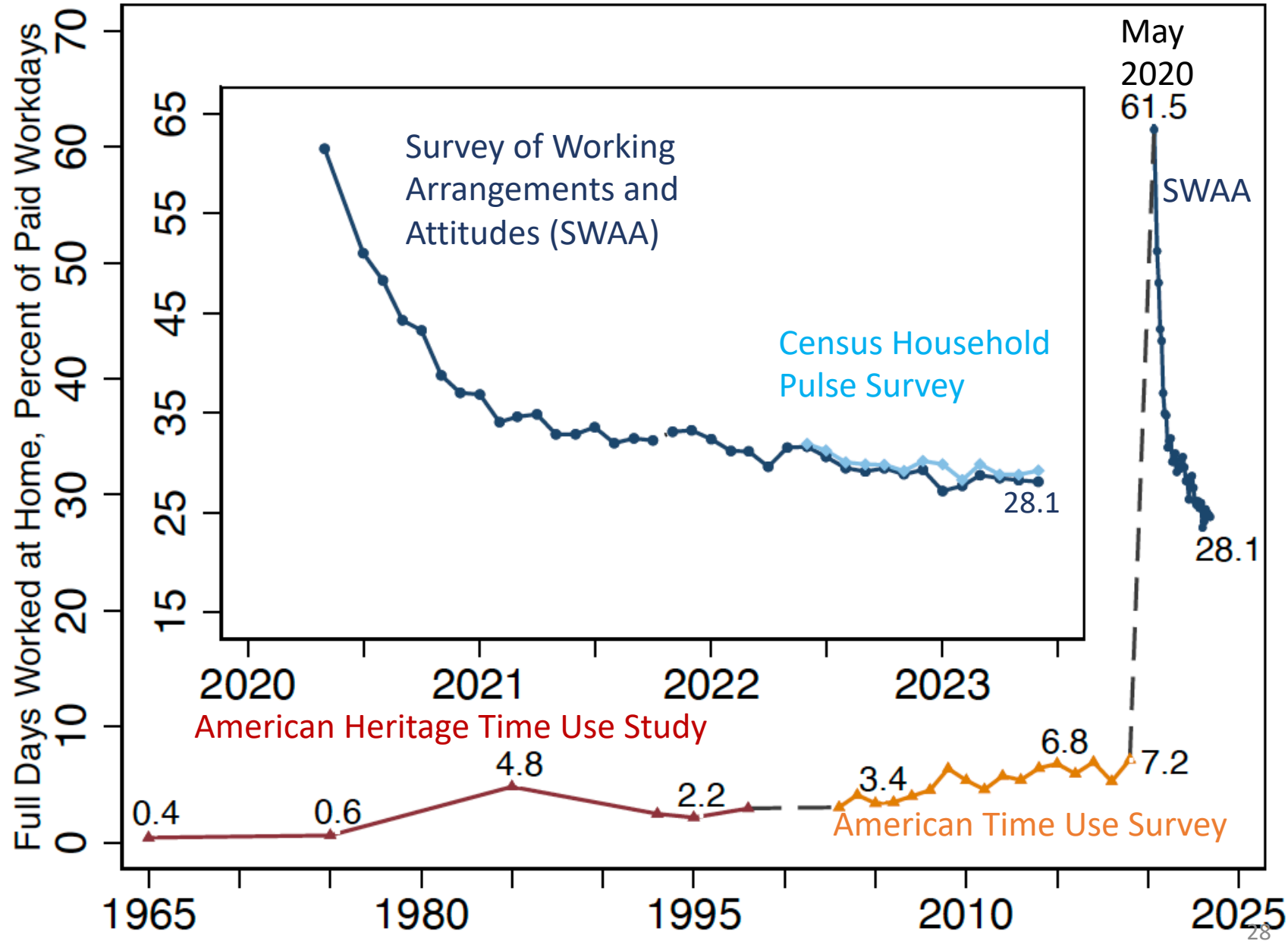
Social Science Matrix Talk
Berkeley Macro-Labor Workshop

26 April 2024

Plan of the Talk

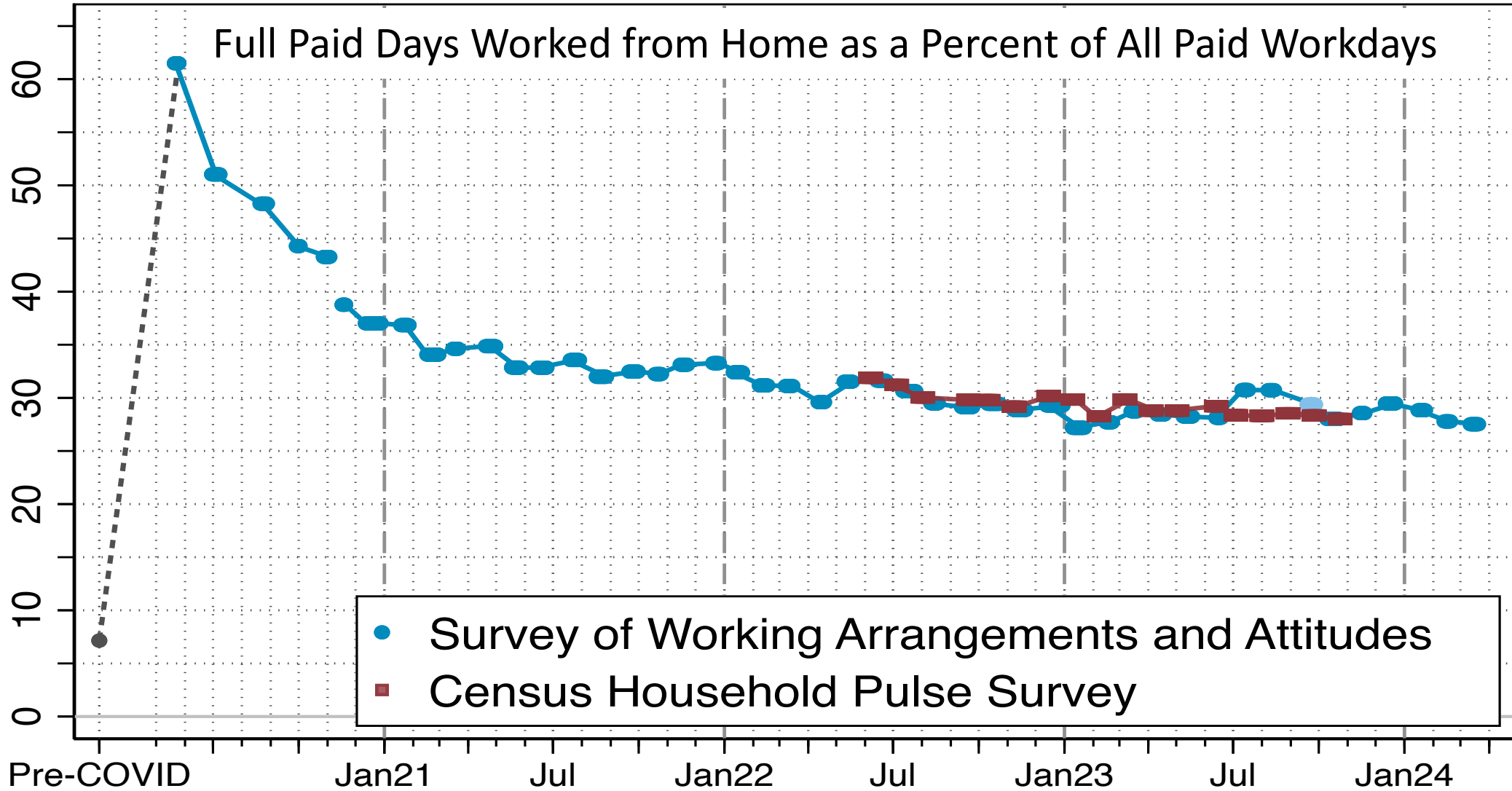
1. The Big Shift to Work from Home
2. How the Pandemic Instigated the Shift
3. Selected Aspects and Implications
 - Workers are becoming less tied to employer locations
 - Direct worker benefits of WFH
 - Structure of preferences around WFH → newfound variety in working arrangements is highly beneficial
 - WFH lowers real (product) wages conditional on TFP and K
 - Reduced wage-growth pressures on the transition path

WFH over Time in the United States, 1965 to June 2023



Reproduced from "[The Evolution of Work from Home](#)" by Barrero, Bloom and Davis (JEP 2023). Samples restricted to working persons, 20-64, with annual earnings > \$10K. See the notes to Figure 1 in BBD for details.

WFH over Time in the U.S. from 2019 to March 2024



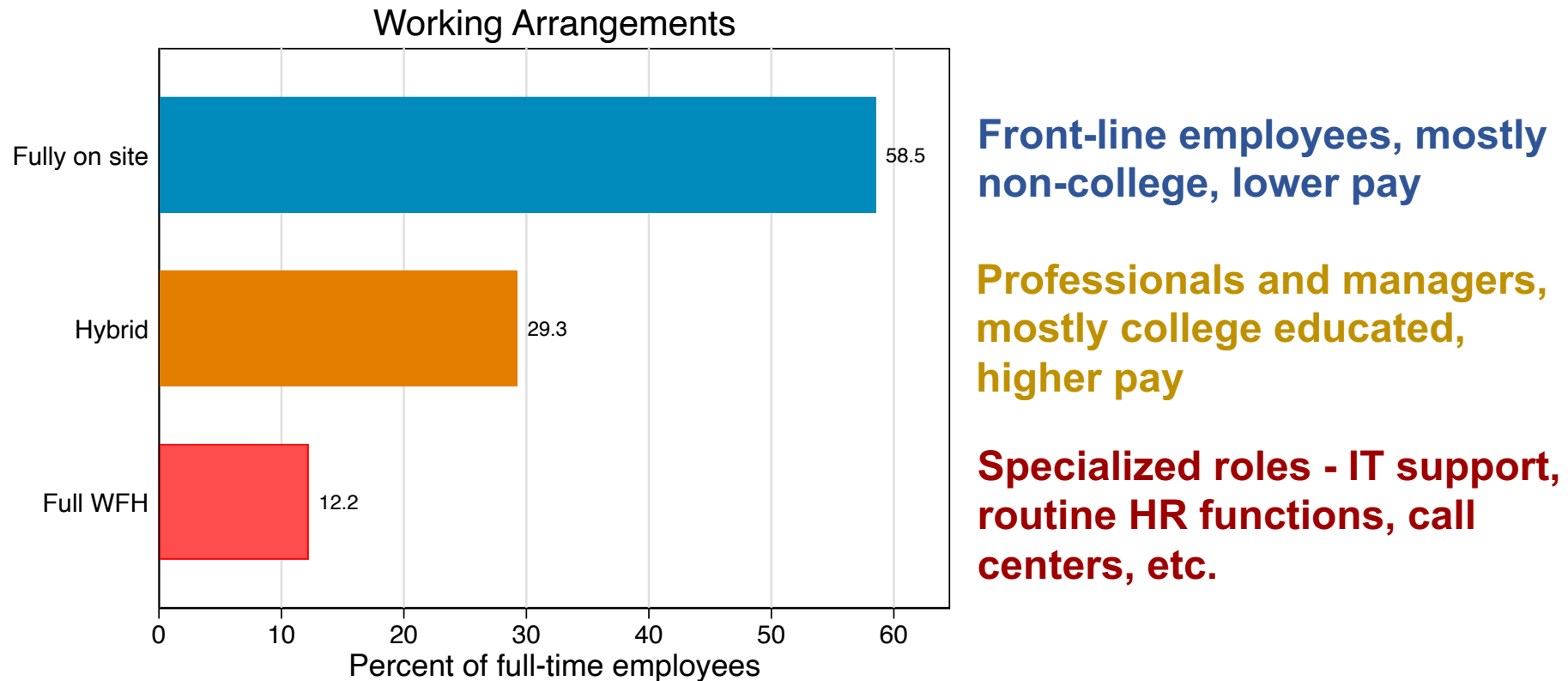
Notes: Samples restricted to working persons, 20-64, with annual earnings > \$10K. We estimate the “Pre-COVID” percentage using data from the 2019 American Time Use Survey. Monthly updates available at www.WFHresearch.com

U.S. WFH Rates, Persons 20-64 Years Old

	Full Days Worked from Home, Percent of Workdays			WFH Hours, Percent of Workhours	
	(1)	(2)	(3)	(4)	(5)
Data source	HPS	SWAA	ATUS	ATUS	CPS
Sample period	Jan to Oct 23	Jan to Oct 23	Jan to Dec 22	Jan to Dec 22	Jan to Oct 23
Income threshold	Household income > \$25k	Prior-year earnings > \$10k	Annualized earnings > \$10k	Annualized earnings > \$10k	Annualized Earnings > \$10K
Work requirement	Worked last week	Worked last week, days with >6 hours	Worked >6 hours on diary day	Worked on diary day	Worked last week
Overall	28.8	28.6	21.5	23.2	14.2
Men	29.0	27.3	17.3	18.3	12.7
Women	28.5	30.4	26.8	29.3	15.8
Difference	+0.5	-3.1	-9.5	-11.0	-3.1
N	426,305	61,966	1,651	2,089	88,195

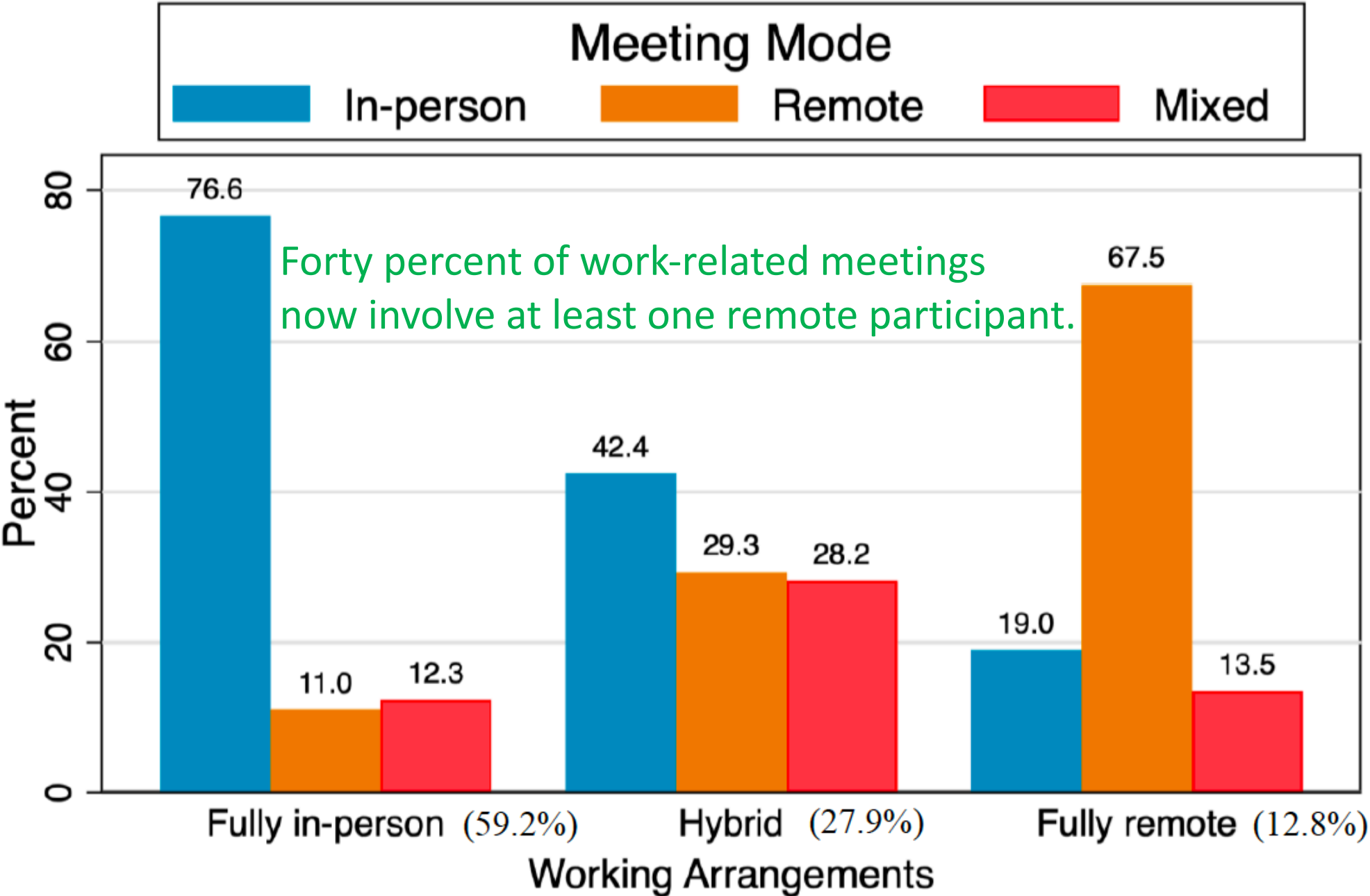
Note: The statistics are cross-sectional means, adjusted for sample weights. In November 2023, the CPS questionnaire deleted a problematic reference to the pandemic in the preamble of its WFH question. That question design change raise the measured WFH share of hours worked by 1.1 ppts in column (5) by our estimate.

Working Arrangements Among Full-Time American Employees as of Mid 2023



Source: The Survey of Working Arrangements and Attitudes, March-July 2023 waves.
“Hybrid” means 1 to 4 full days per week of work from home

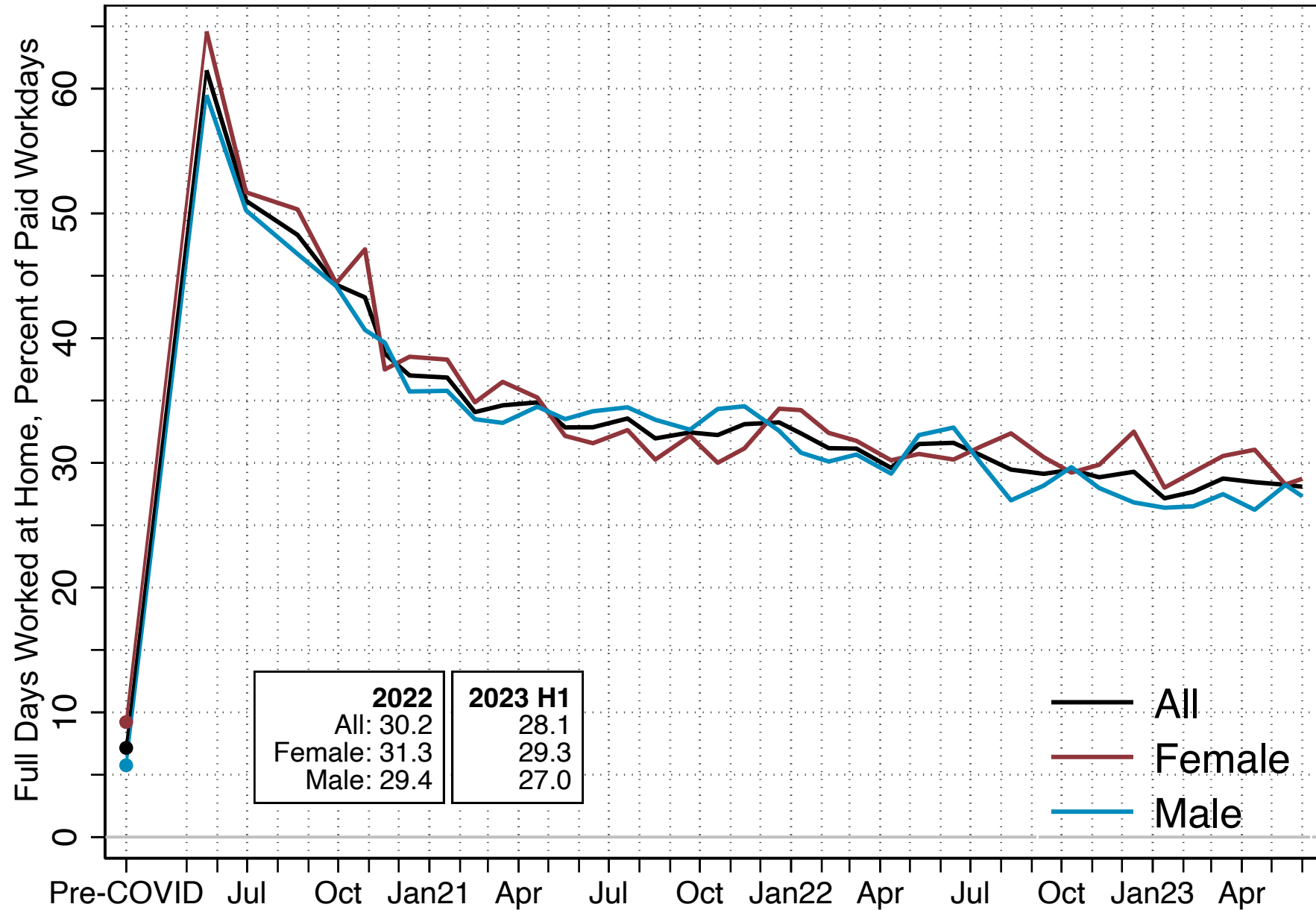
Figure 2: Share of Work Meetings by Mode and Working Arrangements, U.S. Data, March 2024



Forty percent of work-related meetings now involve at least one remote participant.

Reproduced from “The Big Shift in Working Arrangements: Eight Ways Unusual,” by Steven Davis, April 2024. The data cover one randomly selected meeting per employed respondent in the March 2024 Survey of Working Arrangements and Attitudes.

American Women and Men Work from Home at Similar Rates



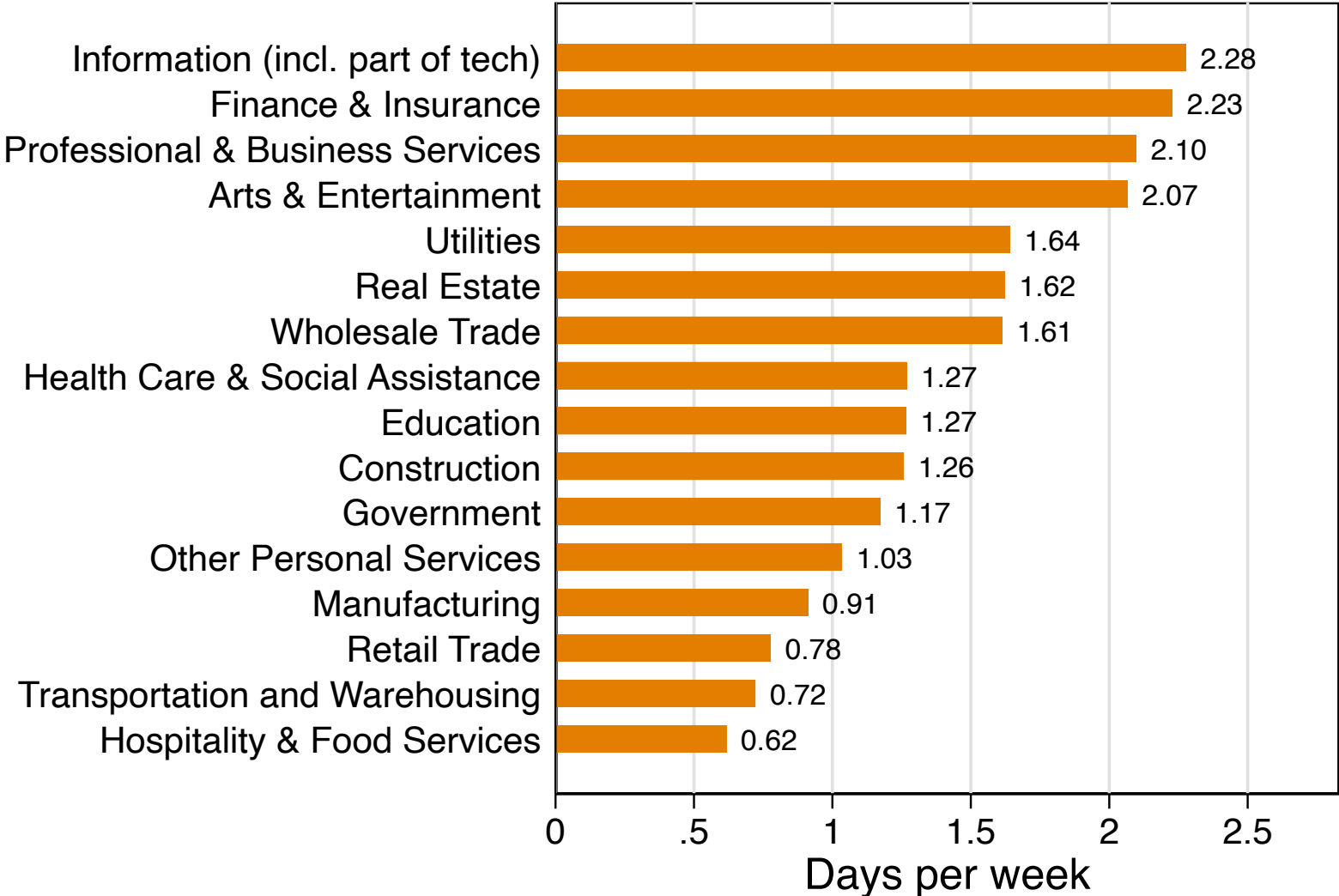
Notes: This chart uses SWAA data except for the 2019 data point, which relies ATUS data. Same sample restrictions as in the previous slide.

Source: Reproduced from Figure 5 in "The Evolution of Work from Home" by Barrero, Bloom and Davis (JEP, 2023).

Work from Home is Most Prevalent in the Tech, Finance, and Professional and Business Services Sectors



Current working from home: All wage and salary employees



Responses to the question:

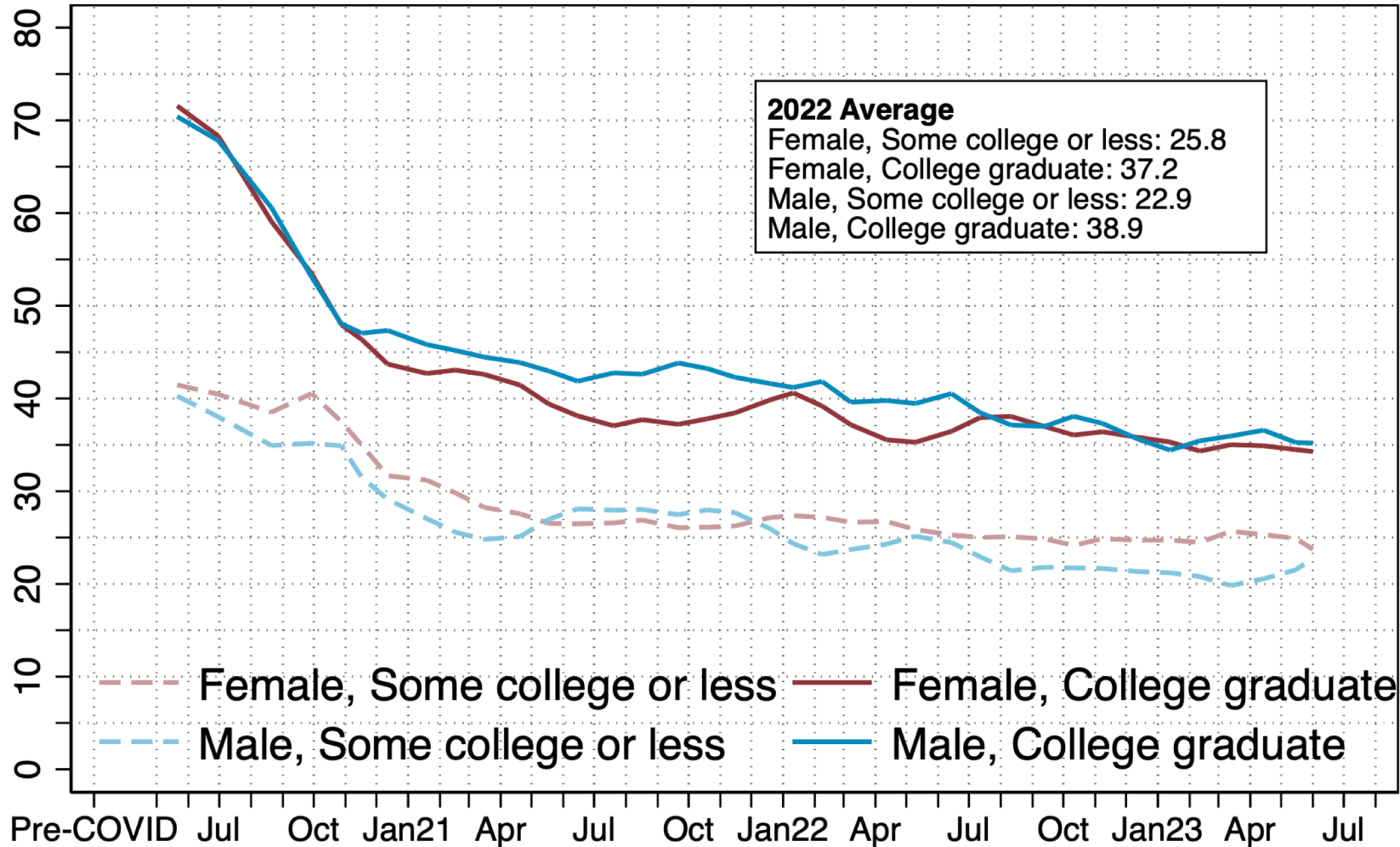
- For each day last week, did you **work a full day (6 or more hours)**, and if so **where?**

Sample: Data are from the July to December 2023 SWAA waves. The sample includes all wage and salary employees who pass the attention-check questions. We exclude mining due to insufficient observations and agriculture to focus on non-farm jobs. We re-weight the sample of US residents aged 20 to 64 earning \$10,000 or more in a prior year to match Current Population Survey on age, sex, education, and earnings.

N = 16,633

College Grads Have Much Higher WFH Rates

Percentage of paid full days worked from home



Based on responses to the questions:

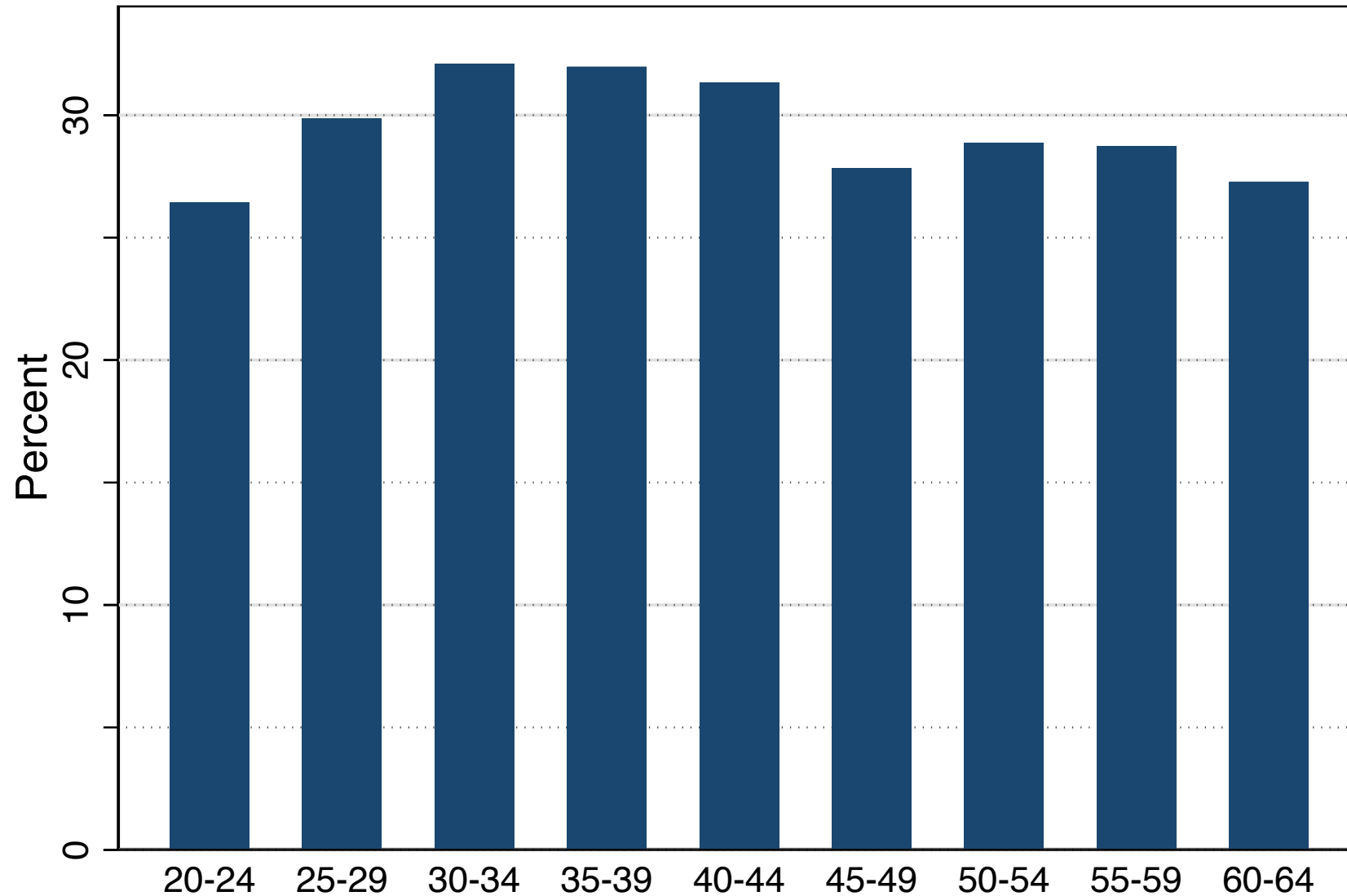
- **Currently (this week)** what is your work status?
- For each day last week, did you **work a full day (6 or more hours)**, and if so **where?**

Notes: For each wave, we compute the percent of paid full days worked from home in the SWAA. The horizontal-axis location shows when the survey was in the field. We re-weight the sample of US residents aged 20 to 64 with annual earnings of at least \$10,000 in a prior year to match CPS shares by age-sex-education-earnings cells. **N = 143,511**

SWAA data from May 2020 to June 2023
 Smoothed with a 3 month centered moving average

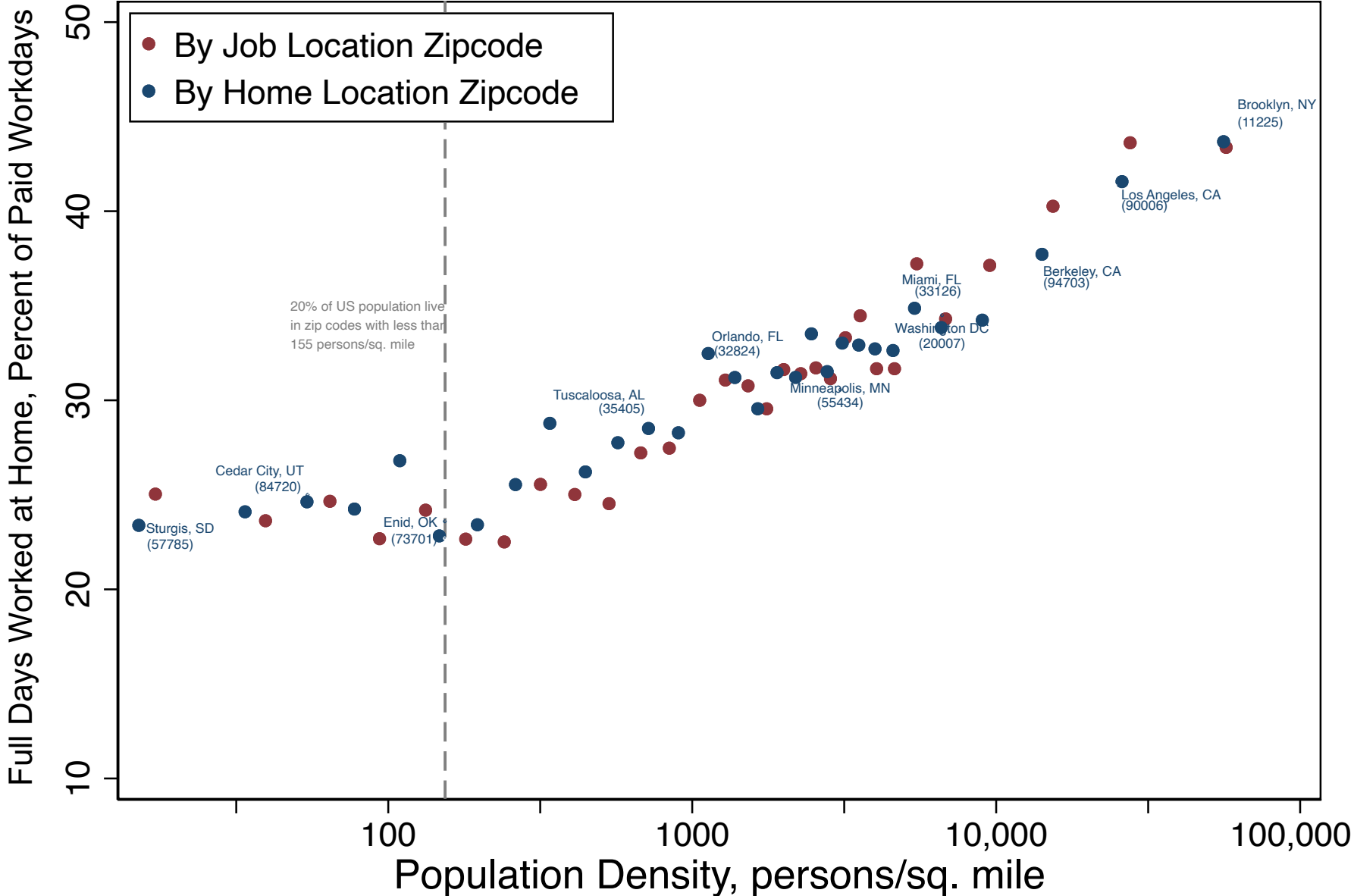
Source: "Why Working from Home Will Stick" by Barrero, Bloom and Davis.

Figure 4: Work-from-Home Intensity Peaks Among Persons in their Thirties
Percentage of paid full days worked from home



Notes: The chart reports full days worked from home as a percent of all paid workdays by age group in the Survey of Working Arrangements and Attitudes (Barrero, Bloom, and Davis, 2023b). We drop respondents who fail our attention-check questions. The sample runs from January 2022 through June 2023. N = 71,000.

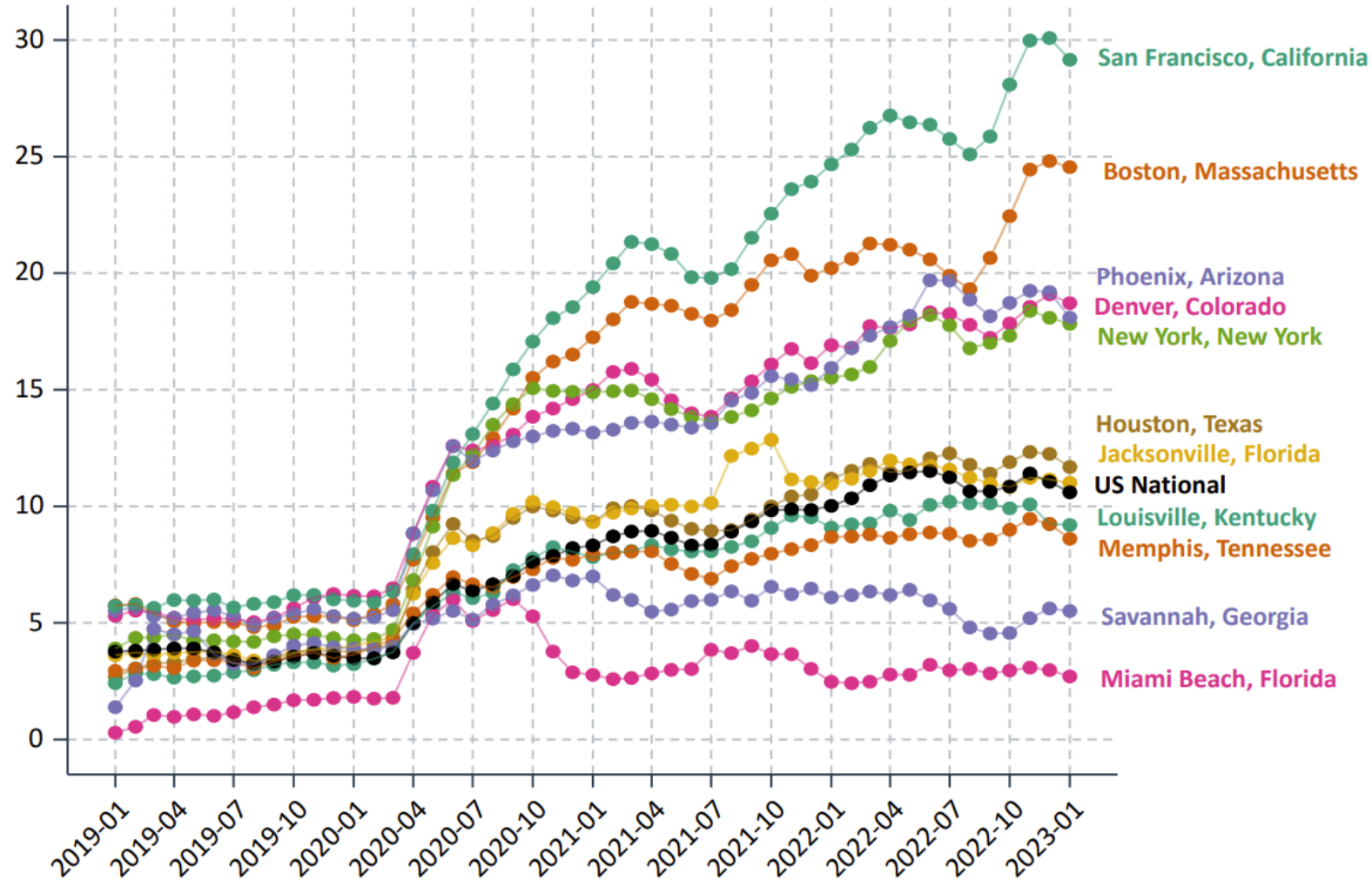
Work from Home Rises with Population Density, U.S. Data



Reproduced from [“The Evolution of Work from Home”](#) by Barrero, Bloom and Davis.

Percent of vacancy postings that explicitly say job offers hybrid or remote work

Work-from-Home Adoption Rates Vary Greatly Across U.S. Cities

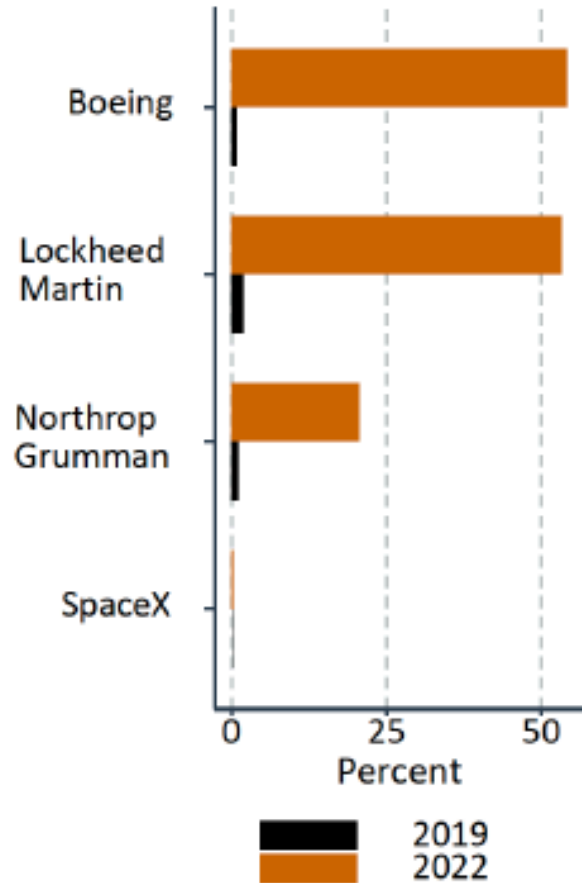


Notes: We develop and apply a large language model to all online job vacancy postings in the US (from Lightcast) to create these data. Updates at www.wfhmap.com.

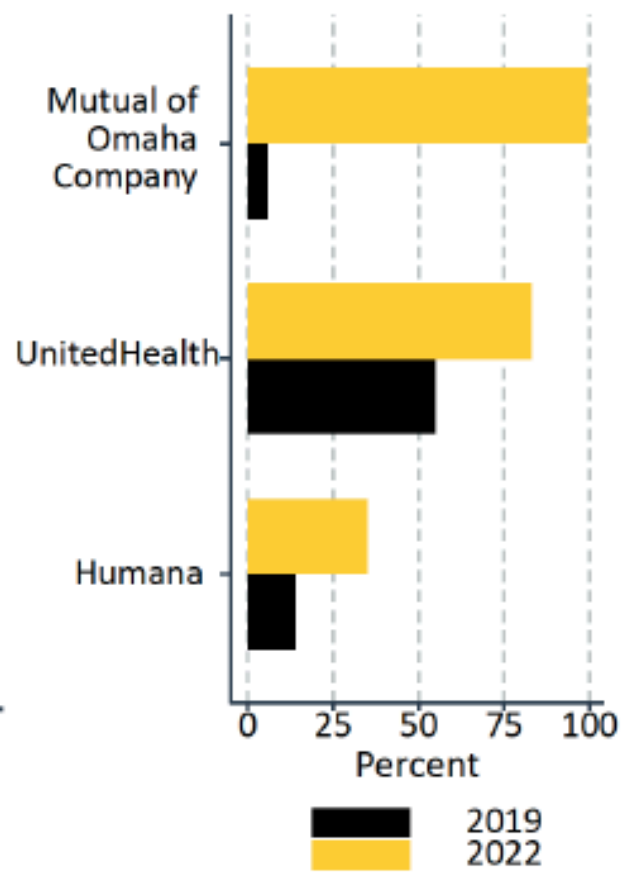
Reproduced from “Remote Work across Jobs, Companies, and Space,”
By Hansen, Lambert, Bloom, Davis, Sadun and Taska.

The Prevalence of Postings that Allow Remote Work Varies Greatly, Even among Same-Industry Firms Recruiting in the Same Occupational Category

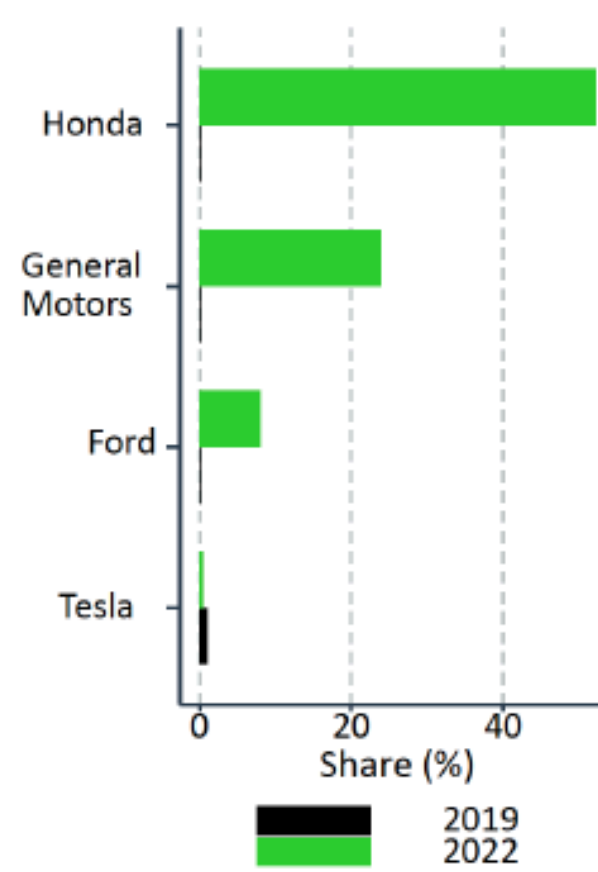
A. Selected Aerospace Firms (NAICS 3364), Management Occupations (SOC 11)



B. Selected Insurance Firms (NAICS 5241), Mathematical Science Occupations (SOC 15-20)



C. Selected Auto Manufacturing Firms, Engineering Occupations (SOC 17-2)



Source: Hansen et al. (2023) using Lightcast data.

How the Pandemic
Instigated a Lasting Shift to
Much Higher WFH Rates

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)

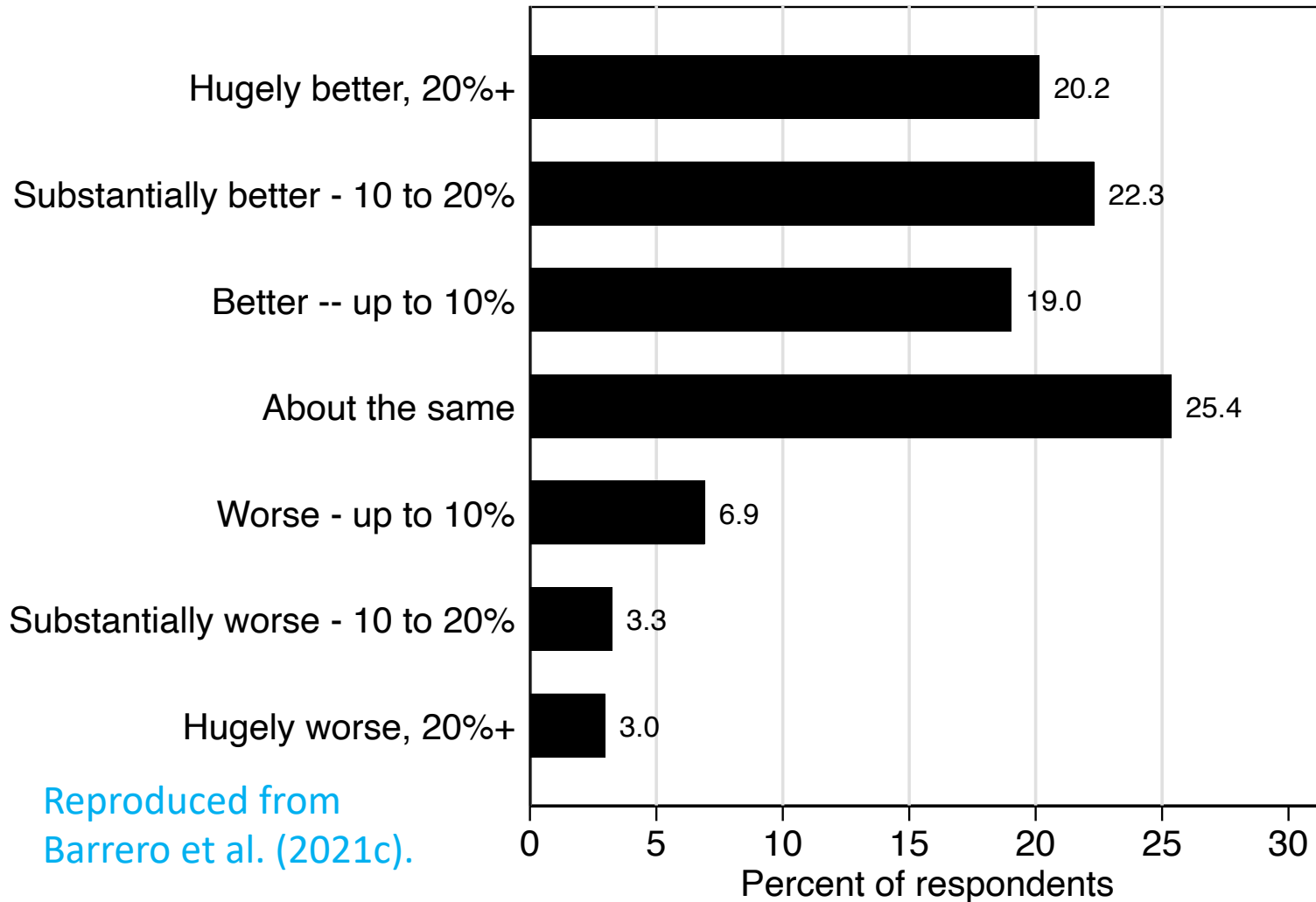


James Gorman

PHOTO: AL DRAGO/BLOOMBERG NEWS

Forced Experimentation: WFH productivity during the pandemic exceeded expectations. U.S. SWAA, July 2020 to March 2021

Relative to expectations, how has WFH turned out?

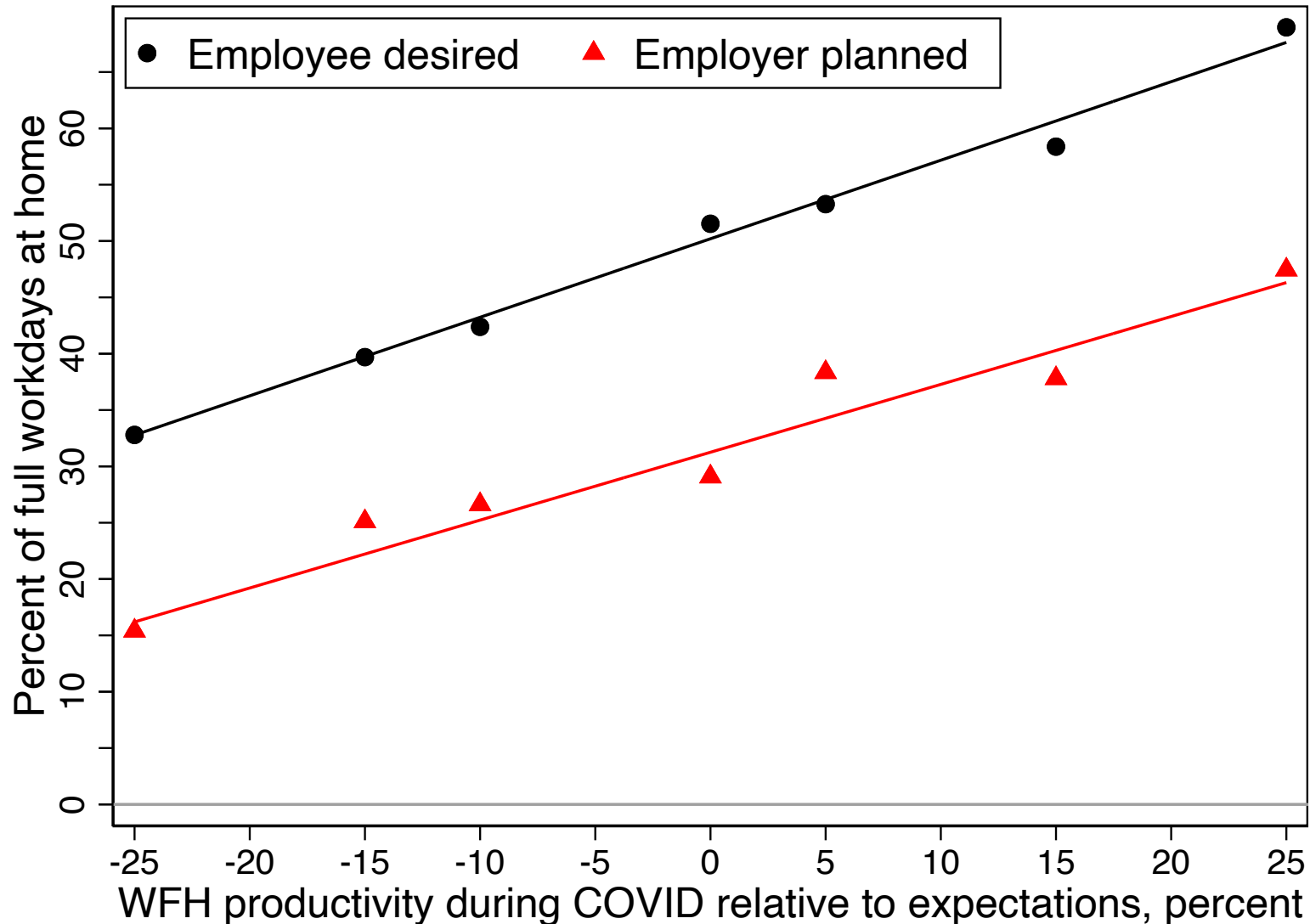


Reproduced from
Barrero et al. (2021c).

*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?

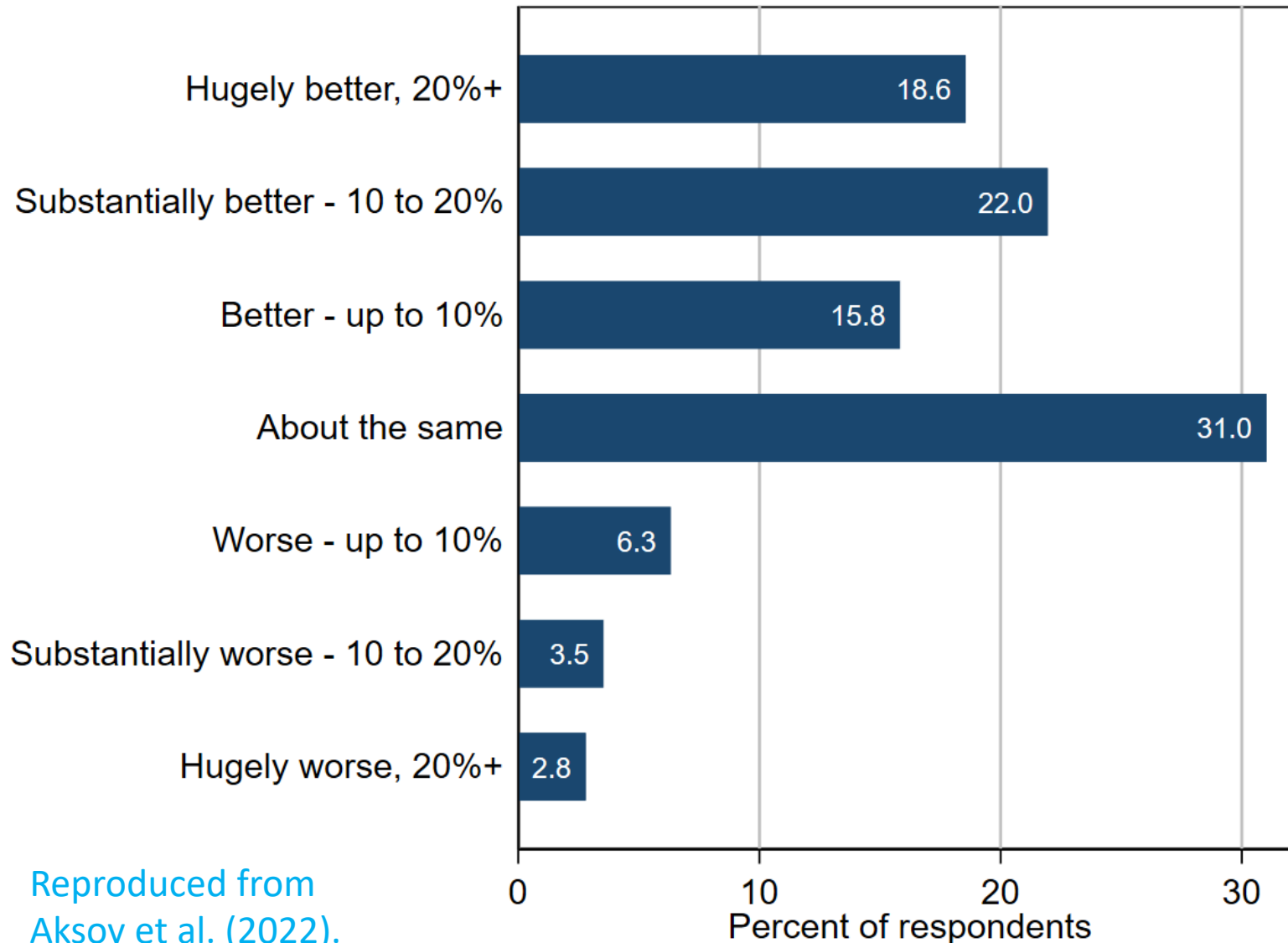
*Compared to your expectations **before COVID (in 2019)** how has working from home turned out for you?*

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.

The Distribution of WFH Productivity Relative to Expectations In a 27-Country Sample, Mid 2021 and Early 2022

WFH productivity, relative to expectations



Reproduced from
Aksoy et al. (2022).

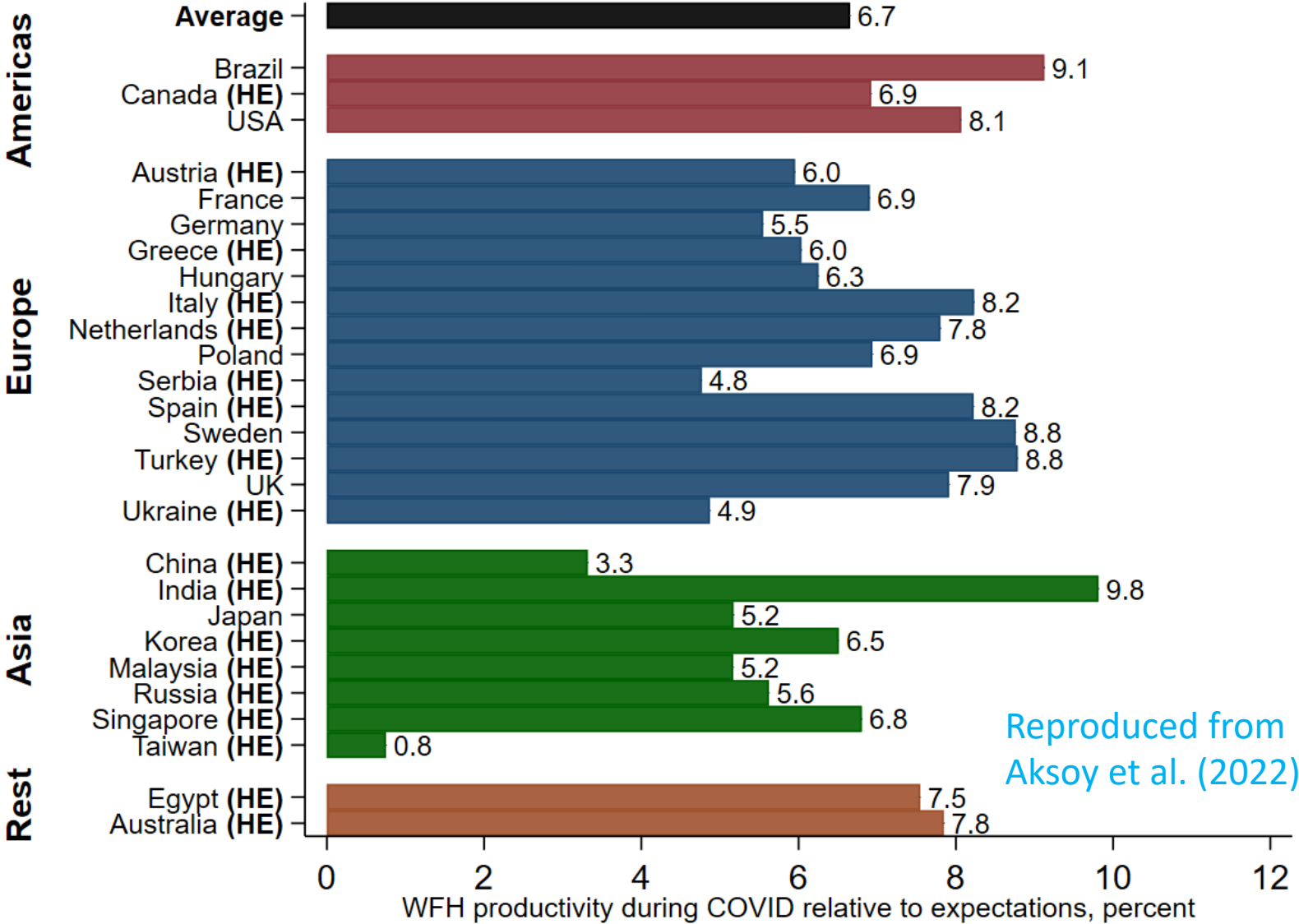
Question: Compared to your expectations **before COVID (in 2019)** how has working from home turned out for you?

- 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

Sample of 19,027 G-SWA respondents in mid 2021 and early 2022 who worked mainly from home at some point during the COVID-19 pandemic.

WFH Productivity Surprises Are Positive, on Average, in All Countries

WFH productivity, relative to expectations

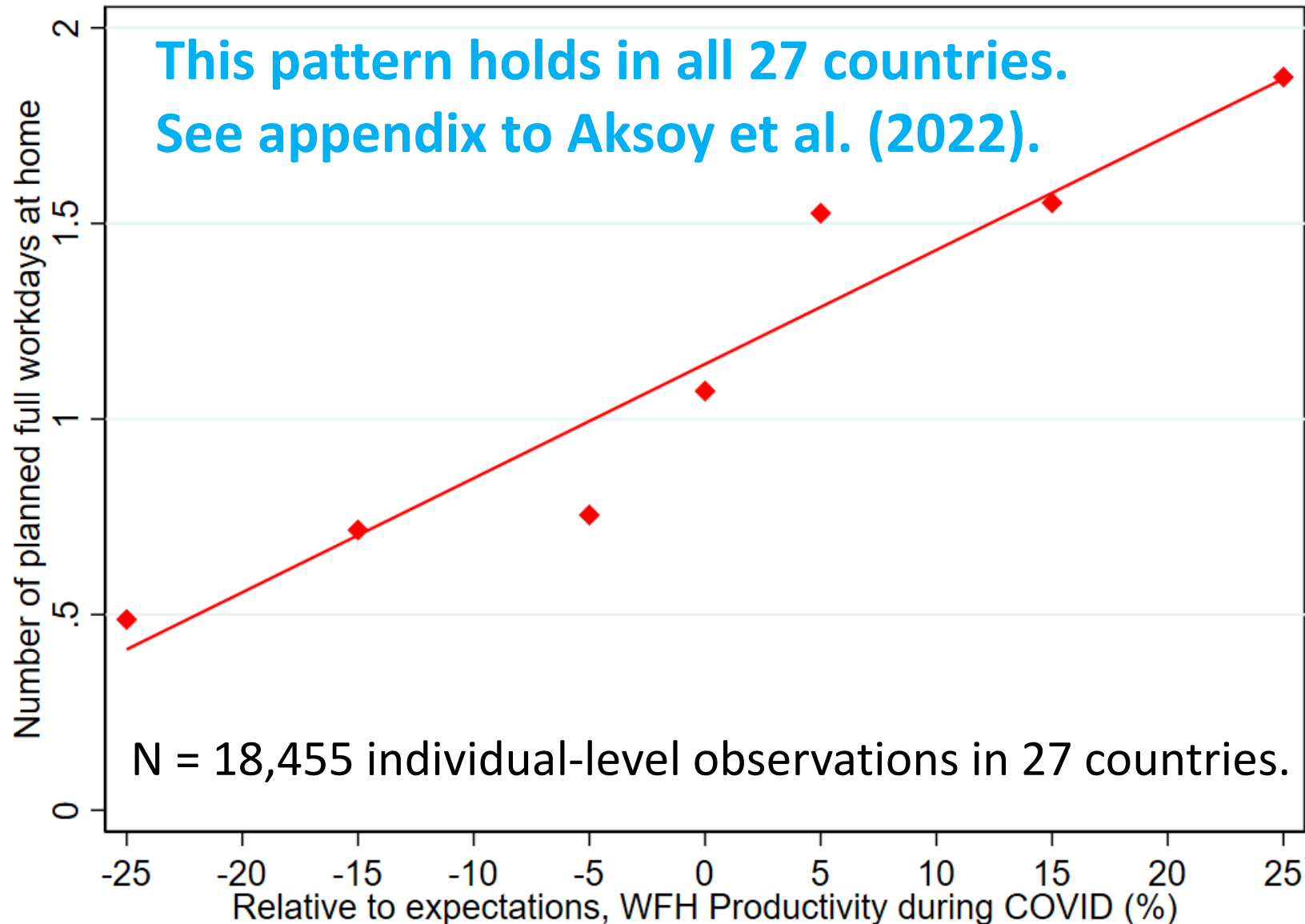


Question: “Compared to your expectations before COVID how has working from home turned out for you?”

Country-level values are conditional means. The “Average” value is the simple mean of the country-level conditional means.

Reproduced from Aksoy et al. (2022).

Planned levels of WFH after the pandemic rise with WFH productivity surprises during the pandemic



Questions:

-- Compared to your expectations **before COVID**, how has working from home turned out for you?

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

Vertical scale: How many days per week, on average, employers plan for respondents to WFH after the pandemic ends.

Discussion, 1

The foregoing evidence strongly supports a three-part explanation of how the pandemic catalyzed a large, lasting uptake in WFH:

1. The pandemic drove a mass, compulsory experiment in WFH.
2. Mass experimentation generated new information and shifted perceptions about the feasibility and productivity of WFH.
3. The shift in perceptions drove a re-optimization of working arrangements, which included a large, lasting shift to much higher WFH levels.

The **pre-conditions** for the shift were also in place: the internet, the “cloud,” web-based video-conferencing technologies, other remote collaboration tools, and widespread access to high-speed broadband service in American households. If the same virus had struck twenty years earlier, we would not have seen a comparable shift to WFH.

Discussion, 2

This explanation and supporting evidence do not imply the big shift to WFH raised productivity. To see this point, consider a simple example:

- Before the pandemic, suppose all workers and their employers perceive WFH to be 10 percent less productive than onsite work.
- Suppose, as well, that all workers are willing to accept a 5 percent pay discount to WFH.

No one works from home in these circumstances, because the perceived productivity loss exceeds the willingness to pay. Now consider what happens in reaction to a pandemic that forces employers and workers to WFH for weeks or months.

- Based on experiences during the pandemic, suppose half of workers (and their employers) learn that WFH is about as (un)productive as expected, while **the other half learns it is Δ percent more productive than expected.**

Discussion, 3

Three cases:

- i. When $0 < \Delta < 5$, WFH levels return to zero after the pandemic ends. In this case, the positive productivity surprise is too small to trigger a lasting change in working arrangements.
- ii. When $5 < \Delta < 10$, half of workers stick with WFH after the pandemic ends, because they now face a productivity discount of only $10 - \Delta$ percent, which is smaller than their willingness to pay to WFH.
 - In this case, the productivity surprise triggers a lasting shift to WFH and a productivity fall of $(\frac{1}{2})(10 - \Delta)$ percent.
 - For example, if the pandemic leads half of workers to conclude that WFH is only 2 percent less productive than onsite work ($\Delta = 8$), then economy-wide productivity falls 1 percent.

Discussion, 4

- iii. When $\Delta > 10$, the productivity surprise drives a lasting shift to WFH and a productivity rise of $(\frac{1}{2})(\Delta - 10)$ percent.

Thus, when forced experimentation leads to a lasting shift to WFH, it can bring higher or lower productivity.

In some preliminary analysis that draws on data for the United States, Barrero et al. (2021) estimate that the lasting shift to WFH raised the economy-wide level of labor productivity by about 1 percent. The productivity effect could be larger or smaller in other countries, and it could well be negative in some countries. Indeed, it could be negative in some industries and regions within the United States, even if it's positive on average.

Discussion, 5

Our explanation for the big shift also addresses another question: If WFH is now attractive for many employees and organizations, why did the shift not happen sooner and more gradually?

Answer: The full benefits of WFH went unrecognized and unrealized before the pandemic drove a sudden, huge surge in experimentation that led to major revisions in perceptions about the feasibility and productivity of WFH.

The *simultaneity* of large-scale experimentation is important in this regard. A law firm, for example, could have experimented with WFH before the pandemic. What it could not have done was experiment with WFH when the courts and other firms – including clients, rival law firms, consultants, and suppliers – also worked remotely.

Had the pandemic not occurred, our evidence suggests that the big shift to WFH would have taken place much more slowly over many years.

Why the Big Shift to WFH Sticks: Fuller Explanation

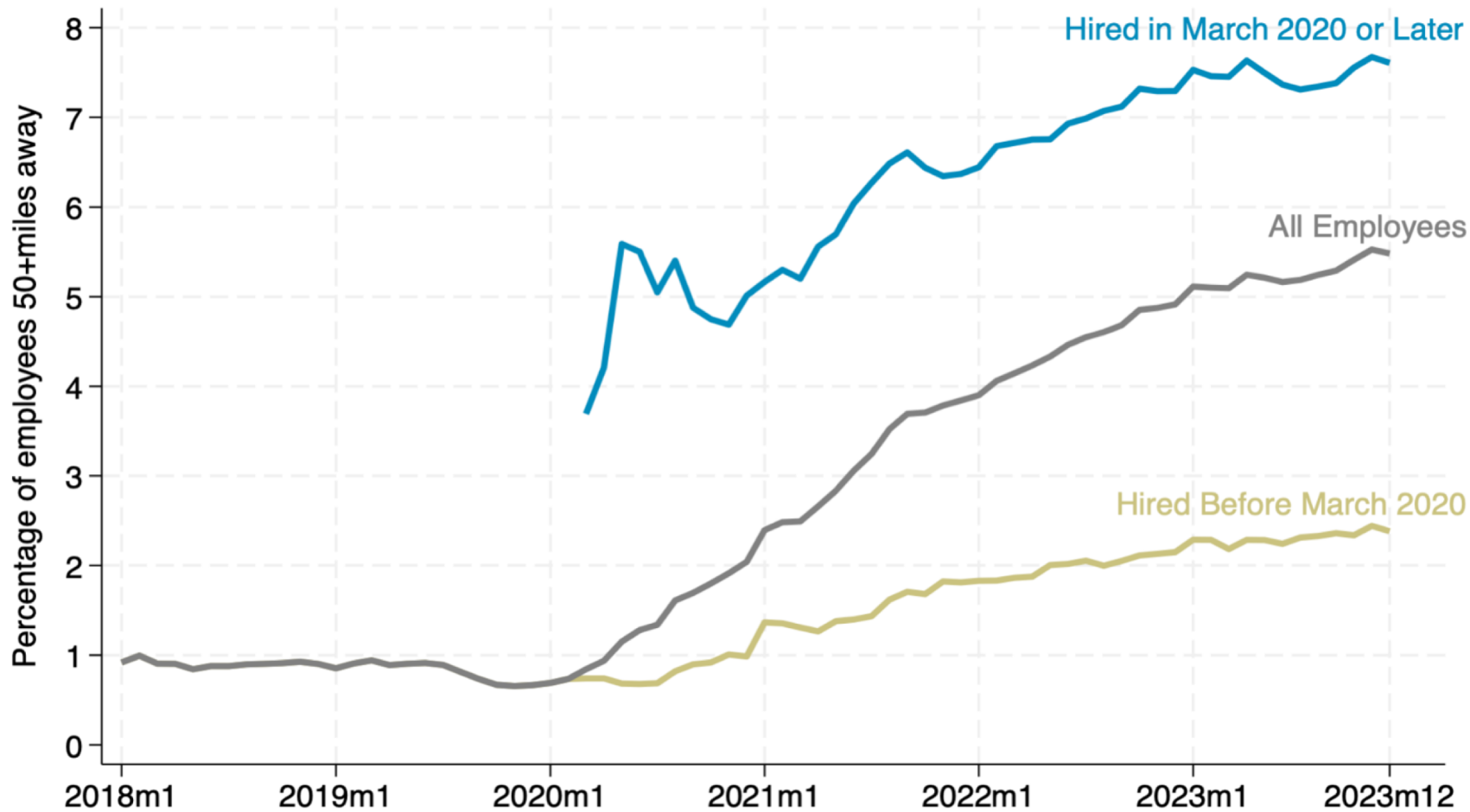
1. Mass experimentation → learning and revision of prior views
→ re-optimization of working arrangements
2. Investments in time, equipment, systems, processes, and management practices that enable and improve WFH
3. A surge in innovation that supports WFH
4. Attitudinal shifts: Stigma around WFH plummeted. Infection risks became more salient, raising the desire to WFH
5. Stricter, longer lockdowns during the pandemic → higher levels of planned WFH after the pandemic
6. Over time, firms and workers exploit the locational flexibility of WFH in ways that make it harder to reverse.

And the pre-conditions were in place for a big shift to WFH.

**Selected Aspects and
Implications of the
Big Shift to WFH
(There Are Many Others)**

Workers Are Becoming Less Tied to Employer Locations

Percentage of Employees Living More than 50 Miles from Employer Location



Three corollaries:

- (1) Job displacements due to industry and firm-level declines will be less clustered in space.
- (2) Fewer job losers will be displaced into highly depressed local labor markets
- (3) The geographic reach of many labor markets is now greater than before the pandemic. Effectively, many markets are now larger and thicker.

Notes: The sample contains employees of 5,793 firms in a balanced panel of mostly smaller and mid-sized firms. Employee-level data are reweighted to match the CPS distribution by (age bin) X sex X major industry. Authors' calculations using proprietary data from Gusto, a payroll processing and HR services firm.

From "[Americans Now Live Farther from Their Employers](#)" by Akan et al. (2024).

Direct Worker Benefits of WFH

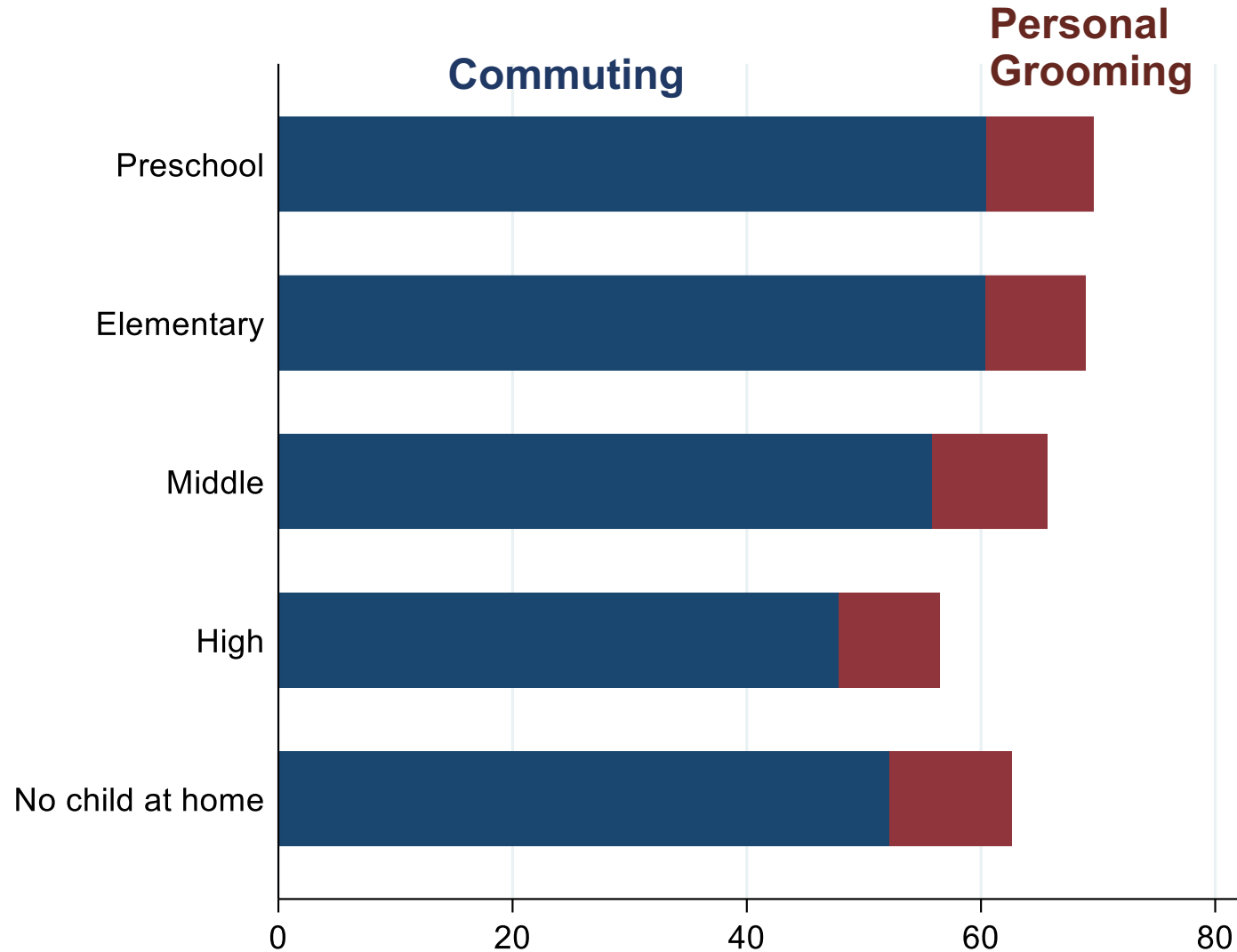
Most workers like to work from home at least part of the week, because doing so ...

1. Saves on time and money costs of commuting and grooming
2. Increases flexibility in time use over the day
3. Expands personal autonomy
4. Relaxes locational constraints

For some people, WFH also complements care-giving activities in the home production function.

These direct benefits of WFH are untaxed job amenities (or involve after-tax cost savings). Hence, labor income taxes favor WFH on the margin, more so for workers with higher marginal tax rates.

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



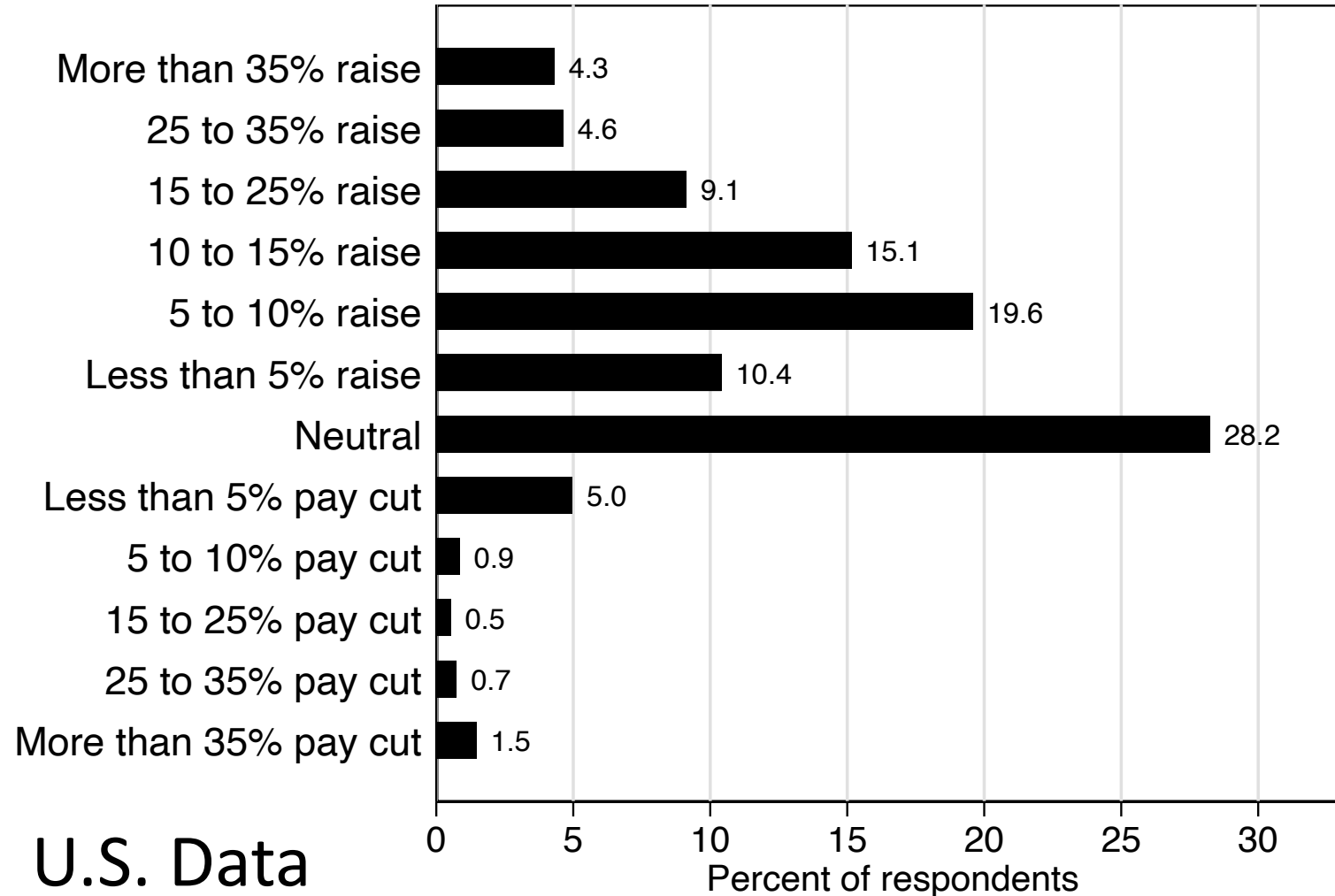
When employees work from home, they save an average **65 minutes per day** by not commuting and taking less time to get ready for work. The chart shows time saved by age of youngest child.

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

When Asked Directly, People Place a High Value on the Option to Work from Home

Mean Value = 8% of Pay, Similar to Findings in Experimental Settings with Narrower Samples

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



Source: SWAA responses to a two-part question.

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

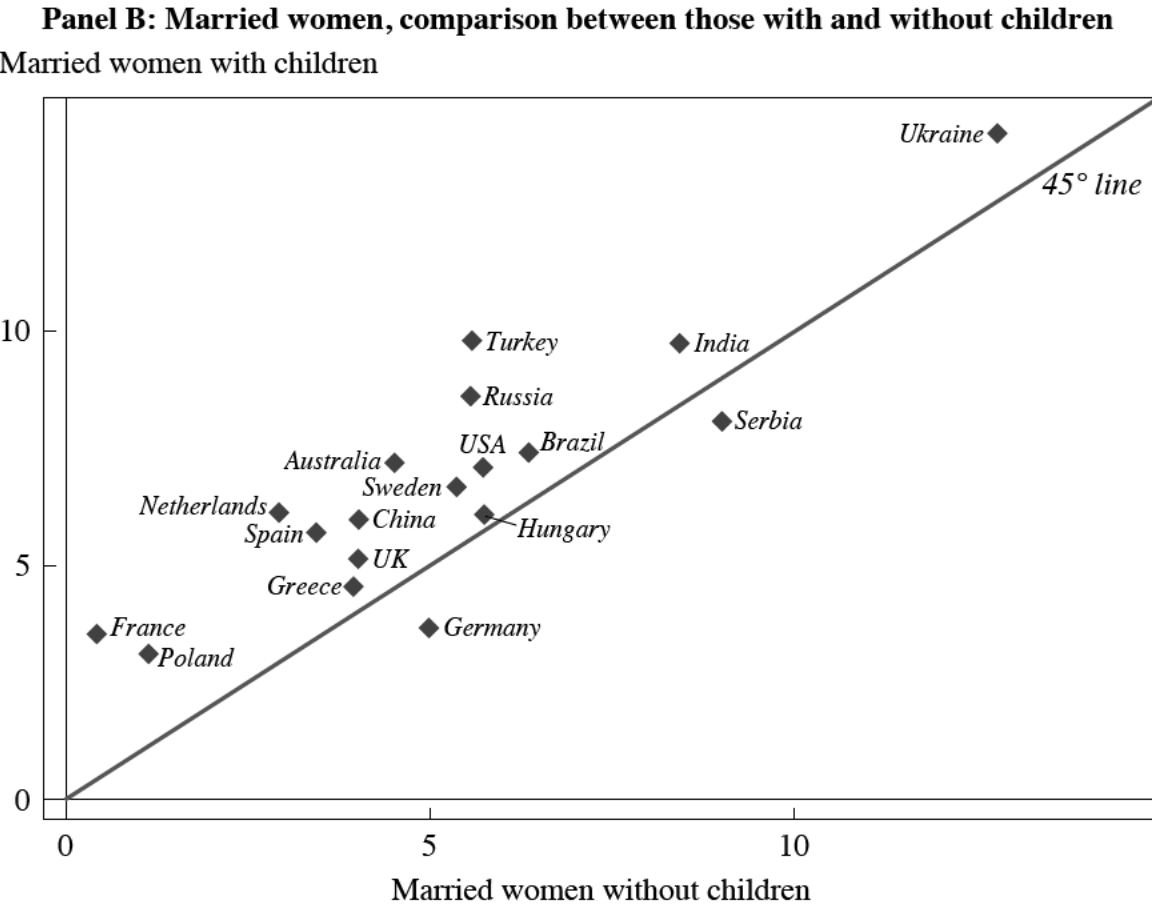
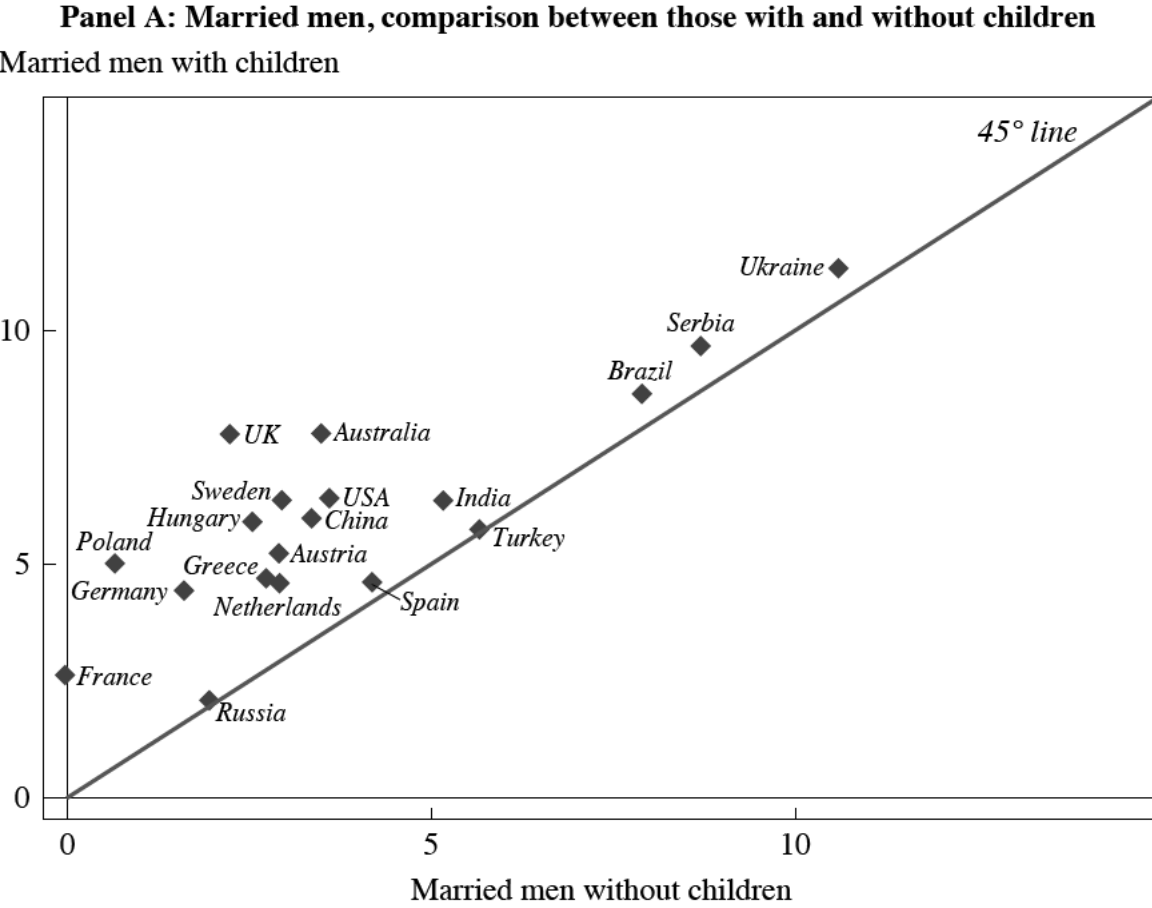
- Positive: I would view it as a benefit or extra pay
- Neutral
- Negative: I would view it as a cost or a pay cut

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?

Data are from 20,750 survey responses collected from September 2020 to February 2021 by Inc-Query and QuestionPro. We asked a similar question in earlier and subsequent waves, but we focus on the above waves, which use identical questions and response options. We re-weight raw responses to match the share of working-age respondents in the 2010-2019 CPS by {age x sex x education x earnings} cells.

People with Children More Highly Value the Option to WFH

Willingness to Pay for Option to WFH 2-3 Days Per Week, % of Pay



Reproduced from Aksoy et al. (2022)

The Structure of Preferences Around WFH

According to the regression analysis of willingness to pay for the option to WFH in a 27-country sample (Aksoy et al., 2022),

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.

Even their most flexible specification yields an R-squared value < 12%.

****People will sort by desired working arrangements & across employers** 34

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
 - More locational flexibility
2. Newfound variety in working arrangements is highly beneficial.
3. Direct benefits flow disproportionately to college-educated persons, who are a larger share of the workforce in richer countries.
4. Not everyone benefits: Persons who want in-person encounters with coworkers, have cramped living quarters or 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.
5. WFH is not suitable for all persons, jobs, tasks and organizations.

WFH lowers real (product) wages conditional on TFP & K

- The big shift yielded time savings of about 2% of pre-pandemic workhours.
- 40% of saved time went into paid work. So, a 0.8% increase in LS.
- Plug into textbook model of a competitive labor market with Cobb-Douglas production and labor share of $(2/3)$ → Real wages fall by 0.27%.
- That's a lower bound on LS and wage effects, because the calculation neglects WFH effects on LF participation and amenity value of WFH: money savings, time flexibility, personal autonomy, location flexibility
- Bargaining with equal division of (new-found) surplus: $(0.5) \times (8\% \text{ pay-equivalent gain}) \times (25\% \text{ of workers who got those gains})$ → Wages fall by 1%.
- This calculation also offers a conservative assessment in that it ignores heterogeneity in preferences around WFH and the (privately optimized) selection of who works from home in equilibrium.

- Spatial considerations: The big shift affords new opportunities to source labor from low-cost places, without relocating the business. That lets employers reduce real product wages. Real worker wages could rise at the same time, depending on how and why wages vary over space. The magnitude of wage effects operating through this channel are hard to assess, but they seem potentially large.

Reduced Wage-Growth Pressures Along the Transition Path

- The big shift raises the amenity value of employment in many jobs.
- Amenity-value gains take the form of time savings, more flexibility in time use, more personal autonomy, and more locational flexibility.
- Economic reasoning says that employers and workers ultimately share the amenity-value gains associated with the big shift.
- Since workers initially reaped the direct benefits of the shift at pre-determined wages, employer benefits take the form of slower wage growth along the transition path to a new equilibrium with compensation packages that recognize higher remote work levels.
- Search and reallocation frictions: It takes time for workers who highly value WFH to sort into jobs that offer that amenity (and for more firms to offer WFH). Bagga et al. (2023) capture this source of sluggish wage dynamics.

Evidence on Wage Moderation Effects

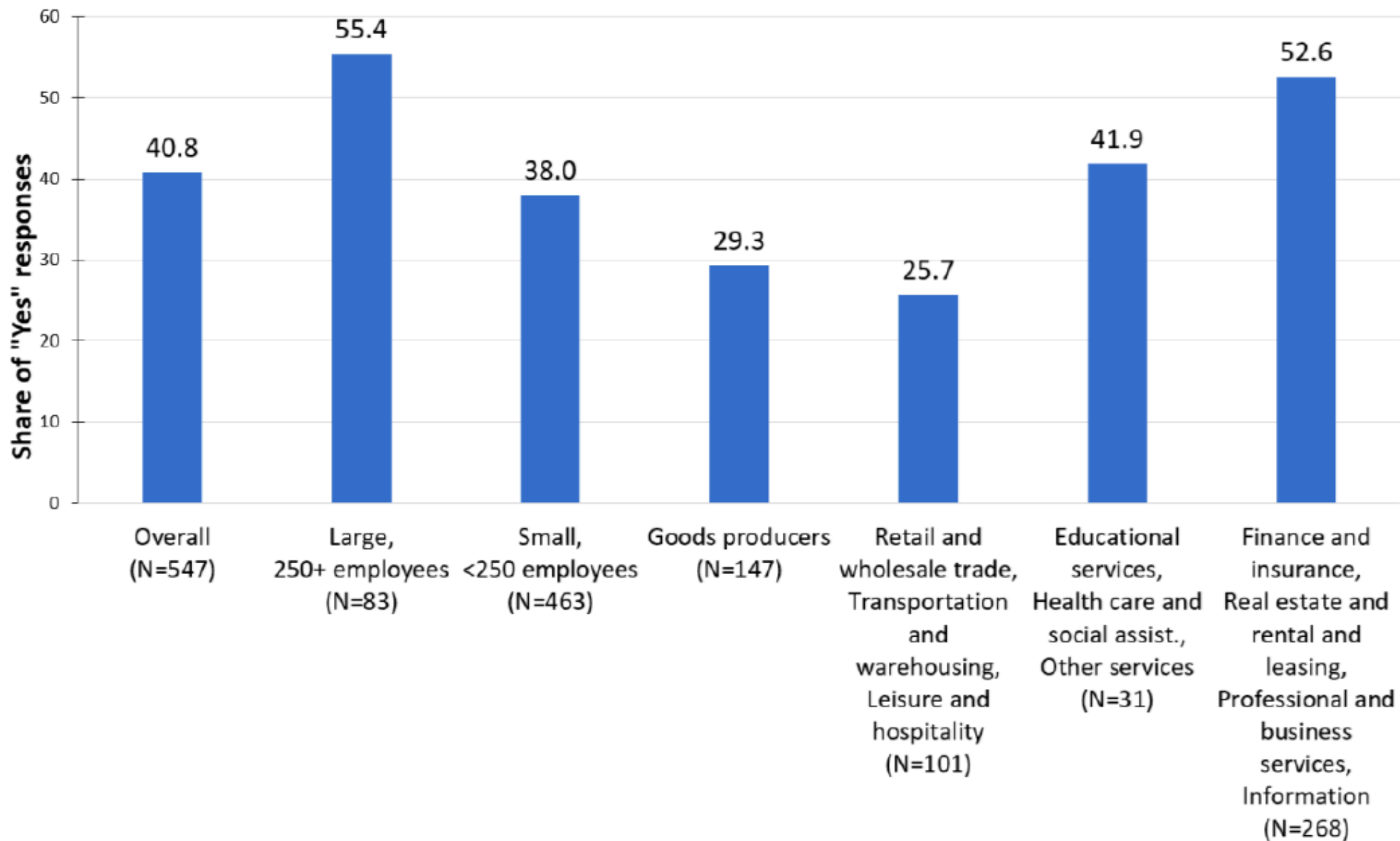
- A. Survey of Business Uncertainty (SBU): We ask business executives whether, and how much, expanded WFH moderated wage growth at their own firms.
- B. The behavior of real wages since early 2021

When a business executive responds “yes” to the previous question, we follow up with:

“What is your best estimate for how much expanded remote-work opportunities have moderated wage-growth pressures at your firm in the past 12 months?”

Response options are 0, 1, 2, ..., 19, 20 % and more than 20%.

Over the next 12 months, will your firm let employees work from home (or other remote location) at least one day per week to restrain wage-growth pressures?



When a business executive responds “yes” to the previous question, we follow up with:

“What is your best estimate for how much your firm can restrain wage-growth pressures in the next 12 months by letting employees work remotely part of the week?”

Response options are 0, 1, 2, ..., 19, 20 % and more than 20%.

Nominal Wage-Growth Moderation Due to the Rise of Remote Work Over a Two-Year Period Centered in April/May 2022 Percentage Points

We assign a zero value to wage-growth restraint (in the look-back or look-ahead direction) if (a) the executive says "No" to the first question, and if (b) the executive says "Yes" to the first question and responds with 0 to the follow-up question.

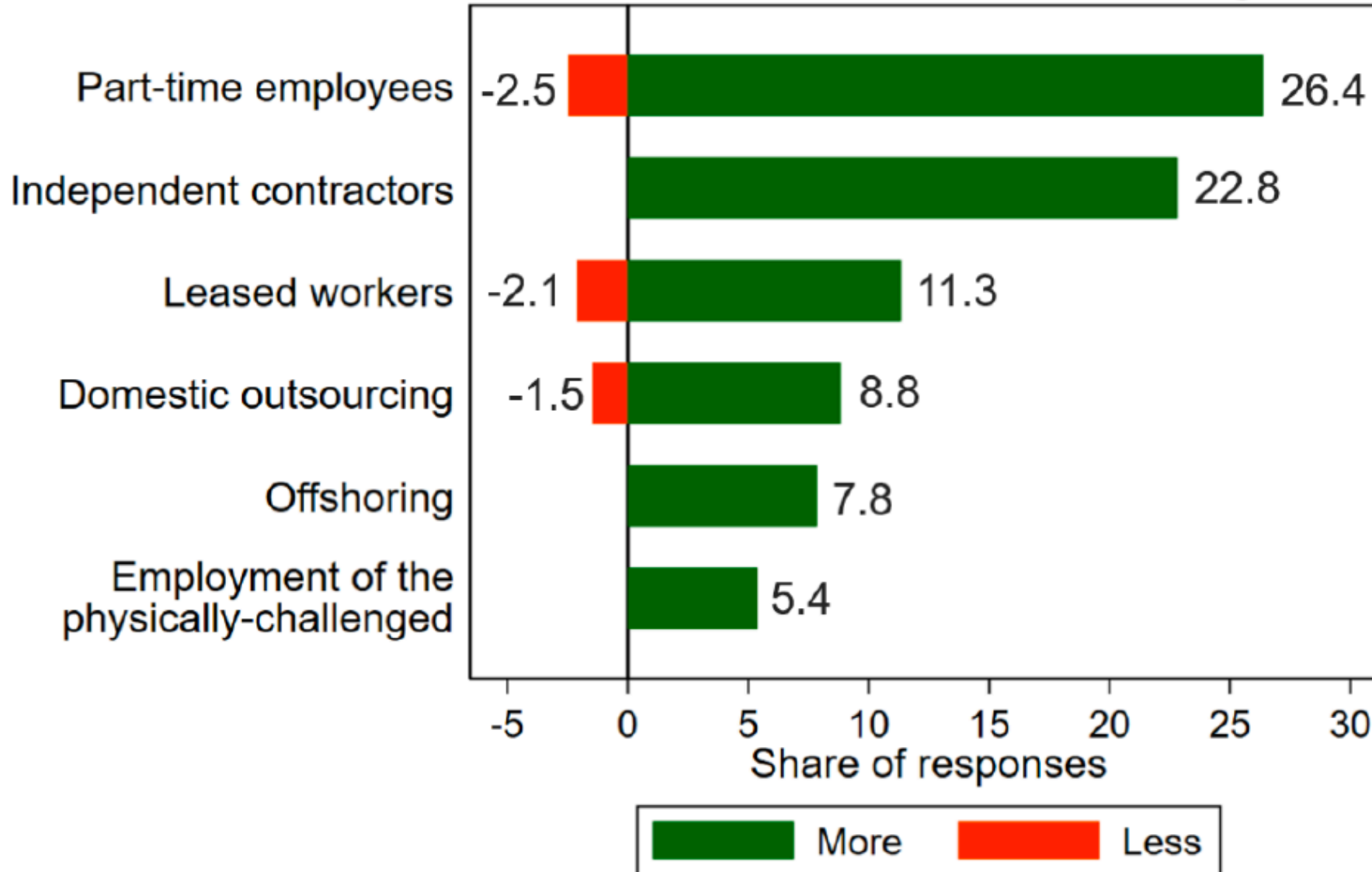
64% of sampled firms have a cumulative wage-growth moderation value of 0.

	Mean Cumulative Wage-Growth Moderation Over Two Years	
	Unweighted	Weighted by Firm Size
Overall	2.2	2.0
Small Firms (fewer than 250 employees)	2.2	2.0
Large Firms (250 or more employees)	2.1	2.0
Goods Producers	1.3	1.3
Retail and Wholesale Trade, Transportation and Warehousing, Leisure and Hospitality	1.4	1.8
Education, Healthcare, Social Assistance, Other services	2.7	3.8
FIRE, Professional and Business Services, Information	3.0	2.3

Figure 3: Other Workforce Changes Associated with the Shift to Remote Work

Has this increase in remote work brought other changes at your firm?
Please answer for each of the following:

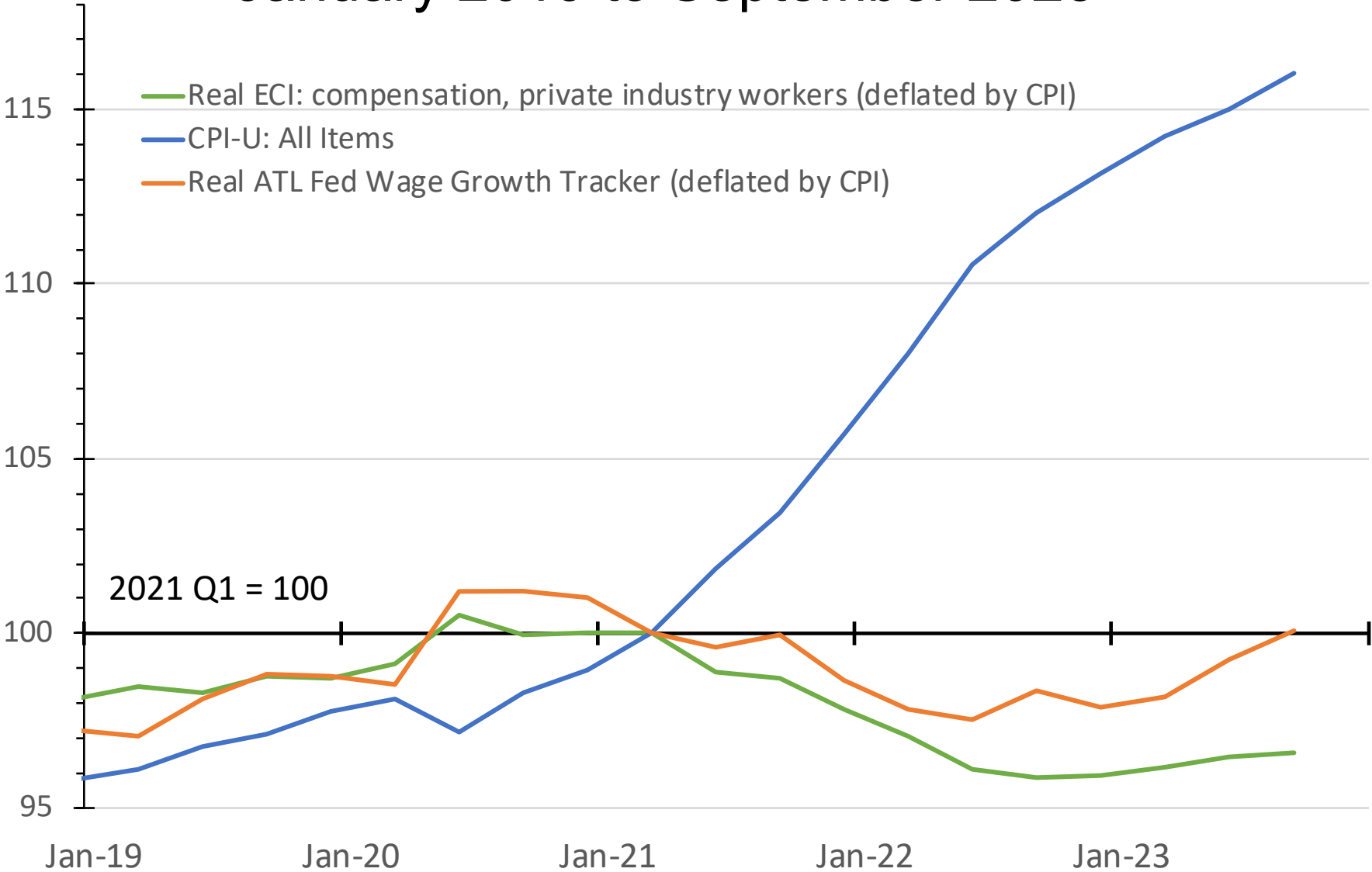
Please answer for each of the following:



Source: Survey of Business Uncertainty and authors' calculations.

Other studies find evidence that offering remote-work options lowers employee quit rates, reducing turnover costs. See Barrero, Bloom and Davis (2021a) and Bloom, Han and Liang (2022).

U.S. Real Wage Behavior and the CPI, January 2019 to September 2023



Sources: Bureau of Labor Statistics, Atlanta Fed, and authors' calculations.

Recent U.S. Episodes with Falling Real Wages

A. Using the Atlanta Fed Wage Tracker, Deflated by the CPI-U

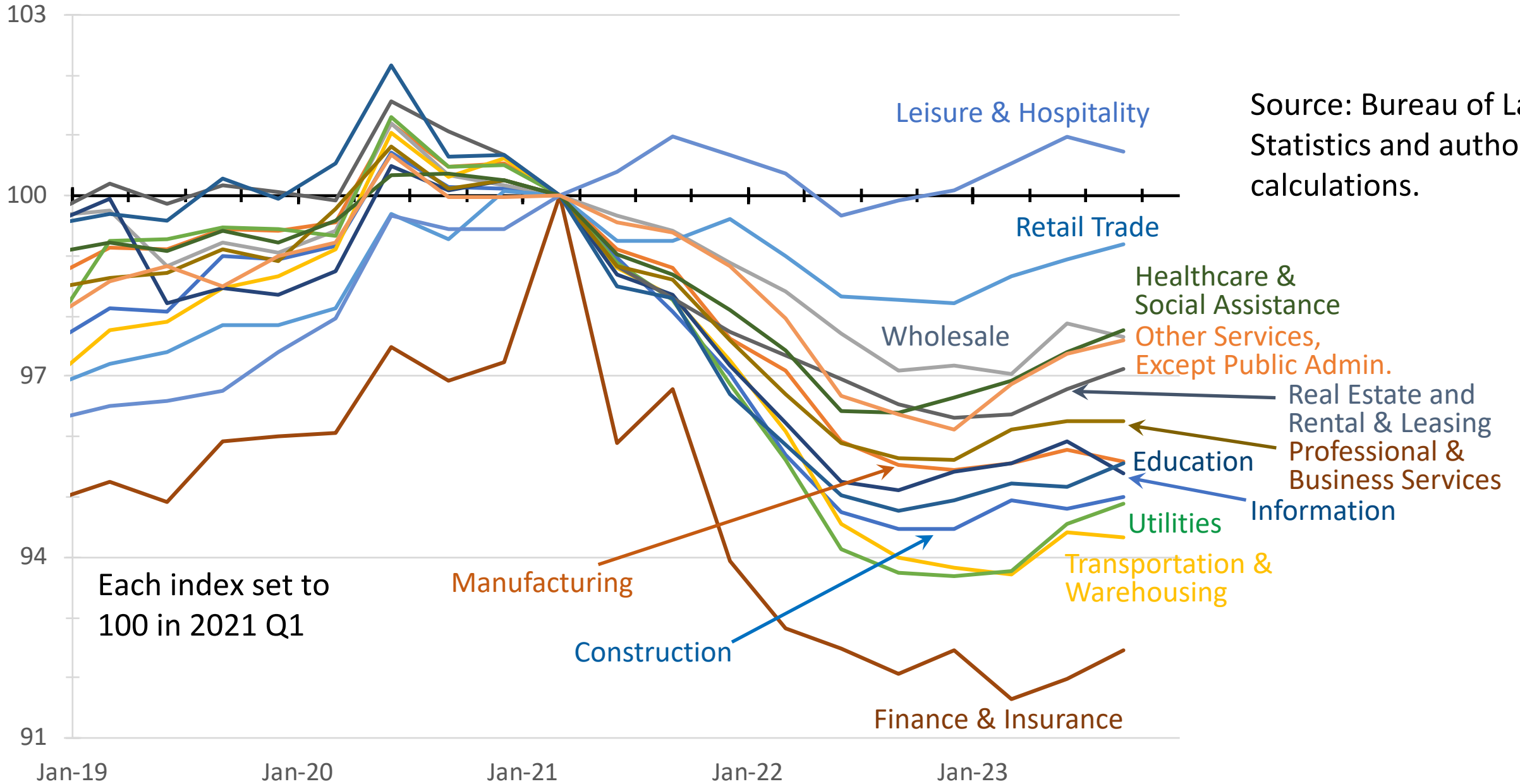
Economic Episode	Percentage Real Wage Change		Unemployment Rate, Percent		Ratio of Vacancies to Unemployed Persons		Mean Vacancy Duration, Days	
	Annualized	Cumulative	Episode Average	Prior 12 Months	Episode Average	Prior 12 Months	Episode Average	Prior 12 Months
August 2007 to September 2008	-1.9	-1.7	5.1	4.5	0.56	0.68	22.4	22.9
August 2009 to December 2009	-2.8	-1.2	9.8	7.9	0.16	0.25	16.1	18.3
August 2010 to February 2012	-1.6	-2.6	9.0	9.8	0.24	0.18	20.4	17.2
April 2021 to October 2022	-2.2	-4.5	4.6	7.8	1.50	0.66	42.2	27.7

B. Using the Employer Cost Index of Total Compensation for Private Sector Workers, Deflated by the CPI-U

Economic Episode	Percentage Real Wage Change		Unemployment Rate, Percent		Ratio of Vacancies to Unemployed Persons		Mean Vacancy Duration, Days	
	Annualized	Cumulative	Episode Average	Prior 4 Quarters	Episode Average	Prior 4 Quarters	Episode Average	Prior 4 Quarters
Q4 2007 to Q3 2008	-2.3	-2.3	5.3	4.5	0.50	0.69	22.1	22.8
Q2 2009 to Q4 2009	-1.5	-1.2	9.6	8.5	0.17	0.21	16.4	17.6
Q4 2010 to Q1 2012	-1.0	-1.5	8.9	9.7	0.26	0.18	20.6	17.8
Q1 2021 to Q4 2022	-2.8	-4.1	4.4	8.7	1.62	0.56	43.8	28.5

Source: “The Shift to Remote Work Lessens Wage-Growth Pressures” by Barrero, Bloom, Davis, Meyer and Mihaylov, NBER WP 30197. Revision in progress.

ECI By Industry, Deflated by the CPI, 2019 Q1 through to 2023 Q3



In “[Job Amenity Shocks and Labor Reallocation](#)” Bagga, Mann, Sahin and Violante show that putting an amenity-value shock into a dynamic equilibrium model with preference heterogeneity over WFH, search frictions, job creation costs, and bargaining explains other unusual features of U.S. labor markets since the pandemic: a surge in quits, a lasting rise in vacancy rates and durations, and low matching efficiency.

Extra Slides

Survey of Working Arrangements and Attitudes (SWAA)

For each day last week, did you work a full day (6 or more hours), and if so where?

Day of the week	Did not work 6 or more hours	Worked <u>from home</u>	Worked at <u>employer or client site</u>
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			
Saturday			
Sunday			

Note: We weight the individual-level SWAA data to match the corresponding CPS shares by age-sex-education-earnings cells. See “Why Working from Home Will Stick” by Barrero, Bloom and Davis for details on how we construct the weights.

Census Household Pulse Survey (HPS)

- In the last 7 days, have any of the people in your household teleworked or worked from home?

- Yes, for 1-2 days
- Yes, for 3-4 days
- Yes, for 5 or more days
- No

Notes:

1. We use HPS sample weights in computing our tabulations.
2. We treat “Yes, for 1-2 days” as 30% of days worked from home, “3-4” as 70% of days, “5 or more” as 100%, and “No” as 0%.

Current Population Survey (CPS)

- *I now have some questions related to how the COVID-19 pandemic affected where people work.*
- *At any time **last week**, did you telework or **work at home** for pay?*
- *Last week, you worked [x] hours How many of these hours did you telework or work at home for pay?*

Notes:

1. We use CPS sample weights when computing our tabulations.
2. The CPS uses the above question design from October 2022 to November 2023. As of December 2023, the CPS modified the introductory sentence to read “I now have some questions about where people worked.” See www.bls.gov/cps/telework.htm#q1. As of this writing (January 2024), the BLS has yet to release the CPS data for December 2023.

American Community Survey (ACS)

How did this person usually get to work LAST WEEK? *Mark (X) ONE box for the method of transportation used for most of the distance.*

<input type="checkbox"/> Car, truck, or van	<input type="checkbox"/> Taxicab
<input type="checkbox"/> Bus	<input type="checkbox"/> Motorcycle
<input type="checkbox"/> Subway or elevated rail	<input type="checkbox"/> Bicycle
<input type="checkbox"/> Long-distance train or commuter rail	<input type="checkbox"/> Walked
<input type="checkbox"/> Light rail, streetcar, or trolley	<input type="checkbox"/> Worked from home → <i>SKIP to question 40a</i>
<input type="checkbox"/> Ferryboat	<input type="checkbox"/> Other method

Notes:

1. We use ACS sample weights in computing our tabulations.
2. We treat someone as working in a fully remote capacity if the response to this question is “Worked from home.”

American Time Use Survey (ATUS)

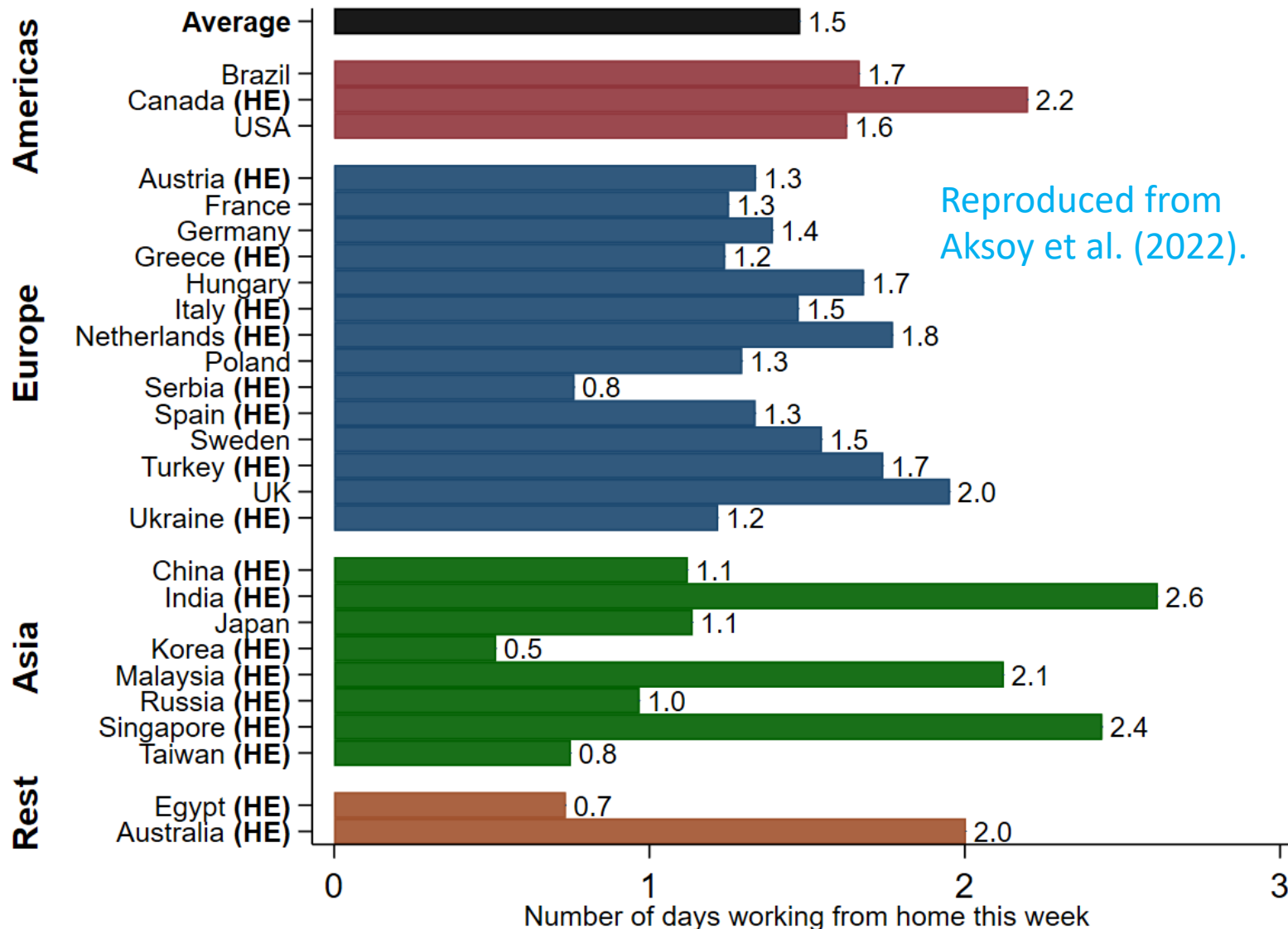
The ATUS elicits time-use diaries that cover a 24-hour period for each respondent. The diary records each activity over the course of the 24 hours, its duration (or start and stop times), where the activity took place, and with whom (if relevant). The granular nature of the time-use data lets us estimate the percent of full workdays performed at home or other remote location, the percent of workhours performed remotely, and the percent of workers who engaged in any remote work in a typical day. The ATUS data also let us investigate how the estimated percent of full workdays performed remotely varies with the definition of “full.

Notes:

1. We use ATUS sample weights in computing our tabulations.
2. We treat “working at main job” and “working at other job” in the ATUS data as work. We treat that work as work from home or other remote location, if it took place at “home or yard,” “someone else’s home,” “school,” “outdoors away from home,” “other store/mall,” or “library.”

Working from Home Is Now a Global Phenomenon among Well-Educated Workers

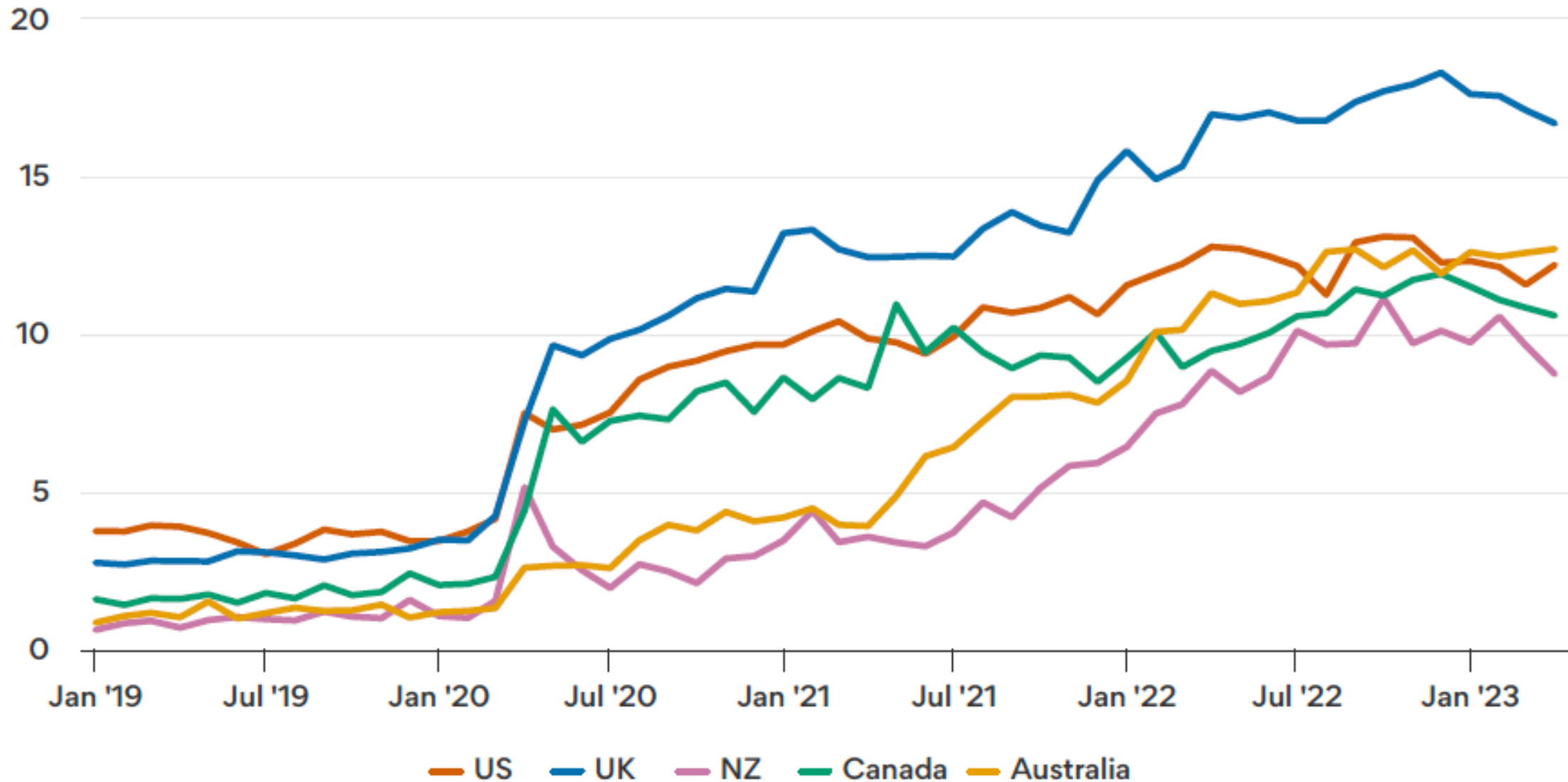
Paid Full Days Working from Home in the Survey Week, Country-Level Conditional Means



Q: “How many full paid days are you working from home this week?”

The chart reflects country dummies in OLS regressions that control for age (20-29, 30-39, 40-49, 50-59), sex, education (Secondary, Tertiary, Graduate), 18 industry sectors and survey wave, treating the raw U.S. mean as the baseline value. We fit the regression to data for 33,091 G-SWA respondents surveyed in mid 2021 and early 2022. The “Average” value is the simple mean of the country-level conditional means. The samples exclude persons who did not finish primary school. **HE** = sample skewed to highly educated workers in the country.

Percent of New Job Vacancies that Offer Remote Work Has Risen Sharply Since Spring 2020. January 2019 to April 2023, Five Countries



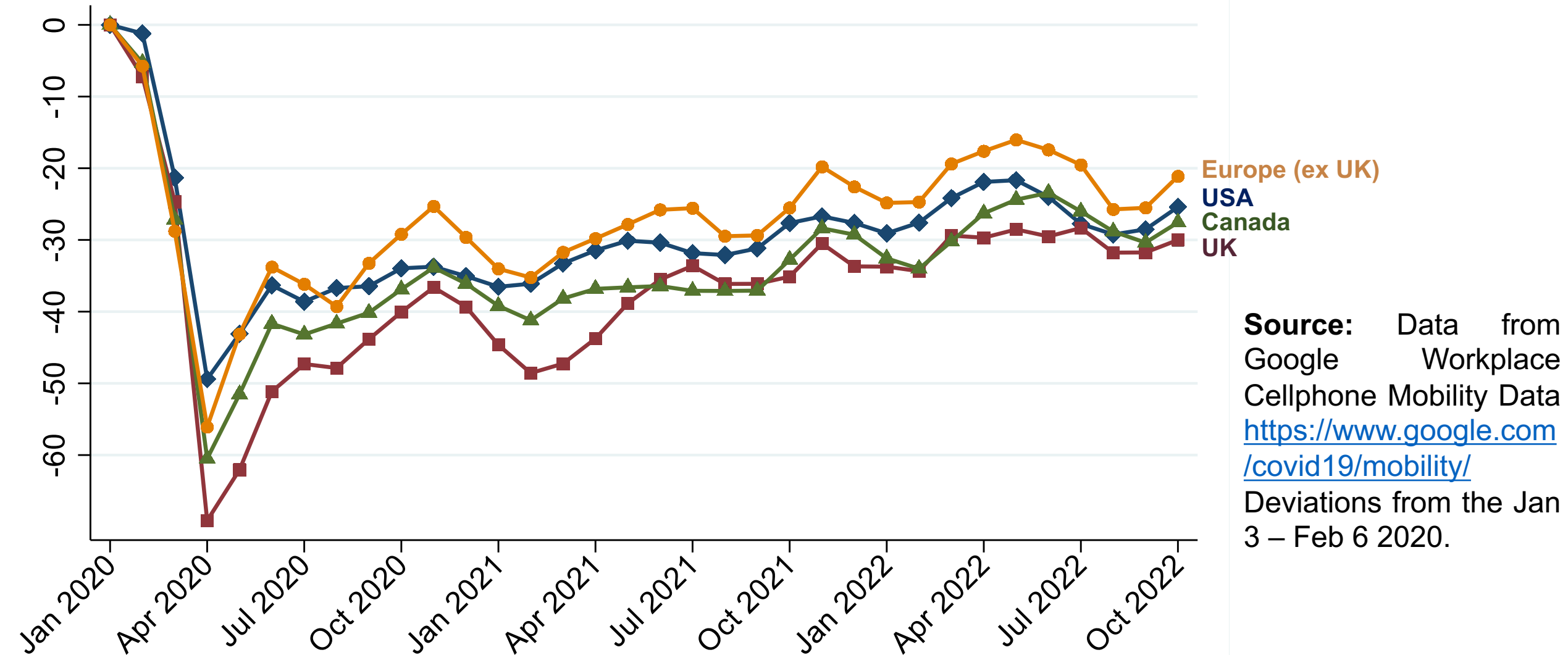
Source: Hansen et al. (2023) and WFHmap.com using Lightcast data.

Yet Another Metric: Workplace Mobility Measures

US, UK and Canada Have More WFH than Europe (ex. UK)

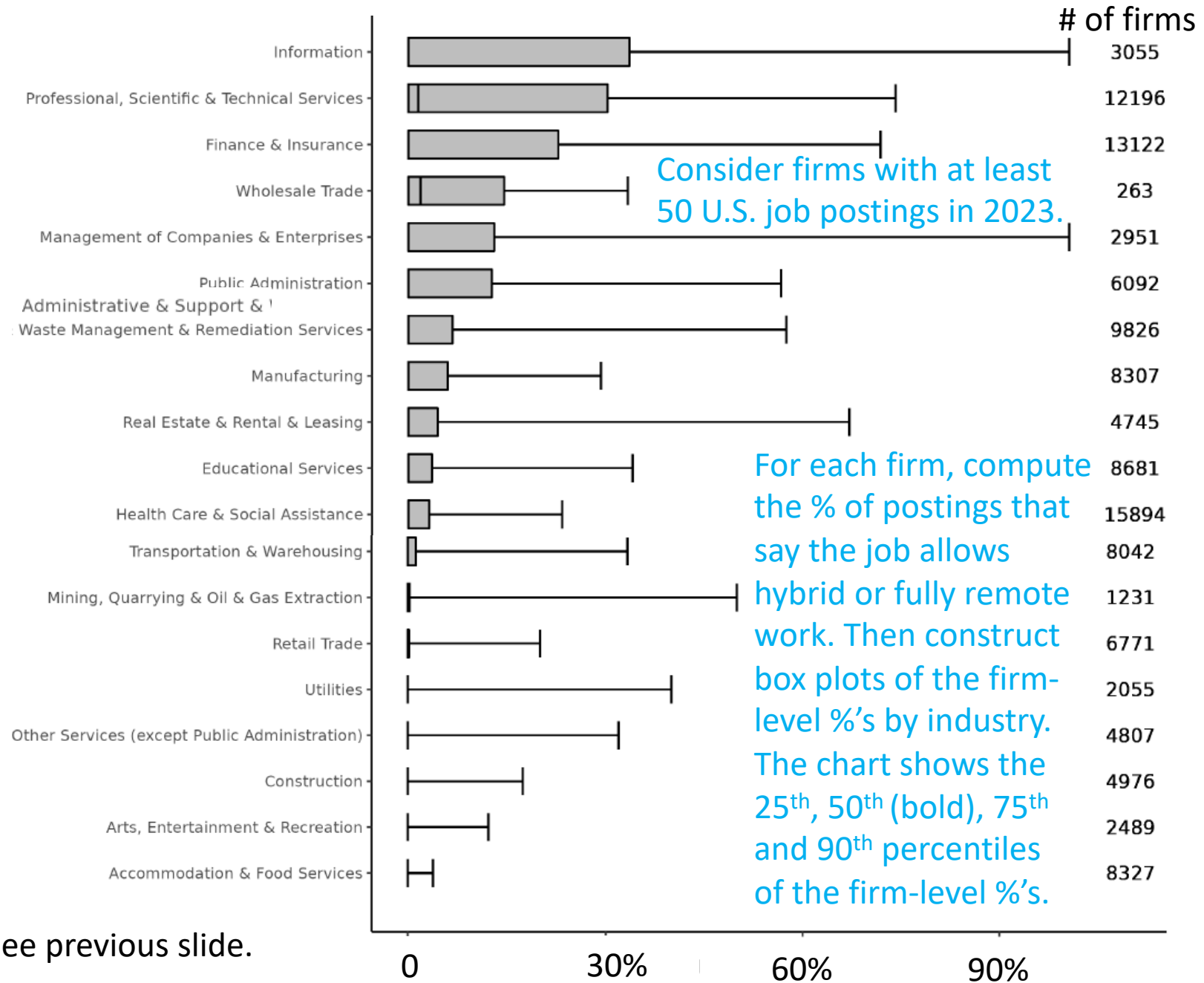
Workplace Trips (so the drop is a measure of WFH)

Google cellphone workplace mobility in % deviation from Jan 2020



Source: Data from Google Workplace Cellphone Mobility Data <https://www.google.com/covid19/mobility/> Deviations from the Jan 3 – Feb 6 2020.

WFH Adoption Rates Vary Greatly Across Same-Industry Firms

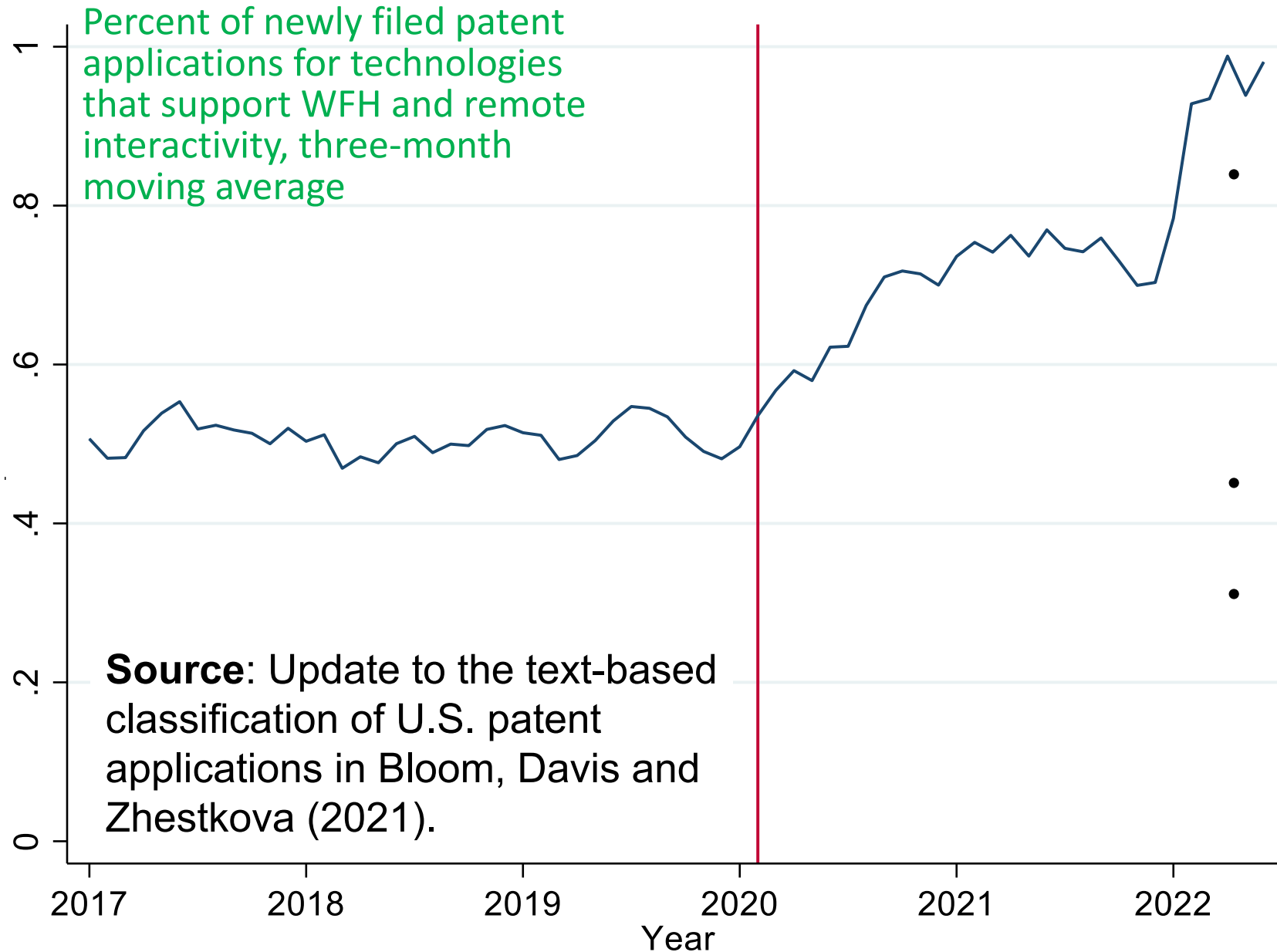


Source: See previous slide.

Investments in time, equipment, systems, processes, and management practices have enabled and entrenched WFH

- The pandemic prompted firms to invest in new equipment and new technologies that support remote work (Riom and Valero, 2020, and Eberly et al., 2021)
- Barrero et al. (2021c) quantify capital investments at home in response to the pandemic and worker time devoted to learning how to WFH. They estimate the value of these pandemic-induced investments at 0.7 percent of a year's GDP.
- Criscuolo et al. (2021) and Riom and Valero (2020) present evidence that firms adopted new managerial practices to support WFH in reaction to the pandemic.
- Bloom, Davis and Zhestkova (2021) find that, in the wake of the pandemic, new patent applications shifted toward technologies that support WFH and remote interactions more generally.
- All of these various investments in equipment, skills, technologies, and managerial practices create durable forms of capital and knowledge that improve performance in the WFH mode now and in the future.

COVID-19 Shifted Patent Applications to Technologies that Support WFH

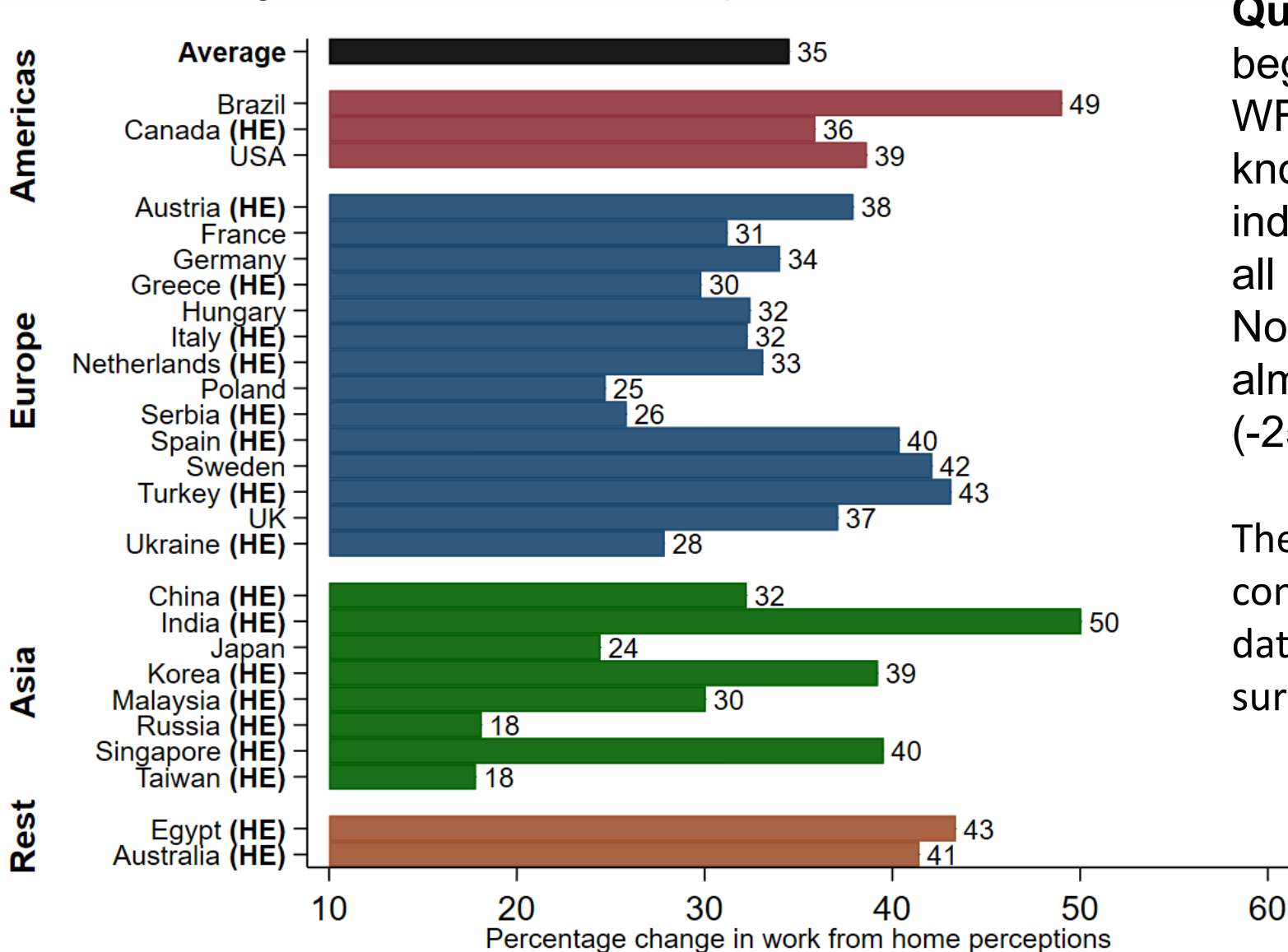


Source: Update to the text-based classification of U.S. patent applications in Bloom, Davis and Zhestkova (2021).

- When the market for WFH-related products and services suddenly expanded five-fold, it triggered an acceleration of new technologies that support WFH and remote interactions.
- Examples: better AV, better remote collaboration tools
- This surge in innovation efforts will likely lead to ongoing improvements in the relative performance of WFH and remote interactions.

The Social Acceptance of Work from Home Is Much Greater Now than before the Pandemic

Change Index for Social Acceptance of WFH



Question: “Since the COVID pandemic began, how have perceptions about WFH changed among people you know?” Response options and assigned index values: Improved among almost all (95%), most (70%) or some (25%), No change (0%), and Worsened among almost all (-95%), most (-70%) or some (-25%).

The chart reports regression-adjusted conditional means. We fit the regression to data for 36,078 G-SWA respondents surveyed in mid 2021 and early 2022.

Reproduced from
Aksoy et al. (2022).