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Measuring Work from Home

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Abstract: Headline estimates for the extent of work from home (WFH) differ widely across U.S. surveys. The differences shrink greatly when we harmonize with respect to the WFH concept, target population, and question design. As of 2025, our preferred estimates say that WFH accounts for a quarter of paid workdays among Americans aged 20-64. The WFH rate is seven percentage points higher for workers with children under eight in the household and about two percentage points higher for women than men. *Desired* WFH rates exceed actual rates in every major demographic group – more so for women, workers with young children, and less educated workers.

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1. Introduction

Several leading surveys yield estimates for the extent of paid work from home (WFH) in the United States. Headline estimates differ widely across survey sources. A close look at nine different surveys and datasets, however, reveals important differences across sources in what counts as WFH, the design and framing of WFH questions, survey methodology, target populations, and sampling periods. After our best efforts to align the data on these dimensions, we find much more similarity in WFH rates across sources. In some cases, seemingly large differences nearly vanish on close examination.

Our measurement efforts contribute to a large and growing literature on WFH, flexible work, and work-life balance. Early contributions include Bloom et al. (2009, 2015) and Mas and Pallais (2017). Mas and Pallais (2020) review the pre-pandemic literature on alternative working arrangements. Adams-Prassl et al. (2020), Barrero et al. (2020), DeFilippis et al. (2020) and Bick et al. (2022), among others, describe WFH outcomes during the early stages of the pandemic. In contrast, we focus on outcomes from 2023 to 2025, by which time the pace of change around working arrangements had greatly slowed.[5] We draw on six distinct sources of household and individual-level survey data, one business survey and two sources that track foot traffic at worksites.

Previous research demonstrates that most workers place a high value on the opportunity to work remotely some or all of the time. In a field experiment, Mas and Pallais (2017) estimate that applicants to call-center jobs would accept an 8 percent pay cut, on average, for the option to WFH. Drawing on SWAA questions that elicit preferences directly, Barrero et al. (2021) find that a broad cross section of American workers value the option to WFH two or three days a week at 8 percent of pay, on average. The value of this option rises, as a percent of pay, with education and earnings. Drawing on comparable survey data for 27 countries, Aksoy et al. (2022) estimate the value of the WFH option at 5 percent of pay, on average. They report greater WFH valuations for women, workers who live with children, those with more education, and those with longer commutes. We find similar patterns in *desired* WFH levels in this study. Cullen et al. (2025) find much higher valuations for the opportunity to WFH in a study that focuses on tech workers.

Why do people like to WFH? Using survey data for full-time workers in 27 countries, Aksoy et al. (2023) find that WFH rates in 2021 and 2022 saved two hours of commuting time per

[5] The "survey of surveys" by Brynjolfsson et al. (2025) focuses on the extent of work from home in 2020.

worker per week relative to a counterfactual with no remote work. Barrero et al. (2025) fit individual-level data on work hours, work mode (remote versus onsite), hourly pay, and time spent commuting and grooming to a model of labor supply and work-mode choice. They find that observed U.S. WFH levels in 2022 and 2023 raised welfare by about two percent, on average, relative to a counterfactual with 2019 WFH levels. In addition to the time savings and productivity effects captured by their model, WFH offers more flexibility in time use over the day and greater personal autonomy.

Another rich line of research considers the productivity effects of WFH. See Choudhury et al. (2021) for an early contribution and Anakpo et al. (2023) and Barrero et al. (2023) for recent reviews. Barrero et al. (2023) and Etheridge et al. (2023) stress the importance of heterogeneity in jobs, workers and organizations and the role of adaptation over time when assessing the productivity effects of WFH.

Other studies consider how WFH affects wages, workforce mix, asset prices, and cities. Barrero et al. (2022) and Liu and Su (2023) provide evidence on how the shift to WFH affects wages. Harrington and Kahn (2023) find that the rise of WFH shrank the motherhood penalty in jobs that facilitate remote work. Pagano et al. (2020), Davis et al. (2021), Favilukis et al. (2021) and Papanikolaou and Schmidt (2022) investigate how firm-level stock price reactions to the COVID-19 pandemic varied with the capacity of their employees to work remotely. Ramani and Bloom (2021) and Gupta et al. (2022a,b) study WFH effects on real estate values. Alipour et al. (2023), among others, provide evidence on how the shift to WFH alters the geography of consumer spending. Delventhal et al. (2022), Delventhal and Parkhomenko (2023), Duranton and Handbury (2023), Monte et al. (2023), and Davis, Ghent, and Gregory (2024) analyze how remote work affects the structure of cities in quantitative spatial models.

The next section describes our main data sources and survey questions. Section 3 compares WFH rates across sources and assesses their sensitivity to the WFH concept, target population, question design, and more. Section 4 reports WFH differences by demographic groups. Section 5 offers concluding remarks.

2. Data Sources

a. Headline WFH estimates

Figure 1 plots headline estimates of U.S. WFH rates in recent years, drawing on six leading surveys. For 2023 and 2024, the reported estimates for the WFH rate range from about 15% in the American Community Survey and the Current Population Survey to 35% or more in the American Time Use Survey and Morning Consult. Clearly, these are enormous differences.

The surveys covered by Figure 1 adopt different WFH concepts, use different questions to quantify WFH (even for the same concept), differ in their target populations, and deploy different survey methods. Some surveys yield information about the prevalence of fully remote work. Some yield information about the prevalence of hybrid arrangements that involve splitting the workweek between home (or other remote location) and the employer's worksite. Some capture both. Other surveys yield information about the fraction of working time or paid workdays performed at home or other remote location. All of these WFH concepts are interesting, but they are distinct and yield dissimilar estimates for the extent of WFH.

Figure 2 restricts attention to employed persons, aged 20 to 64, who satisfy a minimum earnings or income threshold. Panel A reports the *share of paid workdays* performed at home or other remote location. These estimates cover fully remote and hybrid workers alike, capturing variation in WFH activity on both the intensive and extensive margins (i.e., WFH days per week). Estimated WFH rates in Panel A range from 18 to 28% in 2024, a much narrower band than in Figure 1. Panel B of Figure 2 reports *the share of workers who are fully remote*, drawing on four surveys that yield a measure of this WFH concept. Once again, the range of estimates in Panel B is much narrower than in Figure 1. Thus, even the most basic efforts to align the WFH concept and the target population greatly narrows the range of estimated WFH rates across sources.

We turn next to a more detailed description of our data sources and samples.

b. The Survey of Working Arrangements and Attitudes (SWAA)

We have fielded the Survey of Working Arrangements and Attitudes (SWAA) since May 2020. Each month, we sample up to 10,000 U.S. residents,[6] 20 to 64 years of age, and focus on the subsample who earned at least $10,000 in a prior year. [7] We ask about demographics, labor force

[6] Before June 2022 we sampled 5,000 workers per month and before early 2021 it was 2,500.

[7] We adopted the prior earnings requirement to cost-effectively sample persons with recent working experience and attachment to the labor force. As our funding grew, we relaxed and in mid-2022 began collecting data from persons who don't meet the requirement. However, the sample we use in this paper imposes the requirement unless noted. From May 2020 to March 2021, we required respondents to report labor earnings of at least $20,000 in 2019. From April to September 2021, we transitioned to a lower earnings threshold of $10,000 in 2019. From January to March

status, industry and occupation of their current or most recent job, their attitudes towards remote work, whether they worked from home in the prior week, and more. Our monthly survey instruments are posted at https://wfhresearch.com/survey-design-and-question-repository/.

To implement the SWAA, we contract with market research firms like IncQuery. They provide a platform to program the survey questions and intermediate with other firms (e.g., Cint, formerly known as Lucid) that offer access to pre-recruited panels of prospective survey participants. When a survey wave goes to field, the market research firm issues email invitations to prospective respondents and continues until reaching the desired number and mix of participants. Email recipients are selected based on their location within the United States and demographic characteristics. The email message states the estimated survey completion time, but does not describe the topic, and includes a link to an online questionnaire. Respondents who complete the survey receive cash, vouchers, or award points, which they can donate. We do not contact respondents ourselves, do not collect personally identifiable information, and have no way to re-contact them. See Aksoy et al. (2022) for further discussion of this survey technology and evidence of its widespread use in commercial applications.

Before proceeding to our empirical analysis, we drop "speeders" with survey completion times so short as to suggest a lack of careful attention to questions and response options. After dropping speeders (about 15 percent of the sample), median survey completion times range from 6 to 12 minutes across waves, which vary in number and complexity of questions. Since late 2023 we have aimed to limit median completion time to 6 or 7 minutes because shorter surveys tend to have higher quality responses.

We also drop respondents who fail any of four attention checks. The goal is to identify and drop respondents who fail to read questions carefully. Early in the survey we ask "*What is 3 + 4?*" and drop respondents who give any response other than 7. About one-third of the way through the survey, we ask "*In how many cities with more than 500,000 inhabitants have you lived? Irrespective of your answer please insert the number 33."* We drop respondents who do not report 33. About two-thirds through the length of the survey we ask "*What color is grass?... Make sure that you select purple as an answer so we know you are paying attention*…". We keep respondents who respond with purple or green. Finally, we ask respondents their age and birth year near the

2022, we transitioned to a threshold of $10,000 in 2021 and have continued to keep a threshold of $10,000 in the previous year, which applies to most of the data we use in this study.

survey midpoints and end, respectively. We drop respondents if age and birth year don't align.[8] After dropping speeders, an additional 12% of respondents fail one or more of these attention checks.[9]

We reweight the SWAA data to match Current Population Survey (CPS) employment shares in cells defined by the cross product of age, sex, education, and earnings categories.[10] The aim is to construct a sample that is representative of our target population. As one check on the representativeness of SWAA data, we borrow a question about party affiliation almost verbatim from the General Social Survey. We then compare the share of respondents affiliating with the Democratic party to Joe Biden's share of the two-party vote in the respondent's county in the 2020 election. As shown in Appendix Figure A1, the overall and county-by-county Democratic party shares in SWAA data align closely with Democratic vote shares in the 2020 presidential election. We also compute the differences between Democratic and Republican affiliation shares for major demographic groups in the SWAA data and compare them to the corresponding differences in Pew survey data. As shown in Figure A2, these differences correlate closely across the two sources.

When using SWAA data, we calculate the percentage of full paid days worked from home using the following questions:

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

This formulation has been in effect since November 2021, and Figure A3 shows how the second question appears in the survey. Previously, we asked respondents to categorically report their working arrangements between May 2020 and October 2020. From November 2020 to October 2021, we asked respondents to report the number of days worked from home and at the workplace during the reference week, without asking about individual days worked. Our series imputes work-

[8] Specifically, an individual's implied age based on their birth year must be within two years of their stated age (where +/- two years is enough gap to allow for some small calculation errors).

[9] We first included attention-check questions in late 2021 and did not include "What is 3 + 4?" until March 2022. Thus, we cannot make use of these questions in the parts of our empirical analysis that extend back to 2020. Fortunately, our main results are not very sensitive to the exclusion of persons who fail attention-check questions in the more recent data.

[10] To avoid large monthly changes in the weight on any given cell, we use a rolling-weights scheme since April 2021. In month *t*, we compute the share of observations in each age-sex-education-earnings cell during the two months covering *t-1* to *t*. We construct the weights for month *t* by up- or down-weighting those proportions to match the CPS share of the population in each cell. Prior to October 2023 our rolling weights scheme pooled 6 months (*t-5* to *t*) of SWAA data, at which time we switched to our current two-month pooling to be more responsive to high-frequency changes in sample composition. For May 2020 to March 2021 we construct weights by pooling across all months during that period, so weights are identical for the same cell across months during that period.

from-home levels from November 2020 to October 2021 using a regression model that maps responses to the question in Figure A3 to the earlier question.[11]

For more information about the SWAA, we refer interested readers to Barrero, Bloom, and Davis (2023) and www.WFHresearch.com/. The monthly SWAA survey instruments are available at www.WFHresearch.com/survey-design-and-question-repository/, and the SWAA micro data are accessible to interested researchers at https://wfhresearch.com/data.

c. American Time Use Survey (ATUS)

The ATUS elicits time-use diaries that cover a 24-hour period for "designated persons" (DP) selected from among respondents who have completed eight interviews for the Current Population Survey. Its population universe is the civilian noninstitutionalized population aged 15 and over in the United States. All interviews are conducted over the phone, with the interviewer asking about all activities the DP engaged in during a 24-hour period. The resulting diary records the nature of each activity, its duration (or start and stop times), where it took place, and whether it involved other people. Figure A4 reproduces the response options for the ATUS question about where activities took place, and Table A1 provides the distribution of responses for 2022.

Because ATUS time-use diaries only cover a 24-hour period, we assume that the sampled workdays are representative of individual work arrangements when aggregating. The ATUS samples all seven days of the week and reweights entries, so that each day of the week is equally represented. This reweighting is especially important because WFH is more prevalent on Mondays and Fridays than other days of the week. Without it, we get biased estimates of WFH.

The granular ATUS data let us estimate the percent of full workdays performed solely at home or other remote location (without going to the worksite).[12] We classify two activities, namely, "working at main job" and "working at other job" as paid work, measuring the percent of workhours done remotely, and the percent of workers who engaged in any remote work in a typical day. We investigate how the estimated percent of full workdays that are WFH days depends on the definition of a "full" workday and on the samples we use. Because the ATUS is linked to the CPS and includes demographic information, we aim to use samples that are comparable to the SWAA

[11] For more information about this imputation, see the methodological note at https://wfhresearch.com/wp-content/uploads/2022/06/Methodological-Note-June-2022.pdf.

[12] If the work location is reported as the DP's home or yard, we interpret that as WFH. However, the results are robust to switching this definition and including other locations away from the worksite listed in Figure A3. If we take an upper bound estimate that all work done in locations other than the respondent's workplace is WFH, the overall WFH estimate increases from 19.8 (Table1, Column3) to 22.2.

samples; namely, employed persons, 20 to 64, who meet an earnings requirement. That said, much of our work below tests the sensitivity of our estimates to sample selection criteria.

Figure 2a shows that ATUS-based estimates of WFH, pooling across all observations from a calendar year, are lower than SWAA-based estimates. That may be partly because our ATUS sample excludes the self-employed, for whom we do not observe annualized earnings and so cannot impose the same earnings requirement as in the SWAA. WFH rates are higher for self-employed and contract workers than for wage and salary employees. The gap between SWAA- and ATUS-based WFH rates falls by almost half when we drop self-employed and contract workers.

d. Census Household Pulse Survey (CHPS)

The US Census Bureau's Household Pulse Survey (CHPS) was designed to provide real-time data on how COVID-19 affected people's lives. A version of CHPS has been fielded since April 2020. It is designed as a 20-minute online survey with respondents randomly selected based on their address and aims to representative of the US population. Respondents supply demographic data and information about employment and education, among other topics. To best match our SWAA sample, we restrict to respondents who are ages 20-64 and whose household income exceeds $25,000.[13] Given these restrictions, we have approximately 50,000 responses per wave.

Since June 2022, the CHPS has consistently asked the following question about remote work:

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

1) Yes, for 1-2 days

2) Yes, for 3-4 days

3) Yes, for 5 or more days

4) No

To construct a WFH measure from the CHPS that aligns with our SWAA estimates, we make some assumptions. First, we assume responses to the above question are representative of all workers in the household. Then, we translate the amount of WFH in each categorical response as a percent of workdays assuming a 5-day workweek and using the midpoint of each range. For

[13] This threshold corresponds to the lowest CHPS household income category. Our SWAA sample selects on individual labor earnings, which are not reported in the CHPS, so we use household income as an imperfect substitute.

example, we interpret "Yes, for 1-2 days" as 30% of days worked from home because 1.5 WFH days out of a 5-day workweek yields a .30 share (=1.5/5). The same logic translates "3-4 days" into 70% of workdays, "5 or more" to 100%, and "No" to 0%. We aggregate the household responses using person weights.[14]

Since September 2022 the CHPS has also asked employed respondents who report any WFH in the household about their own WFH:

In the last 7 days, have you teleworked or worked from home?

1) Yes, for 1-2 days

2) Yes, for 3-4 days

3) Yes, for 5 or more days

4) No

Because this question is conditional on someone in the household working remotely, we impute no work from home (0% of workdays) for individuals who did not get this question to calculate the overall percentage of days WFH. Averaging the resulting data across persons yields a lower estimate of WFH than the household-level question above, as Figure A5 shows. Moreover, the figure shows the levels implied by the household-level question are much closer to those from SWAA. As shown in Figure 2 (left panel) the CHPS aligns very closely with SWAA, for example both imply that about 30% of full paid workdays were performed at home in 2024.

Since the CHPS is a large nationally representative sample, we also use it to assess the sample shares of demographic groups in the SWAA. Panel A in Figure A6 plots those shares and reveals that the two surveys align on all major demographic groups like sex, education, age, annual earnings, and parental status. Panel B presets the results of a similar exercise that plots the WFH rate in SWAA against the corresponding rate in the CHPS by group. Whereas the overall WFH rates from SWAA and CHPS align closely (see Figure 2a), Panel B in Figure A6 reveals more variation in WFH rates across demographic groups than we obtain in the SWAA.

[14] The aggregate WFH result from the household question is very similar whether we use household or person weights. See Figure A5.

e. Current Population Survey (CPS)

The Current Population Survey (CPS) is a monthly labor force survey that includes detailed demographic and employment data. Since 2022, the CPS has asked the following question:[15]

> *We have some questions related to how the COVID-19 pandemic affected where people work.*
>
> *At any time LAST WEEK did you telework or work at home for pay?*

Respondents who reply "yes" then get a follow-up about the amount of work from home:

> *Last week, you worked N hours. [N is filled in from a prior response.]*
>
> *How many of these hours did you telework or work at home for pay?*

Thus, the CPS aims to measure the share of WFH *hours* rather than days. While not perfectly comparable to the measures of WFH days from other surveys, we use them as the closest substitute available from the CPS. We estimate the share of WFH hours in the CPS starting in late 2022. We focus on employees, 20 to 64, with earnings of at least $10,000 per year. As with the ATUS, we drop self-employed persons.

As seen in the left panel of Figure 2, the CPS yields much lower WFH rates (share of hours) than the WFH share of paid workdays in the CHPS, SWAA, and ATUS. One might expect the CPS to yield *higher* WFH rates, because the CPS questions nudge respondents to include any work done at home (early in the morning, at night, on weekends), whereas our SWAA and ATUS measures focus on full WFH days. The CPS-ATUS discrepancy is especially noteworthy, because both surveys rely on the same sample frame and both exclude the self-employed. Part of the CPS-ATUS WFH gap may reflect non-random response patterns that differ between the two surveys. In 2022, unit response rates average 73% for the CPS and 36% for the ATUS.[16]

There are other reasons for concern about the CPS WFH data. First, it is unclear how respondents should treat work performed in a third space like a coffee shop, friend's home, or coworking facility. Second, if someone works a full day in the office and then spends some extra time in the evening (or on off days) responding to emails, reading reports, etc., will he/she interpret

[15] The CPS uses the above question design from October 2022 to August 2024. As of December 2023, the CPS modified the introductory sentence to read "I now have some questions about where people worked." See www.bls.gov/cps/telework.htm#q1.

[16] See the statistics at www.bls.gov/osmr/response-rates/household-survey-response-rates.htm.

that as work done "for pay"? If the respondent works from a coffee shop, library, or friend's home will he/she interpret it as "telework or work from home?"

Third, the reference to the pandemic in the preamble to the CPS question encourages respondents to focus on remote work that is a consequence of the pandemic. Presumably, though, the survey goal is to measure the extent of *all* remote work. By 2022, most WFH was probably not directly due to the pandemic, so the preamble might lead respondents to understate WFH. To investigate that hypothesis, we fielded the CPS questions on remote work to one quarter of respondents in the October 2023 SWAA wave. Another quarter received modified versions of the CPS questions that address some of the design concerns related to the preamble and the definitions of remote and paid work. The remaining half of October 2023 respondents received the standard SWAA questions about remote work intensity. Our modified CPS questions read as follows:

Did you spend any time LAST WEEK working at home for your job?

Last week, you worked N hours. How many of these hours did you work at home (or at a friend's place, coffee shop, or the like)?

Using this modified CPS formulation raises the estimated WFH share of workhours by 3 percentage points (about 15%) relative to the actual CPS formulation. As reported in Figure A7, the modified CPS question design raises the share of employees with hybrid working arrangements by six percentage points. Thus, seemingly small changes to the CPS question design – extending the definition of "home" to include a friend's house or coffee shop and referring to work "for your job" instead of work "for pay" – has a material impact on the estimated WFH rate. These aspects of the CPS question design matter more for women and for young workers, as shown in Figures A8 and A9. Based on this evidence, we conclude that the CPS question design tends to understate the average extent of WFH.

f. American Community Survey (ACS)

The American Community Survey (ACS) is a large, nationally representative survey conducted by the US Bureau of Census. It is a 1-in-100 national random sample of the population. The ACS includes the following question about commuting modes for work:

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

There are 11 response options, among which "worked from home" is the second to last before "other" category. See Figure A10.

This question design yields a measure for the incidence of fully remote work. The first sentence asks about how this person "usually" gets to work, suggesting most frequent mode of transportation. The second sentence, however, instructs the respondent to choose the "method of transportation used for most of the distance." Hybrid workers who commute at least one day per week, then, should report the primary mode of transportation used when they commute. Thus, someone who works from home 4 days and drives to the office 1 day each week should report "driving" even though they "usually" work from home. Since the distance-weighted instruction comes last, it is probably highly salient, pushing hybrid workers away from choosing remote work. Placement of the "work from home" response option near the end of the list probably also dissuades hybrid workers from choosing that option.

Indeed, when we interpret WFH shares estimated from the ACS question as capturing just fully remote work, they align reasonably well with comparable measures from the SWAA and other surveys. Figure 2b shows such estimates over time for the ACS, CHPS, SWAA, and the CPS (which is again lower than the others). As usual, we focus on harmonized samples that focus on persons aged 20 to 64 and who earn $10,000 or more. In Figure 3 we show a more detailed comparison between the ACS and SWAA for 2023 that breaks down fully remote and hybrid workers in the latter. The ACS estimate of 13.9% is modestly lower than the 16.9% share who we classify as fully remote in SWAA. Thus, the ACS seems to yield a large-sample measure of fully remote work.

g. Morning Consult

Morning Consult (MC) is a business intelligence company that runs a multitude of surveys. They use online survey instruments, include around 6,000 adults each month.[17] The results are weighted based on age, gender, race, education, region, gender by age, and race by education. Since December 2021, the MC data include questions on WFH frequency:

> *Even if you don't do the majority of your work at home, in the past month, on average how often did you work from home?*
>
> *1) I worked from home all or nearly all of the time*
>
> *2) I worked from home most of the time (i.e. 3-4 days a week)*

[17] As reported in the State of Workers Report (April 2023) at https://pro.morningconsult.com/analyst-reports/state-of-workers-2023. However, the corresponding Excel data file contains only 700 to 1,000 observations per month with WFH data.

3) I worked from home some of the time (i.e. 1-2 days a week)

4) I do not work from home at all

To construct a WFH estimate, we assign each categorical WFH amount a percent WFH as we do for the CHPS. So, "Yes, for 1-2 days" is 30% of days worked from home (1.5/5=0.3), "3-4" is 70% of days, "5 or more" is 100%, and "No" is 0%. As seen in Figure 1, prime-age workers in the MC data report high levels of WFH. We do not have access to the underlying microdata, so we are unable to provide a "reconciled" WFH estimate based on MC that harmonizes the sample as we do with publicly available data from government surveys like the CPS and ACS.

h. Survey of Business Uncertainty

The Atlanta Fed Survey of Business Uncertainty collects monthly data from a panel of almost 1,000 senior managers (typically CEOs, CFOs, or other financial managers). It focuses on business expectations and uncertainty, eliciting subjective probability distributions for future own-firm sales and employment, but every wave of the survey also includes special questions about topical issues. For more information about the SBU methodology and data, see Altig et al. (2022) and Barrero (2022). Those special questions have asked about work from home on several occasions, including projections for the post-pandemic outlook (Barrero et al., 2020) and most recently about actual WFH in November 2024. That question asked:

Currently, what share of your firm's full-time employees are in each category? Answers should sum to 100

- *Fully in-person/on-site* (Five or more days at your firm's location in a typical week) ___
- *3 or 4 days at your firm's location* (Hybrid) ___
- *1 or 2 days at your firm's location* (Hybrid) ___
- *Fully virtual/remote* (No days at your firm's location in a typical week) ___

Figure 4 compares the responses, weighted by firm-level employment, against the corresponding share in each category for a comparable SWAA sample. Specifically, we included respondents to the November 2024 SWAA who work as full-time wage and salary employees with one main job at firms that are 5+ years old.[18] The two surveys yield similar distributions of working arrangements, and similar estimates for the share of full WFH days among all paid workdays: 20% in the SBU versus 22% in SWAA.

[18] The SBU has very few firms less then 5 years old.

i. Kastle and Placer AI

Beyond surveys, it is possible to gauge the extent of WFH by tracking in-person attendance at the workplace. Using pre-pandemic attendance levels as a benchmark, a key measure of remote work quantifies how many fewer employees are physically present at work each day. Kastle Systems, a company that provides security services through touchless access control in a multitude of offices across the US, publishes data using this approach. They track "access activity data from KastlePresence app, keycard, and fob usage in […] 2,600 buildings and 41,000 businesses […] across 47 states." Because their data come disproportionately from office buildings, Kastle's measures are best interpreted as the amount of WFH that office workers do. That is generally higher than the broader workforce, since it excludes many front-line workers in retail, manufacturing, and other jobs that are less suited to remote work. That said, Kastle is highly informative about the population that is most likely to WFH.

The benchmark for the Kastle series is number of cardholders who swiped daily into office buildings between February 3 and February 13 in 2020, averaging them by Core Based Statistical Area. They interpret that average as "full occupancy" in a context where most office workers commuted to the worksite five days each week. Kastle also counts the number of individual cards used to swipe into buildings in later periods and interpret any "missing" swipes, relative to the full occupancy benchmark, as a measure of WFH. Figure 5 plots the resulting time series, showing the sharp decline of in-person work in 2020 and the slow and steady return to office that followed. The data also show how office occupancy stabilizes in mid- to late 2022 at around 50%, which aligns with the behavior of the SWAA WFH measure over the same time period.

Since Kastle provides high-frequency granular data on card swipes, we can use their data examine how office occupancy differs across the days of the week. In Figure 6, we can see that over 50% of card holders swipe into their office Tuesday through Thursday. Only 42% do so on Mondays, and only 32% on Fridays. We see a similar pattern in SWAA data, but there is less variation across days because we don't restrict attention to office workers who might enjoy WFH Mondays and Fridays more often than others.[19]

[19] From April 2022 – September 2022, SWAA asked an individual's work location if they worked in person. 37% of the employment share in these months worked in an office. Table A2 reports the shares of other work locations.

Similar to Kastle, the Placer AI index tracks footfall into commercial office buildings using cell-phone mobility data.[20] Any shortfall relative to a pre-pandemic benchmark likely reflects additional work from home, which they publish in a monthly index for the US. Figure 7 plots Placer AI's series alongside the one from SWAA. In October 2024 footfall was 28% down relative to January 2020, compared with a 45% drop in national office usage for Kastle in December 2024 and a WFH rate of 26% of paid workdays in SWAA. The Placer AI cellphone data also shows a similar time pattern to SWAA and Kastle, implying an extremely large drop in footfall in April and May 2020, followed by a gradual recovery until Spring 2023, at which point office traffic appears to roughly stabilize.

3. The Impact of Sample Selection Criteria

We now seek to align various data sources with respect to sample periods, target populations, and WFH concepts. This section examines in greater detail how much these alignment efforts matter while placing special attention on a key statistic of interest: the gender gap in WFH.

Table 1 reports reconciled WFH estimates for the CHPS, SWAA, ATUS, and CPS focusing on data covering January to December 2023,[21] persons with annualized earnings greater than $10,000, and individuals aged 20-64 who were at work last week. The reconciled aggregate estimates still vary, but all surveys show modest differences in WFH rates between men and women. WFH as a percent of workdays ranges from 19.8 in ATUS to 29.1 in CHPS, averaging around one-quarter when weighting by the size of each sample. Women have a modestly higher share of WFH share than men – about 2 percentage points higher on average across sources.

Table 2 compares fully remote work across the ACS, SWAA, and CPS after aligning across sources in the same manner. The highest estimate is from the CHPS, possibly because the underlying survey question is about household rather than individual behavior. If one person in the household works fully remotely, the response might reflect that even if others work at their employer's worksite one or more days a week. Averaging across the four surveys, the share of workers who are fully remote is near 15 percent, with the rate for women about two percentage points higher (although highly variable).

[20] The Place AI Index is available at https://www.placer.ai/free-tools/return-to-office.
[21] The CHPS did not ask their WFH question from November 2023 – December 2023.

One way of dealing with different definitions of WFH—especially, the distinction between hybrid and fully remote work—is by examining the share of people who do any WFH. In Table 3 we estimate the percent of workers with any WFH in the 2023 ATUS and CPS. Both surveys use the same sampling frame, so we could expect them to yield consistent answers. Instead, there is a large gap: almost 33% of workers report any work at home in the ATUS, whereas less than 20% do so in the CPS. In part, this difference could be due to the reference to the pandemic in the CPS question, as we discuss above. The gap is also puzzling when we recall that the CPS question asks about hours of paid work done at home, which would allow respondents to include any work done at home early or late in the day, or on weekends. It seems CPS respondents fail to report much of that WFH, or they do not think of it as work done for pay. Or, alternatively, people who respond to the ATUS and CPS are very different. These observations give us more confidence in the ATUS than the CPS estimates of WFH.

Two sample selection criteria that might have outsize importance for our WFH estimates are (1) the definition of a full workday, and (2) the earnings required for inclusion in the sample. We test the sensitivity of our WFH estimates to these two choices in Tables 4 and 5.

In Table 4 we relax the hours criterion for what counts as a workday, comparing ATUS and SWAA. The SWAA question specifies a full workday as one involving at least six hours of paid work, shown in column 1 for a sample covering all months of 2023. Column 2 shows our baseline measure of WFH based on ATUS data, which imposes the same requirement. We can relax that requirement by exploiting the granularity of the time diary data. Columns 3 and 4 show an increase in the share of workdays that are WFH days when we require just 4 or 2 hours of work that day, respectively. Still, the ATUS data yield a larger value for the remote share of workdays, pushing it up to 25% of days. That is still below the SWAA estimate of almost 29%, suggesting there are other differences between the SWAA and ATUS samples. The inclusion of self-employed and contract workers in the SWAA accounts for nearly half of the remaining SWAA-ATUS gap.

Finally, we consider the impact of imposing an earnings requirement on WFH estimates in Table 5. Our benchmark samples restrict attention to persons aged 20 to 64 with prior-year or annualized earnings greater than $10,000. That requirement appears to matter little, as Table 5 shows. When we raise the earnings requirement to $20K (columns 3 and 6) or eliminate it (columns 1 and 4) we obtain estimates of the WFH share of full workdays that are very similar to the baseline levels (columns 2 and 5) in both SWAA and ATUS.

4. Work from Home over Time and Across Demographic Groups

Average WFH levels in the US seem to have stabilized by 2023, after falling from their pandemic peak. Yet, they still vary across demographic groups, as we document in this section.

Tables 1 to 5 reveal a consistent gender gap in WFH. Women's share of WFH days is 2 or 3 percentage points higher in most surveys. The same is true for the share of women who do any work from home or the share who do it full time. Figure 8a (left panel) shows how that gap has evolved over time in SWAA data. We plot the monthly share of WFH days among full paid days for all workers and separately for men and women from May 2020 to January 2025. All three series comove strongly. The high rate of remote work early in the pandemic declines and then stabilizes at around 27% in recent months. Since mid-2022, women have consistently more WFH than men, but only by a modest percentage. Thus, the forces that drive men and women to WFH (or not) seem to be mostly common to both groups. Any forces that drive a wedge between women's and men's WFH levels seem to be weak or balance each other out. For example, the flexibility of remote work makes childcare easier. Because women disproportionately take on those responsibilities, we might expect them to WFH more than men. We do find that people who live with young children (aged 8 or under) WFH more often than those who don't, as Figure 8b (right panel) shows. Since mid-2022, women with young children also consistently WFH a bit more often than men with children. But we see a similar gender gap among childless workers. Altogether, the absence of a large gender gap suggests that the determinants of who works from home are similar for men and women.

To further explore the determinants of WFH, we use regression models to ask whether some demographic characteristics predict more WFH after conditioning on other variables. This exercise is useful, for example, if women and men with similar education tend to sort into occupations that are not equally amenable to WFH (say, nurses versus radiologists). Table 6 shows the results. Column 1 corroborates the graphical evidence from Figure 8, whereby women WFH more than men, and so do people with children. The gender gap shrinks, however, as we include other demographic and labor market characteristics in the regression model in columns 2 to 5. Moreover, the coefficient on women who live with young children grows as we control for those other variables.

We uncover an inverted-u relationship between WFH and age. Young workers in their early 20s are starting out their careers, so they might WFH less often to benefit from the professional development and mentoring opportunities provided by face-to-face meetings in the workplace. Older workers, in their late 40s, 50s, or 60s, likely have other reasons to limit WFH. They might be less comfortable with remote-work technologies, or they might be managers who prefer in-person monitoring. That leaves workers in their 30s and 40s, who are more likely to have young children and appreciate the flexibility of remote work.

The biggest predictor of WFH is education, however. Highly educated knowledge workers disproportionately work in jobs that are suitable for some remote work. College and graduate degree-holders have WFH rates that 15 percentage points greater than that of otherwise similar workers with no post-secondary education. This pattern only attenuates mildly when we add industry and occupation fixed effects in column 3, as well as time effects to control for the gradual decline in WFH during the 2022-2024 sample period. Caring or living with persons who are particularly vulnerable to COVID-19 and other infectious diseases predicts much higher WFH rates, by six percentage points, as seen in column 5. Living with vulnerable persons does not greatly alter the WFH patterns associated with other demographic characteristics, as seen by comparing columns 4 and 5.

Despite WFH rates in 2023 being four times higher than before the COVID-19 pandemic, survey data indicate that many workers would still like higher WFH. The SWAA has a long-standing question that asks, "*Looking one year ahead, how often would you like to have paid workdays at home?*"[22] The response options include "*Never,*" "*Once or twice per month,*" and options for 1, 2, 3, 4, or 5+ days per week. We translate those responses into a percent of all paid workdays, assuming a 5-day workweek, and compute average desired WFH rates by demographic group. Figure 9 plots those desires against actual WFH rates. All points are above the 45-degree line, meaning that average desires exceed actual WFH in each group. Most workers would like to work from home somewhere between 40 and 50 percent of working days, but in practice only do so about half as much.

Table 7 fits models that regress desired WFH on the same demographic characteristics as Table 6. Columns (1) – (4) show how gender, age, children, and education relate to the average

[22] For SWAA waves prior to August 2023, the wording of the initial clause referred to a future after the end of the pandemic instead of one year ahead.

individual's desired WFH level. Women's desired WFH is between 3 and 6 percentage points higher than men's depending on other controls in the regression. This gap is larger than the one for actual WFH in Table 6. Other factors, like sorting of men and women across industries and occupations, matter less for desired WFH rates than actual WFH rates.

Looking across age groups, desired WFH has an inverted u-shape, just like actual WFH in the full sample (columns 2 and 3). Workers aged 30 to 34 have a desired WFH rate 3.1 percentage points higher than those 20 to 24, and almost 12 percentage points higher than those 60 to 64. Men who live with young children have a desired WFH rate that is 3.6 percentage points higher than men who don't, after controlling for age, education, and occupation and industry effects. Conversely, women who live with young children want to WFH less than those who don't.

Education is a strong predictor of average WFH desires. In the full sample from column 3, workers with a bachelor's degree want a WFH rate 9.1 percentage points higher than workers who didn't go to college. This pattern arises whether we control for industry and occupational fixed effects or restrict to a shorter sample period in columns 4 and 5. Finally, in column 5 we find that individuals who provide care or live with others who are vulnerable to COVID or other infectious diseases have a desired WFH rate 4.9 percentage points higher than others. As with actual WFH, this seems to be a separate dimension that doesn't change the coefficients on other demographic characteristics much, as seen by comparing columns 4 and 5.

Altogether, our conclusion from Tables 6 and 7 is that much of the predictable variation in WFH rates and individuals is associated with the nature of work; namely, with education, industry, occupation, and life-cycle career progression. Gender and family structure matter on the margin, but they account for modest fractions of the predictable variation. Desired and actual WFH rates rise sharply with education. Living with persons who are especially vulnerable to infections is also associated notably higher actual and desired WFH rates.

5. Concluding Remarks

After reviewing multiple data sources, we conclude that about one quarter of all paid workdays were WFH days in 2023 to 2025 among U.S. workers aged 20-64. Whereas headline estimates of WFH differ widely across sources, much of that is due to differences in the WFH concept and the target population. For example, some estimates like that from the American Community Survey reflect the share of workers who are fully remote and broadly match the fully

remote share in other sources. Our work also finds that question design and framing matters when estimating WFH rates.

We also use over 70,000 responses from US residents aged 20 to 64 in the Survey of Working Arrangements and attitudes to document several demographic regularities in actual and desired WFH rates. Men and women WFH at similar rates, and the modest gap between them is partly explained by differences in education, industry, and occupation. We find more robust patterns by age and education, with workers in their 30s to early 40s exhibit higher desired and actual WFH rates than younger and older workers. College-educated workers have much higher actual and desired WFH rates than their less-educated counterparts. Still, demographics explain less than one-tenth of the variation in actual and desired WFH across workers in our sample. Thus, even conditional a large battery of observable job and worker characteristics, actual and desired WFH rates exhibit a great deal of idiosyncratic variation, echoing the pattern found by Aksoy et al. (2022) in a many-country analysis.

References

Adams-Prassl, Abi, Teodora Boneva, Marta Golin, and Christopher Rauh, 2020 "Inequality in the Impact of the Coronavirus Shock: Evidence from Real Time Surveys." *Journal of Public Economics*, 189.

Aksoy, Cevat Giray, Jose Maria Barrero, Nicholas Bloom, Steven J. Davis, Mathias Dolls, and Pablo Zarate, 2022. "Working from Home Around the World," *Brookings Papers on Economic Activity,* Fall.

Aksoy, Cevat Giray, Jose Maria Barrero, Nicholas Bloom, Steven J. Davis, Mathias Dolls, and Pablo Zarate, 2023. "Time Savings When Working from Home," *AEA Papers & Proceedings,* 113.

Aksoy, Cevat Giray, Nicholas Bloom, Steven J. Davis, Victoria Marino and Cem Özgüzel, 2025. "Remote Work, Employee Mix, and Performance," working paper.

Alipour, Jean-Victor, Oliver Falck, Simon Krause, Carla Krolage and Sebastian Wichert, 2023. "The Future of Work and Consumption in Cities After the Pandemic: Evidence from Germany," 15 June.

Althof, Lukas, Fabian Eckert, Sharat Ganapati and Conor Walsh, 2022. "The Geography of Remote Work," *Regional Science and Urban Economics,* 93 (March), 103770.

Altig, David, Jose Maria Barrero, Nicholas Bloom, Steven J. Davis, Brent Meyer, and Nicholas Parker, 2022. "Surveying business uncertainty," *Journal of Econometrics* 231, no. 1: 282-303.

Anakpo, Godfred, Zanele Nqwayibana and Syden Mishi, 2023. "The Impact of Work-from-Home on Employee Performance and Productivity: A Systematic Review," *Sustainability,* 15, no. 5.

Barrero, Jose Maria, 2022. "The Micro and Macro of Managerial Beliefs." *Journal of Financial Economics,* 143, no. 2: 640-667.

Barrero, Jose Maria, Nicholas Bloom, and Steven J. Davis, 2020. "COVID-19 Is Also a Reallocation Shock," *Brookings Papers on Economic Activity,* Summer.

Barrero, Jose Maria, Nicholas Bloom and Steven J. Davis, 2021. "Why Working from Home Will Stick," NBER Working Paper 28731.

Barrero, Jose Maria, Nicholas Bloom and Steven J. Davis, 2025. "Why Working from Home Will Stick," NBER Working Paper 28731, revised.

Barrero, Jose Maria, Nicholas Bloom, Steven J. Davis, Brent Meyer and Emil Mihaylov, 2022. "The Shift to Remote Work Lessens Wage-Growth Pressures," NBER Working Paper 30197.

Bick, Alexander and Adam Blandin, 2021. "Real-Time Labor Market Estimates During the 2020 Coronavirus Outbreak," Working Paper, 18 June.

Bick, Alexander, Adam Blandin, and Karel Mertens, 2022. "Work from Home Before and After the COVID-19 Outbreak," conditionally accepted, *American Economic Journal: Macroeconomics.*

Bloom, Nicholas, Tobias Kretschmer, and John Van Reenen, ''Work-life Balance, Management Practices and Productivity,'' *International Differences in the Business Practice and Productivity of Firms*. (Chicago: University of Chicago Press, 2009).

Bloom, Nicholas, James Liang, John Roberts, and Zhichun Jenny Ying, 2015. "Does Working from Home Work? Evidence from a Chinese Experiment," *Quarterly Journal of Economics*, 130, no. 1, 165-218.

Brynjolfsson, Erik, John J. Horton, Christos Makridis, Alexandre Mas, Adam Ozimek, Daniel Rock and Hong-Yi Tu Ye, 2025. "How Many Americans Work Remotely? A Survey of Surveys and Their Measurement Issues," *Review of Income and Wealth,* forthcoming.

Bureau of Labor Studies, 2018. "Job Flexibilities and Work Schedules – 2017-2018 Data from the American Time Use Survey," https://www.bls.gov/news.release/flex2.nr0.htm

Choudhury, Prithwiraj, Cirrus Foroughi, and Barbara Larson, 2021. "Work-From-Anywhere: The Productivity Effects of Geographic Flexibility," *Strategic Management Journal,* 42, no. 4, 655-683.

Cullen, Zoe B., Bobak Pakzad-Hurson and Ricard Perez-Truglia, 2025. "Home Sweet Home: How Much Do Employees Value Remote Work," NBER Working Paper 33383.

Davis, Steven J., Stephen Hansen, and Cristhian Seminario-Amez, 2021. "Firm-Level Risk Exposures and Stock Returns in the Wake of COVID-19," NBER Working Paper 27867.

Delventhal, Matthew J., Eunjee Kwon and Andrii Parkhomenko, 2022. "How Do Cities Change When We Work from Home?" *Journal of Urban Economics,* 127 (January), 103331.

Delventhal, Matthew J. and Andrii Parkhomenko, 2022. "Spatial Implications of Telecommuting," 28 March.

DeFilippis, Evan, Stephen Impink, Madison Singell, Jeffrey Polzer, and Raffaella Sadun, 2020. "Collaborating During Coronavirus: The Impact of COVID-19 on the Nature of Work," NBER Working Paper No. 27612.

Duranton, Gilles and Jessie Handbury, 20023. "COVID and Cities, Thus Far," NBER Working Paper 31158.

Etheridge, Ben, Li Tang, Yikai Wang and Ashley Burdett, 2023. "Worker Productivity During COVID-19 and Adaptation to Working from Home," 14 June.

Favilukis, Jack, Xiaoji Lin, Ali Sharifkhan and Xiaofei Zhao, 2021. "Labor Force Telework Flexibility and Asset Prices: Evidence from the COVID-19 Pandemic," 7 May.

Flood, S., M. King, R. Rodgers, S. Ruggles, J. Robert Warren, D. Backman, A. Chen, G. Cooper, S. Richards, M. Schouweiler, and M. Westberry (2024). Ipums cps: Version 12.0 [dataset]. Minneapolis, MN: IPUMS.

Flood, S., L. Sayer, D. Backman, and A. Chen (2023). American Time Use Survey Data Extract Builder: Version 3.2 [dataset]. College Park, MD: University of Maryland and Minneapolis, MN: IPUMS.

Gupta, Arpit, Vrinda Mittal, Jonas Peeters and Stijn Van Nieuwerburgh, 2022a. "Flattening the Curve: Pandemic-Induced Revaluation of Urban Real Estate," *Journal of Financial Econiomcs,* 146, no. 2, 594-636.

Gupta, Arpit, Vrinda Mittal and Stijn Van Nieuwerburgh, 2022b. "Work from Home and Office Real Estate Apocalypse," NBER Working Paper 30526.

Harrington, Emma and Matthew E. Kahn, 2023. "Has the Rise of Work-from-Home Reduced the Motherhood Penalty in the Labor Market?" 16 June.

Liu, Sitian and Yichen Su, 2023. "The Effect of Working from Home on the Agglomeration Economies of Cities: Evidence from Advertised Wages," 20 February.

Mas, Alexandre and Amanda Pallais, 2017. "Valuing Alternative Work Arrangements," *American Economic Review*, 107, No. 12, 3722-59.

Mas, Alexandre and Amanda Pallais, 2020, "Alternative Work Arrangements," *Annual Review of Economics*, 12, 631-658.

Monte, Ferdinando, Charly Porcher and Esteban Ross-Hansberg, 2023. "Remote Work and City Structure," 9 June.

Pagano, Marco, Christian Wagner, and Josef Zechner, 2020. "Disaster Resilience and Asset Prices," CEPR Discussion Paper No. 14772.
Papanikolaou, Dimitris and Lawrence Schmidt, 2022. "Working Remotely and the Supply-Side Impact of COVID-19," *Review of Asset Pricing Studies,* 12, No. 1, 53-111.
Prescott, J.J., Norman Bishara, and Evan Starr, 2016. "Understanding Noncompetition Agreements: The 2014 Noncompete Survey Project," *Michigan State Law Review*, 369-464.
Ramani, Arjun and Nicholas Bloom, 2021. "The Donut Effect of COVID-19 on Cities," NBER Working Paper 28876.
Ruggles, S., S. Flood, M. Sobek, D. Backman, A. Chen, G. Cooper, S. Richards, R. Rodgers, and M. Schouweiler (2024). Ipums usa: Version 15.0. [dataset], Minneapolis, MN: IPUMS.
Starr, Evan, J.J. Prescott and Norman Bishara, 2020. "Noncompete Agreements in the U.S. Labor Force," *Journal of Law and Economics*, forthcoming.

Appendix A: SWAA Survey Methodology

Since May 2020, we have run monthly waves of the Survey of Working Arrangements and Attitudes (SWAA). We design the survey instrument and pay the commercial survey provider, IncQuery (in 2020 also QuestionPro) to recruit respondents and field surveys over the internet. Each survey includes 60 to 80 questions on demographics, working arrangements, earnings, commuting, spending near employer premises, expectations and experiences related to WFH, perceptions, and more. Figure A3 displays our main WFH question in SWAA.

Initial SWAA waves collected 2,500 responses each and have gradually increased to 8,000 or 10,000 responses per month by June 2022. Median survey completion time (after dropping "speeders") ranges from 8 minutes, 43 seconds in the 2021 waves to 11 minutes, 54 seconds in the 2022 waves. Since Fall 2024 we have aimed to keep the median completion time between 6 and 7 minutes to preserve data quality. We treat our data as repeated cross sections, although we cannot preclude the possibility that a given respondent appears in multiple waves.

Our target survey population is U.S. residents, 20-64 years old. Early waves also imposed a $20,000 earnings requirement in 2019, which in 2020 we lowered to $10,000 in 2019 or (for 2022 and later) the prior year. Since 2022 we dropped the earnings requirement and compile two datasets: the first goes back to 2020 and imposes the $10,000 earnings threshold while the second doesn't. Most of our estimates use the first dataset with the earnings requirement.

Our survey providers recruit respondents from lists of verified persons supplied by leading market research aggregators, who gather potential respondents from multiple sources. One reason to draw from multiple sources is that the form of respondent compensation depends on where and how they are recruited for online surveys. Some respondents receive airline miles in exchange for survey participation, for instance, while others receive cash or credits that unlock valuable features of internet games. No respondents sign up specifically for our survey.

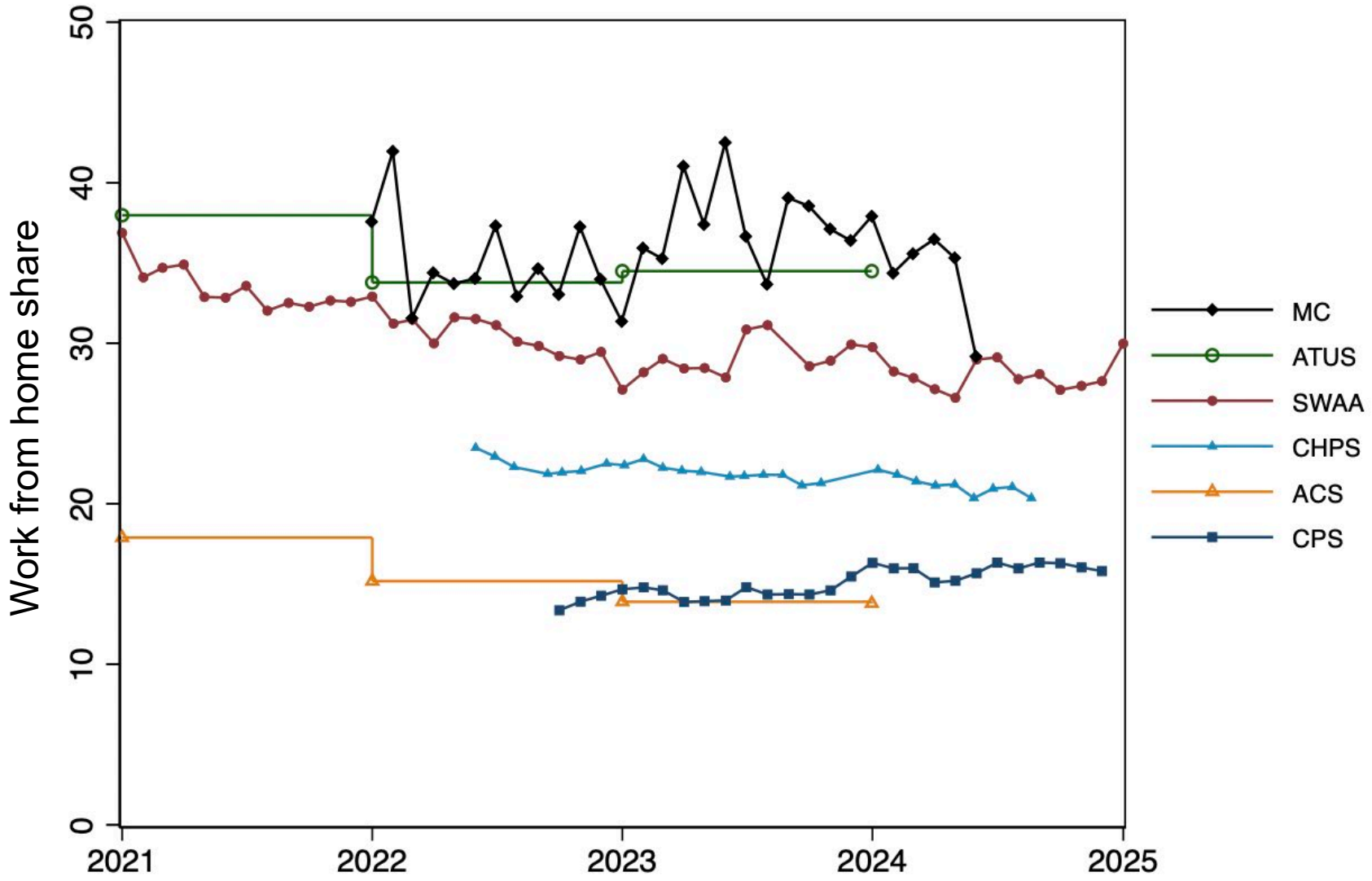
Prescott et al. (2016), Starr et al. (2020) and Bick and Blandin (2021) provide validation exercises and useful discussions of these sorts of online surveys. We adopt many of their practices to enhance data quality. For example, we drop persons who complete the survey too quickly to have read the questions carefully. As of early 2025, that means dropping responses with

completion times below 3.5 to 4 minutes, approximately the bottom 15% of survey completion times.

We seek a sample that is broadly representative of our target population. To that end, we reweight the raw survey data (again, after dropping speeders) to match the joint distribution of persons over age-sex-education-earnings cells in Current Population Survey (CPS) data from 2010 to 2019. The raw data over-represent persons with high earnings and high education, but the reweighted distributions match CPS data in the targeted dimensions. Both raw and reweighted SWAA data are distributed similarly to the CPS data including other variables that are not part of our reweighting scheme. Still, our reweighted data may be selected in other respects that correlate with outcomes of interest. For example, internet survey participants might spend more time online and differ from non-participants in their WFH experiences and attitudes. We cannot rule out this possibility. Given near universal penetration of broadband internet, smartphones, and similar devices in 2020, we see this concern as less worrisome today than 10 or 15 years ago.

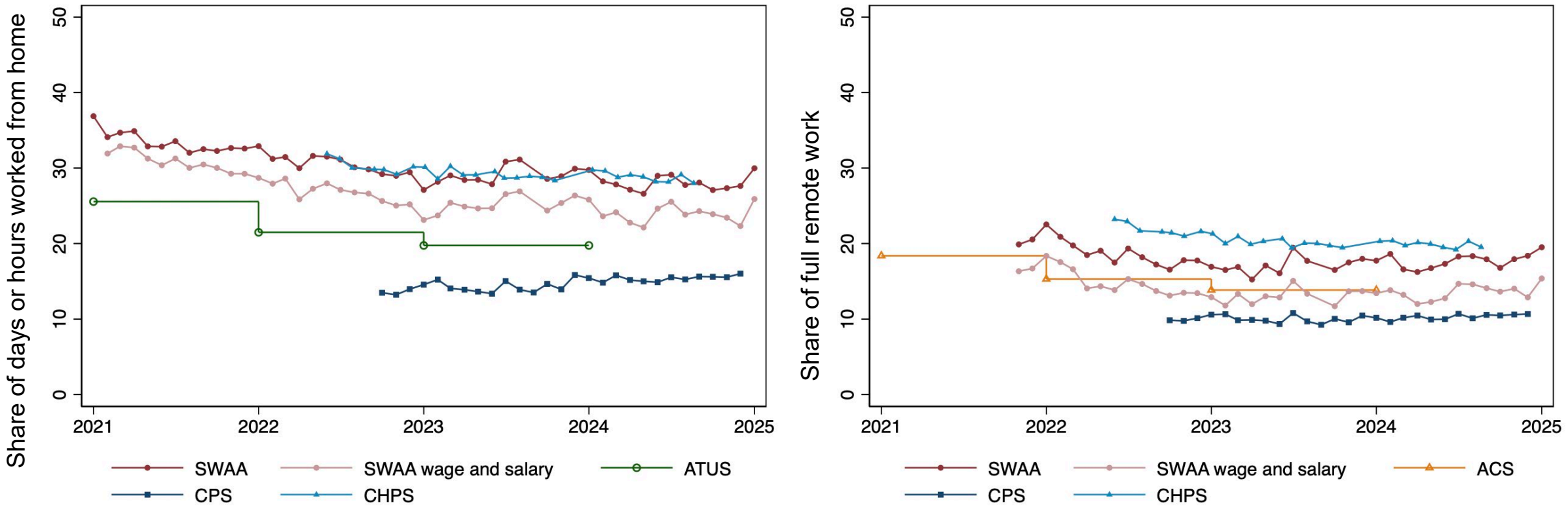
The modal respondent before weighting is a woman, 30 to 40 years old with a 4-year college degree, who earned $50 to $100 thousand in the previous year. Our 2023 core sample has 65,371 observations after dropping "speeders" and cleaning up inconsistent responses. Some variables have fewer observations, because they derive from questions not posed in all survey waves. Before October 2021, for example, we did not ask for the respondent's birth year. In addition, certain questions go only to persons WFH as of the survey date or at some point during the pandemic.

Figure 1: Headline estimates of WFH shares differ widely across survey sources



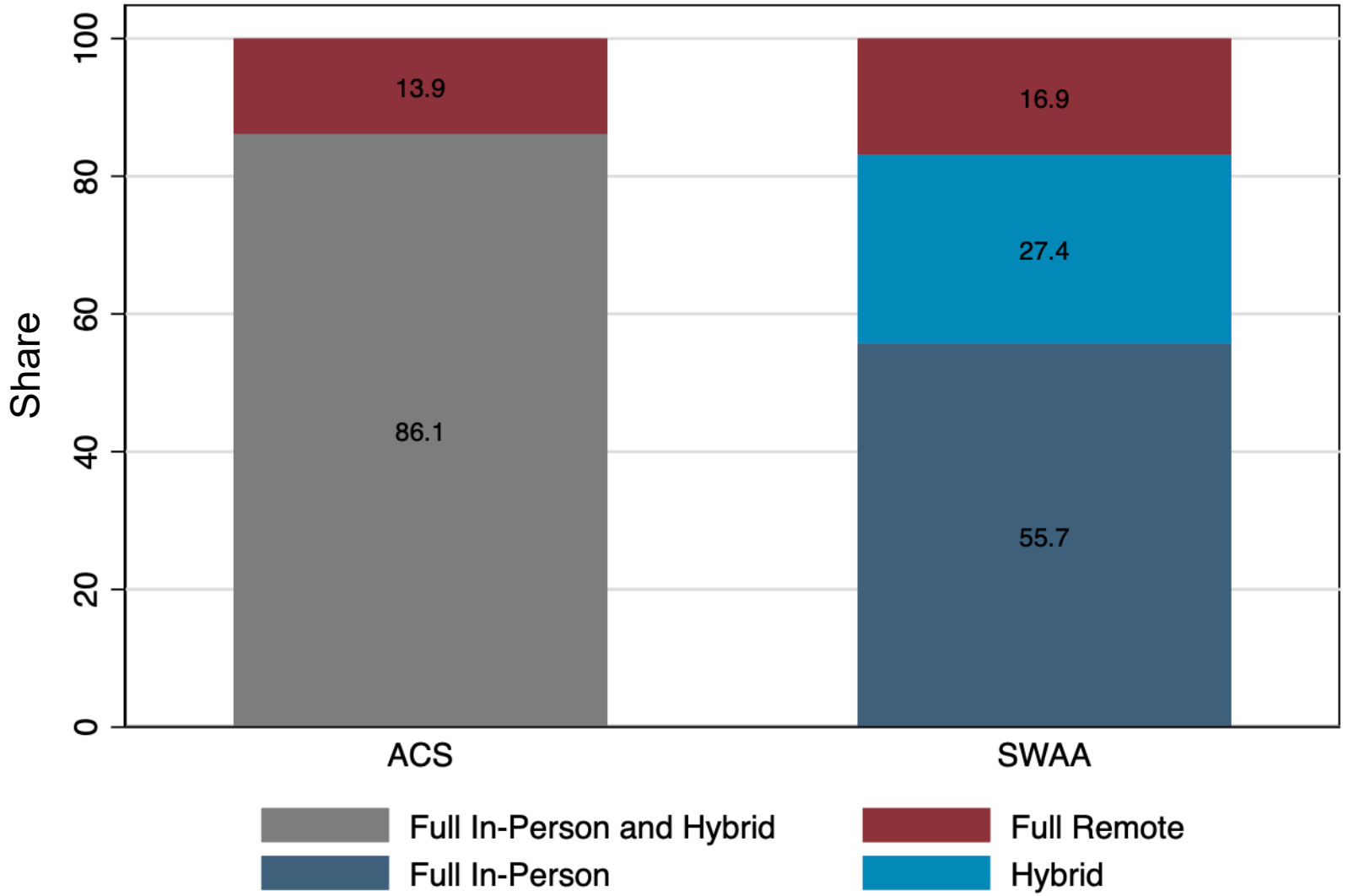
Notes: Survey of Working Arrangements and Attitudes (SWAA) is monthly data from January 2021 – January 2025. The Census Household Pulse Survey (CHPS) is monthly data from June 2022 – October 2023 and January 2024 – August 2024. The American Time Use Survey (ATUS) is pooled at an annual frequency from 2021 – 2023. The American Community Survey (ACS) is annual data from 2021 – 2023. The Current Population Survey (CPS) is monthly data from October 2022 – December 2024. Morning Consult (MC) is monthly data from December 2021 – May 2024.

Figure 2: Aligning on target populations and WFH concepts shrinks the differences



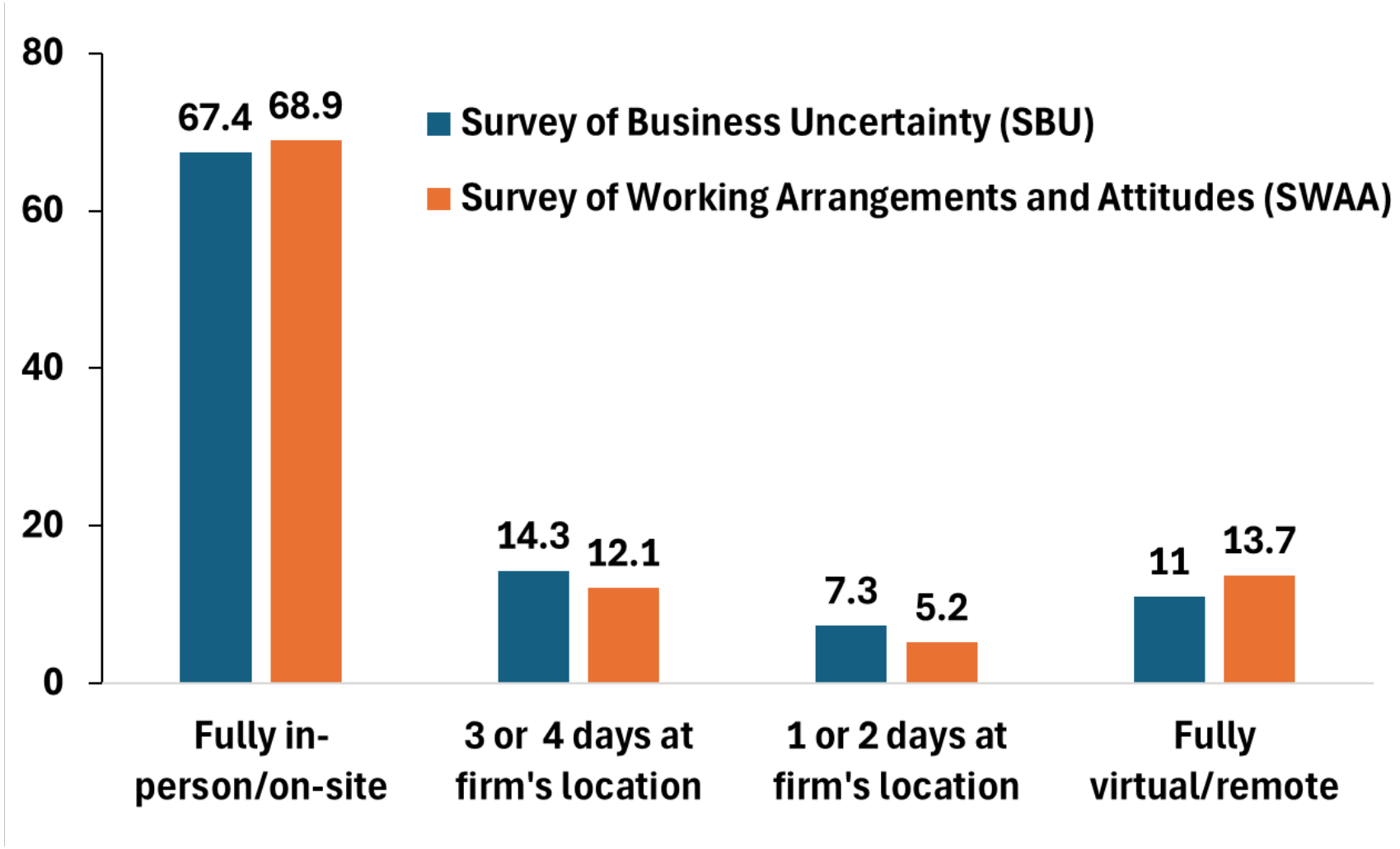
Notes: Panel (a) shows the share of days worked from home. SWAA, ATUS, and CPS restrict to employed individuals 20-64 earning at least $10,000. CHPS restricts to respondents 20-64 with household income at least $25,000. ATUS, CPS, and SWAA wage and salary do not include self-employed individuals. An individual is classed as WFH in SWAA if using full (6 hour) days worked from home in the past week. An individual is classed as WFH in ATUS WFH if at least 6 of their working hours in the diary day were at home. An individual's WFH in the CPS is the number of paid hours they WFH divided by the total of hours they work. WFH in the CHPS is the number of telework days in the past week divided by 5.
Panel (b) shows the share of fully remote days for the restricted SWAA, CPS, and CHPS samples. ACS restricts to employed individuals 20-64 earning at least $10,000. Individuals in SWAA are classed as fully remote if all their workdays in the past week were WFH. Individuals in the ACS are classed as fully remote if their main mode of transportation to work was "work from home". Individuals in the CPS are classed as fully remote if their number of paid hours worked from home equals their number of hours worked in the past week. Fully remote work in the CHPS is if there were 5 or more days teleworked in the household for the past week.

Figure 3: WFH in the ACS is a good measure of fully remote work



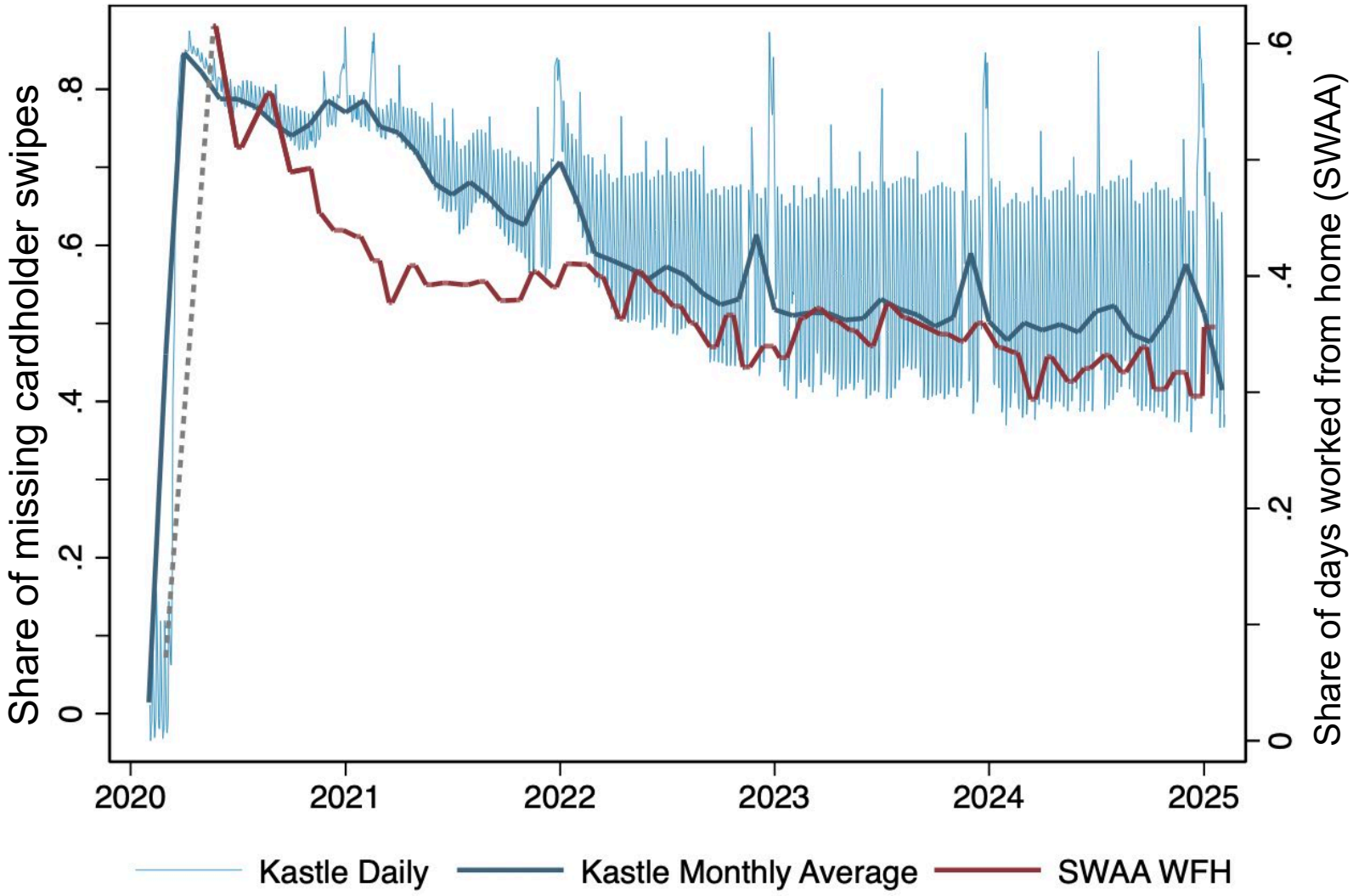
Notes: SWAA and ACS data are pooled from January 2023 – December 2023 and restrict to employed individuals 20-64 earning at least $10,000.

Figure 4: WFH rates reported by managers in the Survey of Business Uncertainty match those from a comparable SWAA sample



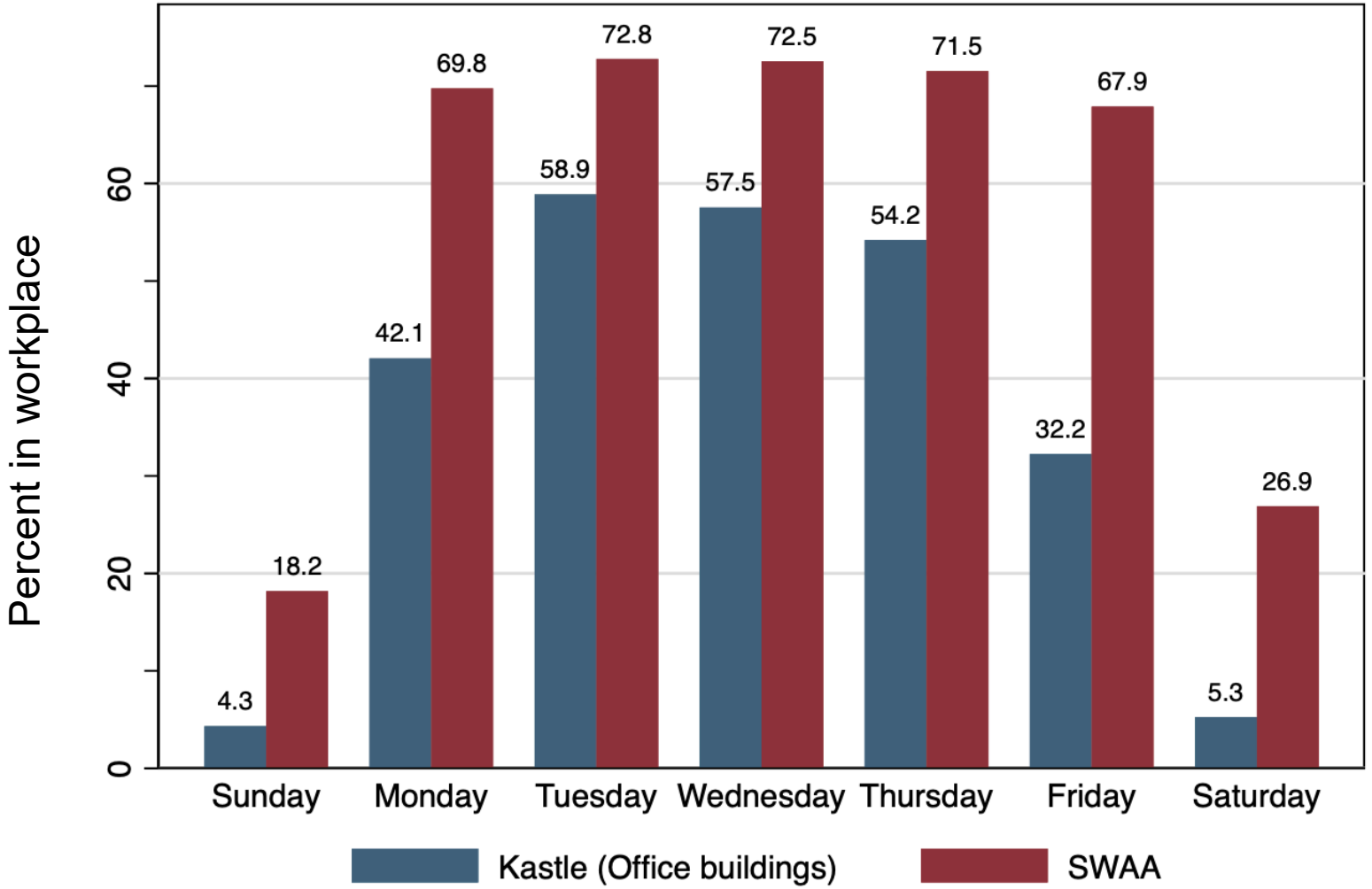
Notes: SWAA includes all employed individuals 20-64 earning at least $10,000. Placer AI includes employed individuals of all ages and earnings in office buildings in major US cities. We construct the Placer AI series as 100 - (employee office visits normalized to January 2020) where 0 is equal to pre-pandemic in person work and 100 is equal to full remote work.

Figure 5: WFH in Top 10 CBSAs mirrors office worker vacancies



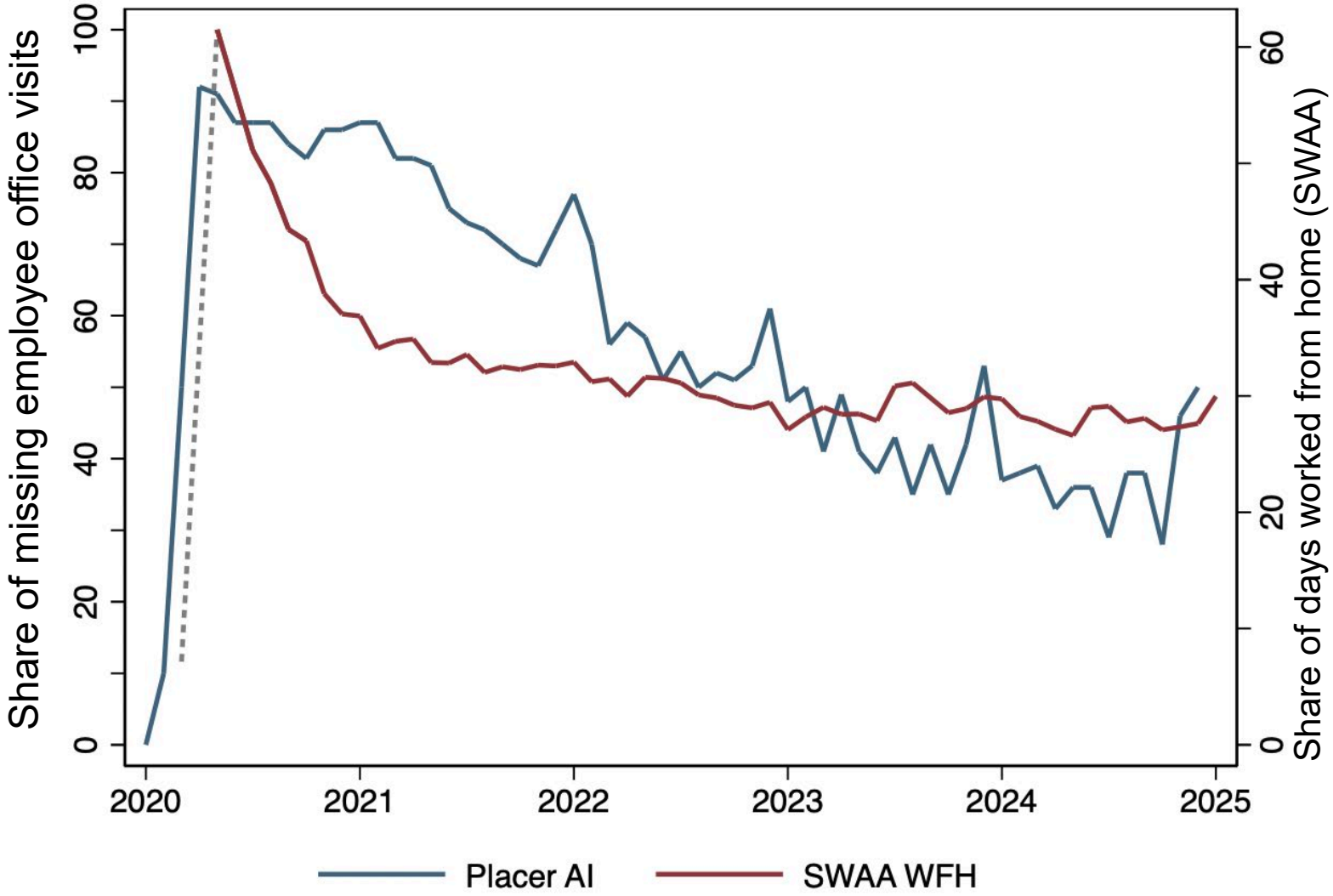
Notes: SWAA and Kastle data are both restricted to the top 10 CBSAs include Washington DC, NYC, Chicago, Houston, Philadelphia, SF, LA, Dallas, San Jose, Austin. SWAA includes all employed individuals 20-64 earning at least $10,000. Kastle includes employed individuals of all ages and earnings, primarily office workers. We construct the Kastle data as 1 - (percent of cardholder swipes into the office normalized to February 3 – February 13 2020) where 0 is equal to pre-pandemic in person work and 1 is equal to full remote work.

Figure 6: Office Buildings Are Emptier on Mondays and Fridays



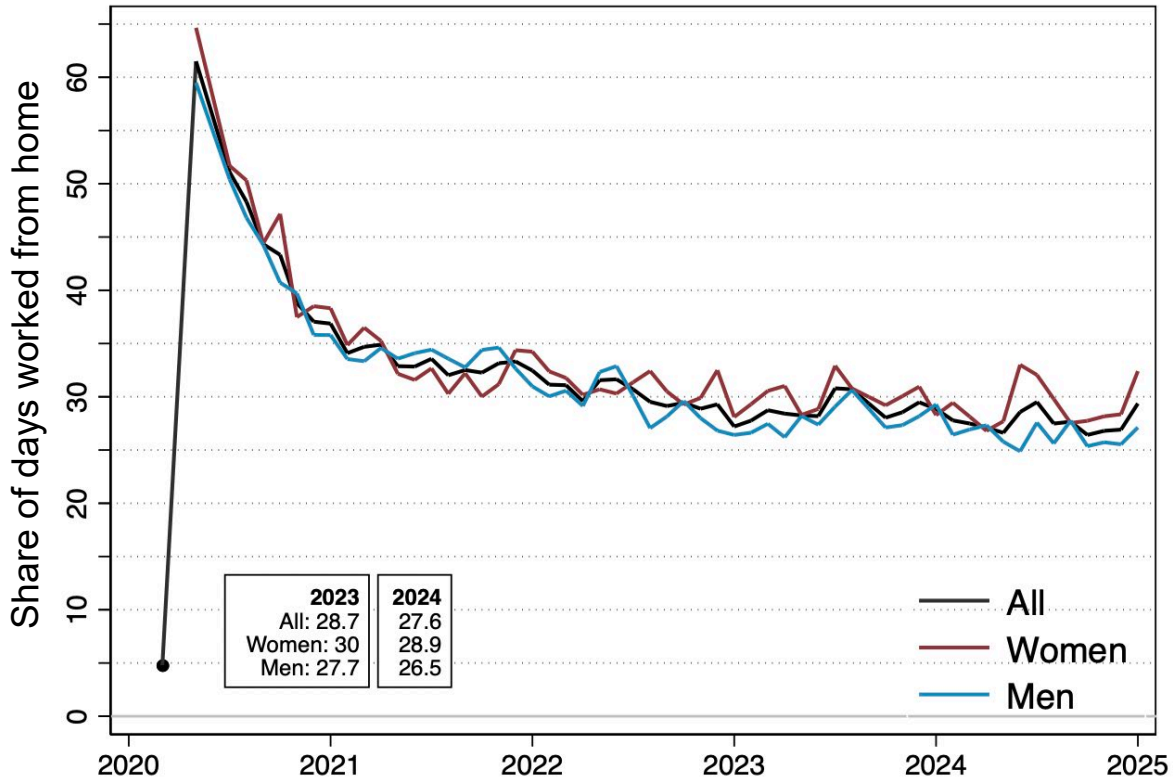
Notes: SWAA and Kastle data are pooled from January 2024 – October 2024 and restricted to the top 10 CBSAs: Washington DC, NYC, Chicago, Houston, Philadelphia, SF, LA, Dallas, San Jose, Austin. SWAA includes employed wage and salaried workers 20-64 earning at least $10,000. Kastle includes employed individuals of all ages and earnings, primarily office workers. The Kastle data are a percent of cardholder swipes into the office normalized to February 3 – February 13 2020) where 100 is equal to pre-pandemic in person work.

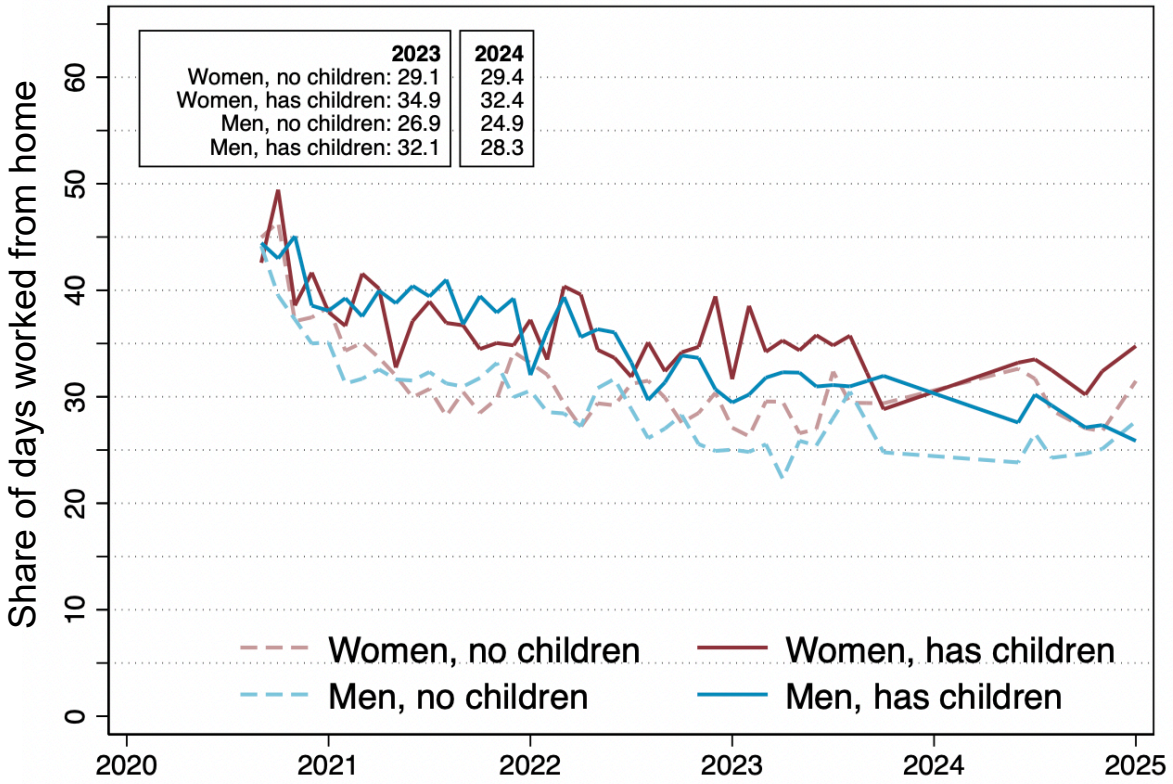
Figure 7: WFH nationwide mirrors return to office trends



Notes: SWAA includes all employed individuals 20-64 earning at least $10,000. Placer AI includes employed individuals of all ages and earnings in office buildings in major US cities. We construct the Placer AI series as 100 - (employee office visits normalized to January 2020) where 0 is equal to pre-pandemic in person work and 100 is equal to full remote work.

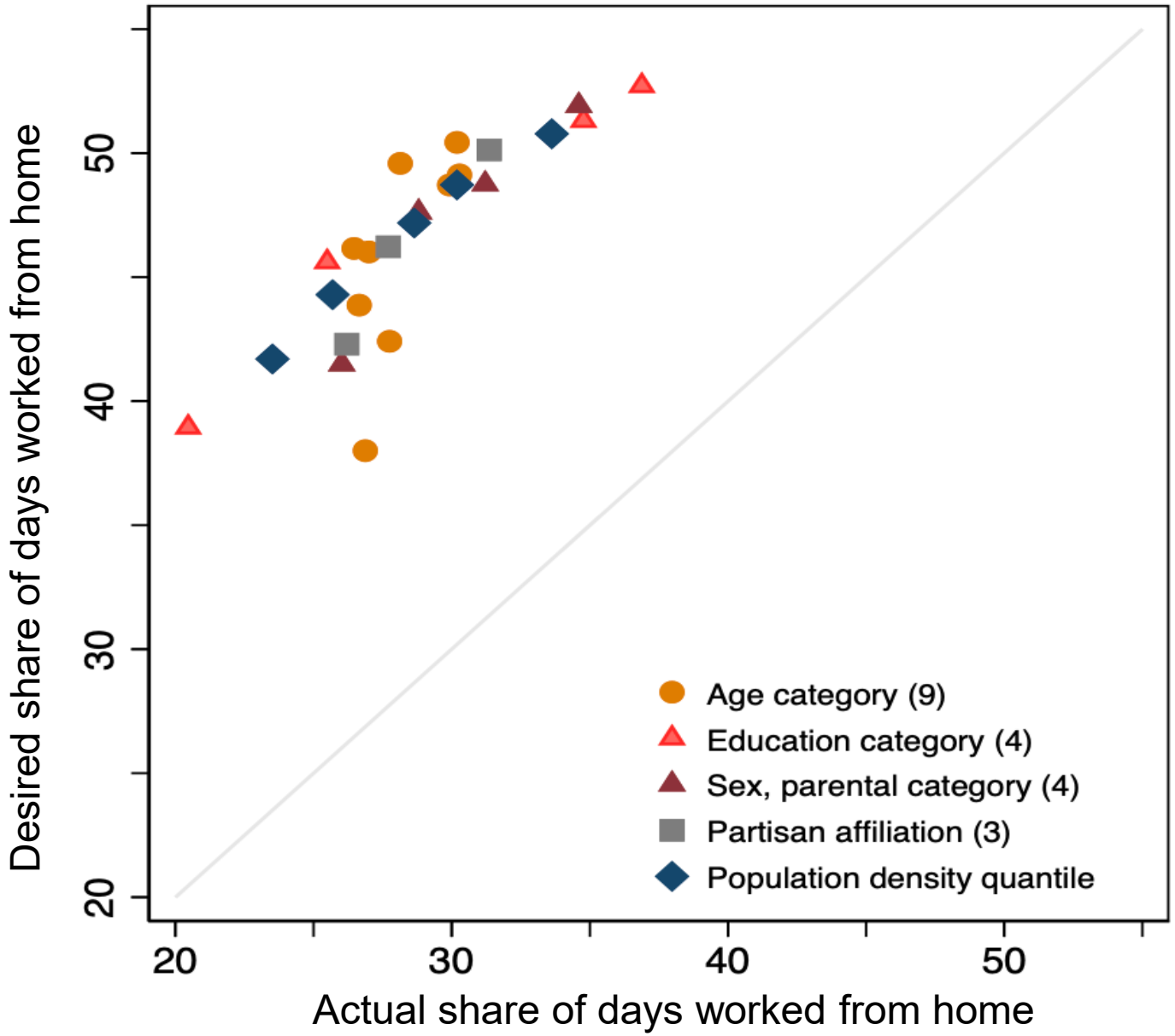
Figure 8: Men and Women Work from Home at Similar Rates





Notes: The pre-COVID figure is from the 2017-2018 American Time Use Survey. SWAA data is from May 2020 – January 2025 and is restricted to individuals 20 - 64 earning at least $10,000. We define individuals as having young children if they live with a child under the age of 8. Sample averages cover January 2023 – December 2023 and January 2024 – December 2024.

Figure 9: Desired WFH Rates Exceed Actual Rates in Every Major Demographic Group



Notes: SWAA data is pooled from September 2022 – January 2025 and is restricted to individuals 20 - 64 earning at least $10,000. Age categories are 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64. Education categories are High school degree or less, Some college, Bachelor degree, Graduate degree. Sex, parental categories are Women no children, Women has children, Men no children, Men has children. Partisan affiliations are Democrat, Independent, Republican.

Table 1: Work-from-Home Rates, Persons 20-64 Years Old

	Full Days Worked from Home, Percent of Workdays				WFH Hours, Percent of Workhours	
	(1)	(1b)	(2)	(3)	(4)	(5)
Data source	**CHPS**	**CHPS imputed**	**SWAA**	**ATUS**	**ATUS**	**CPS**
Sample period	Jan 23 - Oct 23	Jan 23 - Oct 23	Jan – Dec 23	Jan – Dec 23	Jan – Dec 23	Jan – Dec 23
Age range	20 to 64	20 to 64	20 to 64	20 to 64	20 to 64	20 to 64
Income threshold	Household income>$25k	Household income>$25k	Prior-year earnings>$10k	Annualized earnings>$10k	Annualized earnings>$10k	Annualized Earnings > $10K
Work requirement	Worked last week	Worked last week	Worked last week, days with >6 hours	Worked >6 hours on diary day	Worked on diary day	Worked last week
Overall	29.1	24.9	28.	19.8	22.3	14.3
Men	29.3	23.6	27.7	18.7	20.9	12.8
Women	28.9	26.5	29.8	21.0	24.0	16.0
Difference	-0.4	+2.9	+2.1	+2.3	+3.1	+3.2
N	410,499	295,397	47,556	1,671	2,095	106,083

Note: The statistics are cross-sectional means, adjusted for sample weights.

Table 2: Percent Working in a Fully Remote Capacity, 20-64 Years Old

	(1)	(2)	(3)	(4)
Data source	**ACS**	**SWAA**	**CHPS**	**CPS**
Sample period	2023	2023	Jan 23 to Oct 23	2023
Age range	20 to 64	20 to 64	20 to 64	20 to 64
Income threshold	Prior-year earnings>$10k	Prior-year earnings>$10k	Household income>$25k	Annualized earnings>$10k
Work requirement	Worked last week	Worked last week, days with >6 hours	Worked last week	Worked last week
Overall	13.9	16.9	20.2	10.0
Men	12.4	14.1	20.2	8.8
Women	15.5	20.1	20.2	11.3
Difference	+3.1	+6.0	+0.03	+2.4
N	1,205,764	47,556	410,499	106,083

Note: The statistics are cross-sectional means, adjusted for sample weights.

Table 3: Percent of Workers, 20-64, with Any Work from Home

	Percent Who Engaged in Any Work from Home on a Typical Day	Percent Who Engaged in Any Work from Home in a Typical Week
	(1)	(2)
Data Source	**ATUS**	**CPS**
Sample period	Jan to Dec 2023	Jan to Dec 2023
Age range	20 to 64	20 to 64
Income threshold	Annualized earnings>$10k	Annualized earnings>$10k
Work requirement	Worked on diary day	Worked last week
Overall	32.6	19.5
Men	31.7	17.7
Women	33.8	21.4
Difference	+2.1	+3.7
N	2,095	106,083

Note: The statistics are cross-sectional means, adjusted for sample weights.

Table 4: Relaxing the Hours Criterion for "Workdays" Yields a Higher WFH Share of Workdays

	SWAA	ATUS		
	(1)	(2)	(3)	(4)
Sample period	Jan to Dec 23	Jan to Dec 23	Jan to Dec 23	Jan to Dec 23
Age range	20 to 64	20 to 64	20 to 64	20 to 64
Income threshold	Prior-year earnings>$10k	Annualized earnings>$10k	Annualized earnings>$10k	Annualized earnings>$10k
Work requirement	Worked last week, days with >6 hours	Worked last week, days with >6 hours	Worked last week, days with >4 hours	Worked last week, days with >2 hours
Overall	28.7	19.8	21.6	25.2
Men	27.7	18.7	20.5	23.7
Women	29.8	21.0	22.8	26.9
Difference	+2.1	+2.3	+2.3	+3.2
N	47,556	1,671	1,826	1,950

Note: The statistics are cross-sectional means, adjusted for sample weights.

Table 5: Modest Changes in the Earnings Requirement Have Little Impact on the Estimated WFH Rate

	WFH Percent of Workdays, SWAA			WFH Percent of Workhours ATUS		
	(1)	(2)	(3)	(4)	(5)	(6)
Sample Period	Jan to Dec 23	Jan to Dec 23	Jan to Dec 23	Jan to Dec 23	Jan to Dec 23	Jan to Dec 23
Age range	20 to 64	20 to 64	20 to 64	20 to 64	20 to 64	20 to 64
Earnings requirement	None	Prior-year earnings>$10k	Prior-year earnings>$20k	None	Annualized earnings>$10k	Annualized earnings>$20k
Work requirement	Worked last week, days with >6 hours	Worked last week, days with >6 hours	Worked last week, days with >6 hours	Worked last week, days with >6 hours	Worked last week, days with >6 hours	Worked last week, days with >6 hours
Overall	29.7	28.7	28.9	19.6	19.8	20.1
Men	28.2	27.7	27.5	18.2	18.7	18.9
Women	31.4	29.8	30.6	21.5	21.0	21.6
Difference	+3.2	+2.1	+3.1	+3.2	+2.3	+2.7
N	48,804	47,556	46,394	1,825	1,671	1,627

Note: The statistics are cross-sectional means, adjusted for sample weights.

Table 6: How WFH Rates Vary with Individual Characteristics and Circumstances

Regression Results for Actual Percent Work From Home

	(1)	(2)	(3)	(4)	(5)
Women	2.96***	1.34***	1.75***	1.57*	1.28
Children under 8	5.28***	2.44***	1.21**	0.60	0.14
Women, Children under 8	0.47	2.09***	2.56***	1.61	1.61
25-29	–	0.84	0.96	5.18***	5.43***
30-34	–	2.23***	2.51***	3.28*	3.31*
35-39	–	2.22***	2.17***	0.82	0.84
40-44	–	2.61***	3.12***	0.88	0.78
45-49	–	0.63	1.28*	1.25	1.45
50-54	–	0.62	1.26*	0.20	0.48
55-59	–	1.30*	2.15***	1.01	1.02
60-64	–	−0.24	0.36	−1.99	−1.90
Some college	–	5.47***	3.56***	4.44***	4.29***
Bachelor degree	–	14.85***	9.75***	11.62***	11.53***
Graduate degree	–	16.12***	9.82***	11.76***	11.66***
Care for vulnerable person	–	–	–	–	6.32***
Constant	25.61***	17.06***	20.43***	20.42***	18.98***
Industry and Occupation FE	No	No	Yes	Yes	Yes
Date FE	No	No	Yes	Yes	Yes
Observations	80345	80345	80345	18198	18198
R^2	0.01	0.04	0.10	0.11	0.11

Note: Columns (1)-(3) use data from September 2022 through January 2025 and columns (4)-(5) use data from September 2022 - December 2022.
All regressions are weighted to match the CPS.

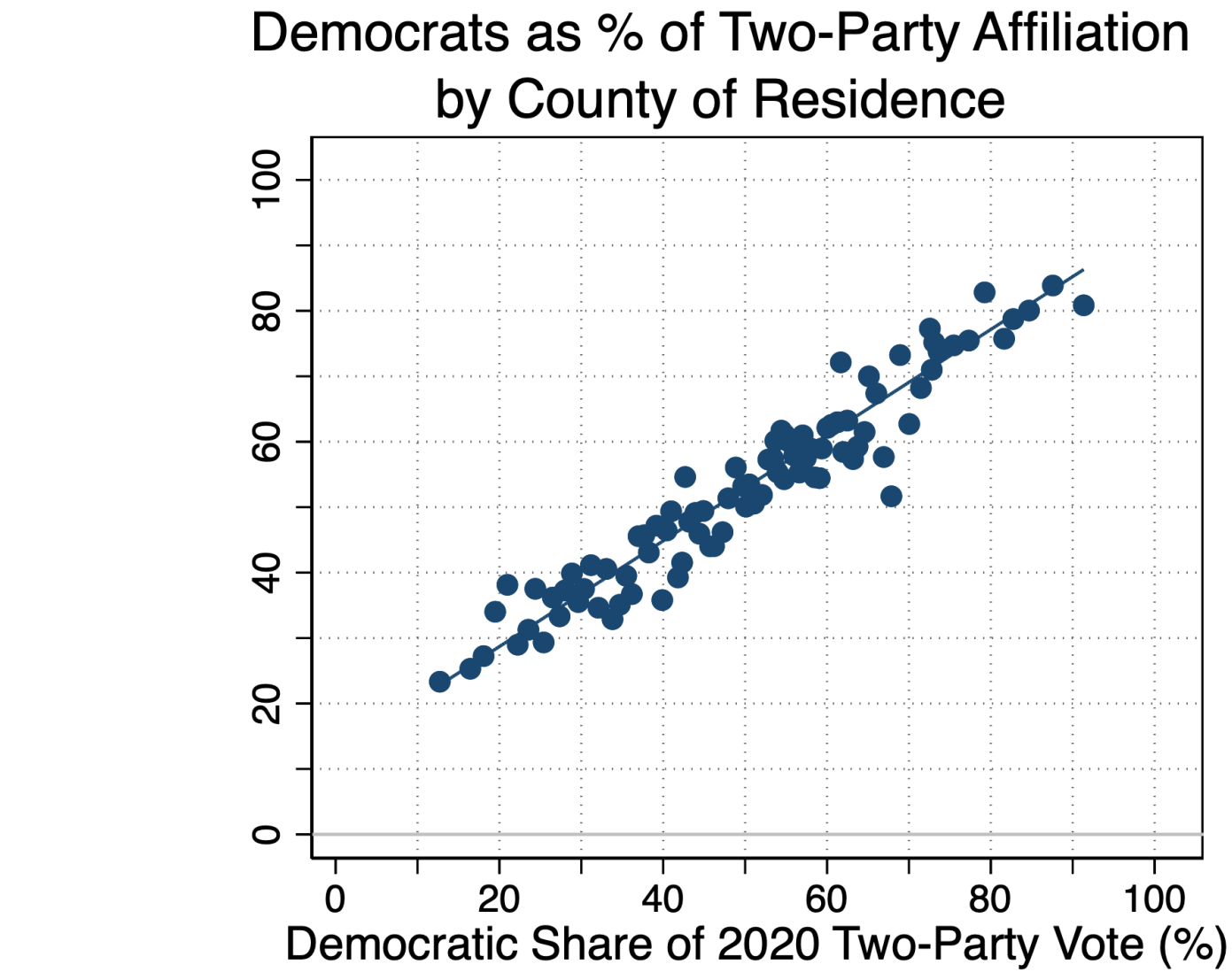
Table 7: How Desired WFH Varies with Individual Characteristics and Circumstances

Regression Results for Desired Percent Work From Home

	(1)	(2)	(3)	(4)	(5)
Women	5.62***	4.14***	4.31***	3.62***	3.40***
Children under 8	8.07***	4.15***	3.63***	3.81***	3.46***
Women, Children under 8	−3.41***	−2.45***	−2.40***	−2.41	−2.42
25-29	–	2.07**	1.95**	5.79***	5.98***
30-34	–	3.01***	3.07***	3.80**	3.82**
35-39	–	1.75**	1.42*	1.82	1.84
40-44	–	1.26*	1.28*	2.07	1.99
45-49	–	−1.04	−0.96	3.26*	3.42*
50-54	–	−2.44***	−2.42***	−1.78	−1.57
55-59	–	−4.32***	−4.19***	−4.70**	−4.69**
60-64	–	−9.12***	−8.94***	−8.00***	−7.93***
Some college	–	5.98***	4.84***	6.65***	6.54***
Bachelor degree	–	12.21***	9.14***	11.09***	11.02***
Graduate degree	–	14.41***	10.78***	13.56***	13.49***
Care for vulnerable person	–	–	–	–	4.90***
Constant	41.82***	36.22***	38.22***	35.67***	34.55***
Industry and Occupation FE	No	No	Yes	Yes	Yes
Date FE	No	No	Yes	Yes	Yes
Observations	80345	80345	80345	18198	18198
R^2	0.01	0.03	0.07	0.07	0.08

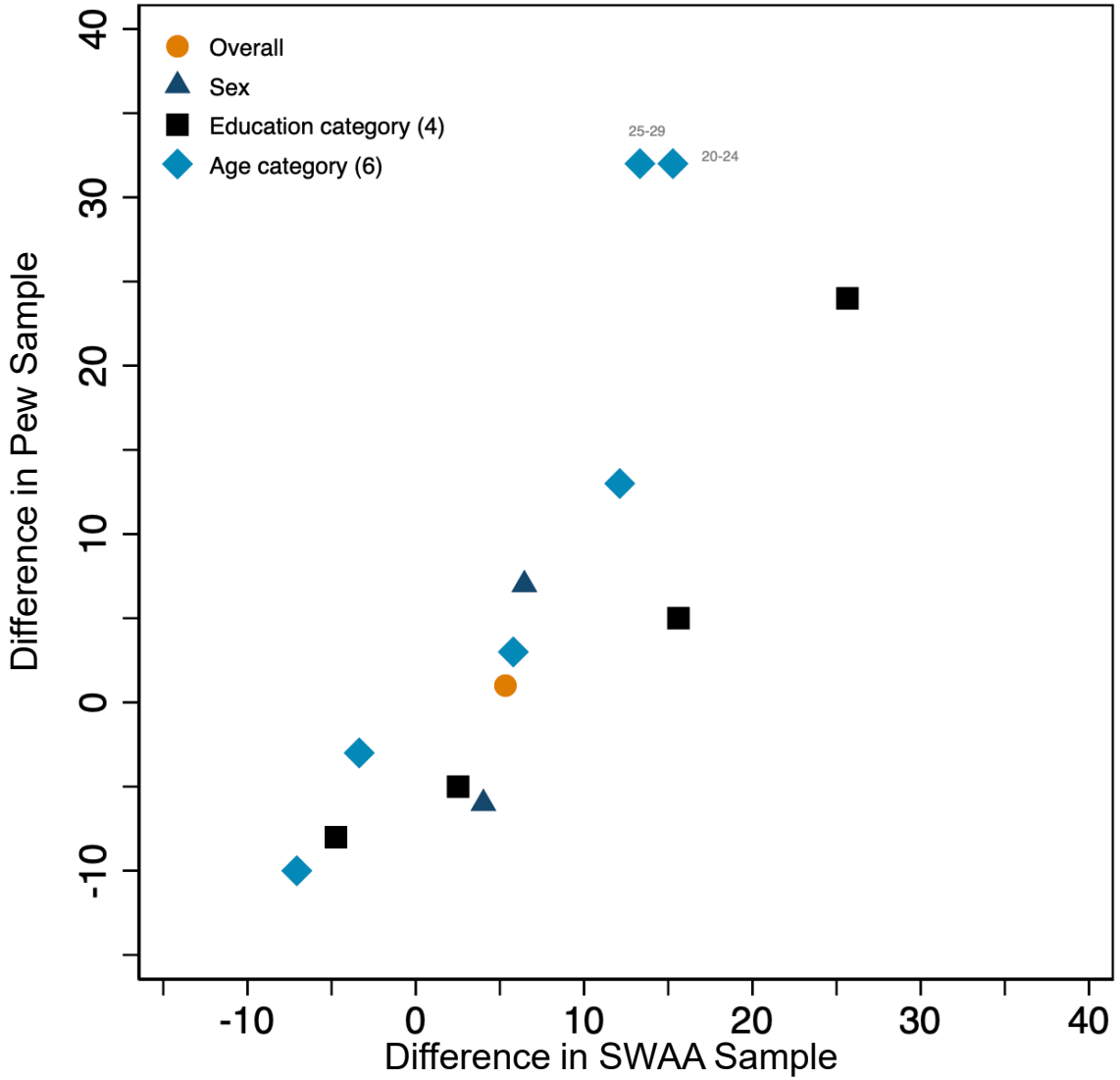
Note: Columns (1)-(3) use data from September 2022 through January 2025 and columns (4)-(5) use data from September 2022 - December 2022.
All regressions are weighted to match the CPS.

Figure A1: Vote Share by County matches SWAA share by Political Preference



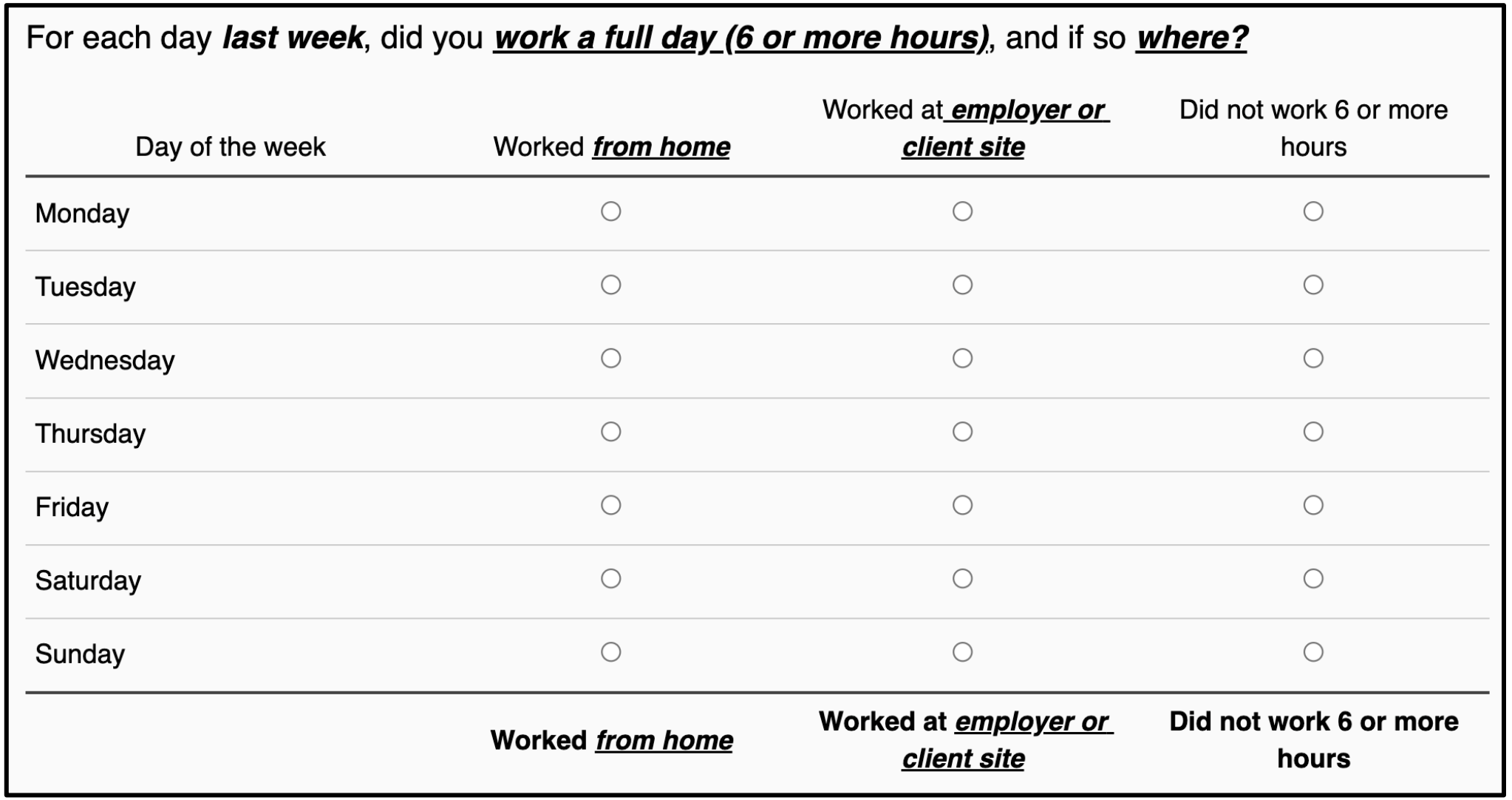
Notes: Source: Responses to the question: *Generally speaking, do you usually think of yourself as a Republican, Democrat, Independent, or what?* **N = 51,185**

Figure A2: SWAA and Pew align on Democrat – Republican Shares by demographic groups



Notes: SWAA data is pooled from January 2023 – April 2024 and is restricted to individuals age 20-70 and does not impose an income requirement. SWAA asks: *"Generally speaking, do you usually think of yourself as a Republican, Democrat, Independent, or what?"* and we class the responses "Strong Democrat; Not very strong Democrat; Independent, close to Democrat" as Democrat and responses "Strong Republican; Not very strong Republican; Independent, close to Republican" as Republican.
The Pew sample includes individuals 18+ and Pew asks*: "% of registered votes who are Democrat/ Lean Democrat or Republican/ Lean Republican"*

Figure A3: SWAA



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

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

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

Figure A4: ATUS Questionnaire Extract on the "Where Universe"

WHERE

Universe: Personal activity reported OR ACTIVITY ≠ Precodes 1, 2, 30, 31

Where were you while you were [ACTIVITY]?

PLACE

1. DP's home or yard
2. DP's workplace
3. Someone else's home
4. Restaurant/Bar
5. Place of worship
6. Grocery store
7. Other store/Mall
8. School
9. Outdoors away from home
10. Library
11. Other place (specify)
30. Bank*
31. Gym/ Health Club*
32. Post Office*

MODE OF TRANSPORTATION

12. Car, truck, or motorcycle (driver)
13. Car, truck, or motorcycle (passenger)
14. Walking
15. Bus
16. Subway/Train
17. Bicycle
18. Boat/Ferry
19. Taxi/Limousine Service
20. Airplane
21. Other (specify)

[If STOPTIME> 4 AM, go to S5: (Summary questions)]
[Else continue to next row]

Notes: ATUS Current Questionnaire at https://www.bls.gov/tus/questionnaires.htm.

Figure A5: WFH in the CHPS is robust to using household or person weights

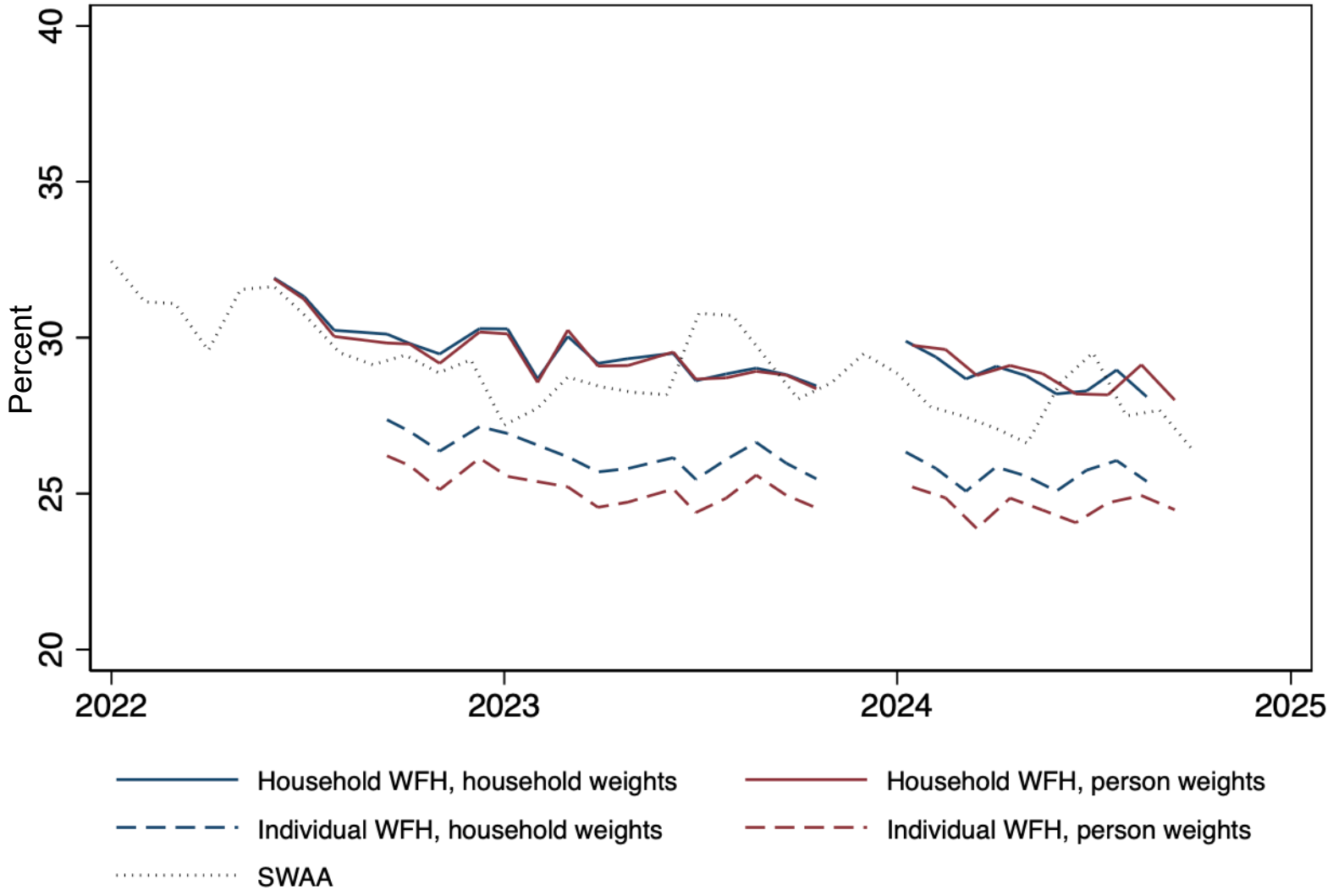
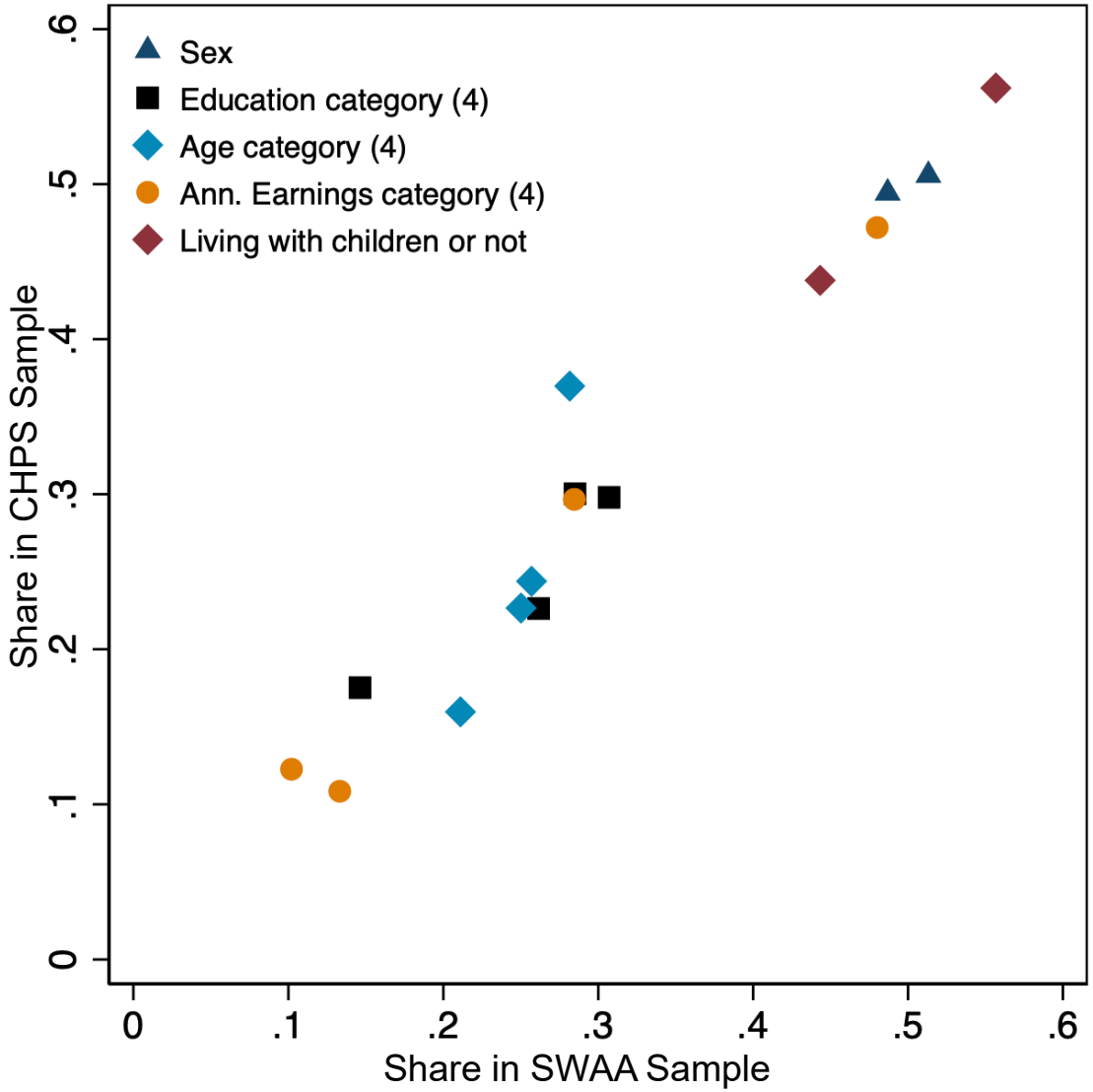
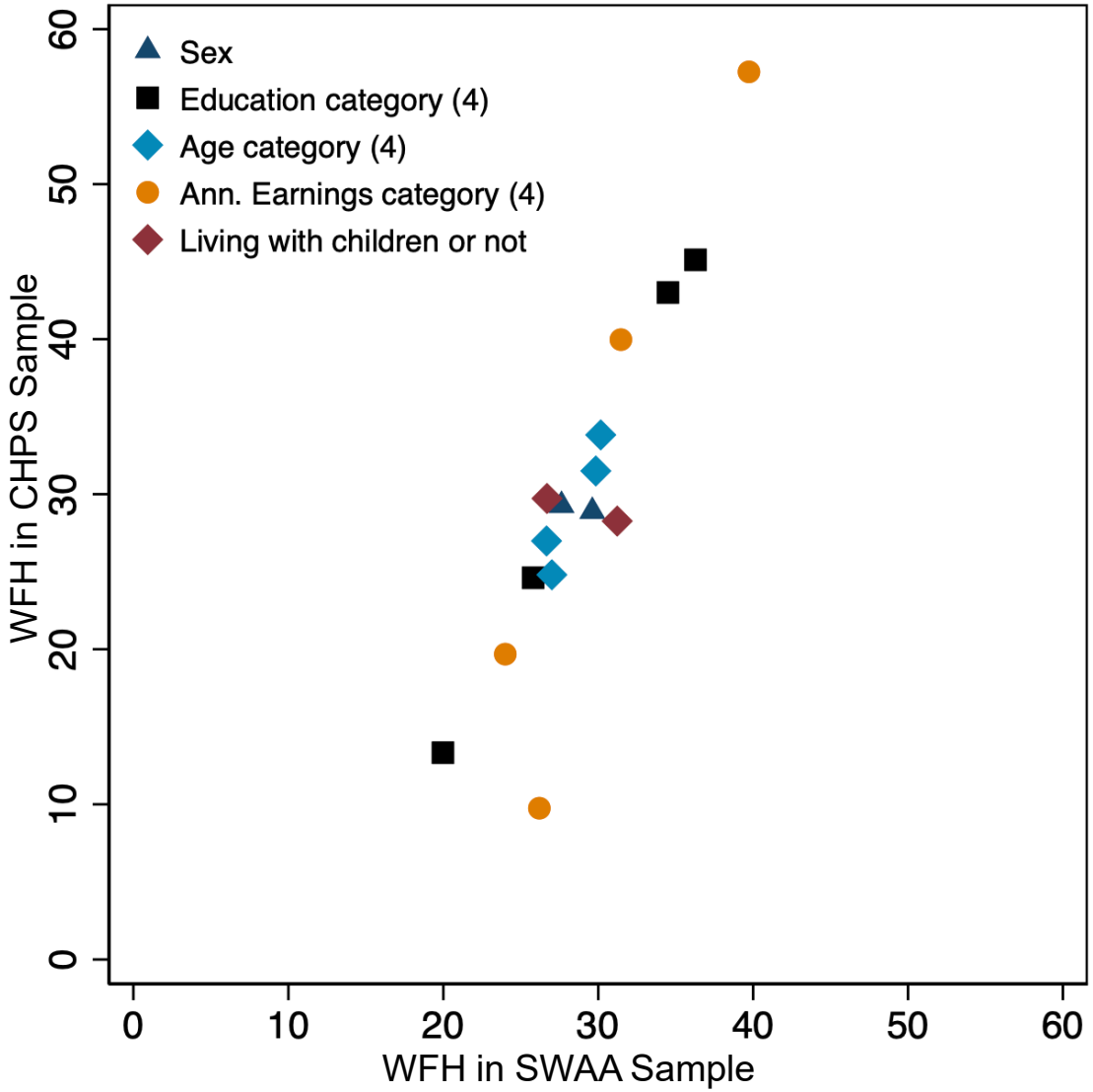


Figure A6: CHPS and SWAA sample shares and WFH align by major demographic groups

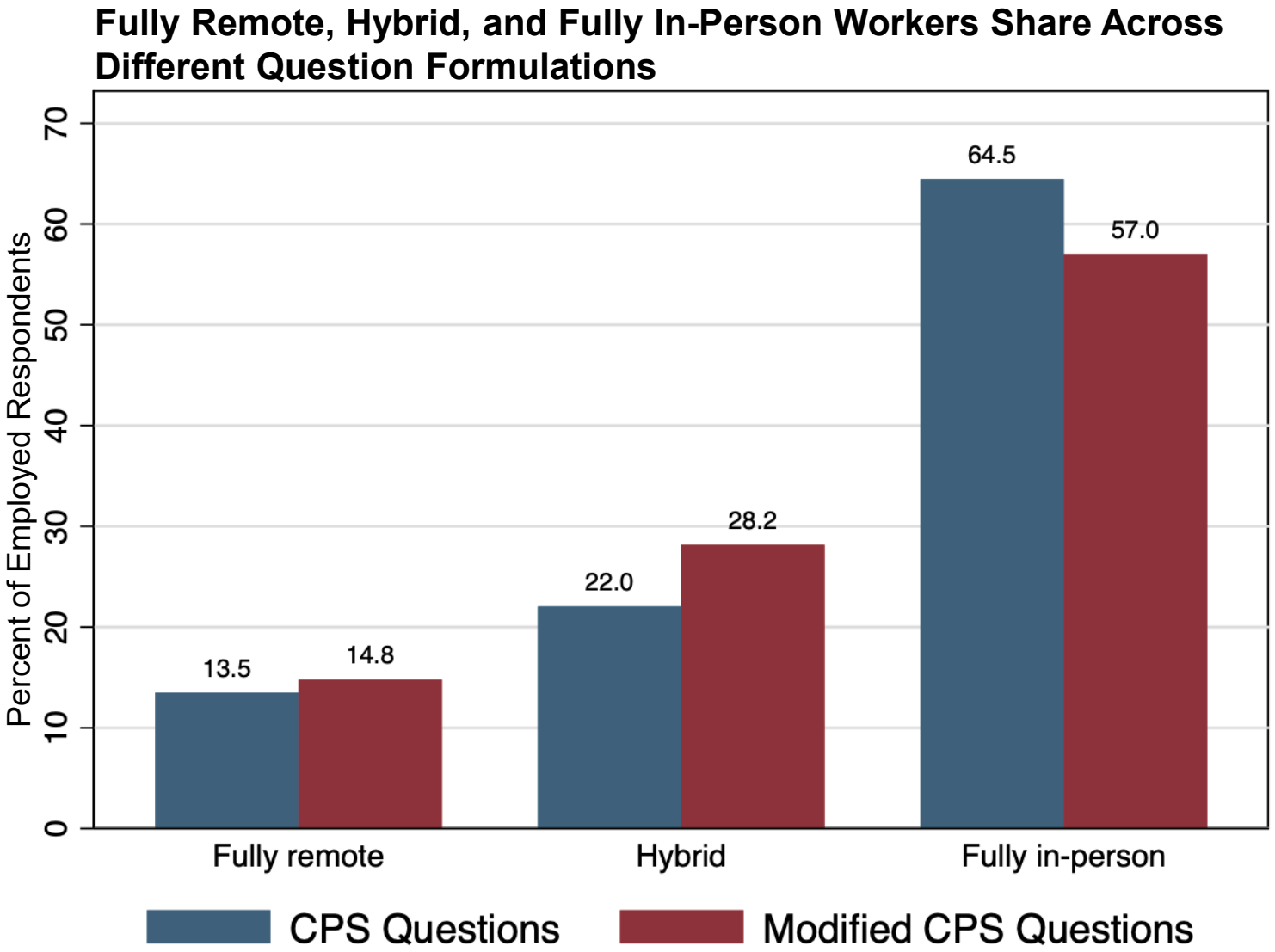




Notes: SWAA and CHPS data are pooled from January 2023 – October 2023. Age categories are 20-29, 30-39, 50-64. Education categories are High school degree or less, Some college, Bachelor degree, Graduate degree. Earnings categories in SWAA for individuals are $10k-$20k, $20k-$50k, $50k-$100k, $100k+. Earnings categories in CHPS for households are $25k-$35k, $35k-$100k, $100k-$200k, $200k+.

Figure A7: Using the SWAA to Assess the CPS Question Design

Hours WFH by question: 23% (CPS questions), 26% (Modified CPS)



Current Population Survey (CPS) Questions:

- We have some questions related to how the COVID-19 pandemic affected where people work.
At any time LAST WEEK did you telework or work at home for pay?

- Last week, you worked N hours. How many of these hours did you telework or work at home for pay?

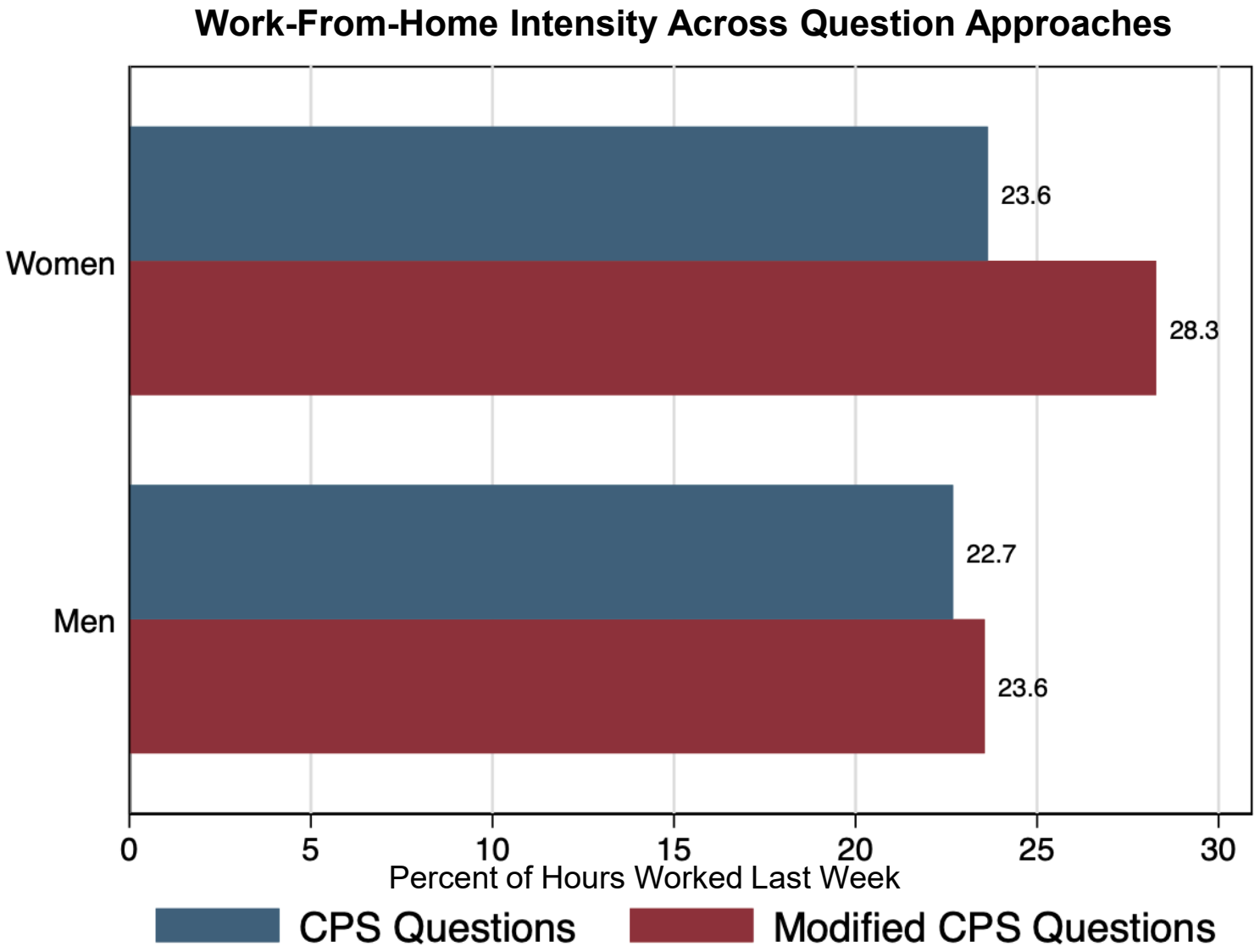
Modified CPS Questions:

- Did you spend any time LAST WEEK working at home for your job?

- Last week, you worked N hours. How many of these hours did you work at home (or at a friend's place, coffee shop, or the like)?

Notes: SWAA data is from October 2023. We randomly assigned each respondent to one set of questions (including a third set not shown). We focus on workers who earned $10,000 or more in the prior year, and who worked for pay in the week prior to the survey. We reweight the raw responses to match the Current Population Survey by age-sex-education-earnings cells.

Figure A8: Question Design and WFH Estimates by Sex



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- Last week, you worked N hours. How many of these hours did you telework or work at home for pay?

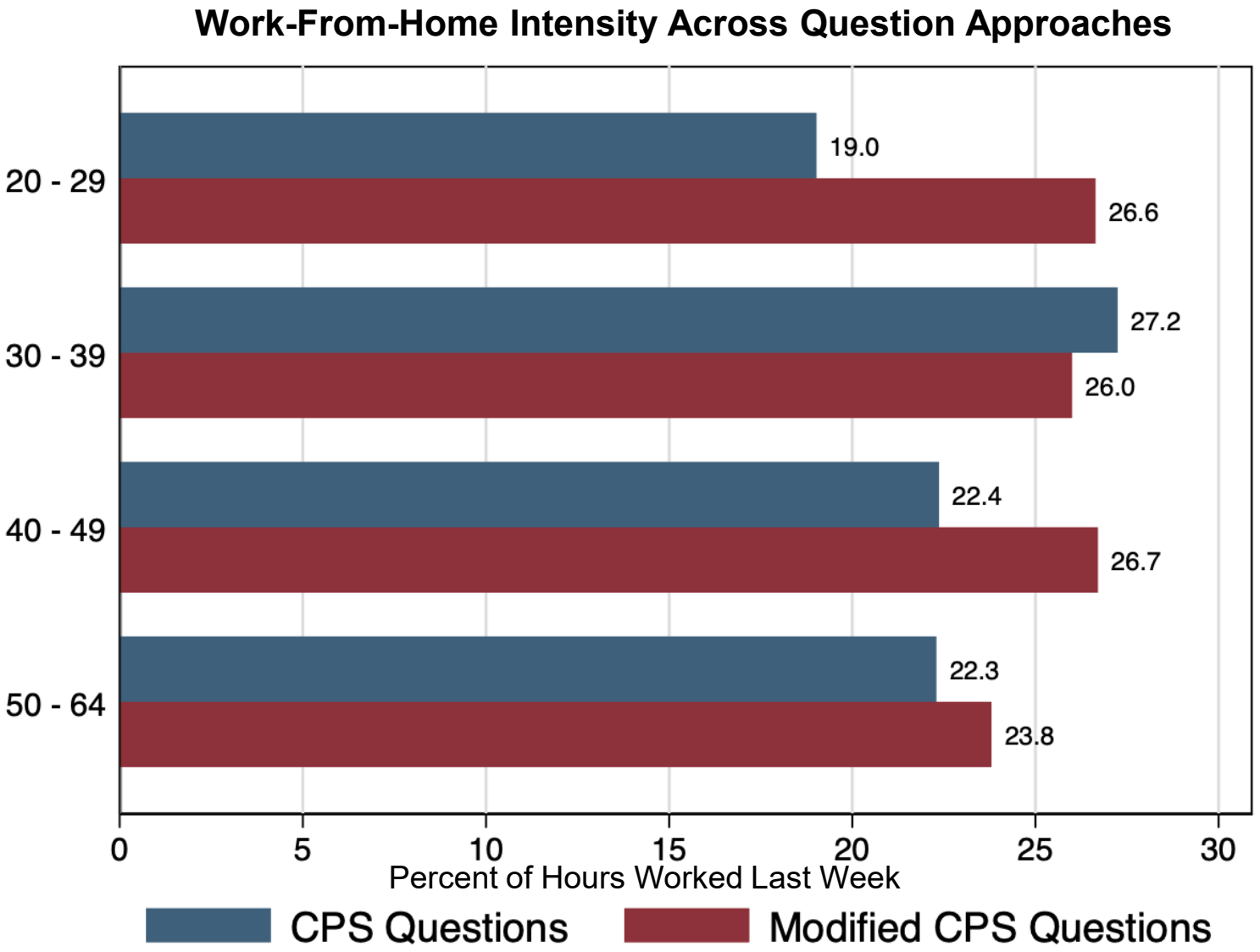
Modified CPS Questions:

- Did you spend any time LAST WEEK working at home for your job?

- Last week, you worked N hours. How many of these hours did you work at home (or at a friend's place, coffee shop, or the like)?

Notes: SWAA data is from October 2023. We randomly assigned each respondent to one set of questions (including a third set not shown). We focus on workers who earned $10,000 or more in the prior year, and who worked for pay in the week prior to the survey. We reweight the raw responses to match the Current Population Survey by age-sex-education-earnings cells.

Figure A9: Question Design and WFH Estimates by Age Group



Current Population Survey (CPS) Questions:

- We have some questions related to how the COVID-19 pandemic affected where people work.
At any time LAST WEEK did you telework or work at home for pay?

- Last week, you worked N hours. How many of these hours did you telework or work at home for pay?

Modified CPS Questions:

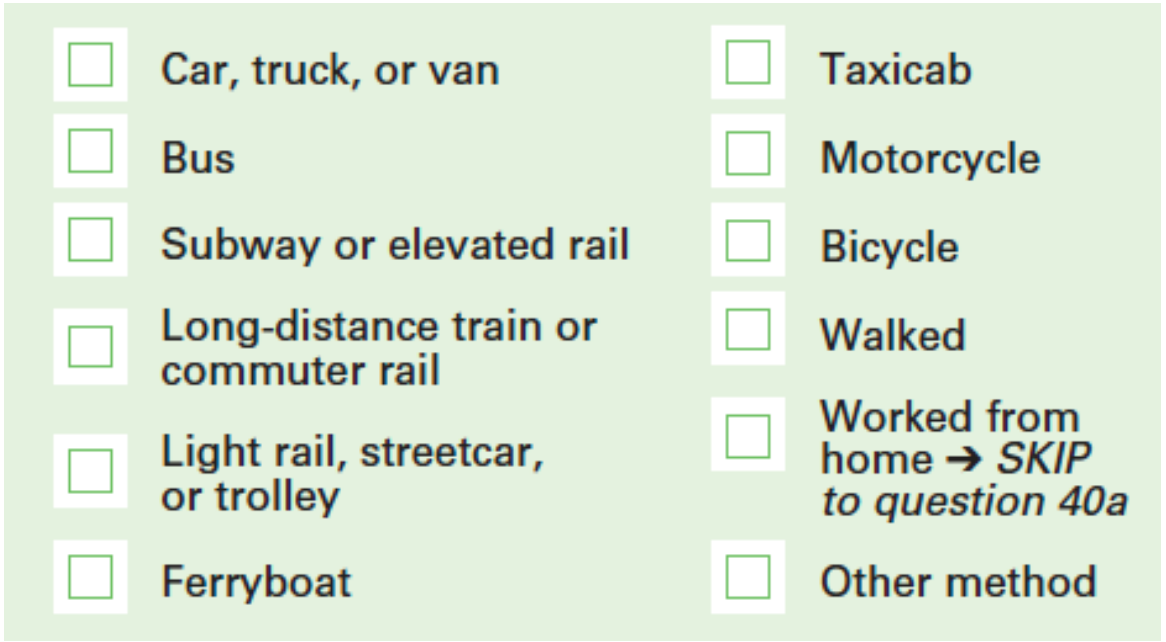
- Did you spend any time LAST WEEK working at home for your job?

- Last week, you worked N hours. How many of these hours did you work at home (or at a friend's place, coffee shop, or the like)?

Notes: SWAA data is from October 2023. We randomly assigned each respondent to one set of questions (including a third set not shown). We focus on workers who earned $10,000 or more in the prior year, and who worked for pay in the week prior to the survey. We reweight the raw responses to match the Current Population Survey by age-sex-education-earnings cells.

Figure A10: American Community Survey (ACS)

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



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

Table A1: Detailed Tabulation of Where Work Happens in the ATUS

Where	Share	Where	Share
DP's home or yard	23.20	Outdoors – not at home	0.51
DP's workplace	71.58	Gym/health club	0.01
Someone else's home	1.35	Other place	1.30
Restaurant or bar	0.18	Driver of car, truck, or motorcycle	1.05
Place of worship	0.04	Passenger of car, truck, or motorcycle	0.01
Grocery store	0.05	Walking	0.03
Other store/mall	0.01	Airplane	0.04
School	0.55	Other mode of transportation	0.09

Notes: The sample runs from January to December 2022. It covers persons 20-64 years old with annualized earnings greater than $10K who worked on the "diary day." "DP" refers to designated person in the ATUS.

Table A2: Work Locations in SWAA

Work Location if In-person	Employment Share	Average WFH
Office	0.37	43.9
Retail / Entertainment	0.15	26.3
Factory / Warehouse	0.15	15.0
Hospital / Healthcare	0.13	25.0
Food / Accommodation	0.10	20.2
School / University	0.10	26.7

Note: SWAA data is pooled from April 2022 – September 2022.