The Evolution of Working from Home

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Summary: Working from home rose five-fold from 2019 to 2023, with 40% of US employees now working remotely at least one day a week. The productivity of remote work depends critically on the mode. Fully remote work is associated with about 10% *lower* productivity than fully in-person work. Challenges with communicating remotely, barriers to mentoring, building culture and issues with self-motivation appear to be factors. But fully remote work can generate even larger cost reductions from space savings and global hiring, making it a popular option for firms. Hybrid working appears to have no impact on productivity but is also popular with firms because it improves employee recruitment and retention. Looking ahead we predict working from home will continue to grow because of the expansion in research and development into new technologies to improve remote working. Hence, the pandemic generated both a one-off jump and a longer-run growth acceleration in working from home.

Working from home has been rising in the United States for many decades, driven by the continuing improvements in technology that enables remote working. As Figure 1a shows back in 1965 around 0.4% of full paid days in the US were worked from home. In the 1960s many of these home-based jobs were in agriculture or craft activities. By the 1990s the work-from-home share had more than doubled to 1% as the person computer started to become available, and quadrupled again at 4.0% by 2016 as the internet became widely available. So even pre-pandemic working from home rates were growing rapidly, doubling roughly every 15 years.

The driving force behind this pre-pandemic growth in working from home was improving technology. In 2019 video-call software like Teams, Webex and Zoom, cloud file-sharing

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packages like Box, Drive and Dropbox, and connectivity software like Asana, Gmail and Slack were widely available facilitating remote work. These technologies are essential for remote work as we know it today, but none of them existed in 2000. Instead, remote work relied on telephone calls and file sharing by email or FTP. Earlier, in the 1980s, telecommunications were even more rudimentary, so remote work typically involving driving or mailing paperwork between home and office locations.

Even against the rapid growth in remote work, the COVID-19 pandemic caused a huge increase in the amount of people working from home. Figure 1b shows that increase using data from the Survey of Working Arrangements and Attitudes (SWAA), the largest monthly survey of US working arrangements running since 2020. Over 60% of days were worked from home in May 2020. In this early-pandemic period social distancing and infection risks meant any employee that could perform their job remotely was working from home. Many others whose job was not possible to do from home didn't work at all, further raising the share of work-from-home days among all workdays. Then, as the pandemic eased over the next three years, levels of remote work dropped and by Summer 2023 they appear to be converging towards about 25% of days. Alongside the SWAA series, Figure 1b shows a separate estimate of the amount of working from homed derived from the Census Household Pulse Survey, which consistently collected work from home data since June 2022. The two series show similar levels and time series variation. Ultimately, the pandemic increased the share of days worked from home from about 5% in 2019 to 25% in 2023, a 5-fold increase, equivalent to about 35 years of pre-pandemic growth.

Of course, not all employees can work from home. Indeed, the US economy, as well as most large organizations, can be split into three different groups of employees distinguished by their working arrangements. Figure 2 shows the relative size of each group. Fully-on-site employees are the most numerous, accounting for about 60% of American employees, and are the lowest paid segment on average. These fully-on-site employees tend to do front-line retail, food services, accommodation, travel, cleaning, security and other in-person jobs that are difficult to do remotely. So, even during the pandemic, employees in these occupations worked almost entirely in person (after the 2020 lockdown periods when many didn't work at all). Over time, some of these jobs could become easier to do remotely as technology and practices evolve. Many

family doctors, for example, ran telemedicine days during the pandemic so patients could get advice, renew prescriptions, obtain test results, etc., using videocalls.

The second group, which we describe as doing "hybrid working from home", is the highest paid group on average, and accounts for nearly 30% of employees. They typically work from home 2 or 3 days a week and commute to business premises the rest of the week. The most common pattern within this group is working from the office Tuesday to Thursday, anchored around heavily in-person activities like meetings, presentations, training, and lunches. On Monday and Friday employees work from home and focus on quieter individual activities. Hybrid employees are generally in graduate and professional jobs, especially in middle and senior management positions of larger firms.

The third group of employees work fully remotely. They tend to work in IT-support, call-center, payroll, HR, or benefits jobs that require more limited interaction. These jobs are mostly computer based, often involving mostly individual tasks, and usually easily monitored. Just over 10% of US employees were working fully remotely by Summer 2023. Earlier in the pandemic, a far larger share of workers (and workdays) was fully remote, including many professionals and managers. But as social distancing restrictions and practices declined, senior managers asked many employees, especially those in team-focused jobs, to return to their offices on a hybrid schedule. We expect the number of fully remote jobs to continue declining in the longer term. Some fully remote jobs will relocate overseas as firms exploit lower labor costs in countries like Mexico, India, and the Philippines. Other jobs may be automated by artificial intelligence, which increasingly can perform routine tasks in HR, payroll, and call center positions.

Most medium and large private and public sector organizations have workers in each of the three groups above. Middle and senior managers often operate on a hybrid schedule, while front line staff in retail, manufacturing, security, accommodations, transport, and cleaning work fully in person. A range of support staff in HR, finance, IT, and call support work fully remotely. Thus, there is a new dimension along which workplace perks vary across employees, extending the types of within-firm inequality issues that have been highlighted in papers like Card et al. (2013) and Song et al. (2019).

a. International Trends in Working from Home

Obtaining comparable data on working from home across countries is challenging. One source comes from Google Workplace Mobility which, until October 2022, tracked the frequency of Monday-to-Friday trips to workplaces by country and month. In October 2022, workplace trips in the US were down by about 25% from January 2020, which matches the 25% rise in working from home in the Census Household Pulse and SWAA data from Figure 1b. The pattern is similar in Canada and the UK, while Europe[4] (excluding the UK) has a somewhat lower drop in workplace mobility of 21%. Elsewhere, the drops are smaller, for example, in Australia workplace mobility was 9% below January 2020 and in Developed Asia[5] it was just 6% below.

The second source on remote work comes from the Global Survey of Working Arrangements (see Aksoy et al., 2022). Focusing on employed college graduates, the G-SWA reveals that across North America and Europe, workers do about 2 days of remote work per week on average, with closer to 1 day per week in Asia.

There are a variety of explanations for why working from home levels vary across countries and regions even after the pandemic. US homes tend to be larger and can accommodate a home-office more often than in other regions, making it easier to work remotely. European and Asian houses and apartments are often smaller, so space may limit worker's ability to work remotely. Aksoy et al. (2022) show that countries with longer and stricter lockdowns had higher levels of current and planned post-COVID working from home in 2022. Thus, Developed Asia's ability to keep the virus under control for much of 2020 and 2021 could lead to lower rates of adoption due to less experimentation into how to work from home during lockdowns. The industrial structure in the US is also more titled towards technology, finance and business services which are well suited to remote work because of the intensity of computer use. Finally, US firms tend to be the most advanced on performance measurement and evaluation systems (e.g., Scur et al. 2021 and

[4] France, Germany, Italy, Spain, the Netherlands, Sweden, and Portugal
[5] South Korea, Japan, Taiwan, Hong Kong, and Singapore

Lamorgese et al. 2023) that are critical for remote work when employees cannot be directly observed in the office.

b. Variations across industries and regions

Industry and occupation are tightly linked to working from home. Industries with many computer- and office-focused occupations, such as information technology, have extremely high remote working shares as highlighted in Figure 3. Indeed, most well-known examples of fully remote firms include tech firms like Yelp, AirBnB and Upwork. Elsewhere in tech, Meta (then known as Facebook), Shopify and Twitter were among the first large companies to commit to some degree of permanent remote work early in the pandemic in May 2020. Finance and other professional and business services industries also have high levels of remote work, although somewhat behind information/tech. At the other end, workers in retail, manufacturing, hospitality, food services, and transport have some of the lowest levels of remote work. A high share of occupations in these industries do mostly in-person work, such as in-store sales, production-line work, food-service preparation, and hospitality work. Management and professional staff in these industries also tend to do more in-person work than similar workers in other industries, to avoid having stark differences in working arrangements with their front-line employees.

Given the skew of remote work towards technology and business services it is perhaps not surprising that remote work is highly concentrated in higher density locations, such as cities and suburbs than in more sparsely populated places and rural areas, as shown in Figure 4. Going from a zip code with a population density of 50,000 persons per square mile, such as South Manhattan, to a zip code with around 100 persons per square mile, such as in Enid Oklahoma, we see the percent of days worked from home fall from about 50% to 20%. About half of that drop can be explained by the industry, demographic and educational profile of those locations, so much of the spatial distribution of working from home comes from differences in the mix of economic activities and people across urban and rural areas. (Buckman et al. 2023).

c. Technology and the Future (Level) of Working from Home

The pandemic-induced surge in working from home appears to have stabilized, with levels of working from home in the US and internationally roughly flat from Fall 2022 onwards. Looking 5, 10, or even 20 years into the future, we expect the amount of working from home to grow faster than in the decades prior to 2020 as supporting technologies improve. An old body of work in economics going back to Schmookler (1966) argues that growing markets create incentives for firms to invest and innovate and thus service that market. The intuition is simple – if a market is larger there are more potential profits from suppling products to the market, and this opportunity induces firms to innovate and invest. The five-fold increase in days worked from home in the US between 2019 and 2023 entails a large increase in the rewards from providing new hardware and software products that support remote work. Bloom, Codreanu, Davis and Zhestkova (2022) show how the number of newly published US patent applications mentioning "working from home", "telework," "remote work," or similar phrases at least three times tripled after the start of the pandemic. Thus, we expect the pandemic will ultimately lead to an increase in the *growth rate* of working from home in the next several decades on top of the persistent increase in the *level* of working from home from about 5% to 25% of working days in the US between 2020 and 2023. Hence, in the short-run of the next one or two years work-from-home levels could mildly drift down, in the longer-run from 2025 onwards we expect working from home levels to revert to their pre-pandemic pattern of gradually growing over time.

2. Working From Home Across Employees

Working from home rates vary heavily across employees. They are highest among college-educated workers in their 30s who have young children. They are also marginally higher for women than men. In this section, we examine some of these key demographic patterns.

a) Education

Probably the single largest single factor explaining variation in working from home is education. There is a strong positive gradient between the amount of WFH and educational attainment, as shown in Figure 5. Employees with a high-school degree or less spend 18% of their days working from home. Those with a graduate degree do so for 37% of their days – more than

double the amount. The reason is college- and graduate-degree holders tend to work in occupations that are heavily computer-based, so are easy to perform remotely. In contrast, employees with only a high-school degree are more likely to be work directly with customers, materials, equipment, or products. As Dingel and Nieman (2020) note, occupation is one of the strongest predictors of whether somebody works from home, with highly educated occupations carrying out activities that are more easily undertaken remotely.

This higher rate of working from home levels among university graduates could be one reason why graduates have seen their pay fall by about 10% compared to non-graduates since the start of the COVID-19 pandemic (Autor et al. 2023). Survey evidence suggests employees value the ability to work from home 2 to 3 days a week as equivalent to about an 8% pay increase (Barrero et al. 2023). Since many jobs held by college graduates and advanced degree holders started offering working from home in 2020, while non-graduate jobs remain mostly fully in-person, the relative supply of college-educated workers has increased. Barrero et al. (2022), further note that high earners ($150,000 per year or more) value this work-from-home amenity more than low earners (below $50,000 per year), by about 5% of their respective current pay. This amenity value enjoyed by more educated, high-earning workers is likely to be one of several forces behind the wage compression documented by Autor et al. (2023), among other shifts in the relative supply of college- and high school-equivalent workers (see, e.g. Abraham and Rendell, 2023).

b) Gender

A second area where there has been extensive discussion around working from home is gender. In Figure 6, using SWAA data we see very little difference in actual WFH levels between female and male workers throughout the pandemic. The average level for women in 2022 was 31.3% compared to 29.6% for men. While this 1.7 percentage-point difference is statistically significant it is small in comparison to the larger trends over time or the differences across education groups.

Buckman et al. (2023) document a larger gender gap in the *desired* level of working from home. Female workers on average want to spend 47% of their working days at home compared to just

43% for men. This gap has persisted throughout the pandemic and arises for workers with and without children under 18. The gender gap in desired WFH days is larger among employees without a bachelor's degree, perhaps because there is less access to childcare in that population.

c) Age

There is a non-monotonic pattern in the level of actual working from home by age, which we can see in Figure 7. Workers in their early 20s, and their 50s and 60s spend a smaller of their paid workdays at home, compared to employees in their 30s and 40s.

Young workers in their 20s often benefit from professional development and mentoring, which is best carried out in person. This age group also likely places a higher value of socializing at work further pushing for more in-person working. They also tend to live in shared apartments, which makes working from home particularly challenging. With, say, four adults sharing one apartment there is usually only one living room to work in during the day. That means other roommates either need to work in their bedroom, or work in a café or other external location.

Older employees in their 50s and 60s are less keen on working from home. Many have spent decades working in person before the pandemic and have no childcare obligations tethering them to their home. This older group also tends to be more senior in the workplace, managing groups or teams, which leads them towards a more in person preference. Indeed, there seems to be a stark divide between managers and other employees in this age group, with managers being notably less keen on working from home. (See Barrero et al., 2023b).

In contrast employees in their 30s and 40s are the most likely to have young children at home, typically have the longest commute across all age groups and, consistent with those two facts, also have the highest preference for working from home.

d) Children

Workers who live with young children on average work from home more often, as we show in Table 1. We regress the percent of days worked from home against several demographic factors. In columns (1) to (3) we include variables discussed earlier – gender, age, and education – and

find significantly higher working from home for women, employees in their 30s, and those with a college degree or more education, matching the results in Figures 6 to 8. In column (4) we add an indicator for the presence of children under 18 years old and find that workers with children work from home about 3.7 p.p. more working than those who do not live with children. Aksoy et al. (2022) also show how workers with young children report higher amenity values for working from home in a broad cross section of countries. Because having young children may be correlated with other demographics like age and education, in the final column we include all demographic variables and controls for (broad) industry and occupation categories. Qualitatively, the result is similar, although the magnitude of the coefficients drop on most variables.

In terms of magnitudes having children is not the most important predictor for whether someone works from home. Education categories have far larger coefficients in Table 1, meaning they are the strongest predictors of individual working from home levels, even when controlling for industry, occupation, and other demographic factors in column (4). Thus, the ability to work from home is primarily a characteristic of the education of the employees, while demographic factors like age, gender and the presence of children playing a secondary role.

3. The Productivity of Working from Home

The impact of working from home on employee productivity is a central issue that has sparked vigorous debate in the academic literature and among businesses, policymakers, and the media. The debate stems from genuine differences of opinion between employees and managers on the productivity of remote work, as Figure 8 shows. We asked each group about the impact of working from home on productivity in 2022 and obtained average effects equal to +7.4% among workers and -3.5% among managers. The figure also provides systematic evidence of the anecdotes often reported in media about misalignment within organizations on the amount of remote work employees are allowed to do and related policies.

But the debate also reflects a confusion of two different modes of remote work. The first is fully remote work, which the research literature has associated with lower productivity on average,

perhaps 5% to 20% depending on the specific metric and study. The second is hybrid working, which is associated with flat or even slightly positive average impacts on productivity.

a. Fully Remote

Fully remote working appears to lower average productivity by around 10% to 20%. Emmanuel and Harrington (2023) use data from a Fortune 500 firm which had both in-person and remote call centers pre-pandemic. The firm shifted all workers to fully remote in April 2020 at the onset of the COVID-19 pandemic. Using the always remote call-centers as the control group they find an 8% reduction in call volumes among employees who shifted from fully in-person to fully remote work. Gibbs, Mengel and Siemroth (2022) examine IT professionals in a large Indian technology company who shifted to fully remote work at the onset of the pandemic. Measured performance among these workers remained constant while remote but they worked longer hours, implying a drop in employee productivity of 8% to 19%. Atkin, Schoar, and Shinde (2023) run a randomized control trial of data-entry workers in India, randomizing between working fully in the office and fully at home. They find home-workers are 18% less productive.

One explanation for these falls in productivity when shifting to fully remote working is challenges in communicating and innovating in an entirely remote environment. Gibbs et al. (2022) provide evidence that increased communications and coordination costs can crowd out productive work time when fully remote. Yang et al. (2021) study over 60,000 Microsoft workers that the pandemic shifted to fully remote in a staggered fashion. Email and messaging traffic reveal that the move to fully remote led employee-to-employee communication networks to become more static as workers were less likely to create new connections. In-person work can lead serendipitous meetings with colleagues in meetings, the break room or at the proverbial watercooler, generating more connections. While working remotely, these kinds of interactions are less common, so fewer new connections are created, and social networks become more static. Battiston et al. (2021) study police dispatchers in the UK and show how those working in the same room work faster than others working in different rooms and communicating electronically, particularly during busier periods. In-person working may thus allow for richer and faster communication, which can be important for time-sensitive activities.

Another explanation relies on creativity. Brucks and Levav (2022) ran two experiments on creating new product designs, asking teams to suggest new uses for a current product. The teams were randomized into meeting fully in person or fully remotely. They found fully remote teams were less effective than in person teams with a lower external rating of their new product ideas. They argue remote teams tended to be more distracted (possibly by multi-tasking) and less focused on their team activity. Remote employees can more easily toggle to read emails, surf the web or do other activities, which is harder during in-person meetings. Anyone that has taught large classes online is aware of these challenges of having to compete with distractions that are easier to minimize when teaching in person in the classroom.

Plenty of managers also raise concerns over employee mentoring and learning in fully remote setting. Indeed, a Pew survey raises this concern as one of the two largest challenges for remote work, with 36% of respondees claiming teleworking reduced their opportunities to be mentored.[6] Emmanuel, Harrington and Pallais (2023) study mentoring practices and team relations at a large software firm that had some teams housed together in the same building and also split across two buildings. Pre-pandemic, employees housed in the same building as their teammates received 21% more comments on their code from coworkers than those housed in a different building. These comments are suggestions and ideas on how to improve their code and play an important role improving employee performance and learning. At the start of the pandemic, all employees were sent home to work fully remote. These building location differences rapidly disappeared, but all team members now received almost 50% fewer comments than those housed in the same building pre-pandemic. The drop in feedback was largest for junior employees, showing how remote work can impede learning for this group in particular.

A third explanation for the drop in productivity in fully remote teams involves motivation and self-control. The moniker "shirking from home" was popular pre-pandemic. The running joke was that the three enemies of working from home were "the bed, the fridge and the television," all of which point to difficulties related to self-discipline when working remotely.[7] There is a

[6] The other major challenge was social connections with co-workers, see https://www.pewresearch.org/fact-tank/2023/03/30/about-a-third-of-us-workers-who-can-work-from-home-do-so-all-the-time/

[7] See, for example, https://www.newscientist.com/article/mg24132121-100-winning-at-work-is-flexible-working-actually-a-good-idea/

long literature on self-control problems in economics (for example Kaur et al. 2015) and without direct managerial supervision many remote workers may find it hard to motivate themselves sufficiently. Kunn, Seel and Zegners (2022) find remote competitors in international chess tournaments have significantly worse performance according to artificial intelligence chess evaluation engines. Since these are highly motivated professionals playing for rankings and prize money, it appears that overcoming potential self-control issues may not be easy. Indeed, any university professors know students often choose to study in libraries as a self-commitment device, even though their grades already provide a strong incentive for performance. So, it is perhaps not surprising that employees that are working remotely on a full-time basis may at time struggle with self-motivation.

a. Hybrid

Hybrid working, whereby employees have a mix of time at home and in the office each week appears to be associated with flat or positive average impacts on productivity. One early study is Bloom et al. (2015) who run a field experiment at cTrip.com, a large Chinese travel agent, on 250 call-center workers. They randomly assign employees to either come into the office 5 days a week, or come in 1 day a week work from home the other 4 days. Home-based employees saw a 13% increase in productivity per day. They had 9% more working time due to shorter breaks and less sick leave, and 4% greater efficiency per hour. Choudhury (2020) examines employees of the US PTO who were allowed to work from home for 4 days a week and found the number of patent actions rose by 5%. It rose by a further 8% when they were given greater locationally flexibility. Choudhury et al. (2022) study an NGO in Bangladesh whose human resources department also randomized workers into coming into work or not. Workers that ended up in a hybrid arrangement – neither full-time at home nor full-time at the office – sent more emails, drafted more complex emails and had better job satisfaction. Bloom, Han and Liang (2022) run a randomized control trial on 1600 graduate employees of trip.com. These employees are a mix of coders, marketing, finance, and business employees, both recent graduate hires and more senior managers. Those with even birthdays worked in the office for five days a week while those with odd birthdays were randomized into working from home on Wednesday and Friday. The firm ran the experiment for six months and discovered the impact on individual productivity was zero or marginally positive depending on the metric used. Performance evaluations and promotions

showed no impact, while lines-of-code written, and self-assessed productivity increased about 4%.

Finally, several studies have asked hybrid workers to self-assess their own productivity, typically finding positive self-reported impacts. Barrero et al. (2023) report US employees to perceive about a 3% to 5% increase in productivity, while Aksoy et al. (2022) report slightly lower (but still positive) figures from 20 countries around the world.

So, in conclusion fully remote working appears to be associated with lower average productivity, likely from a combination of worse communication, professional development, and motivation. In contrast, hybrid working appears to have zero or mildly positive impact on performance. So, why would an organization agree to have fully remote employees if that entails a negative productivity impact? The reason is cost savings. First, fully remote employees are cheaper because they do not require office space. Second, they can be hired nationally or internationally at lower prevailing wages (e.g. Brinatti et al. 2022). Over the longer run, many organizations will likely shift to operating with managers and professionals working a hybrid schedule in the US and other advanced economies. Those managers and professionals will live within commuting distance from the office, but many support staff will work fully remotely scattered across the country or even internationally.

4. Conclusion

Working from home increased persistently after the COVID-19 pandemic, rising fivefold from about 5% of working days in 2019 to 25% in 2023. US workers now fall into three broad categories. The largest group of around 60% of workers does not work from home, most often because they work in a job that is hard to do remotely. These are mostly lower-paid employees in activities like frontline retail, manufacturing, transport, security, cleaning, and food services. The next largest group, at just below 30% of the labor force, are hybrid workers who typically work from home two or three days each week. They are typically higher-paid college graduates in managerial and professional activities, often in technology or business service industries. The final group, comprising just above 10% of the labor force, work fully remotely. They are

typically in support roles like payroll, benefits, HR, call centers and some coding jobs and earn less than the typical professional hybrid worker.

The amount of working from home varies across countries. The highest levels are in North America and Northern Europe, with lower levels in Southern Europe, and lower levels still in Asia and particularly in developing countries. How much a country works from home depends on the share of employment in remote friendly technology and business-service industries, the quality and reach of broadband infrastructure, managerial practices that allow business managers to monitor and direct remote and hybrid workers, the length and stringency of pandemic lockdowns, and the size of the typical employee's home. Within countries there is also much geographical variation: remote work is far more prevalent near city centers than in rural areas.

Working from home also varies across demographic groups. The biggest single predictor of whether someone gets to work from home is education, with college graduates doing more than twice as much as workers who only have a high school degree. Age plays a more limited role, but we can still see that employees in their 30s have the highest levels of working from home, in part due to greater childcare requirements, while those in their 20s or over 50 come into work more often. Working from home is similar across genders, with female workers spending about 2% more days at home than male workers. The gender gap is larger when it comes to *desired* days working from home, with females wanting about 4% more days.

The productivity of working from home depends critically on the specific mode: fully remote or hybrid work. Fully remote work is associated with about 10% to 20% *lower* productivity than fully in-person work. Challenges with communicating remotely – even with the latest telecommunications technology – barriers to mentoring and on-the-job learning, and issues with self-motivation drag employee productivity when fully remote. But fully remote work also lowers other business costs, namely floorspace, but also wages if the business can now access cheaper labor in farther off domestic and international locations. Hybrid working, in turn, appears to have small *positive* impacts on productivity, coming from two sources. First, hybrid workers save about two or three hours each week from less commuting, and some of that time

goes into more hours in their current job. Second, hybrid workers appear to be more productive on their home days because of fewer distractions and quieter home working conditions.

In the longer run we predict the amount of working from home will continue to grow, primarily due to technological improvements and changing norms. In 10 to 20 years we could see 30% to 40% of working days being done from home, continuing the long run trend of growing levels of working from home, which has roughly doubled every 15 years going back to the 1960s. The pandemic led to an additional one-off five-fold jump, but also jumpstarted a surge in research and development into new hardware and software products to support working from home. Thus, we expect the rate of technological change in remote work friendly innovations to fuel a new phase of work from home adoption in the coming decades.

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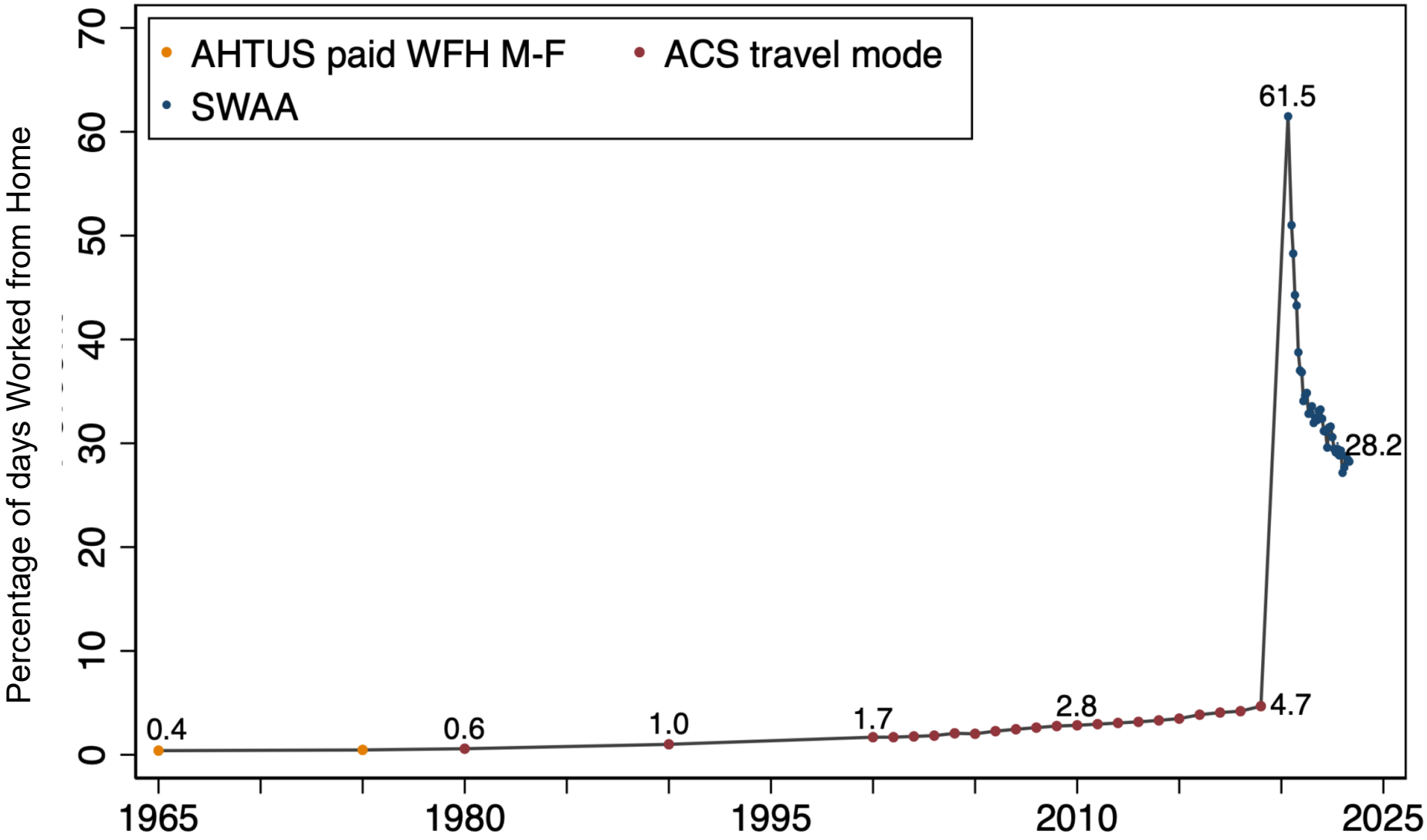
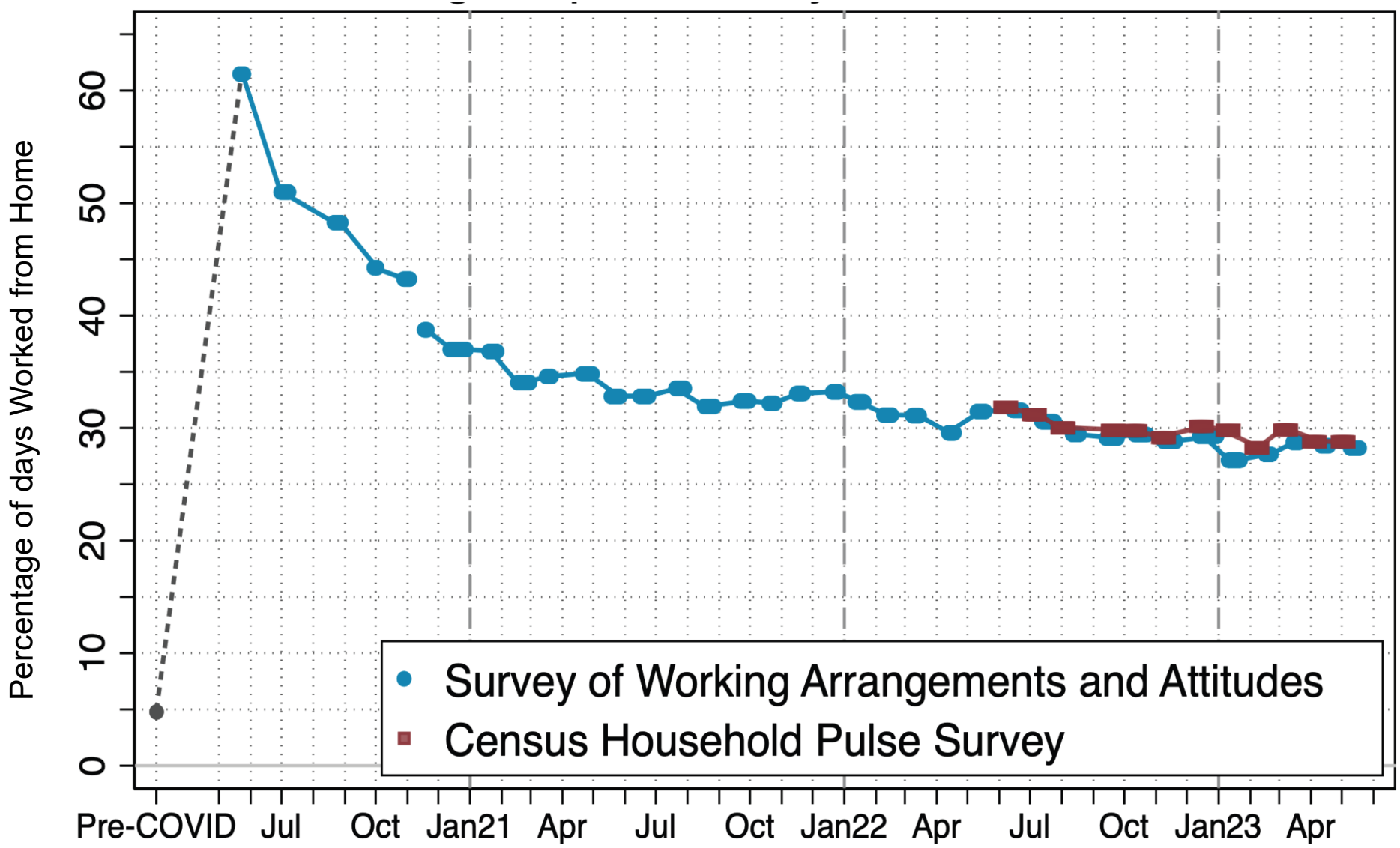
Figure 1a: The pandemic-era WFH jump follows steady growth from 1965



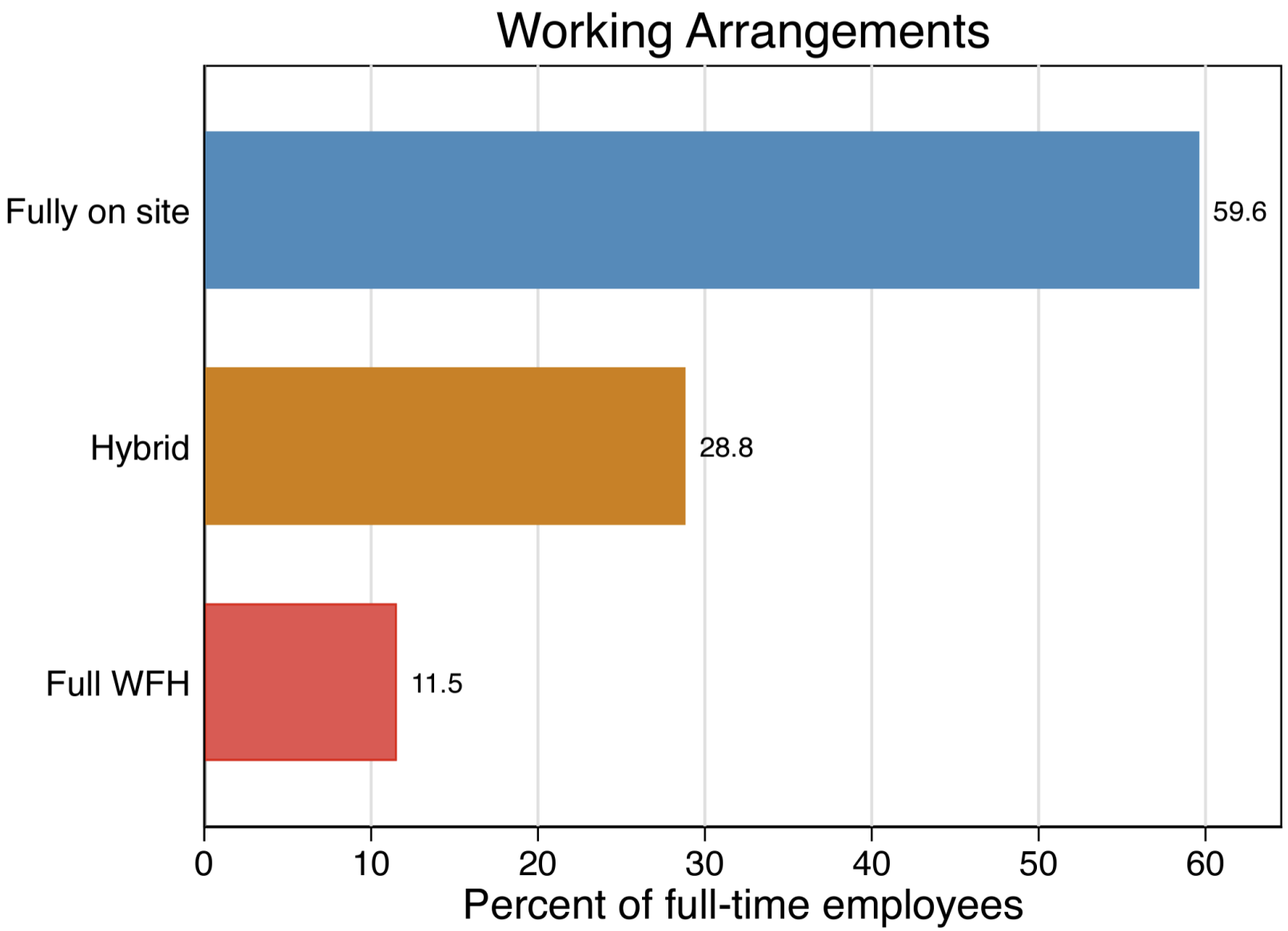
Notes: 1965-75 uses the American Historical Time Use Survey, 1980-2019 uses the American Community Survey and May 2020-July 2022 uses the Survey of Workplace Attitudes and Arrangements www.wfhresearch.com. Individuals aged 20-64 who earned $20,000+ in 2020 dollars, weighted to match the US population by age, gender, education and income.

Figure 1b: The pandemic-era WFH jump follows steady growth from 1965



Source: SWAA data from 131,225 survey responses weighted to match the US population. Pre-covid data from the American Time Use Survey. CHPS 364,540 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/

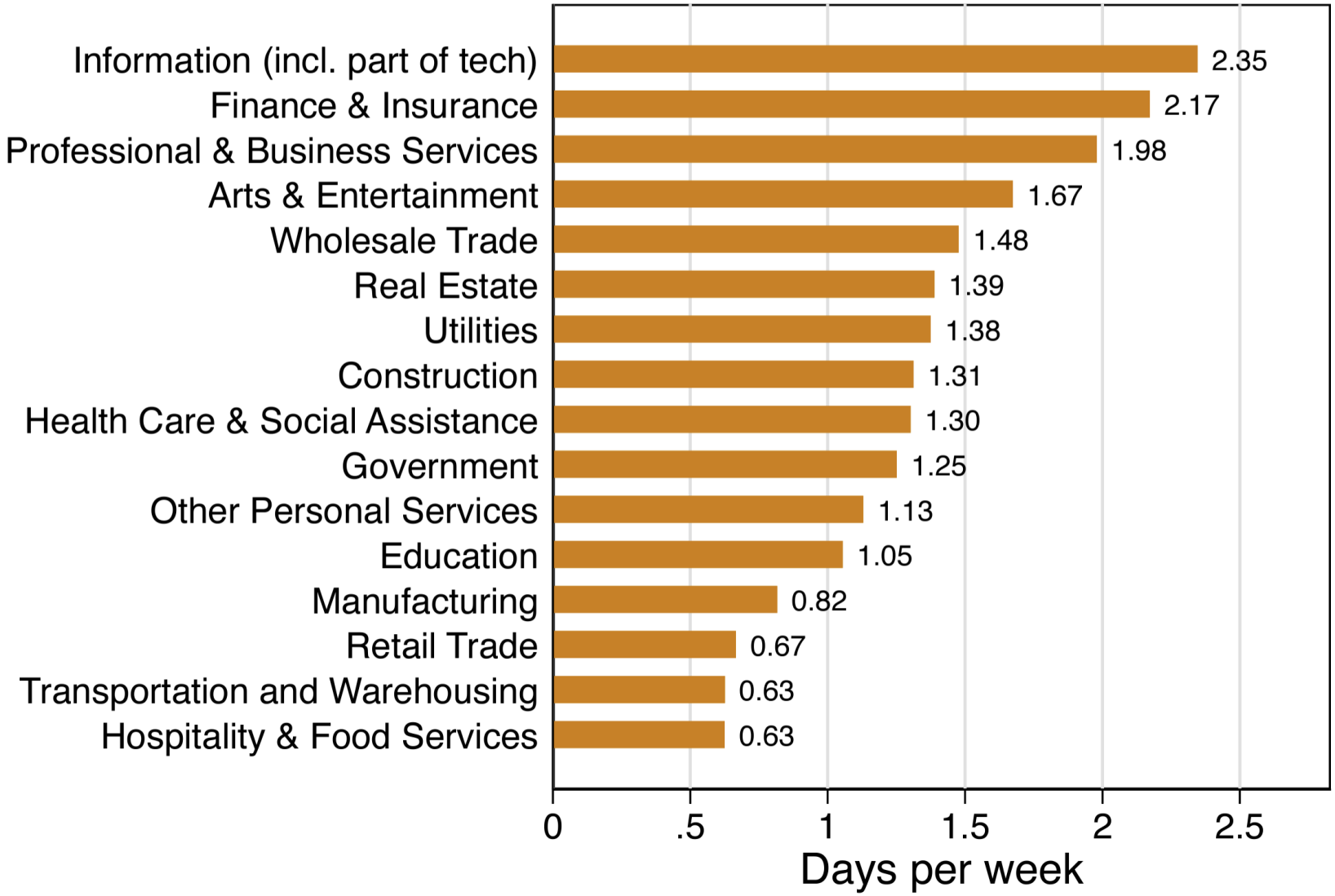
Figure 2: Employees are split into three groups



Source: The sample covers the January 2023 to April 2023 waves of the SWAA https://wfhresearch.com/

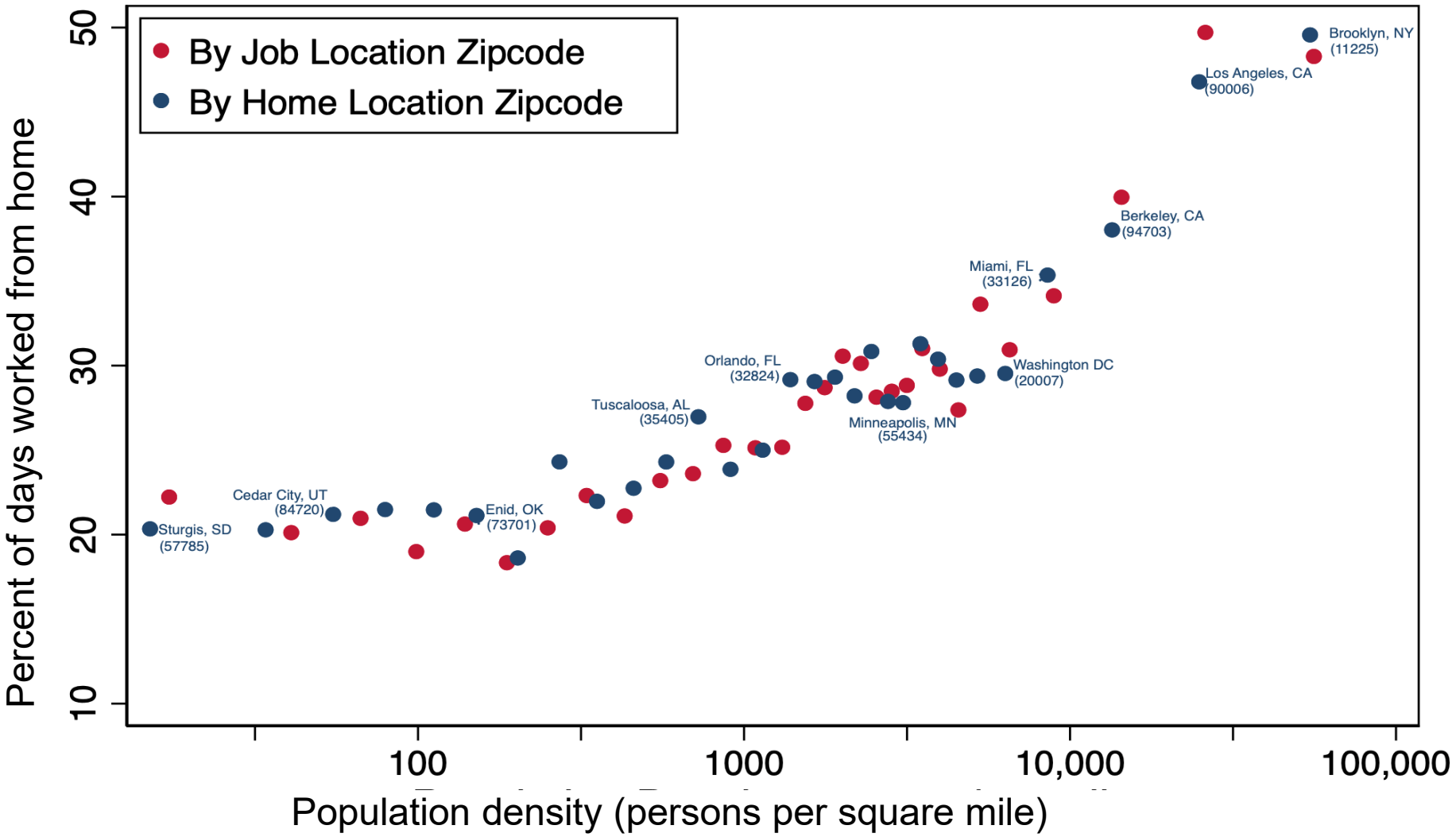
Figure 3. WFH is prevalent in industries with many knowledge workers, and disproportionately so among tech companies

Current WFH: all wage and salary employees by industry



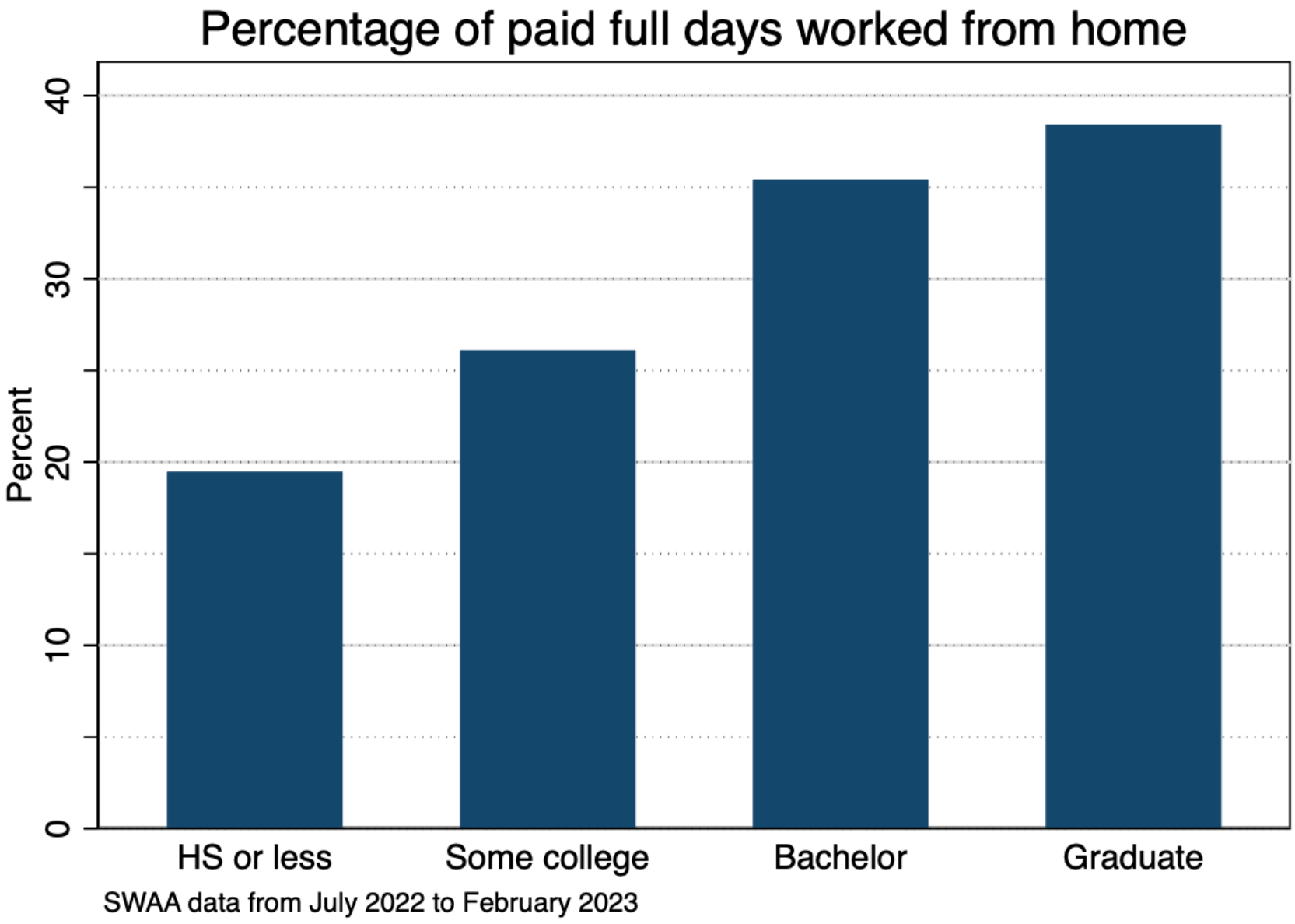
Notes: Survey of Workplace Attitudes and Arrangements www.wfhresearch.com November 2022 to April 2023

Figure 4. WFH is particularly high in large cities and urban areas



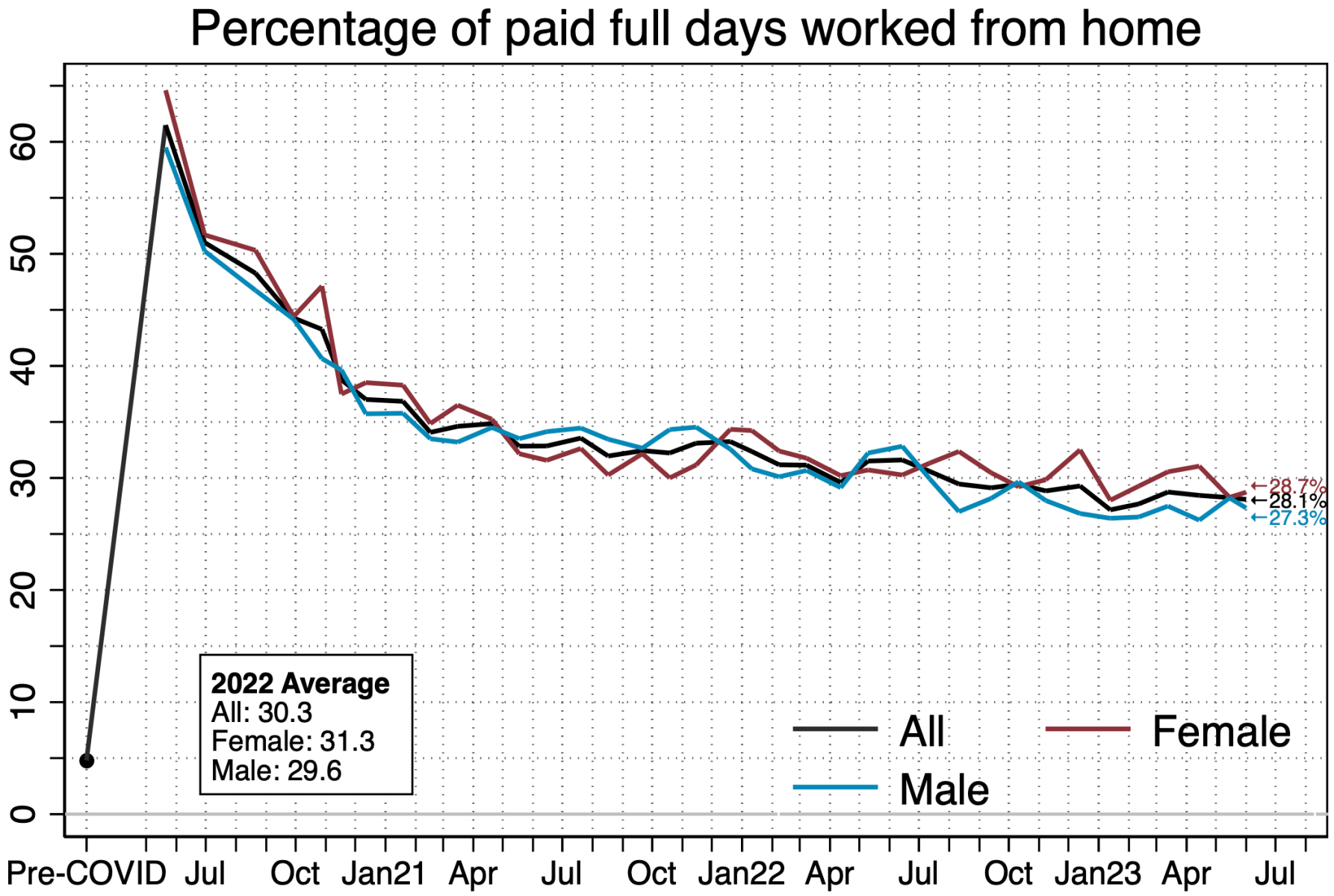
Notes: Survey of Workplace Attitudes and Arrangements www.wfhresearch.com Sample N=13,662 from April to July 2022

Figure 5: Days WFH are Higher For More Educated Employees



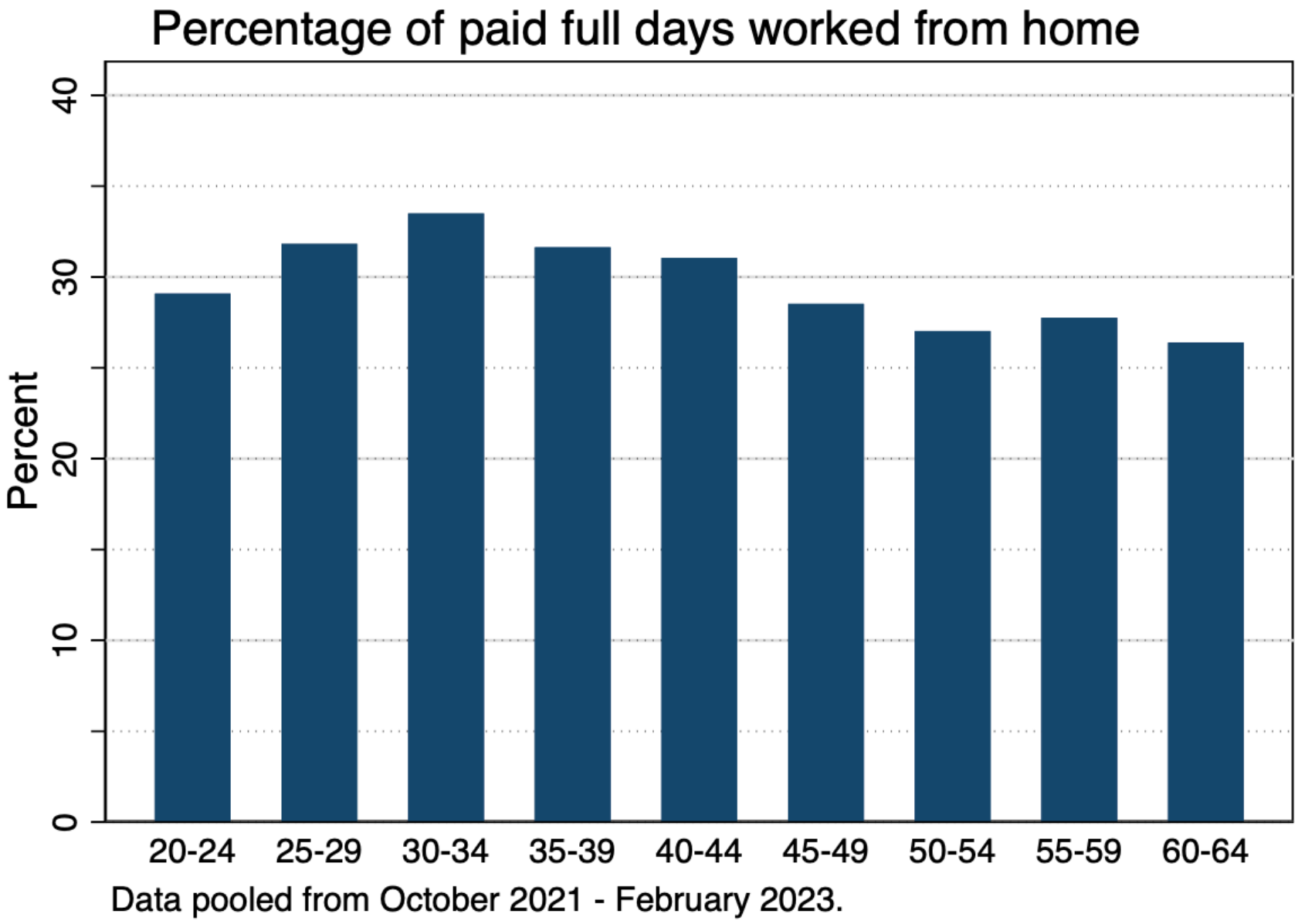
Notes: Survey of Workplace Attitudes and Arrangements www.wfhresearch.com Sample N=13,662 from April to July 2022

Figure 6: Days WFH are Similar for Female and Male employees



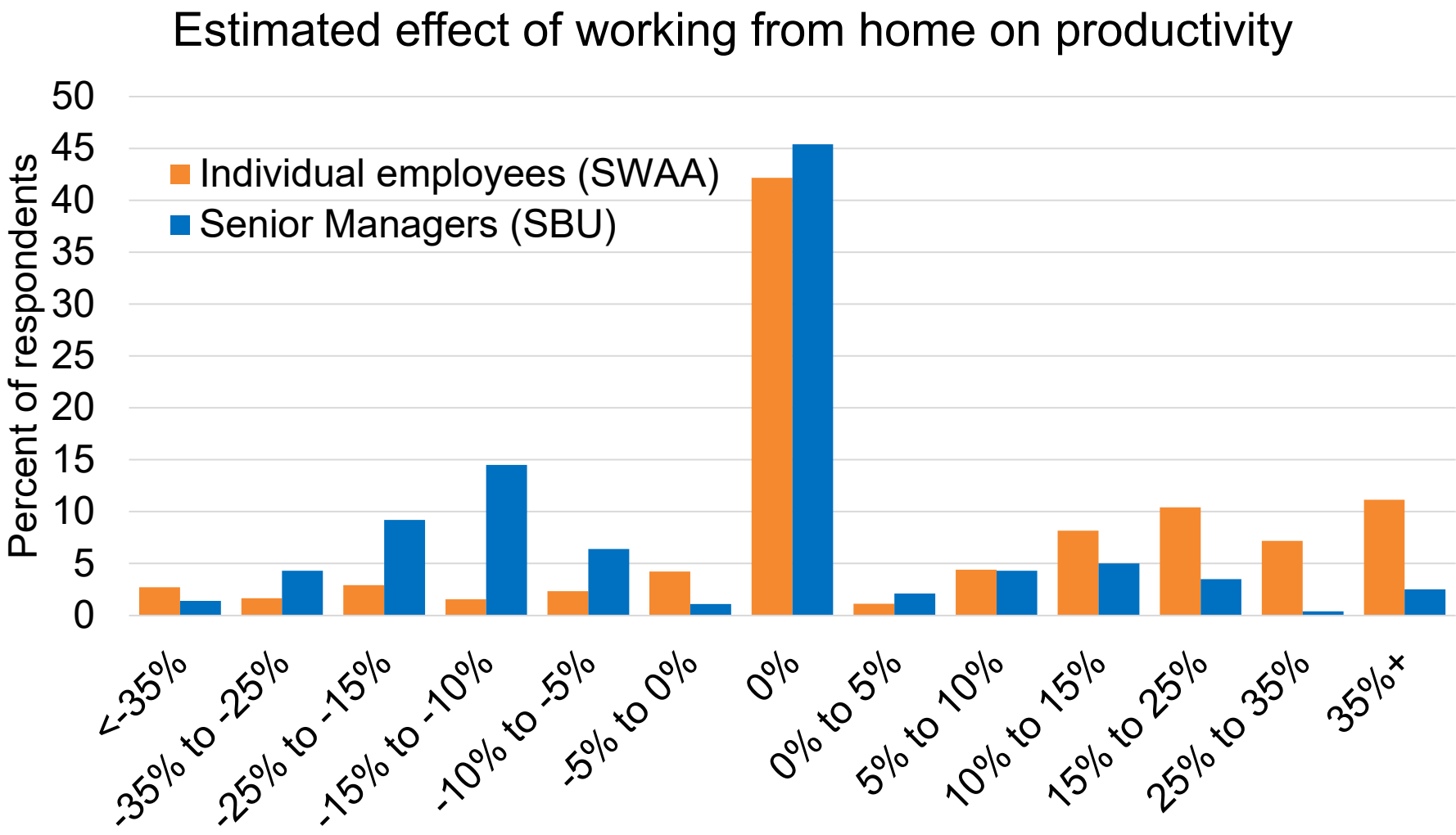
Notes: Survey of Workplace Attitudes and Arrangements www.wfhresearch.com Sample N=13,662 from April to July 2022

Figure 7: Days WFH Peak for Employees in their 30s



Notes: Survey of Workplace Attitudes and Arrangements www.wfhresearch.com Sample N=13,662 from April to July 2022

Figure 8. Employees believe WFH increases productivity by 7.4% while managers believe it reduces it by 3.5%



Note: SWAA participants asked "How much less/more efficient are you working from home than on business premises?" from the July to September 2022 reweighted to match all US employees 20 to 64. N=13,082; www.wfhresearch.com SBU participants asked: "How much less/more productive would employees [who work from home at least one day per week] be if working on business premises five days a week?" reweighted to match all US firms. N=282. www.atlantafed.org/SBU

Table 1: WFH by gender, education, age-bin and child

Regression Results for Actual Percent Work From Home

	(1)	(2)	(3)	(4)	(5)
Female	1.51***	–	–	–	1.21***
25-29	–	2.26**	–	–	2.22**
30-34	–	4.37***	–	–	2.70***
35-39	–	2.10**	–	–	0.80
40-44	–	1.51*	–	–	0.43
45-49	–	−1.43	–	–	−0.09
50-54	–	−2.41**	–	–	−1.05
55-59	–	−1.59*	–	–	−0.24
60-64	–	−2.93***	–	–	−1.99**
Some college	–	–	6.85***	–	4.75***
Bachelor degree	–	–	16.37***	–	10.68***
Graduate degree	–	–	19.19***	–	12.95***
Children under 18	–	–	–	3.65***	1.05***
Industry and Occupation FE	No	No	No	No	Yes
Date FE	No	No	No	No	Yes
Observations	64863	64863	64863	64863	64863
R^2	0.00	0.00	0.04	0.00	0.11

Note: Data from October 2021 through January 2023.
All regressions are weighted to match the CPS.

Notes: Survey of Workplace Attitudes and Arrangements www.wfhresearch.com