

The Future of WFH

Nick Bloom (Stanford)

Atlanta Fed, October 2nd 2024




The New York Times

Even Zoom Is Making People Return to the Office

The tech company that helped millions of people work from home is finally tired of its employees being far away. It's not the only one that feels that way.

Share full article

260



The company behind popular video conferencing software has mandated that its employees return to working in the office, at least part-time. Justin Sullivan/Getty Images

BBC

Home

News

US Election

Sport

Business

Innovation

Culture

Arts

Travel

Earth

Video

Live


Amazon tells staff to get back to office five days a week

17 September 2024

Share Save

Natalie Sherman

BBC News



Amazon has faced protests over previous changes to working from home

Bloomberg

Live TV

Markets

Economics

Industries

Tech

Politics

Businessweek

Opinion

More

EUROPEAN STOCKS UPDATE

8,378.65

▲ 33.70 0.40%

7,574.07

▼ 61.88 0.81%

19,213.14

▼ 111.79 0.58%

LIVE NOW

BTV's Special Coverage of US Vice Presidential Debate

Watch

Return to Office: \$1.3 Trillion Problem

Empty Offices

Worker Burnout

Career Risk

Killing the Work-Life Balance

Work Shift Productivity

McKinsey Weighs Asking Staffers to Come to Office More Often

Senior partners in Miami, Boston told staff of possible change

Several big firms have sought to limit remote work recently

Facebook

Twitter

LinkedIn

Email

GD

Gift this article

In this Article

McKinsey & Co Inc

Private Company

By Ambereen Choudhury, and Amy Bainbridge

October 1, 2024 at 2:43 PM PDT

Save

Translate

Listen 2:51

McKinsey & Co. is considering upping the amount of days it expects staffers across North America to spend in the office each week as the

BUSINESS INSIDER


FINANCE

This Wall St CEO is still trumpeting the benefits of WFH

Jennifer SorSep 23, 2024, 12:51 PM PDT

Share

Save



Lazard CEO Peter Orszag. Getty Images; Jenny Chang-Rodriguez/BI

Lazard is extolling the virtues of its work-from-home policies in a rare show of support for hybrid work on Wall Street.

WFH hasn't prevented young bankers and analysts from excelling at their jobs, Lazard's CEO said.

The Telegraph

NewsSportBusinessMoneyOpinionUkraineUS electionTravelHealthLifestyleCulturePuzzles

UK newsTory leadershipPoliticsWorldHealth newsDefenceScienceEducationEnvironmentInvestigationsGlobal

Starmer backs working from home as ‘culture of presenteeism’ is bad for productivity

Suggested plans to introduce ‘right to switch off’ could mean staff spend less time in office

Nick Gutteridge
Chief Political Correspondent

Related Topics
Keir Starmer, Labour Party, Working from home, Angela Rayner

19 August 2024 5:26pm

Bookmark

Comment

Close

Facebook

WhatsApp

Email



Workers who are consistently contacted outside of working hours could receive thousands of pounds

SEARCH

FORTUNE

MY ACCOUNT

Subscribe Now

Your Subscription is expired. You can renew it [here](#).

Home

News

Tech

Finance

Leadership

Well

Recommend

Fortune 500

SUCCESS: MARC BENIOFF

Marc Benioff drops a bomb after calling Salesforce workers back to their desks: ‘I don’t work well in an office—it just doesn’t work with my personality’

BY JANE THIER
September 15, 2023 at 10:32 AM PDT



Marc Benioff prefers to work remotely. DAVID PAUL MORRIS—BLOOMBERG/GETTY IMAGES

Going to cover three sections

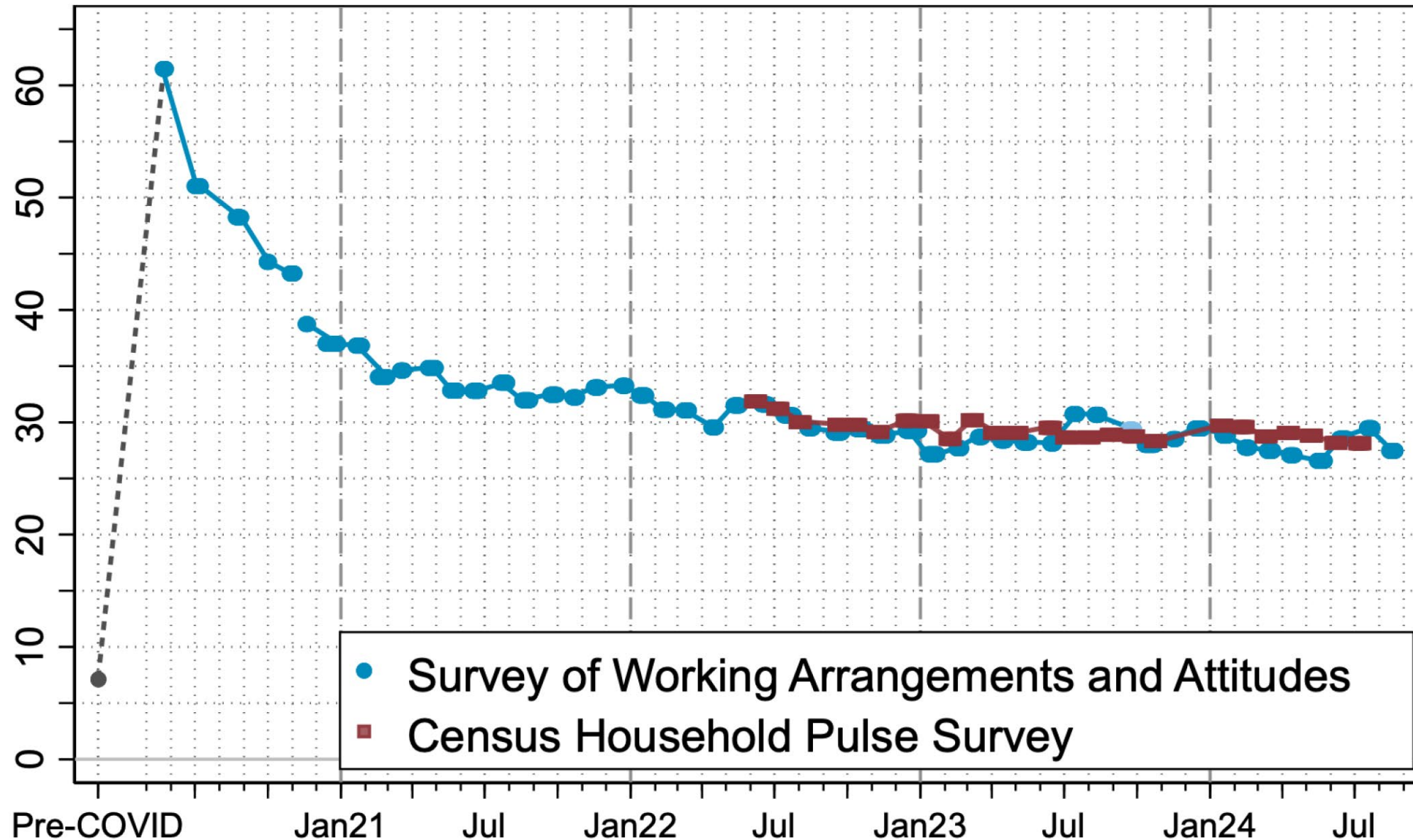
>>>> Current state of working from home

>>>> Thoughts on managing hybrid and remote

>>>> Four impacts on the economy

WFH is stabilizing at about 25% of days: a 5-fold jump vs 2019

US full days worked from home, %

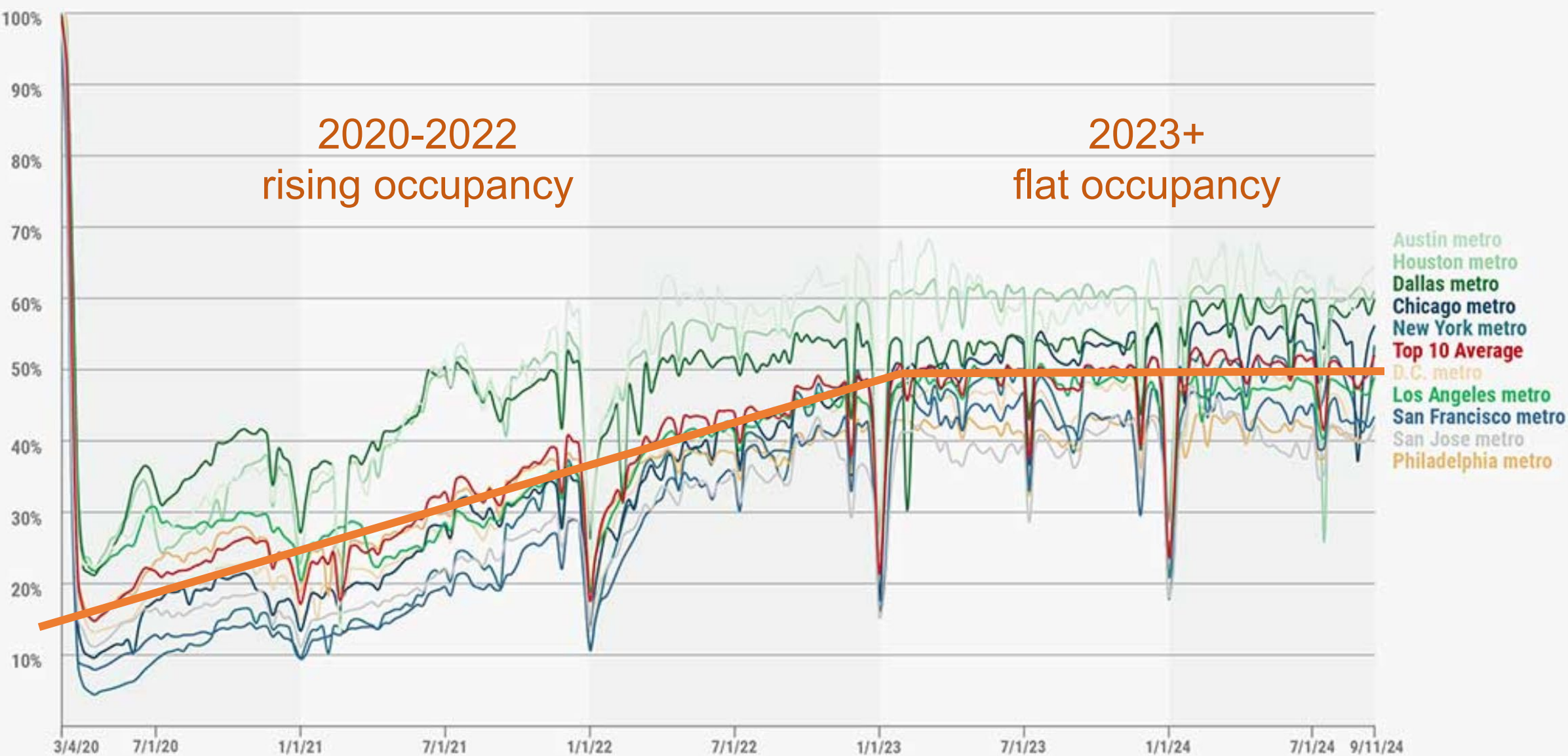


Source: N=198,742 (SWAA) N = 866,373 (HHP) SWAA data from survey responses weighted to match the US population. Pre-covid data from the American Time Use Survey. CHPS respondents weighted to match the US population aged 20 to 64 in households with incomes above \$25,000.

Survey of Workplace Attitudes and Arrangements (Barrero, Bloom and Davis 2021) <https://wfhresearch.com/>

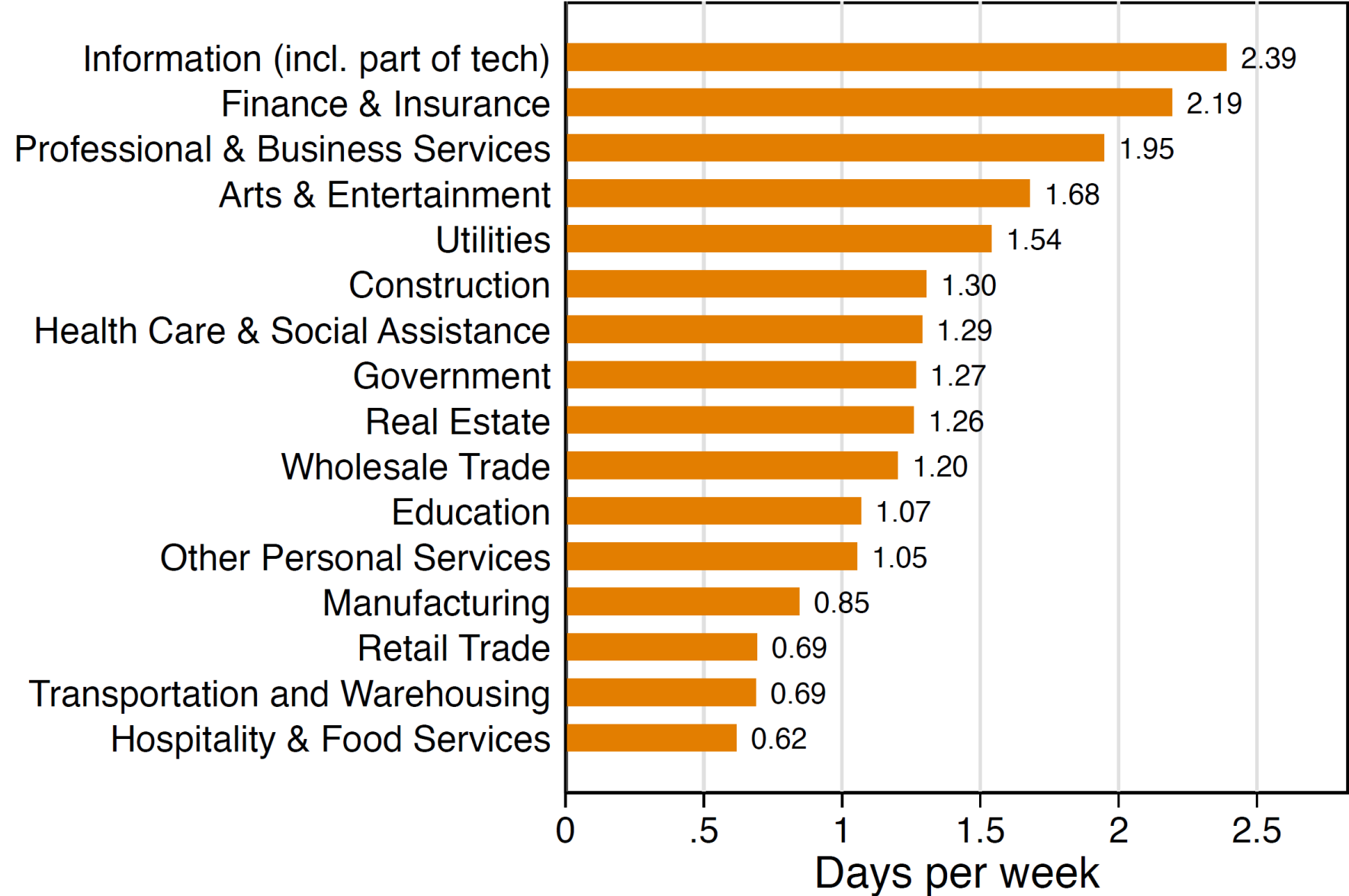
Office occupancy also stabilizing at about 50% of 2019 levels

Kastle office occupancy data



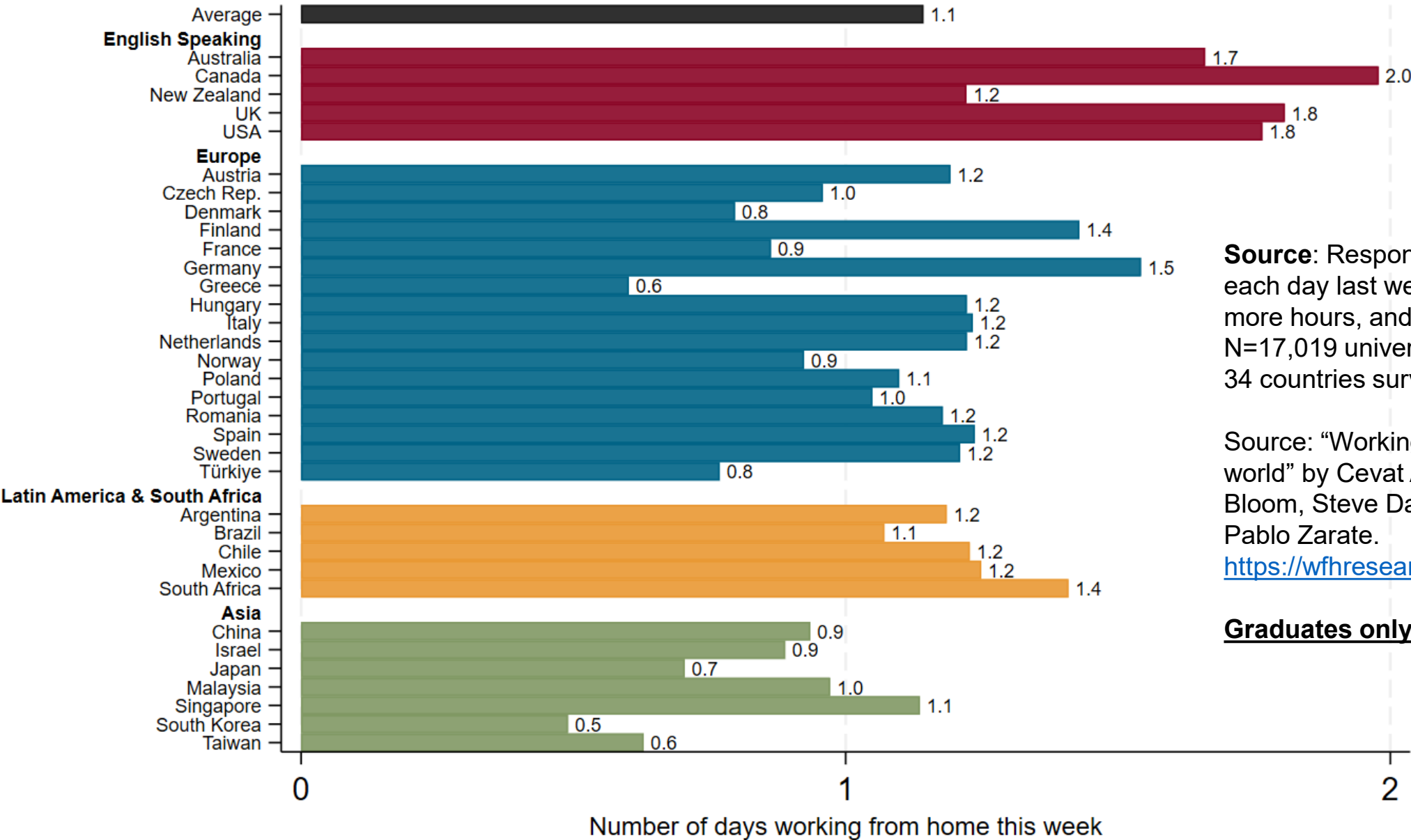
WFH varies by industry – highest in tech and finance

Current WFH: all wage and salary employees by industry



Notes: Survey of Workplace Attitudes and Arrangements
www.wfhresearch.com Sample from January 2023 to June 2023

WFH varies by country - highest in North America and UK



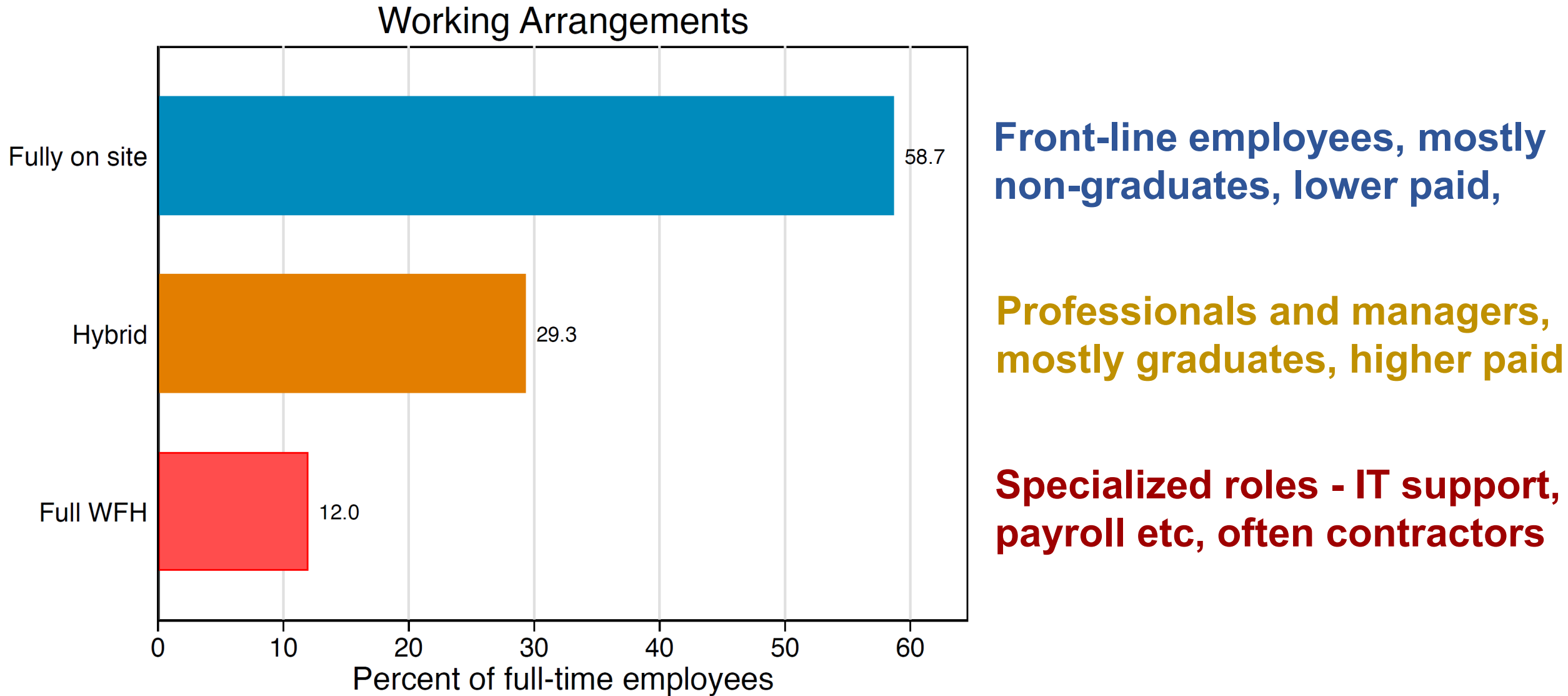
Source: Responses to the question “For each day last week, did you work 6 or more hours, and if so where?”. Sample of N=17,019 university graduate workers in 34 countries surveyed in April-June 2023.

Source: “Working from home around the world” by Cevat Aksoy, Jose Barrero, Nick Bloom, Steve Davis, Mathias Dolls and Pablo Zarate.

<https://wfhresearch.com/gswadata/>

Graduates only

But not everyone gets to WFH – most employees come in every day

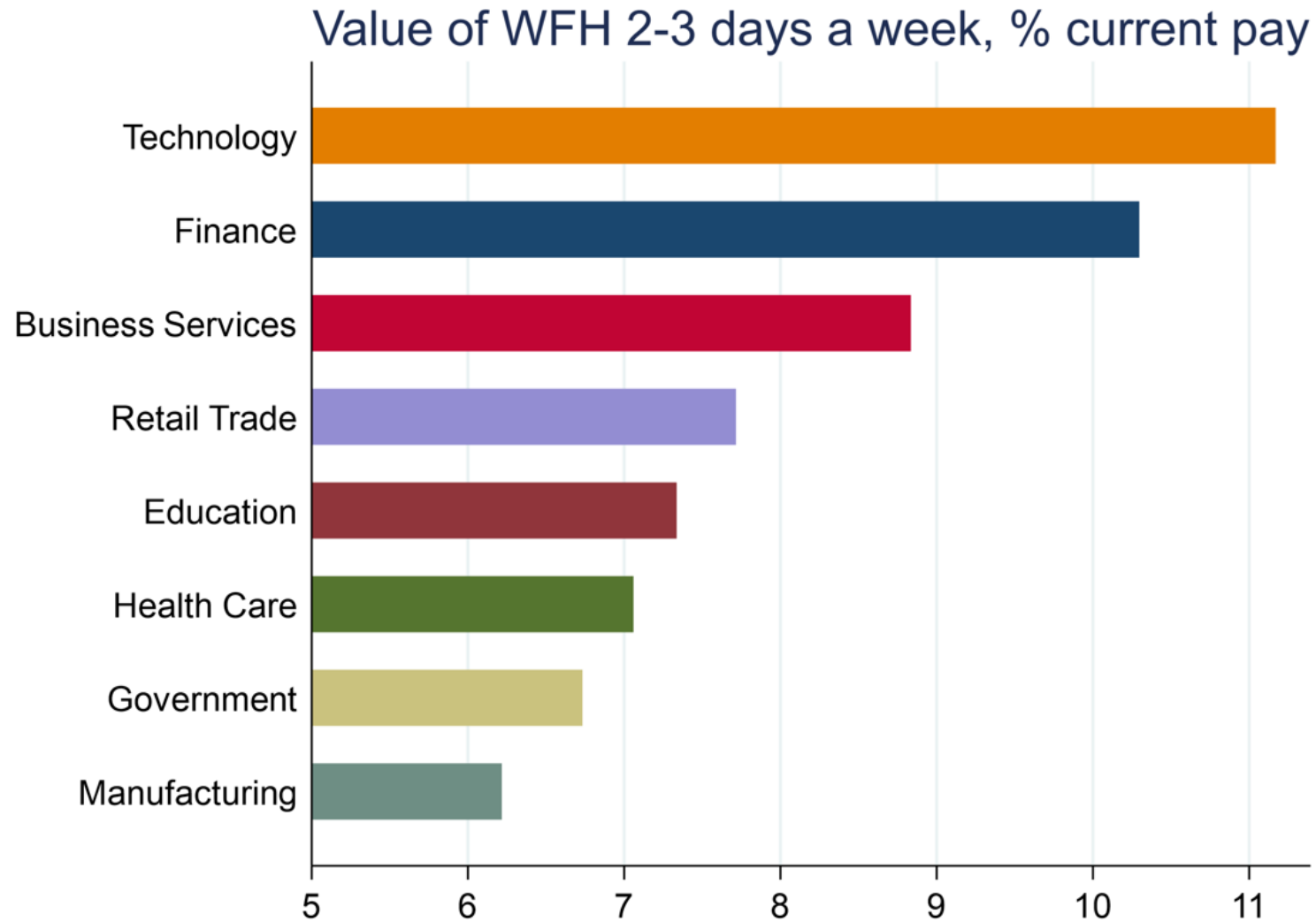


Source: The sample covers the March 2023 to June 2023 waves of the SWAA. Details on <https://wfhresearch.com/>

Four Key factors driving WFH choice (focus on the first two – the key drivers)

- 1. Happiness (→recruitment and retention)**
- 2. Productivity**
- 3. Space**
- 4. Talent**

Happiness: Employees like hybrid about as much as 8% more pay...



Source: Data from 17,087 responses through 2021, reweighted to match US population. Industries with 1000+ respondents. Details on <https://wfhresearch.com/>

RCT on 1612 engineers, marketing and finance professionals found hybrid WFH reduced quit rates 35% (and no performance impact)

Hybrid working from home improves retention without damaging performance

nature

<https://doi.org/10.1038/s41586-024-07500-2>

Received: 15 August 2023

Accepted: 30 April 2024

Published online: 12 June 2024

Open access

 Check for updates

Nicholas Bloom^{1,2}, Ruobing Han^{3,4} & James Liang^{3,4}

Working from home has become standard for employees with a university degree. The most common scheme, which has been adopted by around 100 million employees in Europe and North America, is a hybrid schedule, in which individuals spend a mix of days at home and at work each week^{1,2}. However, the effects of hybrid working on employees and firms have been debated, and some executives argue that it damages productivity, innovation and career development^{3–5}. Here we ran a six-month randomized control trial investigating the effects of hybrid working from home on 1,612 employees in a Chinese technology company in 2021–2022. We found that hybrid working improved job satisfaction and reduced quit rates by one-third. The reduction in quit rates was significant for non-managers, female employees and those with long commutes. Null equivalence tests showed that hybrid working did not affect performance grades over the next two years of reviews. We found no evidence for a difference in promotions over the next two years overall, or for any major employee subgroup. Finally, null equivalence tests showed that hybrid working had no effect on the lines of code written by computer-engineer employees. We also found that the 395 managers in the experiment revised their surveyed views about the effect of hybrid working on productivity, from a perceived negative effect (–2.6% on average) before the experiment to a perceived positive one (+1.0%) after the experiment. These results indicate that a hybrid schedule with two days a week working from home does not damage performance.

Working from home (WFH) surged after the COVID-19 pandemic, with university-graduate employees typically WFH for one to two days a week during 2023 (refs. 2,6). Previous causal research on WFH has focused on employees who are fully remote, usually working on independent tasks in call-centre, data-entry and helpdesk roles. This literature has found that the effects of fully remote working on productivity are often negative, which has resulted in calls to curtail WFH^{7–10}. However, there are two challenges when it comes to interpreting this literature. First, more than 70% of employees WFH globally are on a hybrid schedule. This group comprises more than 100 million individuals, with the most common working pattern being three days a week in the office and two days a week at home^{2,6}. Second, most employees who are regularly WFH are university graduates in creative team jobs that are important in science, law, finance, information technology (IT) and other industries, rather than performing repetitive data-entry or call processing tasks^{10,11}.

This paper addresses the gap in previous studies in two key ways. First, it uses a randomized control trial to examine the causal effect of a hybrid schedule in which employees are allowed to WFH two days per week. Second, it focuses on university-graduate employees in software engineering, marketing, accounting and finance, whose activities are mainly creative team tasks.

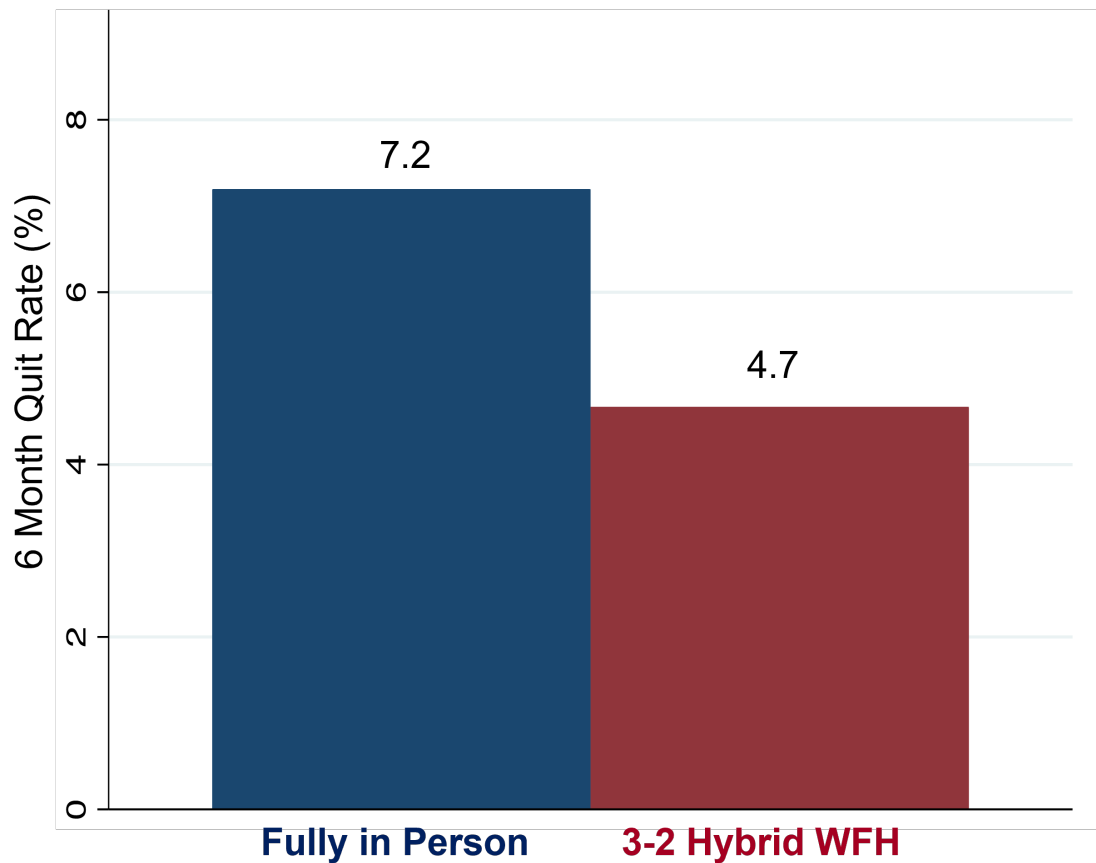
Our study describes a randomized control trial from August 2021 to January 2022, which involved 1,612 graduate employees in the Airfare

and IT divisions of a large Chinese travel technology multinational called Trip.com. Employees were randomized by even or odd birthdays into the option to WFH on Wednesday and Friday and come into the office on the other three days, or to come into the office on all five days.

We found that in the hybrid WFH (‘treatment’) group, attrition rates dropped by one-third (mean_{control} = 7.20, mean_{treat} = 4.80, $t(1610) = 2.02$, $P = 0.043$) and work satisfaction scores improved (mean_{control} = 7.84, mean_{treat} = 8.19, $t(1343) = 4.17$, $P < 0.001$). Employees reported that WFH saved on commuting time and costs and afforded them the flexibility to attend to occasional personal tasks during the day (and catch up in the evenings or weekends). These effects on reduced attrition were significant for non-managerial employees (mean_{control} = 8.59, mean_{treat} = 5.33, $t(1215) = 2.23$, $P = 0.026$), female employees (mean_{control} = 9.19, mean_{treat} = 4.18, $t(568) = 2.40$, $P = 0.017$) and those with long (above-median) commutes (mean_{control} = 6.00, mean_{treat} = 2.89, $t(609) = 1.87$, $P = 0.062$).

At the same time, we found no evidence of a significant effect on employees’ performance reviews, on the basis of null equivalence tests, and no evidence of a difference in promotion rates over periods of up to two years (‘Null results’ section of the Methods). We did find significant differences in pre-experiment beliefs about the effects of WFH on productivity between non-managers and managers. Before

Hybrid WFH lowered employee quit rates by 35%



Source: Attrition rates for 1612 engineers, marketing and finance professionals of Trip.com who were randomized between September 2021 and February 2022 by even and odd birthdays into control (5-days a week in the office) and treatment (Mon, Tue and Thur in the office; Weds and Fri working from home). Difference statistically significant at the 5% level. Details in Bloom, Han and Liang (2022) “How Hybrid Work from Home Works Out”.

¹Department of Economics, Stanford University, Stanford, CA, USA. ²Shenzhen Finance Institute, School of Management and Economics, The Chinese University of Hong Kong, Shenzhen, China.

³National School of Development, Peking University, Beijing, China. ⁴Trip.com, Shanghai, China. ⁵These authors contributed equally: Nicholas Bloom, Ruobing Han. ⁶E-mail: nbloom@stanford.edu; hanruobing@tsinghua.edu.cn; liangj@trip.com

Productivity: *Hybrid* appears to have about a flat impact. *Fully-remote* studies find range of impacts from -30% to +13% (average about -10%),

Organized Hybrid

Fully Remote

DOES WORKING FROM HOME WORK? EVIDENCE FROM A CHINESE EXPERIMENT*

NICHOLAS BLOOM
JAMES LIANG
JOHN ROBERTS
ZHICHUN JENNY YING

A rising share of employees now regularly engage in working from home (WFH), but there are concerns this can lead to “shirking from home.” We report the results of a WFH experiment at Ctrip, a 16,000-employee, NASDAQ-listed Chinese travel agency. Call center employees who volunteered to WFH were randomly assigned either to work from home or in the office for nine months. Home working led to a 13% performance increase, of which 9% was from working more minutes per shift (fewer breaks and sick days) and 4% from more calls

Hybrid working from home improves retention without damaging performance

<https://doi.org/10.1038/s41586-024-07500-2>

Received: 15 August 2023

Accepted: 30 April 2024

Published online: 12 June 2024

Open access

Check for updates

Nicholas Bloom^{1,2,3}, Ruobing Han^{1,2,3} & James Liang^{4,5,6}

Working from home has become standard for employees with a university degree. The most common scheme, which has been adopted by around 100 million employees in Europe and North America, is a hybrid scheme, in which individuals spend a mix of days at home and at work each week¹. However, the effects of hybrid working on employees and firms have been debated, and some executives argue that it damages productivity, innovation and career development^{2,3}. Here we ran a six-month randomized control trial investigating the effects of hybrid working from home on 1,612 employees in a Chinese technology company in 2021–2022. We found that hybrid working improved job satisfaction and reduced quit rates by one-third. The reduction in quit rates was significant for non-managers, female employees and those with long commutes. Null equivalence tests showed that hybrid working did not affect performance grades over the next two years of reviews. We found no evidence for a difference in promotions over the next two years overall, or for any major employee subgroup. Finally, null equivalence tests showed that hybrid working had no effect on the lines of code written by computer-engineer employees. We also found that the 395 managers in the experiment revised their surveyed views about the effect of hybrid working on productivity, from a perceived negative effect (–2.6% on average) before the experiment to a perceived positive one (+1.0%) after the experiment. These results indicate that a hybrid scheme with two days a week working from home does not damage performance.

Working from home (WFH) surged after the COVID-19 pandemic, with university graduate employees typically WFH for one to two days a week during 2023 (ref. 2a). Previous causal research on WFH has focused on employees who are fully remote, usually working on independent tasks in call-centre, data-entry and helpdesk roles. This literature has found the effects of fully remote working on productivity to be often negative, which has resulted in calls to curtail WFH^{1,2}. However, there are two challenges when it comes to interpreting this literature. First, more than 70% of employees WFH globally are on a hybrid schedule. This group comprises more than 100 million individuals, with the most common working pattern being three days a week in the office and two days a week at home^{3,4}. Second, most employees who are regularly WFH are university graduates in creative team jobs that are important in science, law, finance, information technology (IT) and other industries, rather than performing repetitive data-entry or call-processing tasks⁵.

This paper addresses the gap in previous studies in two key ways. First, it uses a randomized control trial to examine the causal effect of a hybrid schedule in which employees alternate between WFH two days per week. Second, it focuses on university graduate employees in software engineering, marketing, accounting and finance, whose activities are mainly creative team tasks.

Our study describes a randomized control trial from August 2021 to January 2022, which involved 1,612 graduate employees in the Airfare

“WORKING” REMOTELY? SELECTION, TREATMENT, AND THE MARKET FOR REMOTE WORK

Natalia Emanuel · Emma Harrington¹

April 9, 2022

Abstract: How does remote work affect productivity and how productive are workers who choose remote jobs? We decompose these effects using data from the call-centers of a US Fortune 500 retailer. The retailer employed both remote and on-site workers prior to Covid-19 and went entirely remote during the lock-

down. We find that, on average, workers who chose remote jobs were more productive than those who chose on-site jobs. These effects were driven by workers who were more productive before Covid-19 and who were more productive during the lockdown.

Work-From-Anywhere: The Productivity Effects of Geographic Flexibility

Prithwiraj (Raj) Choudhury,¹ Cyrus Foroughi,² and Barbara Larson³

An emerging form of remote work allows employees to *work-from-anywhere*, so that the worker can choose to live in a preferred geographic location. While traditional work-from-homes (WFH) programs offer the worker temporal flexibility, work-from-anywhere (WFA) programs offer *both* temporal and geographic flexibility. WFA should be viewed as a nonpecuniary benefit likely to be preferred by workers who must derive greater utility by moving from their current geographic location to their preferred location. We study the effects of WFA on productivity at the United States Patent and Trademark Office (USPTO) and exploit a natural experiment in which the implementation of WFA was driven by negotiations between managers and the patent examiners’ union, leading to exogeneity in the timing of individual examiners’ transition from a work-from-home to a work-from-anywhere program. This transition resulted in a 4.4 percent increase in output without affecting the incidence of rework. We also report results related to a plausible mechanism: an increase in observable effort as the worker transitions from a WFH to a WFA program. We employ illustrative field interviews, micro-data on locations, and machine learning analysis to shed further light on geographic flexibility, and summarize worker, firm, and economy-wide implications of provisioning WFA.

Running Head: Work-From-Anywhere: Productivity Effects

Keywords: geographic flexibility; work-from-anywhere; remote work; telecommuting; worker mobility

Acknowledgements: The authors are thankful to Iain Cockburn, Srikanth Kannan, Jins Meuris, Chris Rider, Tim Simcoe, and participants and reviewers at Boston University, Harvard Business School, INSEAD Mobility Conference, Stanford GSB O/B Department, Temple University, University of Wisconsin–Madison, and Wharton People and Organizations Conference for comments on a prior draft.

Work from Home and Productivity: Evidence from Personnel and Analytics Data on Information Technology Professionals

Michael Gibbs

University of Chicago and Institute of Labor Economics

Friederike Mengedot

Univ

Ch

Univ

Article

Virtual communication curbs creative idea generation

nature

<https://doi.org/10.1038/s41586-022-04043-y>

Received: 17 July 2020

Accepted: 14 March 2022

Published online: 27 April 2022

Check for updates

Melanie S. Brucks^{1,2} & Jonathan Levay²

COVID-19 accelerated a decade-long shift to remote work by normalizing working from home on a large scale. Indeed, 75% of US employees in a 2021 survey reported a personal preference for working remotely at least one day per week¹, and studies estimate that 20% of US workdays will take place at home after the pandemic ends². Here we examine how this shift away from in-person interaction affects innovation, which relies on collaborative idea generation as the foundation of commercial and scientific progress³. In a laboratory study and a field experiment across five countries (in Europe, the Middle East and South Asia), we show that videoconferencing inhibits the production of creative ideas. By contrast, when it comes to selecting which ideas to pursue, we find no evidence that videoconferencing groups are less effective (and preliminary evidence that they may be more effective) than in-person groups. Departing from previous theories that focus on oral and written technologies limit the synchronicity and extent of information exchanged^{4,5}, we find that our effects are driven by differences in the physical nature of videoconferencing and in-person interactions. Specifically, using eye-gaze and recall measures, as well as latent semantic analysis, we demonstrate that videoconferencing hampers idea generation because it focuses communicators on a screen, which prompts a narrower cognitive focus. Our results suggest that virtual interaction comes with a cognitive cost for creative idea generation.

In the wake of the COVID-19 pandemic, millions of employees were mandated to work from home indefinitely and virtually collaborate using videoconferencing technologies. This unprecedented shift to full-time remote employment demonstrated the viability of virtual work at a large scale, further legitimizing the growing work-from-home movement of the last decade. In a 2021 survey, 75% of US employees reported a personal preference for working from home at least one day a week, and 40% of employees indicated they would quit a job that required full-time in-person work¹. In response, leading firms across various sectors, including Google, Microsoft, JPMorgan and Amazon, increased the flexibility of their post-pandemic work-from-home policies², and research estimates that 20% of all US workdays will be conducted remotely once the pandemic ends³.

We explore how this shift towards remote work affects essential workplace tasks. In particular, collaborative idea generation is at the heart of scientific and commercial progress⁴, as virtual communicators narrow their visual scope to the shared environment of a screen, their cognitive focus narrows in turn. This narrowed focus constrains the associative process underlying idea generation, whereby thoughts branch out and activate disparate information that when combined to pursue new ideas^{5–10}. Yet the narrowed cognitive focus induced by the use of screens in virtual interaction does not hinder all collaborative activities. Specifically, idea generation is typically followed by selecting which idea to pursue, which requires cognitive focus and analytical reasoning¹¹. Here we show that virtual interaction uniquely hinders idea

generation – videoconferencing – that conveys many of the same oral and non-verbal information cues as face-to-face interaction. If videoconferencing eventually closes the information gap between virtual and in-person interaction, the question arises whether this new technology could effectively replace in-person collaborative idea generation. Here we show that, even if videoconferencing could communicate the same information, it remains an inherent and overlooked physical difference in communicating through video that is not psychologically benign: in-person teams operate in a fully shared physical space, whereas virtual teams inhabit a virtual space that is bounded by the screen in front of each member. Our data suggest that this physical difference in shared space compels virtual communicators to narrow their visual field by concentrating on the screen and filtering out peripheral visual stimuli that are not visible or relevant to their partner. According to previous research that empirically and neurologically links visual and cognitive attention^{12–14}, as virtual communicators narrow their visual scope to the shared environment of a screen, their cognitive focus narrows in turn. This narrowed focus constrains the associative process underlying idea generation, whereby thoughts branch out and activate disparate information that when combined to pursue new ideas^{5–10}. Yet the narrowed cognitive focus induced by the use of screens in virtual interaction does not hinder all collaborative activities. Specifically, idea generation is typically followed by selecting which idea to pursue, which requires cognitive focus and analytical reasoning¹¹. Here we show that virtual interaction uniquely hinders idea

¹Marketing Division, Columbia Business School, Columbia University, New York, NY, USA. ²Marketing Division, Stanford Graduate School of Business, Stanford University, Stanford, CA, USA. ³Ph.D. candidate, INSEAD, Fontainebleau, France.

108 | Nature | Vol 605 | 5 May 2022

NBER WORKING PAPER SERIES

WORKING FROM HOME, WORKER SORTING AND DEVELOPMENT

David Atkin
Antoinette Schor
Sumit Shinde

Working Paper 31515

nature
human behaviour

ARTICLES

<https://doi.org/10.1038/s41562-024-0796-4>

Check for updates

The effects of remote work on collaboration among information workers

Longqi Yang^{1,2}, David Holtz^{3,4}, Sonia Jaffe⁵, Siddharth Suri⁶, Shilpi Sinha⁷, Jeffrey Weston⁸, Connor Joyce⁹, Neha Shah¹, Kevin Sherman¹, Brent Hecht¹⁰ & Jaime Teevan¹⁰

The coronavirus disease 2019 (COVID-19) pandemic caused a rapid shift to full-time remote work for many information workers. Viewing this shift as a natural experiment in which some workers were already working remotely before the pandemic enables us to separate the effects of firm-wide remote work from other pandemic-related confounding factors. Here, we use rich data on the emails, calendars, instant messages, videos/audio calls and workweek hours of 61,182 US Microsoft employees over the first six months of 2020 to estimate the causal effects of firm-wide remote work on collaboration and communication. Our results show that firm-wide remote work caused the collaboration network of workers to become more static and siloed, with fewer bridges between disparate parts. Furthermore, there was a decrease in synchronous communication and an increase in asynchronous communication. Together, these effects may make it harder for employees to acquire and share new information across the network.

Before the COVID-19 pandemic, at most 5% of Americans worked from home for more than three days per week¹, whereas it is estimated that, by April 2020, as many as 37% of Americans were working from home (WFH) full-time². Thus, a matter of weeks, the pandemic caused about one-third of US workers to shift to WFH and nearly every American that was able to work from home did so³. Many technology companies, such as Twitter, Facebook, Square, Box, Slack and Quora, have taken this shift one step further by announcing longer term and, in some cases permanent, remote work policies that will enable at least some employees to work remotely even after the pandemic⁴. More generally, COVID-19 has accelerated the shift away from traditional office work, such that even firms that have been more likely to share a common work policy in place after the pandemic has ended are unlikely to fully return to their pre-COVID-19 work arrangements⁵. Instead, they are likely to switch to some type of hybrid work model, in which employees split their time between remote and office work, or a mixed-mode model, in which firms are comprised of a mixture of full-time remote employees and full-time office employees. For example, some scholars predict a long-run equilibrium in which information workers will work from home approximately 20% of the time⁶. For long-term policy decisions regarding remote, hybrid and mixed-mode work to be well informed, decision makers need to understand how remote work would impact information work in the absence of the effects of COVID-19. To answer this question, we treat Microsoft’s company-wide WFH policy during the pandemic as a natural experiment that, subject to the validity of our identifying assumptions, enables us to causally identify the impact of firm-wide remote work on employees’ collaboration networks and communication practices.

Previous research has shown that network topologies including the strength of ties, has an important role in the success of both individuals and organizations. For individuals, it is beneficial to have access to new, non-redundant information through connections to different parts of an organization’s formal organizational chart and through connections to different parts of an organization’s informal communication network⁷. Furthermore, being a conduit through which such information flows by bridging ‘structural holes’ in the organization can have additional benefits for individuals⁸. For firms, certain network configurations are associated with the production of high-quality creative output⁹, and there is a competitive advantage to successfully engaging in the practice of knowledge transfer¹⁰ in which experiences from one set of people within an organization are transferred to and used by another set of people within that same organization¹¹. Conditional on a given network position or configuration, the efficacy with which a given tie can transfer or provide access to novel information depends on its strength. Two people connected by a strong tie can often transfer information more easily (to keep their ties more likely to share a common work policy in place after the pandemic has ended are unlikely to fully return to their pre-COVID-19 work arrangements⁵). Instead, they are likely to switch to some type of hybrid work model, in which employees split their time between remote and office work, or a mixed-mode model, in which firms are comprised of a mixture of full-time remote employees and full-time office employees. For example, some scholars predict a long-run equilibrium in which information workers will work from home approximately 20% of the time⁶. For long-term policy decisions regarding remote, hybrid and mixed-mode work to be well informed, decision makers need to understand how remote work would impact information work in the absence of the effects of COVID-19. To answer this question, we treat Microsoft’s company-wide WFH policy during the pandemic as a natural experiment that, subject to the validity of our identifying assumptions, enables us to causally identify the impact of firm-wide remote work on employees’ collaboration networks and communication practices.

Previous research has shown that network topologies including the strength of ties, has an important role in the success of both individuals and organizations. For individuals, it is beneficial to have access to new, non-redundant information through connections to different parts of an organization’s formal organizational chart and through connections to different parts of an organization’s informal communication network⁷. Furthermore, being a conduit through which such information flows by bridging ‘structural holes’ in the organization can have additional benefits for individuals⁸. For firms, certain network configurations are associated with the production of high-quality creative output⁹, and there is a competitive advantage to successfully engaging in the practice of knowledge transfer¹⁰ in which experiences from one set of people within an organization are transferred to and used by another set of people within that same organization¹¹. Conditional on a given network position or configuration, the efficacy with which a given tie can transfer or provide access to novel information depends on its strength. Two people connected by a strong tie can often transfer information more easily (to keep their ties more likely to share a common work policy in place after the pandemic has ended are unlikely to fully return to their pre-COVID-19 work arrangements⁵). Instead, they are likely to switch to some type of hybrid work model, in which employees split their time between remote and office work, or a mixed-mode model, in which firms are comprised of a mixture of full-time remote employees and full-time office employees. For example, some scholars predict a long-run equilibrium in which information workers will work from home approximately 20% of the time⁶. For long-term policy decisions regarding remote, hybrid and mixed-mode work to be well informed, decision makers need to understand how remote work would impact information work in the absence of the effects of COVID-19. To answer this question, we treat Microsoft’s company-wide WFH policy during the pandemic as a natural experiment that, subject to the validity of our identifying assumptions, enables us to causally identify the impact of firm-wide remote work on employees’ collaboration networks and communication practices.

Previous research has shown that network topologies including the strength of ties, has an important role in the success of both individuals and organizations. For individuals, it is beneficial to have access to new, non-redundant information through connections to different parts of an organization’s formal organizational chart and through connections to different parts of an organization’s informal communication network⁷. Furthermore, being a conduit through which such information flows by bridging ‘structural holes’ in the organization can have additional benefits for individuals⁸. For firms, certain network configurations are associated with the production of high-quality creative output⁹, and there is a competitive advantage to successfully engaging in the practice of knowledge transfer¹⁰ in which experiences from one set of people within an organization are transferred to and used by another set of people within that same organization¹¹. Conditional on a given network position or configuration, the efficacy with which a given tie can transfer or provide access to novel information depends on its strength. Two people connected by a strong tie can often transfer information more easily (to keep their ties more likely to share a common work policy in place after the pandemic has ended are unlikely to fully return to their pre-COVID-19 work arrangements⁵). Instead, they are likely to switch to some type of hybrid work model, in which employees split their time between remote and office work, or a mixed-mode model, in which firms are comprised of a mixture of full-time remote employees and full-time office employees. For example, some scholars predict a long-run equilibrium in which information workers will work from home approximately 20% of the time⁶. For long-term policy decisions regarding remote, hybrid and mixed-mode work to be well informed, decision makers need to understand how remote work would impact information work in the absence of the effects of COVID-19. To answer this question, we treat Microsoft’s company-wide WFH policy during the pandemic as a natural experiment that, subject to the validity of our identifying assumptions, enables us to causally identify the impact of firm-wide remote work on employees’ collaboration networks and communication practices.

¹Microsoft Corporation, Redmond, WA, USA. ²Haas School of Business, University of California, Berkeley, CA, USA. ³MIT Initiative on the Digital Economy, Cambridge, MA, USA. ⁴Ph.D. candidate, INSEAD, Fontainebleau, France.

NATURE HUMAN BEHAVIOUR | www.nature.com/naturehumanbehaviour

¹Department of Economics, Stanford University, Stanford, CA, USA. ²Shenzhen Finance Institute, School of Management and Economics, The Chinese University of Hong Kong, Shenzhen, China. ³National School of Development, Peking University, Beijing, China. ⁴Yipco, Shanghai, China. ⁵These authors contributed equally: Nicholas Bloom, Ruobing Han, John Liang. ⁶Department of Economics, Stanford University, Stanford, CA, USA. ⁷Department of Economics, Stanford University, Stanford, CA, USA. ⁸Department of Economics, Stanford University, Stanford, CA, USA. ⁹Department of Economics, Stanford University, Stanford, CA, USA. ¹⁰Department of Economics, Stanford University, Stanford, CA, USA. ¹¹Department of Economics, Stanford University, Stanford, CA, USA. ¹²Department of Economics, Stanford University, Stanford, CA, USA. ¹³Department of Economics, Stanford University, Stanford, CA, USA. ¹⁴Department of Economics, Stanford University, Stanford, CA, USA. ¹⁵Department of Economics, Stanford University, Stanford, CA, USA. ¹⁶Department of Economics, Stanford University, Stanford, CA, USA. ¹⁷Department of Economics, Stanford University, Stanford, CA, USA. ¹⁸Department of Economics, Stanford University, Stanford, CA, USA. ¹⁹Department of Economics, Stanford University, Stanford, CA, USA. ²⁰Department of Economics, Stanford University, Stanford, CA, USA. ²¹Department of Economics, Stanford University, Stanford, CA, USA. ²²Department of Economics, Stanford University, Stanford, CA, USA. ²³Department of Economics, Stanford University, Stanford, CA, USA. ²⁴Department of Economics, Stanford University, Stanford, CA, USA. ²⁵Department of Economics, Stanford University, Stanford, CA, USA. ²⁶Department of Economics, Stanford University, Stanford, CA, USA. ²⁷Department of Economics, Stanford University, Stanford, CA, USA. ²⁸Department of Economics, Stanford University, Stanford, CA, USA. ²⁹Department of Economics, Stanford University, Stanford, CA, USA. ³⁰Department of Economics, Stanford University, Stanford, CA, USA. ³¹Department of Economics, Stanford University, Stanford, CA, USA. ³²Department of Economics, Stanford University, Stanford, CA, USA. ³³Department of Economics, Stanford University, Stanford, CA, USA. ³⁴Department of Economics, Stanford University, Stanford, CA, USA. ³⁵Department of Economics, Stanford University, Stanford, CA, USA. ³⁶Department of Economics, Stanford University, Stanford, CA, USA. ³⁷Department of Economics, Stanford University, Stanford, CA, USA. ³⁸Department of Economics, Stanford University, Stanford, CA, USA. ³⁹Department of Economics, Stanford University, Stanford, CA, USA. ⁴⁰Department of Economics, Stanford University, Stanford, CA, USA. ⁴¹Department of Economics, Stanford University, Stanford, CA, USA. ⁴²Department of Economics, Stanford University, Stanford, CA, USA. ⁴³Department of Economics, Stanford University, Stanford, CA, USA. ⁴⁴Department of Economics, Stanford University, Stanford, CA, USA. ⁴⁵Department of Economics, Stanford University, Stanford, CA, USA. ⁴⁶Department of Economics, Stanford University, Stanford, CA, USA. ⁴⁷Department of Economics, Stanford University, Stanford, CA, USA. ⁴⁸Department of Economics, Stanford University, Stanford, CA, USA. ⁴⁹Department of Economics, Stanford University, Stanford, CA, USA. ⁵⁰Department of Economics, Stanford University, Stanford, CA, USA. ⁵¹Department of Economics, Stanford University, Stanford, CA, USA. ⁵²Department of Economics, Stanford University, Stanford, CA, USA. ⁵³Department of Economics, Stanford University, Stanford, CA, USA. ⁵⁴Department of Economics, Stanford University, Stanford, CA, USA. ⁵⁵Department of Economics, Stanford University, Stanford, CA, USA. ⁵⁶Department of Economics, Stanford University, Stanford, CA, USA. ⁵⁷Department of Economics, Stanford University, Stanford, CA, USA. ⁵⁸Department of Economics, Stanford University, Stanford, CA, USA. ⁵⁹Department of Economics, Stanford University, Stanford, CA, USA. ⁶⁰Department of Economics, Stanford University, Stanford, CA, USA. ⁶¹Department of Economics, Stanford University, Stanford, CA, USA. ⁶²Department of Economics, Stanford University, Stanford, CA, USA. ⁶³Department of Economics, Stanford University, Stanford, CA, USA. ⁶⁴Department of Economics, Stanford University, Stanford, CA, USA. ⁶⁵Department of Economics, Stanford University, Stanford, CA, USA. ⁶⁶Department of Economics, Stanford University, Stanford, CA, USA. ⁶⁷Department of Economics, Stanford University, Stanford, CA, USA. ⁶⁸Department of Economics, Stanford University, Stanford, CA, USA. ⁶⁹Department of Economics, Stanford University, Stanford, CA, USA. ⁷⁰Department of Economics, Stanford University, Stanford, CA, USA. ⁷¹Department of Economics, Stanford University, Stanford, CA, USA. ⁷²Department of Economics, Stanford University, Stanford, CA, USA. ⁷³Department of Economics, Stanford University, Stanford, CA, USA. ⁷⁴Department of Economics, Stanford University, Stanford, CA, USA. ⁷⁵Department of Economics, Stanford University, Stanford, CA, USA. ⁷⁶Department of Economics, Stanford University, Stanford, CA, USA. ⁷⁷Department of Economics, Stanford University, Stanford, CA, USA. ⁷⁸Department of Economics, Stanford University, Stanford, CA, USA. ⁷⁹Department of Economics, Stanford University, Stanford, CA, USA. ⁸⁰Department of Economics, Stanford University, Stanford, CA, USA. ⁸¹Department of Economics, Stanford University, Stanford, CA, USA. ⁸²Department of Economics, Stanford University, Stanford, CA, USA. ⁸³Department of Economics, Stanford University, Stanford, CA, USA. ⁸⁴Department of Economics, Stanford University, Stanford, CA, USA. ⁸⁵Department of Economics, Stanford University, Stanford, CA, USA. ⁸⁶Department of Economics, Stanford University, Stanford, CA, USA. ⁸⁷Department of Economics, Stanford University, Stanford, CA, USA. ⁸⁸Department of Economics, Stanford University, Stanford, CA, USA. ⁸⁹Department of Economics, Stanford University, Stanford, CA, USA. ⁹⁰Department of Economics, Stanford University, Stanford, CA, USA. ⁹¹Department of Economics, Stanford University, Stanford, CA, USA. ⁹²Department of Economics, Stanford University, Stanford, CA, USA. ⁹³Department of Economics, Stanford University, Stanford, CA, USA. ⁹⁴Department of Economics, Stanford University, Stanford, CA, USA. ⁹⁵Department of Economics, Stanford University, Stanford, CA, USA. ⁹⁶Department of Economics, Stanford University, Stanford, CA, USA. ⁹⁷Department of Economics, Stanford University, Stanford, CA, USA. ⁹⁸Department of Economics, Stanford University, Stanford, CA, USA. ⁹⁹Department of Economics, Stanford University, Stanford, CA, USA. ¹⁰⁰Department of Economics, Stanford University, Stanford, CA, USA. ¹⁰¹Department of Economics, Stanford University, Stanford, CA, USA. ¹⁰²Department of Economics, Stanford University, Stanford, CA, USA. ¹⁰³Department of Economics, Stanford University, Stanford, CA, USA. ¹⁰⁴Department of Economics, Stanford University, Stanford, CA, USA. ¹⁰⁵Department of Economics, Stanford University, Stanford, CA, USA. ¹⁰⁶Department of Economics, Stanford University, Stanford, CA, USA. ¹⁰⁷Department of Economics, Stanford University, Stanford, CA, USA. ¹⁰⁸Department of Economics, Stanford University, Stanford, CA, USA. ¹⁰⁹Department of Economics, Stanford University, Stanford, CA, USA. ¹¹⁰Department of Economics, Stanford University, Stanford, CA, USA. ¹¹¹Department of Economics, Stanford University, Stanford, CA, USA. ¹¹²Department of Economics, Stanford University, Stanford, CA, USA. ¹¹³Department of Economics, Stanford University, Stanford, CA, USA. ¹¹⁴Department of Economics, Stanford University, Stanford, CA, USA. ¹¹⁵Department of Economics, Stanford University, Stanford, CA, USA. ¹¹⁶Department of Economics, Stanford University, Stanford, CA, USA. ¹¹⁷Department of Economics, Stanford University, Stanford, CA, USA. ¹¹⁸Department of Economics, Stanford University, Stanford, CA, USA. ¹¹⁹Department of Economics, Stanford University, Stanford, CA, USA. ¹²⁰Department of Economics, Stanford University, Stanford, CA, USA. ¹²¹Department of Economics, Stanford University, Stanford, CA, USA. ¹²²Department of Economics, Stanford University, Stanford, CA, USA. ¹²³Department of Economics, Stanford University, Stanford, CA, USA. ¹²⁴Department of Economics, Stanford University, Stanford, CA, USA. ¹²⁵Department of Economics, Stanford University, Stanford, CA, USA. ¹²⁶Department of Economics, Stanford University, Stanford, CA, USA. ¹²⁷Department of Economics, Stanford University, Stanford, CA, USA. ¹²⁸Department of Economics, Stanford University, Stanford, CA, USA. ¹²⁹Department of Economics, Stanford University, Stanford, CA, USA. ¹³⁰Department of Economics, Stanford University, Stanford, CA, USA. ¹³¹Department of Economics, Stanford University, Stanford, CA, USA. ¹³²Department of Economics, Stanford University, Stanford, CA, USA. ¹³³Department of Economics, Stanford University, Stanford, CA, USA. ¹³⁴Department of Economics, Stanford University, Stanford, CA, USA. ¹³⁵Department of Economics, Stanford University, Stanford, CA, USA. ¹³⁶Department of Economics, Stanford University, Stanford, CA, USA. ¹³⁷Department of Economics, Stanford University, Stanford, CA, USA. ¹³⁸Department of Economics, Stanford University, Stanford, CA, USA. ¹³⁹Department of Economics, Stanford University, Stanford, CA, USA. ¹⁴⁰Department of Economics, Stanford University, Stanford, CA, USA. ¹⁴¹Department of Economics, Stanford University, Stanford, CA, USA. ¹⁴²Department of Economics, Stanford University, Stanford, CA, USA. ¹⁴³Department of Economics, Stanford University, Stanford, CA, USA. ¹⁴⁴Department of Economics, Stanford University, Stanford, CA, USA. ¹⁴⁵Department of Economics, Stanford University, Stanford, CA, USA. ¹⁴⁶Department of Economics, Stanford University, Stanford, CA, USA. ¹⁴⁷Department of Economics, Stanford University, Stanford, CA, USA. ¹⁴⁸Department of Economics, Stanford University, Stanford, CA, USA. ¹⁴⁹Department of Economics, Stanford University, Stanford, CA, USA. ¹⁵⁰Department of Economics, Stanford University, Stanford, CA, USA. ¹⁵¹Department of Economics, Stanford University, Stanford, CA, USA. ¹⁵²Department of Economics, Stanford University, Stanford, CA, USA. ¹⁵³Department of Economics, Stanford University, Stanford, CA, USA. ¹⁵⁴Department of Economics, Stanford University, Stanford, CA, USA. ¹⁵⁵Department of Economics, Stanford University, Stanford, CA, USA. ¹⁵⁶Department of Economics, Stanford University, Stanford, CA, USA. ¹⁵⁷Department of Economics, Stanford University, Stanford, CA, USA. ¹⁵⁸Department of Economics, Stanford University, Stanford, CA, USA. ¹⁵⁹Department of Economics, Stanford University, Stanford, CA, USA. ¹⁶⁰Department of Economics, Stanford University, Stanford, CA, USA. ¹⁶¹Department of Economics, Stanford University, Stanford, CA, USA. ¹⁶²Department of Economics, Stanford University, Stanford, CA, USA. ¹⁶³Department of Economics, Stanford University, Stanford, CA, USA. ¹⁶⁴Department of Economics, Stanford University, Stanford, CA, USA. ¹⁶⁵Department of Economics, Stanford University, Stanford, CA, USA. ¹⁶⁶Department of Economics, Stanford University, Stanford, CA, USA. ¹⁶⁷Department of Economics, Stanford University, Stanford, CA, USA. ¹⁶⁸Department of Economics, Stanford University, Stanford, CA, USA. ¹⁶⁹Department of Economics, Stanford University, Stanford, CA, USA. ¹⁷⁰Department of Economics, Stanford University, Stanford, CA, USA. ¹⁷¹Department of Economics, Stanford University, Stanford, CA, USA. ¹⁷²Department of Economics, Stanford University, Stanford, CA, USA. ¹⁷³Department of Economics, Stanford University, Stanford, CA, USA. ¹⁷⁴Department of Economics, Stanford University, Stanford, CA, USA. ¹⁷⁵Department of Economics, Stanford University, Stanford, CA, USA. ¹⁷⁶Department of Economics, Stanford University, Stanford, CA, USA. ¹⁷⁷Department of Economics, Stanford University, Stanford, CA, USA. ¹⁷⁸Department of Economics, Stanford University, Stanford, CA, USA. ¹⁷⁹Department of Economics, Stanford University, Stanford, CA, USA. ¹⁸⁰Department of Economics, Stanford University, Stanford, CA, USA. ¹⁸¹Department of Economics, Stanford University, Stanford, CA, USA. ¹⁸²Department of Economics, Stanford University, Stanford, CA, USA. ¹⁸³Department of Economics, Stanford University, Stanford, CA, USA. ¹⁸⁴Department of Economics, Stanford University, Stanford, CA, USA. ¹⁸⁵Department of Economics, Stanford University, Stanford, CA, USA. ¹⁸⁶Department of Economics, Stanford University, Stanford, CA, USA. ¹⁸⁷Department of Economics, Stanford University, Stanford, CA, USA. ¹⁸⁸Department of Economics, Stanford University, Stanford, CA, USA. ¹⁸⁹Department of Economics, Stanford University, Stanford, CA, USA. ¹⁹⁰Department of Economics, Stanford University, Stanford, CA, USA. ¹⁹¹Department of Economics, Stanford University, Stanford, CA, USA. ¹⁹²Department of Economics, Stanford University, Stanford, CA, USA. ¹⁹³Department of Economics, Stanford University, Stanford, CA, USA. ¹⁹⁴Department of Economics, Stanford University, Stanford, CA, USA. ¹⁹⁵Department of Economics, Stanford University, Stanford, CA, USA. ¹⁹⁶Department of Economics, Stanford University, Stanford, CA, USA. ¹⁹⁷Department of Economics, Stanford University, Stanford, CA, USA. ¹⁹⁸Department of Economics, Stanford University, Stanford, CA, USA. ¹⁹⁹Department of Economics, Stanford University, Stanford, CA, USA. ²⁰⁰Department of Economics, Stanford University, Stanford, CA, USA. ²⁰¹Department of Economics, Stanford University, Stanford, CA, USA. ²⁰²Department of Economics, Stanford University, Stanford, CA, USA. ²⁰³Department of Economics, Stanford University, Stanford, CA, USA. ²⁰⁴Department of Economics, Stanford University, Stanford, CA, USA. ²⁰⁵Department of Economics, Stanford University, Stanford, CA, USA. ²⁰⁶Department of Economics, Stanford University, Stanford, CA, USA. ²⁰⁷Department of Economics, Stanford University, Stanford, CA, USA. ²⁰⁸Department of Economics, Stanford University, Stanford, CA, USA. ²⁰⁹Department of Economics, Stanford University, Stanford, CA, USA. ²¹⁰Department of Economics, Stanford University, Stanford, CA, USA. ²¹¹Department of Economics, Stanford University, Stanford, CA, USA. ²¹²Department of Economics, Stanford University, Stanford, CA, USA. ²¹³Department of Economics, Stanford University, Stanford, CA, USA. ²¹⁴Department of Economics, Stanford University, Stanford, CA, USA. ²¹⁵Department of Economics, Stanford University, Stanford, CA, USA. ²¹⁶Department of Economics, Stanford University, Stanford, CA, USA. ²¹⁷Department of Economics, Stanford University, Stanford, CA, USA. ²¹⁸Department of Economics, Stanford University, Stanford, CA, USA. ²¹⁹Department of Economics, Stanford University, Stanford, CA, USA. ²²⁰Department of Economics, Stanford University, Stanford, CA, USA. ²²¹Department of Economics, Stanford University, Stanford, CA, USA. ²²²Department of Economics, Stanford University, Stanford, CA, USA. ²²³Department of Economics, Stanford University, Stanford, CA, USA. ²²⁴Department of Economics, Stanford University, Stanford, CA, USA. ²²⁵Department of Economics, Stanford University, Stanford, CA, USA. ²²⁶Department of Economics, Stanford University, Stanford, CA, USA. ²²⁷Department of Economics, Stanford University, Stanford, CA, USA. ²²⁸Department of Economics

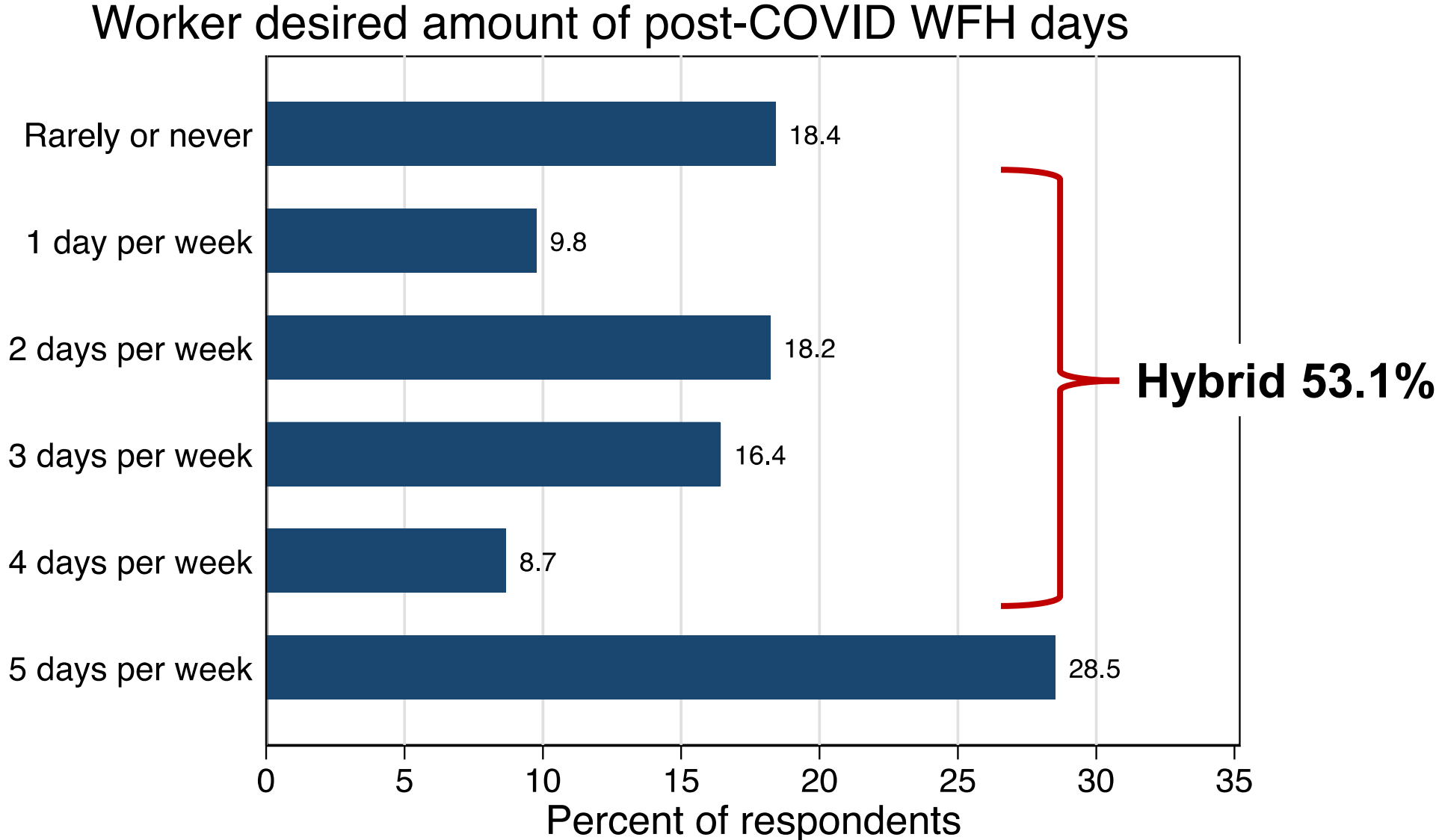
Going to cover three sections

>>>> Current state of working from home

>>>> Thoughts on managing hybrid and remote

>>>> Four impacts on the economy

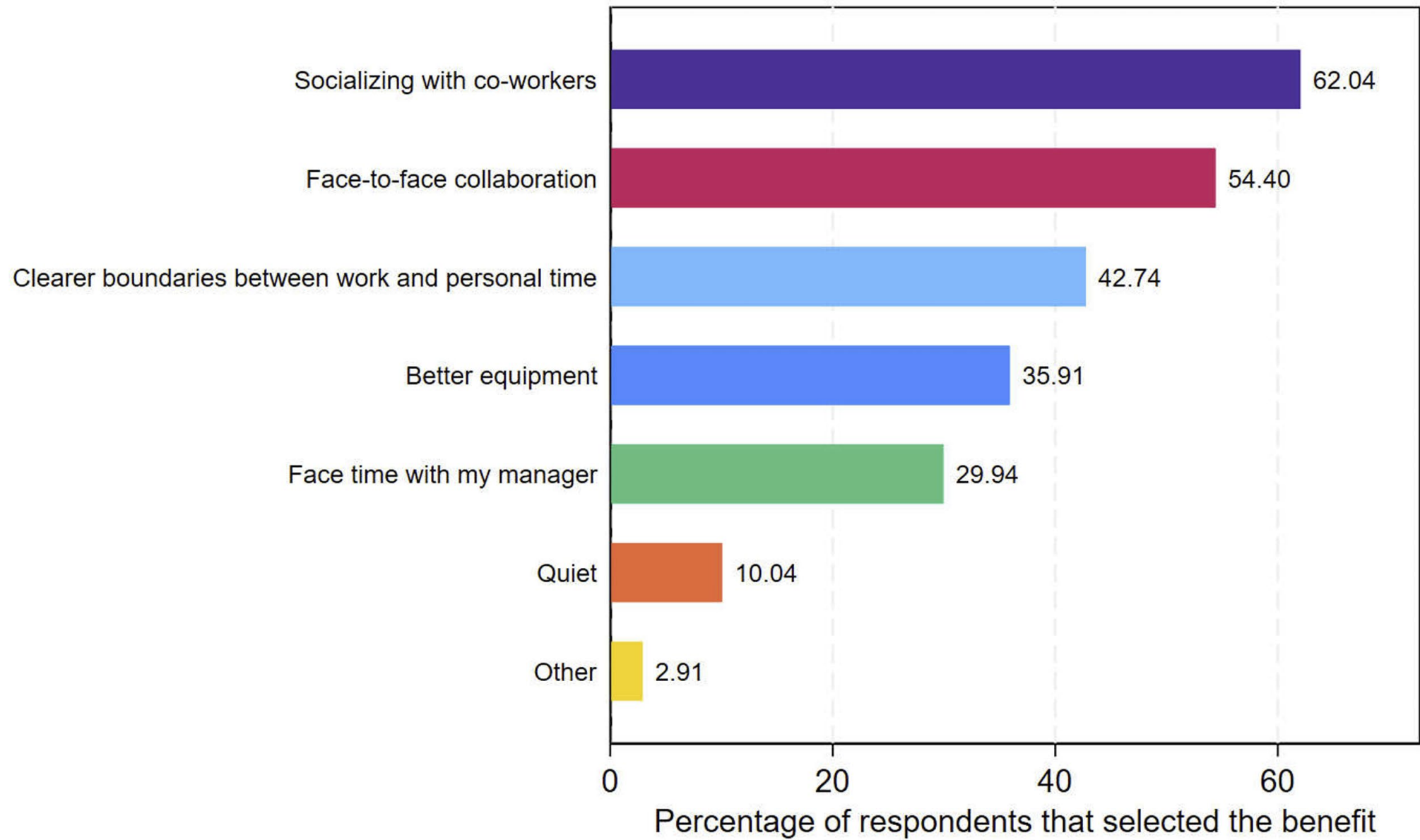
Managing this is *hard* - there is a wide variation in what employees



Sample: Full-time wage and salary employees who are able to WFH. N = 11439

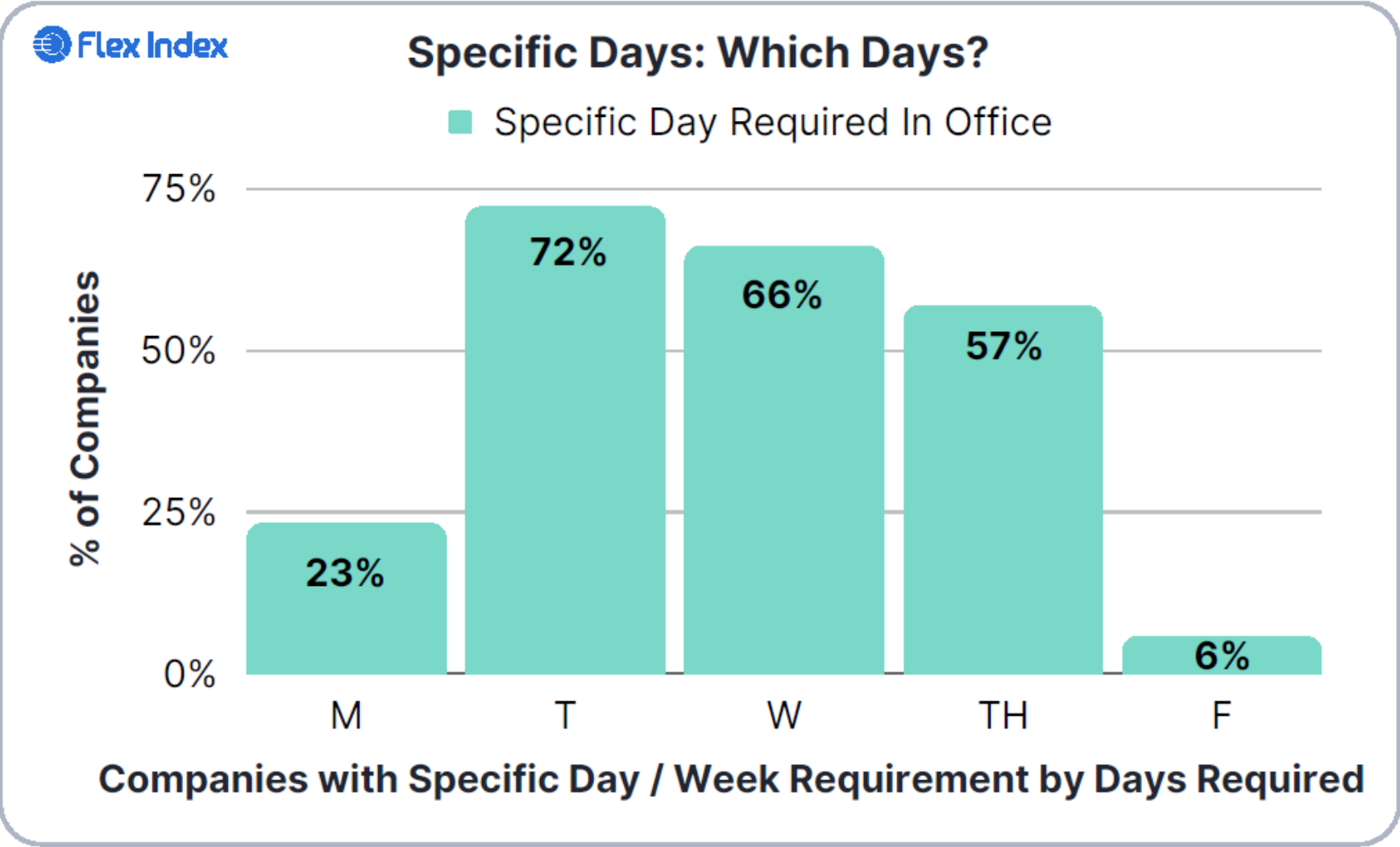
1) Coordination – office benefits are being with co-workers

Qu: “What are the top three benefits of working on your employer’s business premises?”




Notes: Among workers that have work-from home experience during the COVID-19 pandemic. Responses to the question “What are the top benefits of working on your employer’s business premises? Please choose up to three”. Sample of N=20,732 workers in 34 countries surveyed in April-May 2023. All values are available at <https://bit.ly/Figures-GSWA-2023>

Coordination generates the hybrid squeeze into Tuesday to Thursday



Source: [Flex Index](https://flex.scoopforwork.com) (flex.scoopforwork.com) employee surveys and publicly available data on companies with a specific day / week office requirement. N = 229 companies. The Flex Index is presented by [Scoop](https://scoopforwork.com) (scoopforwork.com).

A photograph of a modern office interior. In the foreground, a woman with short blonde hair is seen from the side, working at a desk. Behind her, a man with a beard and glasses, wearing a pink polo shirt, is seated at a desk with a large white monitor, looking at his laptop. To his right, another person with curly hair is seated at a desk, facing away from the camera. Further back, a man in a blue shirt is seated at a desk, also facing away. The office features large windows with black frames, wooden paneling on the walls and desks, and various office equipment like monitors, keyboards, and plants. The lighting is bright and natural, coming from the windows.


- 

1º

Porte A

	Out	Nov	Dez	4Tri	Jan	Fev	Mar	1Tri
Total Segmentos	61,53	83,64	79,17	73,25	52,27	0,00	0,00	34,37
Total PF	70,15	76,99	75,13	68,82	42,11	0,00	0,00	26,86
Preferencial	58,09	86,85	86,87	76,92	15,16	0,00	0,00	13,43

Data: 00/00/2000



1º

SEGMENTO


	PESO	META	REAL	%	PONTOS	OPORT.
Cientes						
Incr. Base Ativa	0	28	146	150,0	0,00	0,0
Incr. Clientes c/ Ofer...	0	153	0	0,0	0,00	0,0
Abertura Contas PF	0	120	24	11,3	0,00	0,0
Abertura Contas Busine...	0	6	0	0,0	0,00	0,0
Aquisição Com Of. Bási...	0	136	0	0,0	0,00	0,0
Conversão Of. Básica	0	313	1	0,0	0,00	0,0
Vendas						
Super Auto	0	5	2	40,0	0,00	0,0
Seguro Vida	0	47	26	55,3	0,00	0,0
Seguro Residencial	0	25	8	32,0	0,00	0,0
Seguro Auto	0	6	1	16,7	0,00	0,0
Seguro Vida Master	0	2	0	0,0	0,00	0,0
Cartões	0	140	75	53,6	0,00	0,0
CP Protegido	0	295	70	23,7	0,00	0,0
Capitalização	0	58	6	10,3	0,00	0,0
Novas Cobranças Ativas	0	4	2	50,0	0,00	0,0
Títulos Liquidados	0	5.301	1.815	34,2	0,00	0,0
Captações - Captação Líquida						
Captação Alvo	0	1.371	1.072	78,2	0,00	0,0
Previdência Foco PF	0	184	599	325,6	0,00	0,0
Captação Demais	0	766	-3.001	-391,8	0,00	0,0
Depósito à Vista / Float						
DAV / Float	0	100	1.708	999,0	0,00	0,0
Empréstimos - Incr. Saldo Médio						
Empréstimos Alvo PF	0	543	-118	-21,7	0,00	0,0

TOTAL SEGMENTOS 52,27

PERÍODO Jan. Fev Mar 1Tri

Tri: 10% Jan: 27%

Voltar
Imprimir



Going to cover three sections

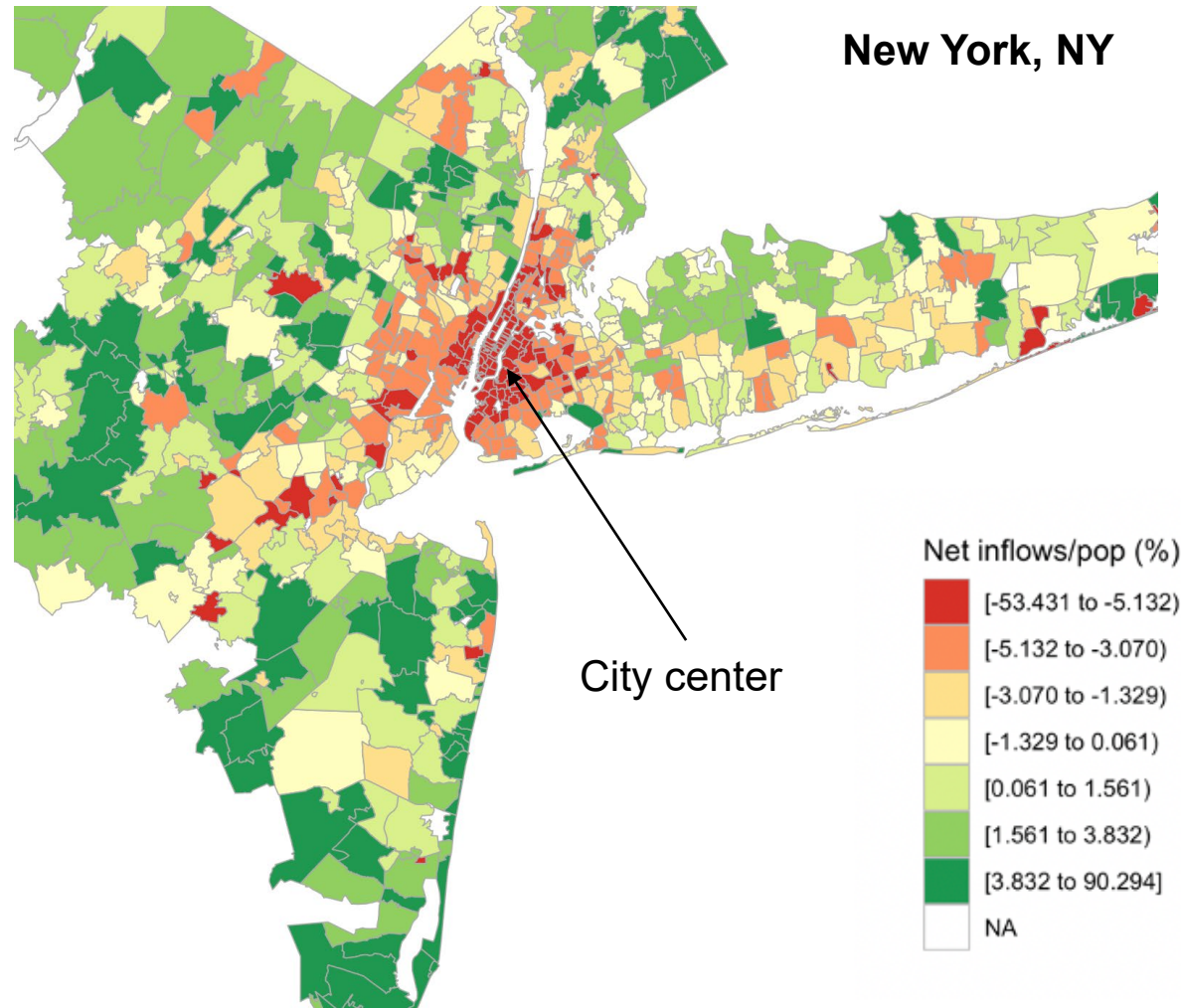
>>>> Current state of working from home

>>>> Thoughts on managing hybrid and remote

>>>> Four impacts on the economy

1) The Donut Effect: almost 1m people have left US big city centers

Cumulative net flows Feb 2020 - June 2023 as % of population

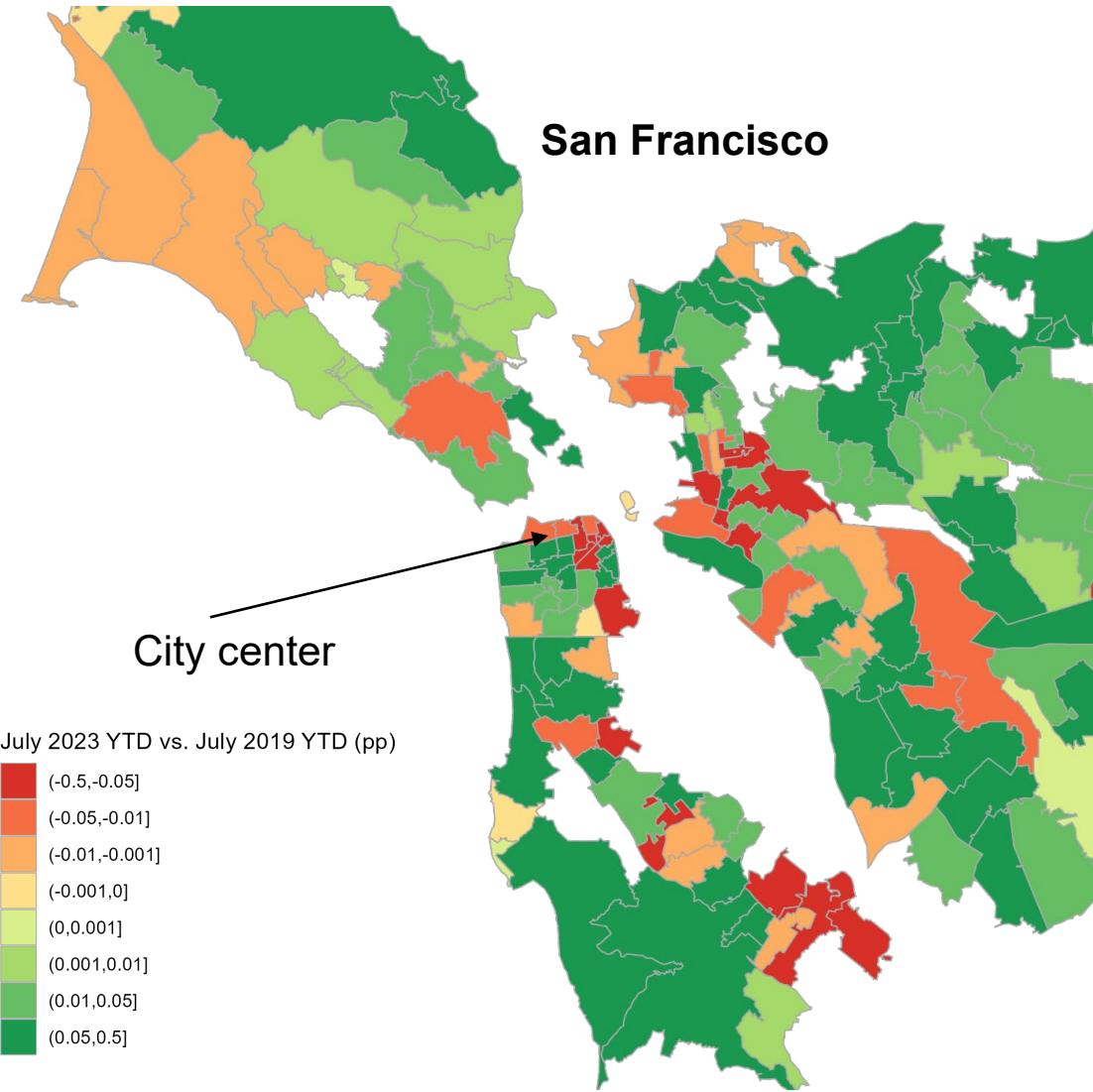


Source: Arjun Ramani and Nicholas Bloom “The Donut Effect”, NBER Working Paper 2021 (updated 2023) using US Postal Service zip-code Change of Address Data <https://nbloom.people.stanford.edu/sites/g/files/sbiybj4746/f/w28876.pdf>

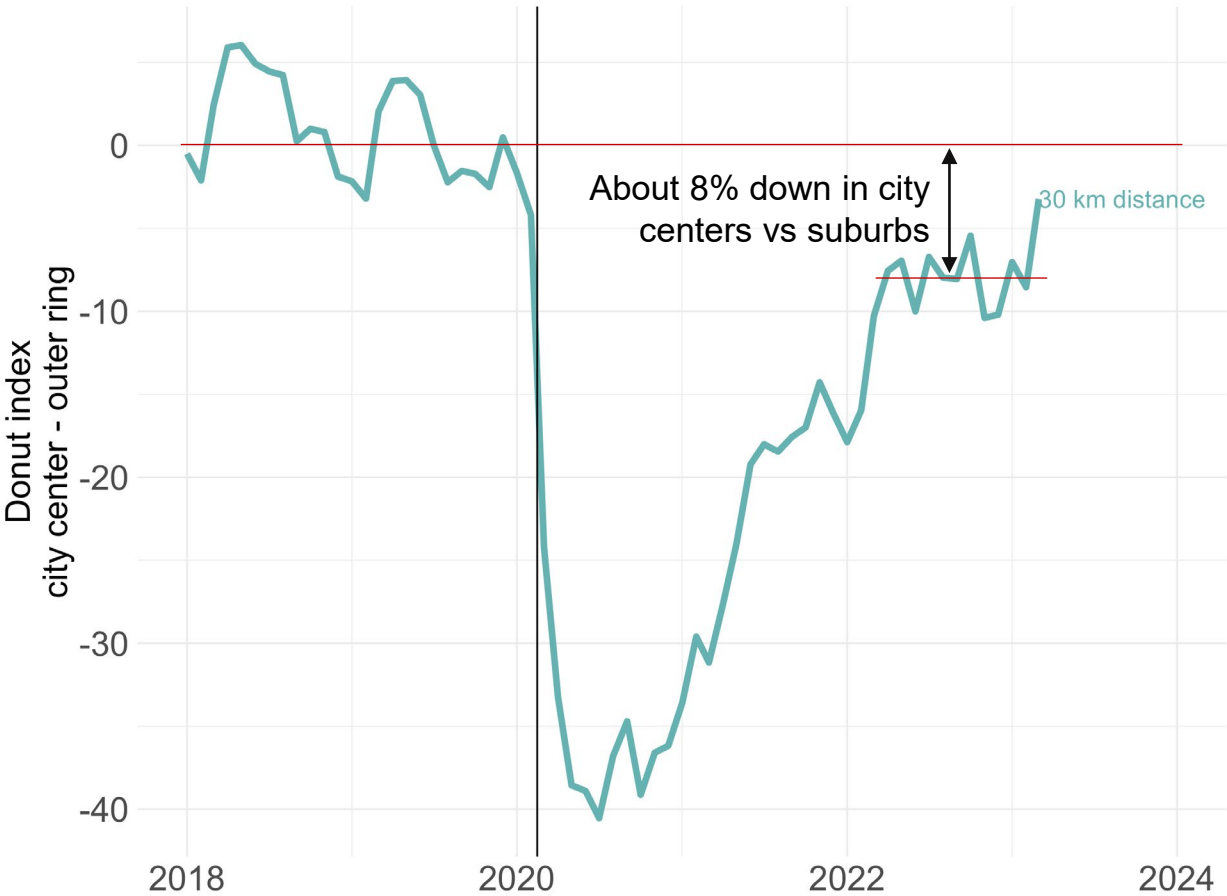
The Donut-Effect is also boosting suburban retail spending



MasterCard spending change heat map

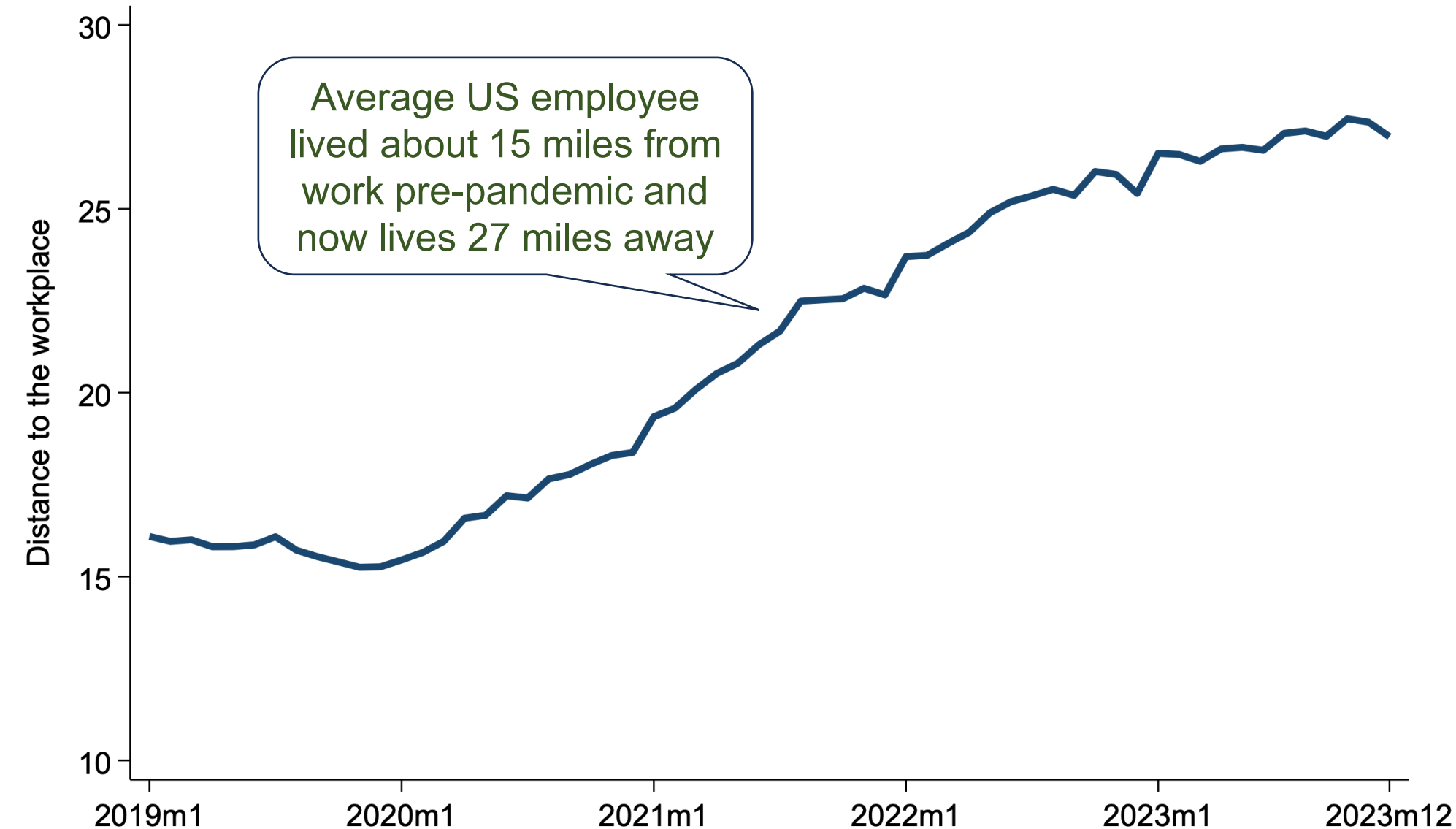


Top 12 largest US cities retail spend, city center less suburb



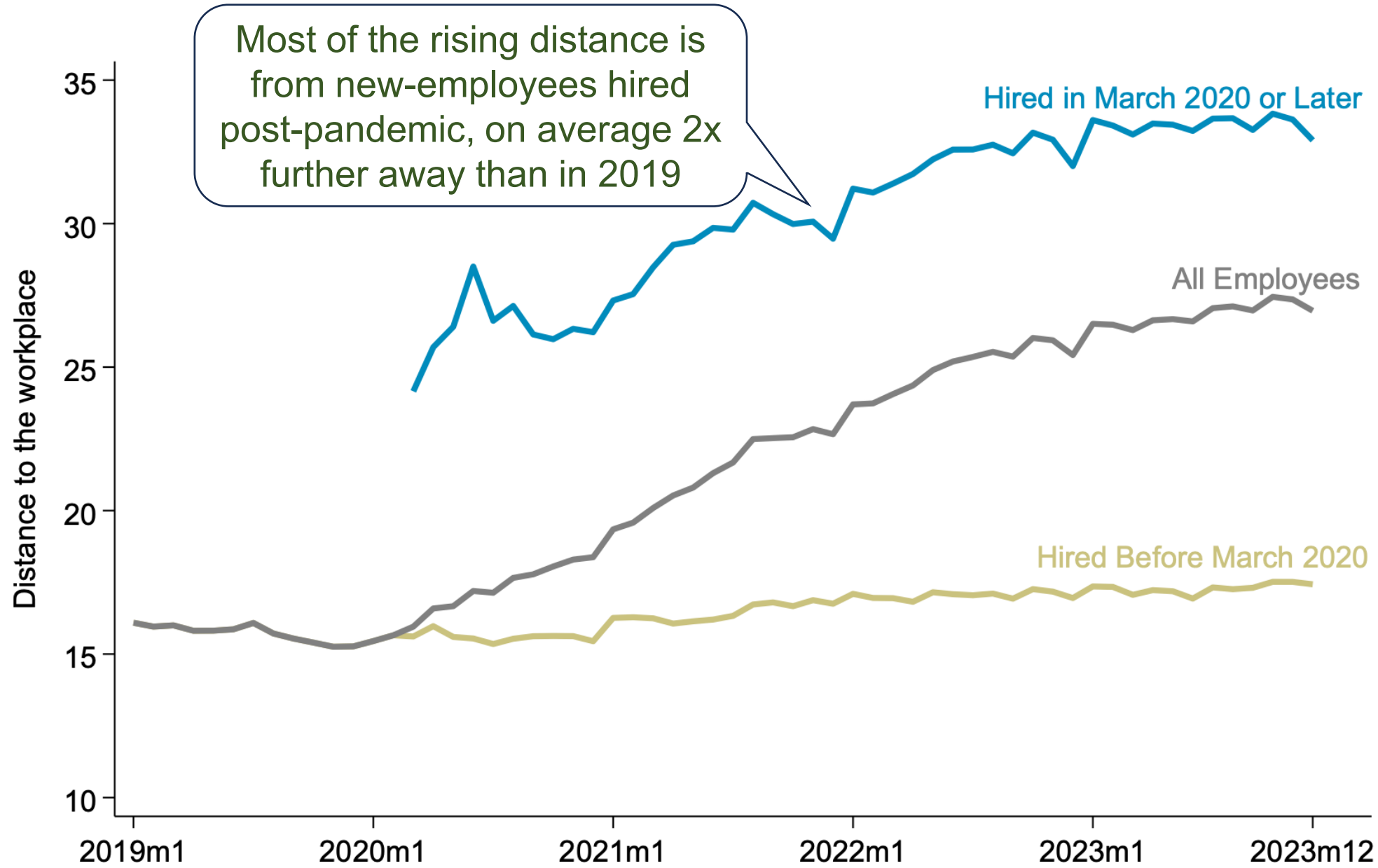
Notes: Constructed using Mastercard spending data. Each spending index is normalized such that the average 2019 value is 100; thus the difference has an average value of 0 in 2019. The level of the index can be interpreted as the relative growth of the city center vs the outer ring. Source Ramani, Alcedo and Bloom (2023)

2) Employees are living further from work



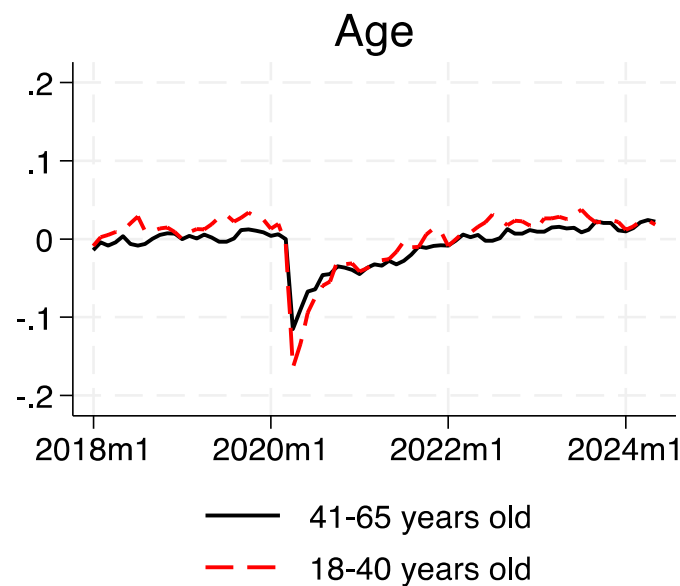
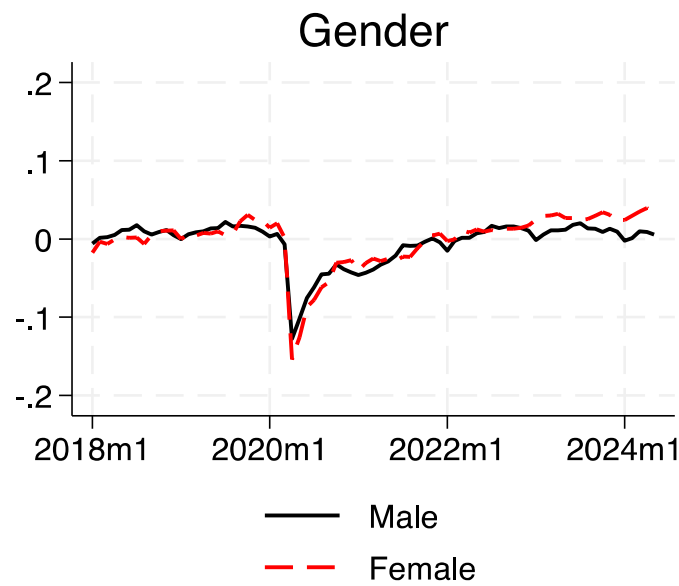
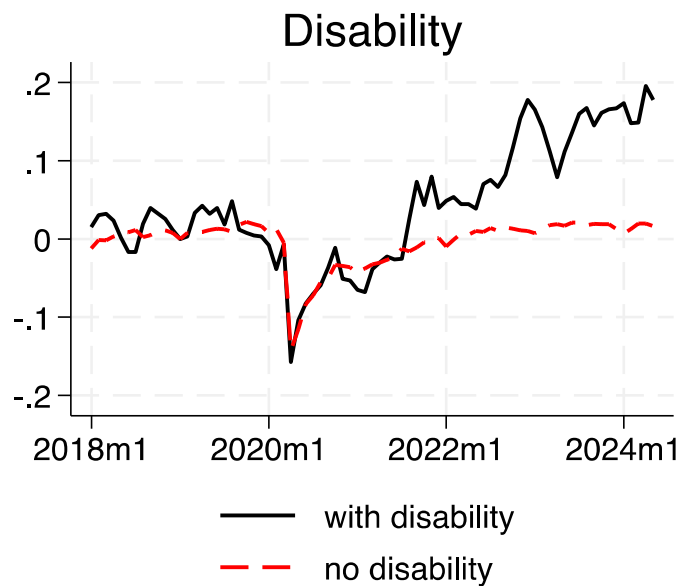
Notes: The sample contains employees of 5,793 firms in a balanced panel of firms. Employee-level data are reweighted to match the CPS distribution by (age bin) X sex X major industry. Distance from home to employer location is winsorized at 500 miles. Authors' calculations using Gusto payroll data.

Most of this is new hires - WFH has expanded firm's hiring circle

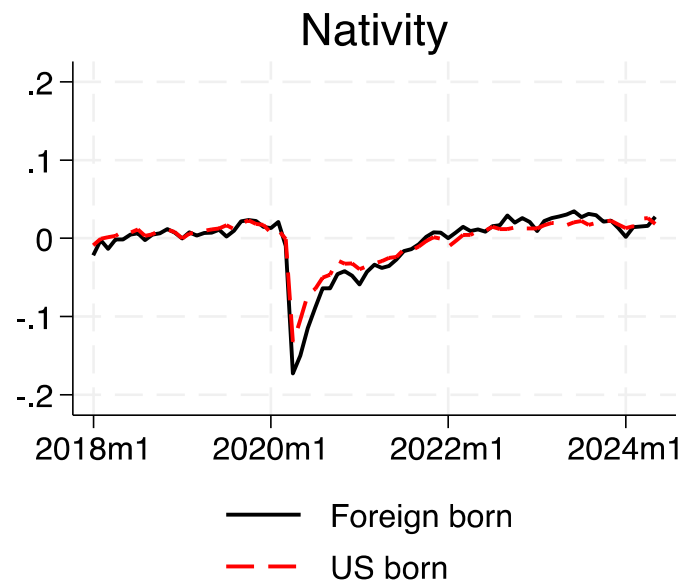
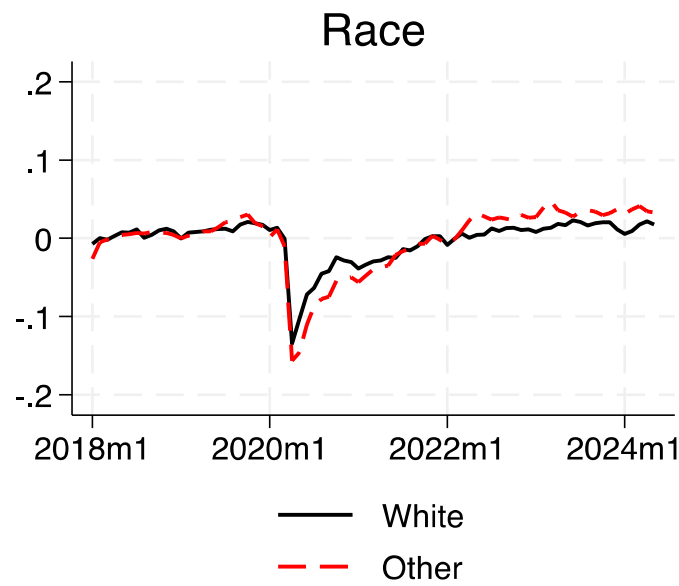
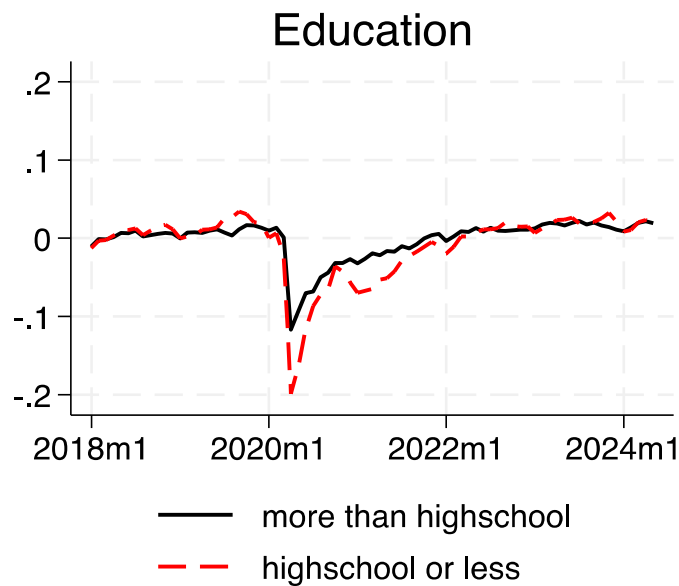


Notes: The sample contains employees of 5,793 firms in a balanced panel of firms in the Gusto payroll data. Employee-level data are reweighted to match the CPS distribution by (age bin) X sex X major industry. Source: Authors' calculations using Gusto payroll data.

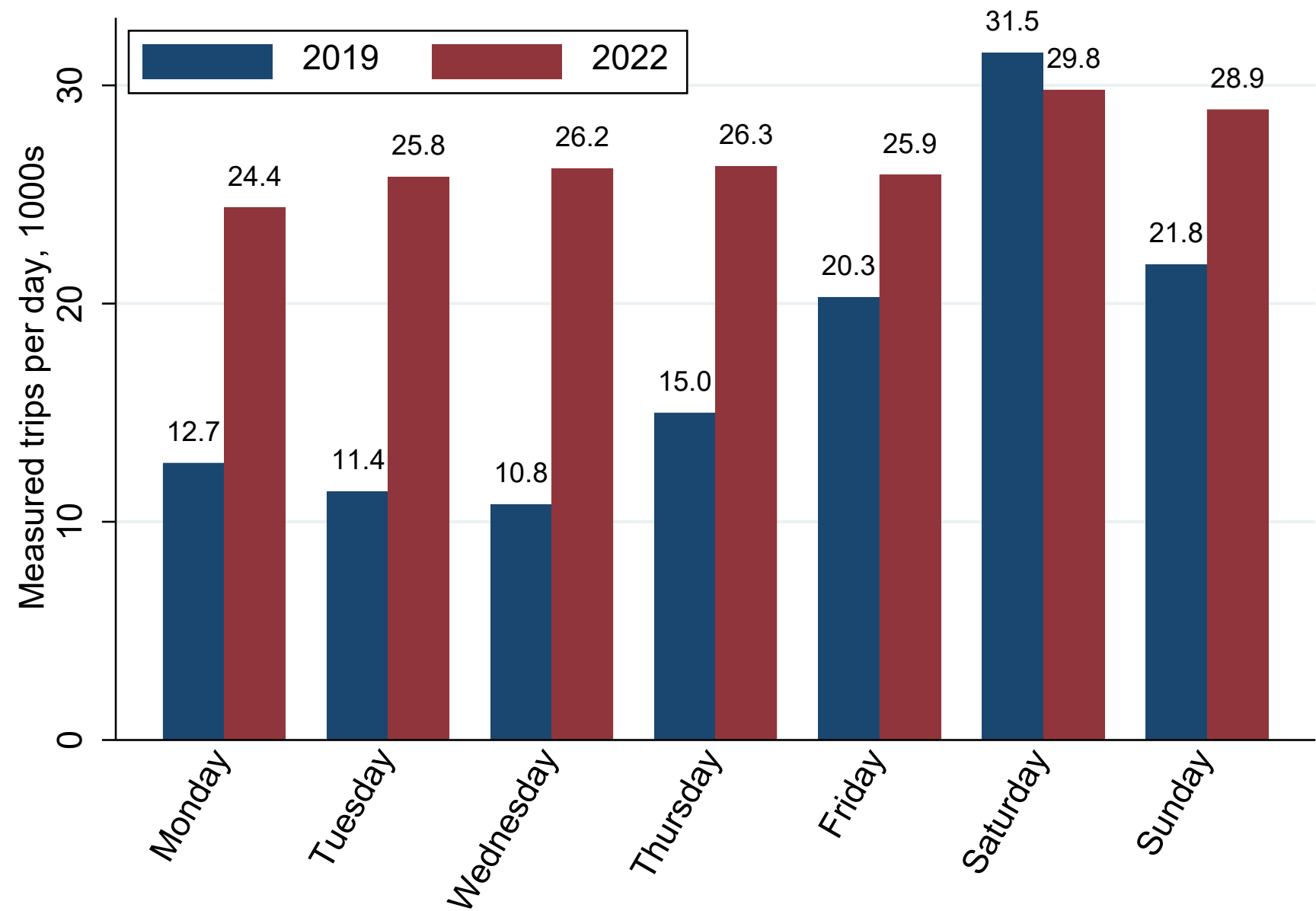
3) Disability employment has increased by about 2m post pandemic



Note: Graphs of the percent change in the employment rate relative to January 2019 by disability, gender, age, race, education and native/foreign born (18-64 years old). Data from the US Current Population Survey. Disability includes only physical disabilities. From “*Working from home and disability employment*” by Nicholas Bloom, Gordon Dahl and Dan-Olof Rooth, NBER Working Paper 32943



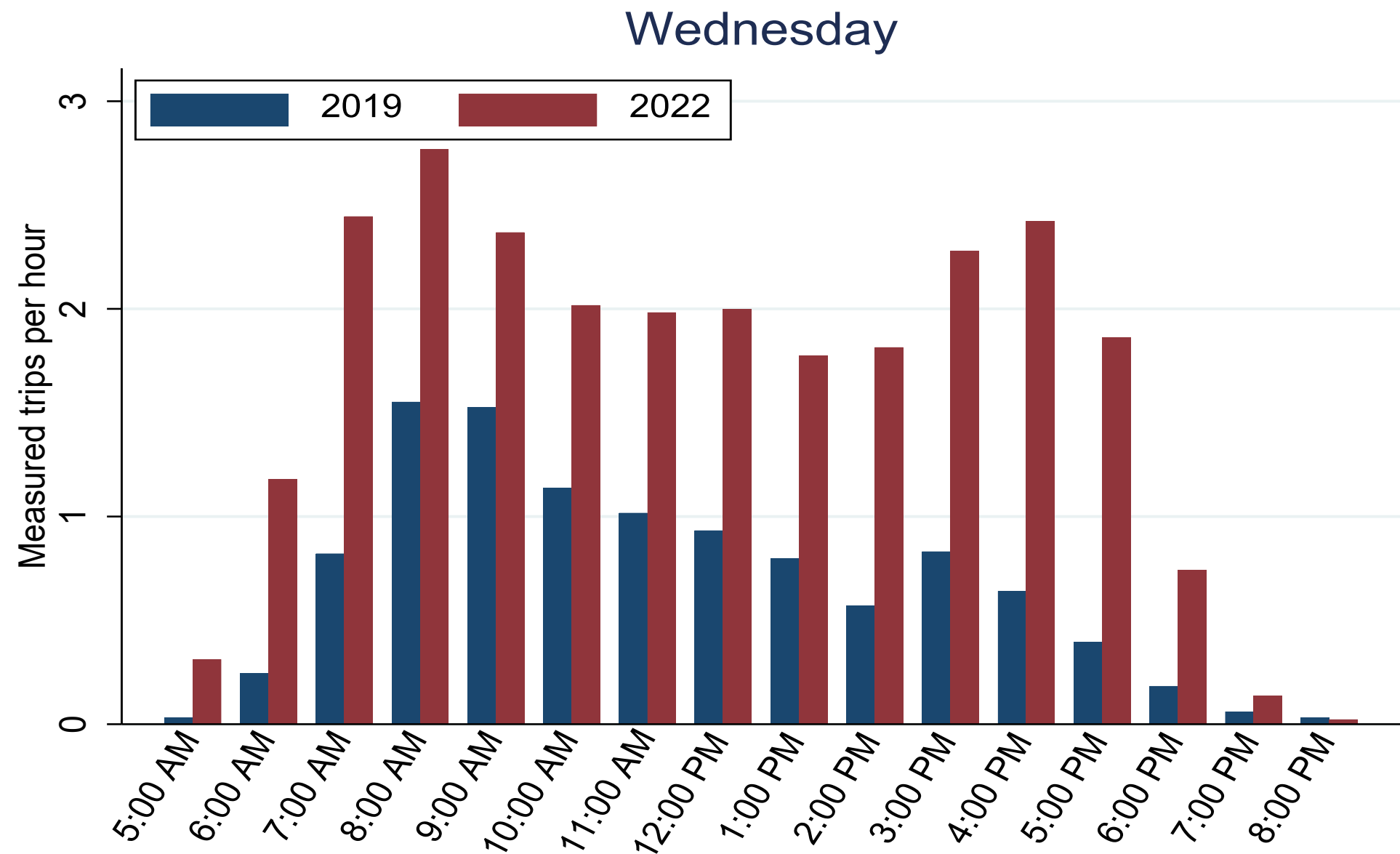
(4) “Golf effect” - weekday leisure boom



Note: Data for August 2019 and August 2022 for a sample of trips. Those included are trips in the INRIX database, which includes trips in vehicles with GPS and phones with location tracking turned-on. The trip needs to be to one of the 3,400 satellite identified gold courses and to have lasted more than two hours. We estimate we sample about 5% of total golf trips.



...the weekday increase happened throughout the day - for example a 178% increase at 3pm on Wednesday



Note: Data for August 2019 and August 2022 for a sample of trips. Those included are trips in the INRIX database, which includes trips in vehicles with GPS and phones with location tracking turned-on. The trip needs to be to one of the 3,400 satellite identified gold courses and to have lasted more than two hours. We estimate we sample about 5% of total golf trips.

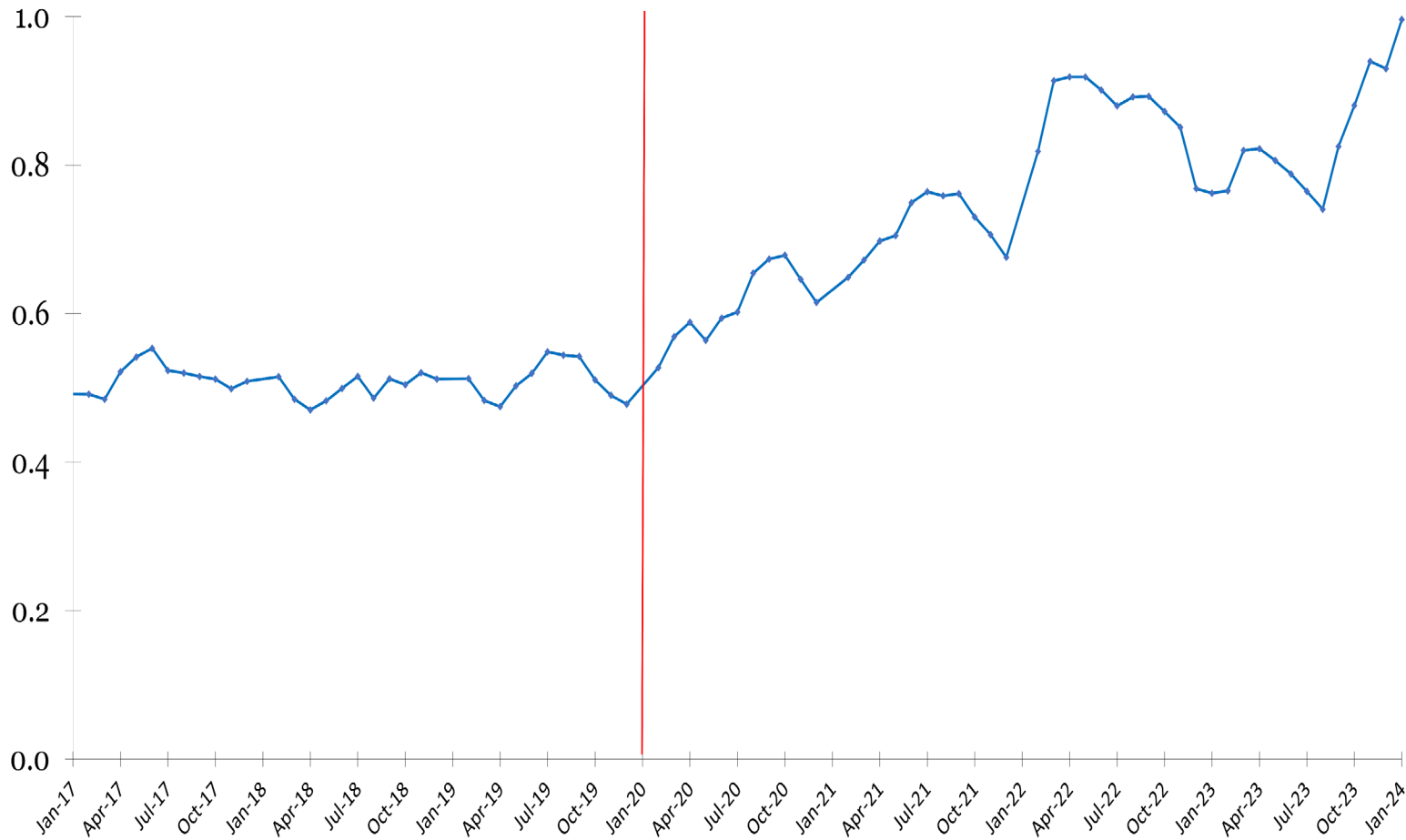


The “Golf-effect” will boost weekdays for many ‘leisure’ activities

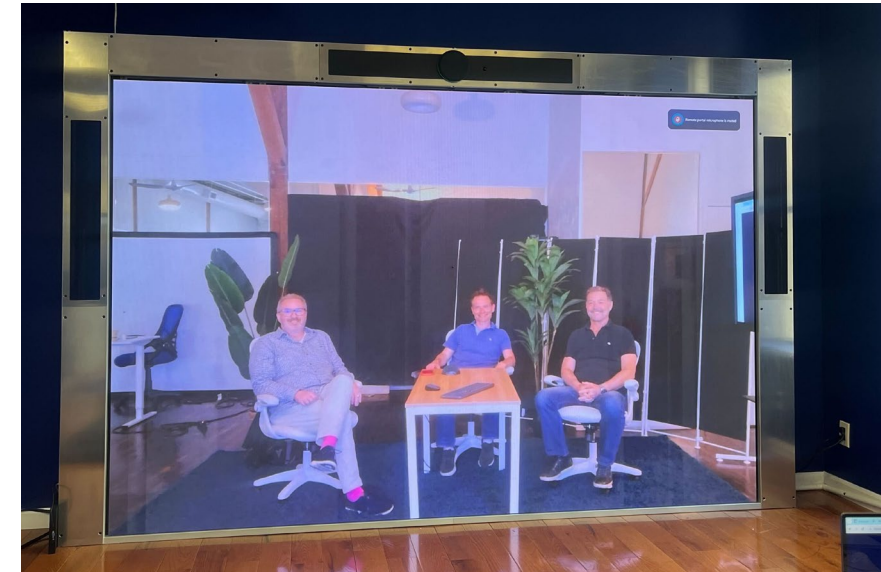


Looking 5+ years out better technology will boost WFH

Share of New Patent Applications Supporting WFH



New WFH technologies are being rapidly developed as the market for WFH products has increased 5x. For example, better video, screens, virtual reality and holograms etc



Source: US Patent and Trademark Office new patent application files. Details in Bloom, Nicholas, Codreanu, Mihai, Steven J. Davis, and Yulia Zhestkova from May 2024. "[COVID-19 Shifted Patent Applications toward Technologies that Support Working from Home.](#)"

Conclusions

WFH is here to stay, typically 2 days a week

Managing it is hard – needs coordination and a performance review focus

Impacts wide ranging on cities, transport, retail, technology and golf

