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Work from home, time allocation, and well-being: the impact of lockdowns

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Abstract
During the COVID-19 pandemic, the incidence of working from home (WFH) skyrocketed as businesses closed and distancing standards were mandated, exposing many workers to a remote work arrangement. This paper studies how WFH relates to worker time allocation and enjoyment, considering gender differences and pandemic phases, using real-time data from the UK Click-and-Drag Diary covering pre-pandemic, lockdown, and post-pandemic periods. Findings show no statistically significant overall relationship to time allocation, but reveal gender disparities: pre-pandemic, WFH involved less paid work and more leisure among women, but during lockdowns, patterns converged. The results also indicate that there were no statistically significant differences in instantaneous enjoyment between WFH and non-WFH male employees. Female WFH employees enjoyed leisure time less than their counterparts pre-pandemic, however this negative correlation vanished during and after the pandemic. The economic implications span labor productivity, gender dynamics in employment, business model adaptation, and work-life balance. These findings could impact corporate policies, human resource strategies, and the design of governmental policies related to the labor market and gender equality.

Keywords Time use · Work from home · COVID-19 · Lockdown · CaDDI data

JEL classification J16 · J22

1 Introduction

The onset of the Covid-19 pandemic in March 2020 triggered unforeseen changes, compelling governments to impose mobility restrictions that radically transformed

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worker behavior. Among the most globally adopted measures, working from home (WFH), or telecommuting, contrasted with working away from home (WAFH), stood out especially, generating notable transformations in labor behavior patterns. This has led to an unprecedented surge in remote work practices worldwide, profoundly altering our work habits and daily routines.[1]

WFH has been a common practice for farmers and self-employed workers over the past decades. However, WFH practices are relatively new for white-collar office workers. In this sense, WFH has revolutionized organizational dynamics, enabling employees to conduct a portion of their work remotely, leveraging technology to engage with colleagues. This practice, aimed at ensuring seamless task execution, not only fosters flexibility tailored to family obligations but also requires a delicate balance between professional and personal spheres for many individuals. However, it brings about heightened work demands for others, blurring the distinction between work and leisure.[2] Notably, WFH reshapes travel routines by eliminating commutes, with far-reaching implications for individual well-being and health.

Despite the fact that WFH was already growing in popularity before Covid-19, partially because of environmental concerns (Athanasiadou & Theriou, 2021), the pandemic has had an undeniable impact in accelerating the trends towards WFH. Ceccato et al. (2022) predict a growing market trend favoring WFH, although Wang et al. (2023) note variations across different WFH segments. The sudden surge in WFH during pandemic-induced lockdowns reshaped behaviors, impacting commuting habits, familial presence during work hours, and potentially enhancing workday flexibility (Kim, 2020). However, this shift also presents challenges like blurred work-life boundaries and reduced social interaction (Brindal et al., 2022; Frazis, 2023; Fujiwara et al., 2020; Hamermesh, 2020; Möhring et al., 2021; Ruiz et al., 2021).

A range of studies have investigated the effects of WFH during the pandemic. Del Boca et al. (2020) observed an increased domestic workload for Italian women, while Andrade and Petiz Lousã (2021) analyzed the impact of WFH on work-life balance. Sullivan et al. (2021) examined evolving pandemic impacts on time management and virus exposure risks in the UK. Blahopoulou et al. (2022) focused on Spanish workers, highlighting a positive relationship between WFH, satisfaction, and performance, with subjective well-being mediating such relationships. Restrepo and Zeballos (2022) utilized time-use data from the US to analyze changes in WFH and WAFH time allocation during the pandemic, noting small changes in time allocation due to the pandemic among those who WAFH, but significant changes among those

[1] For brevity, the term WFH in this paper refers to "work from home" or "worker from home," and WAFH refers to "work away from home" or "worker away from home." This nomenclature aligns with the conventions established by Bloom et al. (2015) and Restrepo and Zeballos (2022).

[2] Amuedo-Dorantes et al. (2024) analyze the impact of the Covid-19 pandemic on work organization, utilizing 24-hour diary data from the American Time Use Survey (ATUS). The study reveals a substantial surge in WFH post-pandemic, eliminating previous selectivity into remote work. Both men and women engaged in WFH exhibit reduced work hours and increased interruptions compared with office-based employees pre-pandemic. Intriguingly, certain occupations witnessed a decline in interruptions and non-standard work hours among men pre-pandemic, suggesting WFH's potential for productivity enhancement. However, remote workers in these fields continued to face interruptions and non-standard schedules compared with in-office peers. Nonetheless, the prevalence of remote work in these occupations diminished during the pandemic as WFH became a standard arrangement.

who WFH, including large increases in paid work, along with decreased travel time, socializing, shopping time, and chores. In a related study, Pabilonia and Vernon (2023) focused on analyzing parents' joint time allocation during the Covid-19 pandemic, reporting an increase in both mother and father chores, while also noting that mothers combined paid work and childcare activities to a greater extent than fathers.

Furthermore, studies have explored WFH and satisfaction levels: Song and Gao (2020) found lower overall satisfaction among US WFH individuals, varying by day, WFH type, and gender, while Restrepo and Zeballos (2023) concluded that WFH is associated with increased emotional well-being in the US. Giménez-Nadal et al. (2020) investigated time-use decisions, noting increased enjoyment and flexibility for WFH individuals. Gender disparities emerge as a recurring theme, yet definitive conclusions remain challenging. Foliano et al. (2022) examined subjective well-being during the pandemic in the UK, emphasizing individual well-being, leisure, and gender differences. Hamermesh (2020) and Giménez-Nadal et al. (2023) studied satisfaction in the UK and US, exploring gender discrepancies in simulated confinement scenarios.[3]

In this study, we examine the intricate interplay among WFH dynamics, worker time allocation, the temporal distribution of paid work versus non-work activities, and instantaneous happiness. We aim to discern potential moderating relationships linked to distinct phases of the Covid-19 pandemic. Leveraging data from the UK Click-and-Drag Diary Instrument, our analysis encompasses pre-pandemic periods (2016), the lockdown phases (spanning May to June 2020, November 2020, and January 2021), and the post-pandemic phase following the relaxation of confinement measures (summer 2021).

Our findings indicate that while WFH does not notably correlate with certain facets of worker time allocation, gender disparities do surface. Pre-pandemic, female WFH individuals allocated comparatively less time to paid work compared to their counterparts engaged in WAFH. Intriguingly, during lockdowns and subsequent relaxation phases, this trend diverged from the earlier observed pattern. Moreover, parallels emerge regarding the temporal distribution of paid work, leisure, and unpaid work. Pre-pandemic, WFH participants displayed a tendency toward reduced paid work and increased leisure and unpaid work during standard work hours, contrasting with WAFH individuals. However, this pattern reversed during evening hours. Yet, these distinctions diminished and, at times, became indistinguishable during lockdown periods.

Ultimately, our analysis does not reveal statistically significant disparities between WFH and WAFH employees concerning instantaneous happiness. However, a pre-pandemic negative correlation surfaced for WFH women's leisure time, a trend that did not persist during or post the pandemic phases.

Our research yields two primary contributions to the understanding of WFH dynamics amid the Covid-19 pandemic. First, we investigate the nuanced relationship between WFH promotion during the pandemic, and worker time allocation, focusing on paid work, leisure, and unpaid work. By analyzing real-time data from

[3] Another research strand investigated the health and well-being implications of WFH; see Beckel and Fisher (2022) for a literature review.

time use diaries in pre-, during-, and post-lockdown periods, we eschew reliance on simulated scenarios (Hamermesh, 2020; Giménez-Nadal et al., 2023). This approach allows us to explore whether and how the endorsement of WFH practices has related to the distribution of these activities without speculative simulations.[4]

Second, we look at the aspect of immediate enjoyment pertaining to paid work, leisure, and unpaid work. Using data insights that capture instantaneous enjoyment, we forego the need for simulated estimations. Our exploration aims to uncover potential discrepancies in how WFH and WAFH individuals experience and derive satisfaction from their daily activities. By investigating whether the promotion of WFH has moderated these experiential differences, we offer unique insights into the subjective aspects of WFH experience without relying on hypothetical estimations of enjoyment.

The rest of the paper is structured as follows. Section 2 reviews existing research on WFH, time allocation, and well-being, before and during the pandemic. Section 3 describes the data and variables. Sections 4 and 5 show the empirical strategy and the results for time allocation and well-being. Finally, Section 6 concludes.

2 Literature review

2.1 Work from home before the Covid-19 pandemic

Prior to the emergence of COVID-19 in 2020, WFH and telecommuting were extensively scrutinized across various disciplines. The literature associated WFH with numerous advantages, encompassing societal and environmental benefits like reduced urban concentration, traffic congestion, air pollution, population centrality, and energy consumption (Sampath et al., 1996; Safirova, 2002; White et al., 2007; Rhee, 2008). Businesses viewed WFH favorably, aiming to augment organization and profitability while cutting turnover rates and office costs (Golden, 2006; Sardeshmukh et al., 2012; Duxbury & Halinski, 2014). Nonetheless, these impacts seemed to be sector-dependent, and limited empirical evidence hindered conclusive results (Bloom et al., 2015).

Among the extensively studied benefits was the improvement of work-life balance pre-COVID-19. Researchers like Gajendran and Harrison (2007), Allen et al. (2013), and Chung and van der Horst (2018) found a negative correlation between work-family conflicts and WFH. Dockery and Bawa (2018) affirmed WFH's role in fairly distributing household responsibilities in Australia, while Edwards and Field-Hendrey (2002) emphasized its significance for women in the US. In a related context, Restrepo and Zeballos (2020) showed that WFH was associated with a reduction in paid work hours, consequently allowing for more time available for leisure and health behaviors. Thus, they reported a positive correlation between WFH and health benefits. Other studies failed to distinguish disparities between WAFH and WFH workers in terms of performance or work-life balance. They highlighted WFH's association with reduced job prospects, workplace inclusivity, coworker

[4] We also examine the temporal dimension of these activities by scrutinizing the timing of paid work, unpaid work, and leisure throughout the day, drawing from insights established by Hamermesh (1999).

satisfaction, and suboptimal outcomes for subordinates working under managers engaged in WFH. Additionally, it led to a loss of control over work processes (Bailey & Kurland, 2002; Golden, 2007; Rhee, 2008; Morganson et al., 2010; Golden & Fromen, 2011; Gajendran et al., 2014).

2.2 Subjective well-being

The exploration of individual well-being traces back to early authors like Francis Ysidro Edgeworth and Alfred Marshall (Kahneman & Krueger, 2006), centered on how one perceives life progress (Diener et al., 2018). Subjective well-being, now a developed concept, involves diverse measures and methods (Fritjers, 2022). Some studies gauge respondents' subjective well-being through overall life satisfaction or general happiness, often using tools like the Satisfaction With Life Scale (SWLS).

Alternate methods encompass measuring affective well-being, capturing emotions experienced in daily life, assessed by tools like the Positive Affect Negative Affect Scale (PANAS). Instantaneous well-being, linked to time allocation, focuses on emotions felt during activities, measured through specific positive and negative experiences (Kahneman & Deaton, 2010). Experienced utility, a concept from economics, delves into emotions resulting from choices, with real-time measurement termed instantaneous utility (Kahneman et al., 1997).

Methodologies for linking activities and instantaneous feelings include Activity Enjoyment Ratings and the Experience Sampling Method. Methods such as the 'yesterday diary' and Day Reconstruction Method gather affective data on hedonic experience, providing insights into national and individual well-being.

Past research examines the connection between time allocation and affective well-being, highlighting leisure's superiority in providing enjoyment compared with other activities (Kahneman et al., 2004). It also emphasizes the positive effects of voluntary activities and spending time with others on overall well-being (Gimenez-Nadal & Molina, 2015; Sullivan, 1996; Helliwell & Putnam, 2005).

Regarding WFH employees' well-being, studies suggest WFH can potentially enhance workers' well-being (Kossek et al., 2006; Anderson et al., 2015). Reports indicate higher well-being measures for WFH workers, including increased job satisfaction and reduced psychological strain (Bloom et al., 2015; Bentley et al., 2016; Restrepo & Zeballos, 2023). However, comparisons between WFH and WAFH outcomes remain inconclusive (Novaco & Gonzalez, 2009) due to a range of conflicting findings.

2.3 Work from home in times of Covid-19

The Covid-19 pandemic and subsequent lockdowns have garnered significant research attention regarding their impact on subjective well-being. Diverse findings have emerged from various studies regarding the effects of lockdowns on well-being. Recchi et al. (2020) and Foa et al. (2020) reported increased well-being in France and the UK due to lockdown measures, while Long (2021) observed heightened well-being in the US during lockdowns, and Brand et al. (2020) emphasized the positive influence of physical exercise. Additionally, Restrepo and Zeballos (2023) noted increased emotional well-being associated with WFH in the US, using time-use data.

In contrast, Möhring et al. (2021) documented decreased family and job satisfaction in Germany, while Zacher and Rudolph (2021) found no significant changes in well-being in the same country. Other research by Ruiz et al. (2021) and Brindal et al. (2022) identified negative impacts on well-being in the UK, Latin American countries, and Australia due to isolation during lockdowns.

The pandemic's effect on time allocation and its correlation with well-being has led to several hypotheses. One theory suggests a return to traditional gender roles (Del Boca et al., 2020; Sevilla & Smith, 2020), while another finds a more equitable distribution of household labor (Boll et al., 2021; Sevilla & Smith, 2020).

Studies on changes in time allocation during lockdowns present conflicting conclusions. Some indicate a relatively increased involvement of mothers in unpaid work and childcare compared with fathers (Del Boca et al., 2020; Farré et al., 2020; Pabilonia & Vernon, 2023), while others suggest reduced gender gaps with increased engagement by fathers (Craig & Churchill, 2020; Carlson et al., 2021; Yaish et al., 2021). These disparities arise from factors such as population specifics, cultural context, pandemic responses, and data type. Furthermore, Restrepo and Zeballos (2022) report, using time-use data from the US, that time allocations of WFH were particularly affected by the pandemic, with increased paid work, whereas the time allocations of WAFH were minimally affected during the Covid-19 era compared with the pre-pandemic period.

Our research builds on prior studies, including Gimenez-Nadal et al. (2023), by utilizing actual time-use diaries during Covid-19 lockdowns, avoiding simulations for more accurate results. Similarly, studies by Sullivan et al. (2021) and Foliano et al. (2022) explore pandemic impacts on time use and subjective well-being. However, our focus extends beyond leisure activities to encompass paid and unpaid work, investigating how work from home relates to time allocation and well-being under Covid-19 circumstances.

3 Data and variables

We use the UK Click-and-Drag Diary Instrument (CaDDI) data (Sullivan et al., 2021b) to examine changes in time use patterns before, during, and after the Covid-19 pandemic.[5] This dataset comprises time use diaries collected in the UK during three distinct periods: prior to the pandemic in 2016, during the pandemic (May-June 2020, November 2020, January 2021), and post-pandemic when confinement measures eased (summer 2021). The diaries, structured in 10-minute episodes from 4 am to 4 am the following day, capture primary activities, their locations, and the presence of others. Our analysis explores shifts in time allocation across these periods. Time use diaries, such as those in the CaDDI sample, have become pivotal in understanding daily worker behaviors (Gimenez-Nadal & Molina, 2022). They offer more accurate data compared to surveys reliant on general questions (Harms et al., 2019), providing more precise estimations (Bonke, 2005; Yee-Kan, 2008).

The UK initiated lockdown measures in March 2020 in response to the escalating Covid-19 pandemic. Subsequent lockdowns were implemented to address evolving

[5] See https://www.timeuse.org/time-use-diaries-and-the-covid-19-crisis.

pandemic situations, with adjustments made to the timeline and severity according to changing circumstances. The initial lockdown announcement occurred on March 23rd, legally enforced from March 26th. This lockdown was extended on April 16th, and by May 10th, guidance suggested a return to workplaces for individuals unable to work from home, while advocating avoiding public transport. Schools and non-essential shops gradually reopened towards the end of June, albeit with ongoing adherence to lockdown measures and social distancing protocols. This period, spanning from the onset of the lockdown to June 2020, aligns with the first data collection period for the CaDDI diaries during the lockdown.

Several measures relaxing lockdown restrictions were implemented in July and August 2020, marking a period of eased restrictions. However, as the pandemic evolved, a second national lockdown commenced from November 5th to December 2nd. This second lockdown coincides with the CaDDI's second data collection phase during Covid-19 lockdowns. Subsequently, due to evolving circumstances, a third national lockdown began on January 6th, 2021. Throughout the spring and summer of 2021, most restrictions were gradually eased or lifted, with the majority of legal limits on social contact removed by July. This phase of relaxed, eased, or lifted measures corresponds to the relaxation period, during which the CaDDI collected time use diaries.

3.1 Sample requirements

We began with the original CaDDI sample, comprising 3423 individuals. Initially, we excluded 312 individuals due to incomplete data on key variables, resulting in a reduced sample of 3111 individuals. Following this, we further refined the sample by excluding individuals who reported diary entries on atypical days, yielding a sample size of 2734 individuals.[6] Given our focus on WFH practices, we narrowed the scope to employed individuals, including both employees and self-employed workers, leading to the exclusion of 848 individuals who were not employed. Moreover, to capture work-related diary entries specifically, we retained only workers who completed diaries on workdays, producing a sample of 1425 individuals. Additionally, considering the temporal structure of the CaDDI data, we eliminated 215 individuals who recorded diary entries during a brief period between lockdowns in the summer of 2020. This finalizes our sample selection process. These restrictions leave a final sample of 1210 individuals, and 1,808 observations, as some interviewed individuals filled in two diaries during two different workdays:[7] 234 individuals (294 observations) correspond to the period pre Covid-19; 774 individuals (1177 observations) correspond to the lockdowns period; and 202 individuals (337 observations) correspond to the period of relaxation that followed the lockdowns. Furthermore, 57.36% of the individuals in the sample (i.e., 694 individuals) are men, while the remaining 42.64% (516 individuals) are women.

[6] The primary disparity between typical and atypical days appears to be driven by variations in unpaid work activities. However, our key findings remain consistent, even when individuals reporting diary entries on atypical days are not excluded. Further exploration of typical versus atypical days is deferred to future research.

[7] The composition of the sample is shown in Appendix Table 8.

3.2 Variables

We begin by utilizing the diary structure of the CaDDI data to determine the time allocated by interviewed workers to paid work, leisure, and unpaid work activities, based on their primary activity throughout the day. Paid work is delineated in accordance with the CaDDI data guide, encompassing activities categorized as 117 "paid work including at home," 118 "formal education," and 125 "work break". Leisure activities are identified based on prior research methodologies (e.g., Aguiar & Hurst, 2007; Gimenez-Nadal & Sevilla, 2012), encompassing activities such as dog walking, hobbies, reading, engaging in sports, etc. Unpaid work comprises activities related to household chores, excluding childcare duties.[8]

We also utilize the diary structure of the CaDDI data to determine which workers have the capability to work from home (WFH) during the diary day. Specifically, we use information regarding the location of each diary episode, distinguishing between episodes at home, the workplace, and other or unspecified locations. Our primary identification of WFH workers is as follows: we categorize a worker as WFH if all their paid work episodes occurred at home, indicating that the individual did not commute to or from the worksite on the diary day and only worked from home. As an alternative, we also identify WFH individuals as those who spent at least one hour engaged in paid work activities at home (referred to as "WFH (alternative)" throughout the analysis).

The third pivotal variable in our analysis measures the instantaneous enjoyment experienced during daily activities. Within the CaDDI data, information is provided on the instantaneous enjoyment associated with each episode of paid work, leisure, and unpaid work, elicited through the question: "How much did you enjoy this time?", utilizing a scale from 1 "didn't enjoy at all" to 7 "enjoyed very much". This variable serves to define the instantaneous enjoyment linked to each episode, capturing the affective feelings, also known as "experienced instantaneous utility" or "instantaneous well-being," that individuals experience during specific activities (Kahneman et al., 2004). Consequently, this well-being measure encapsulates the moment-to-moment flow of enjoyment (Kahneman & Krueger, 2006; Kahneman & Deaton, 2010). The CaDDI provides data on overall life satisfaction, ranging from 1 for "completely dissatisfied" to 7 for "completely satisfied". Consistent with Gimenez-Nadal et al. (2023), we include overall life satisfaction, a measure of cognitive subjective well-being (Fritjers, 2022), as a control variable in our analysis. This allows us to account for variations in reported well-being across individuals.

The CaDDI data allows us to define several variables potentially associated with time allocation and well-being, which we designate as control variables, encompassing age (measured in years), highest level of formal education attained, marital status (cohabiting or single), UK citizenship status, family size, number of children, self-employment status, and usual weekly work hours. Additionally, we categorize the day of the week when diaries were completed; residential region (London, Yorkshire & Humberside, East Midlands, East Anglia, South East, South West, West Midlands, North West, Scotland, Wales, Northern Ireland, and North East); and social status (upper and middle class, lower middle class, skilled working class, and

[8] See Appendix Table 9 for details on paid work, leisure, and unpaid work.

Table 1 Workers from home and away from home

	Pre Covid-19		Lockdowns		Relaxation	
VARIABLES	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
WFH	0.169	0.375	0.636	0.481	0.448	0.498
WFH (alternative)	0.202	0.402	0.670	0.470	0.505	0.501
N. Observations	294		1177		337	

The sample (CaDDI) is restricted to employed individuals who worked during the diary day. WFH are defined as workers whose paid work activities were all reported at home. WFH (alternative) are defined as workers who spent at least 1 hour in paid work activities at home

working class) to proxy for income or earnings.[9] Moreover, we consider worker occupation (semi-skilled or unskilled manual, skilled manual, clerical/administrative, supervisory/junior managerial, intermediate managerial/professional/administrative, higher managerial/professional/administrative), and worker self-reported health status (ranging from 1 "very bad" to 5 "very good").

Finally, we define certain controls at the episode level, which could potentially influence the experienced instantaneous enjoyment of episodes (Gimenez-Nadal et al., 2023). These controls show whether episodes are conducted alone, with a spouse, with children, or with others; the location of episodes (at home, workplace, or another/unspecified location); engagement in secondary activities while performing the main activity; and the hour of the day when activities are undertaken, intended to capture potential fatigue accumulated throughout the day that might impact well-being.

3.3 Descriptive statistics

Table 1 displays the proportion of WFH workers within the sample (both in our baseline and alternative identification). Preceding the Covid-19 period, 16.9% of observations corresponded to workers who exclusively conducted their paid work activities from home, while 20.2% represented workers who spent at least 1 h working from home.[10] These figures surged to 63.6 and 67.0%, respectively, during the lockdown period, and decreased to 44.8 and 50.5%, respectively, during the relaxation period. These trends align with existing data indicating a substantial increase in teleworking practices during the Covid-19 period (Barrero et al., 2023), mirroring the measures adopted to adapt to the evolving pandemic circumstances.

Table 2 shows descriptive statistics of the primary variables, namely the time allocated by workers to paid work, leisure, and unpaid work activities, highlighting the differences between WFH and WAFH and changes in time of such differences.

[9] In the realm of economic research, social status is derived from data and corresponds to the social grade outlined by the Market Research Society. This grade is characterized by the occupation and employment status of individuals generating income. However, the CaDDI data lacks alternative tools for defining or proxying income in a standardized manner during the specified time periods.

[10] These figures exhibit a slight difference compared with the proportion of remote work in the US pre-Covid-19, as reported by Bloom et al. (2015) and Barrero et al. (2023). The utilization of time-use diaries to define remote work, coupled with potential variations between the US and the UK, could account for this observed disparity.

(Descriptive statistics of demographics are shown in Table 10 in the Appendix A.) On average, WFH females (males) spent about 119.1 (56.6) fewer minutes per day in paid work than WAFH females, although such difference decreased during lockdowns, when WFH females (males) spent 32.9 (44.2) fewer minutes in paid work than WAFF females. These differences disappeared in the relaxation period, both for females and males. Regarding leisure, prior to the Covid-19 outbreak, WFH females (males) spent 65.4 (61.5) more minutes per day on these activities, although the difference vanished during and after lockdowns among females, and decreased during lockdowns to 26.4 min per day among males, vanishing during the relaxation period. Finally, in terms of unpaid work, the difference between WFH and WAFH was not significant, both among females and among males, before, during and after lockdowns.

Table 3 presents the average enjoyment ratings for paid work, leisure, and unpaid work activities at the episode level. (Additional averages for females and for males are shown in Tables 11 and 12 in the Appendix A.) Paid work episodes appeared to be more enjoyable for WFH individuals than for WAFH individuals before the Covid-19 pandemic. During lockdowns and the relaxation period, this trend persisted for females, yet a reverse trend was observed for males. Male WFH reported lower levels of enjoyment during paid work compared with WAFH counterparts, with the difference being statistically significant only during lockdowns. In contrast, for leisure activities, Table 3 indicates that WAFH individuals derived greater enjoyment from their leisure episodes than WFH individuals, for both women and men, during lockdowns and the relaxation period. However, before the Covid-19 outbreak, this was only observed among males, while female WFH and WAFH individuals reported similar enjoyment levels for their leisure activities. Concerning unpaid work, averages indicate that before the pandemic, female WAFH individuals found more enjoyment in their unpaid work episodes compared with WFH individuals, while the opposite was observed for males. However, during lockdowns and the relaxation period, it was WAFH workers, regardless of gender, who found more enjoyment in their unpaid work episodes.

4 Work from home and time allocation

4.1 Empirical Strategy

The summary statistics presented in Table 2 show only the raw disparities between WFH and WAFH across different time periods. However, these distinctions may be influenced by confounding factors, such as the demographic characteristics of the workers. To address this potential issue, we examine differences in worker time allocation between WFH and WAFH while accounting for the time period under analysis and controlling for observable worker demographics.

To achieve this, we estimate by Ordinary Least Squares (OLS) linear regression models, a method commonly used in time-use research (e.g., Sevilla & Smith, 2020). We estimate the following equation for an individual i:

$$Time_i = \beta_0 + \beta_1 T_i + \beta_2 L_i + \beta_3 R_i + \beta_4 T_i \times L_i + \beta_5 T_i \times R_i + \beta_X' X_i + \varepsilon_i \qquad (1)$$

Table 2 Descriptive statistics of main variables

	FEMALES					MALES				
	WAFH		WFH		Diff.	WAFH		WFH		Diff.
VARIABLES	Mean	Std. Dev.	Mean	Std. Dev.		Mean	Std. Dev.	Mean	Std. Dev.	
A. Pre Covid-19										
Paid work time	435.805	123.221	316.751	192.974	119.054***	494.082	106.875	437.433	204.534	56.649**
Leisure time	263.402	121.861	328.766	187.838	−65.364**	273.674	136.942	335.216	209.522	−61.542**
Unpaid work time	69.390	86.911	85.386	74.427	−15.996	24.758	39.366	38.223	54.656	−13.465
N. Observations	99		26			149		20		
B. Lockdowns										
Paid work time	469.786	149.002	436.935	144.607	32.851***	478.235	125.202	434.067	137.288	44.168***
Leisure time	260.567	151.305	257.973	149.899	2.594	268.647	144.017	295.051	148.805	−26.404**
Unpaid work time	52.727	67.067	61.872	69.083	−9.145	34.727	53.227	51.605	78.281	−16.878***
N. Observations	186		319			253		419		
C. Relaxation										
Paid work time	462.155	121.770	470.080	180.852	−7.925	488.778	146.319	474.154	131.333	14.624
Leisure time	202.570	137.595	234.420	168.315	−31.850	289.822	198.526	251.370	171.138	38.452
Unpaid work time	45.612	56.479	64.817	85.939	−19.205	41.660	58.522	45.638	61.656	−3.978
N. Observations	59		50			129		99		

The sample (CaDDI) is restricted to employed individuals who worked during the diary day. All time allocations are defined in minutes per day. WFH are defined as workers whose paid work activities were all reported at home. Difference defined as the average value for WAFH minus the average value for WFH. *** significant at the 1%; ** significant at the 5%; * significant at the 10%

Table 3 Averages of enjoyment at the episode level

	PAID WORK EPSODES			LEISURE EPISODES			UNPAID WORK EPISODES		
VARIABLES	WAFH	WFH	Diff.	WAFH	WFH	Diff.	WAFH	WFH	Diff.
A. Pre Covid-19									
Women	4.081	5.446	−1.365***	5.685	5.687	−0.002	5.557	5.162	0.395**
N. episodes	4350	786		2564	860		653	218	
Men	4.399	4.818	−0.419***	5.673	5.506	0.167***	4.935	5.092	−0.157***
N. episodes	7400	844		4046	679		384	78	
B. Lockdowns									
Women	4.453	4.582	−0.129***	5.390	5.385	0.005***	5.093	4.964	0.129***
N. episodes	8864	13,785		4743	8366		994	1881	
Men	4.925	4.786	0.139***	5.719	5.526	0.193***	5.561	4.920	0.641***
N. episodes	12,165	18,245		6775	12,482		815	2028	
C. Relaxation									
Women	4.560	4.863	−0.303***	5.365	4.954	0.411***	5.147	4.660	0.487***
N. episodes	2728	2317		1216	1159		288	364	
Men	5.234	4.563	0.671	6.035	5.649	0.386***	5.420	5.067	0.353**
N. episodes	6319	4583		3750	2625		551	501	

The sample (CaDDI-episode level) is restricted to episodes of employed individuals who worked during the diary day. Difference defined as the average value for WAFH minus the average value for WFH. *** significant at the 1%; ** significant at the 5%; * significant at the 10%

where $Time_i$ represents the daily minutes dedicated to market work, leisure, or unpaid work; T_i is the dummy variable identifying WFH; L_i is the dummy variable identifying individuals who filled out the diary during the Covid-19 lockdowns; R_i is the dummy variable identifying workers who filled out the diary after the relaxation of Covid-19-related measures; X_i is a vector of socio-demographic characteristics (gender, age, education, marital status, citizenship, family size, number of children, self-employment status, and weekly work hours); and ε_i is the error term.[11]

Equation (1) includes two interaction terms, $T_i \times L_i$ and $T_i \times R_i$, in addition to terms T_i, L_i and R_i. The coefficients associated to the standalone terms L_i and R_i capture the correlation between the dependent variables (the daily minutes dedicated to market work, leisure, or unpaid work), and the different phases of the Covid-19 pandemic (lockdowns, and relaxation, respectively, compared to the period before the pandemic, which is the reference period). On the other hand, the coefficient associated to the term T_i captures the baseline correlation between being a WFH (relative to being a WAFH) and the dependent variables, which corresponds to said correlation during the baseline period (i.e., before the pandemic). Therefore, the coefficients associated to interaction terms $T_i \times L_i$ and $T_i \times R_i$ capture the additional correlation between the dependent variables and being a WFH that arises during lockdowns and during the relaxation period, respectively.

The estimations of Eq. (1) include several fixed effects that, for the sake of simplified notation, are not explicitly detailed. These fixed effects cover factors such as the completion day of the diaries, residential region, social class, occupation, and health status. Additionally, the estimates incorporate sample weights provided by the CaDDI data at the individual level. We report robust standard errors. Equation (1) is estimated first on the pooled sample including both females and males, and then separately for females and males.[12]

4.2 Pooled results

Table 4 shows estimates of Eq. (1) for the pooled sample of females and males. Column (1) shows results for paid work time, Column (2) shows estimates for leisure time, and Column (3) shows estimates for unpaid work time. Results indicate that net of worker observables, WFH relates to a decrease of paid work time of about 85.35 min per day before the Covid-19 pandemic. The results also indicate that lockdowns were not related to changes in paid work among WAFH or WFH, as the coefficients of interest are not statistically significant at standard levels. However, the gap in paid work after the pandemic between WFH and WAFH is estimated to disappear, since the estimated coefficient is positive and statistically significant. Overall, computing partial correlations between WFH and paid work before, during, and after lockdowns, we obtain that WFH was related to a decrease in paid work of about 85.35 min pre-pandemic, and to a decrease of about 44.79 min during

[11] OLS estimates are appropriate in this context as they produce unbiased estimates of long-run time use (Stewart, 2013). Alternative specifications could be based on the inverse hyperbolic sine transformation (Bellemare & Wichman, 2020); results using such an approach are robust and available upon request.

[12] We additionally analyze the timing of these activities in Appendix B.

Table 4 Pooled estimates on worker time allocation

VARIABLES	PAID WORK (1)	LEISURE (2)	UNPAID WORK (3)
WFH	−85.345*** (29.651)	60.381** (30.497)	10.422 (10.217)
Lockdown	9.679 (17.968)	20.332 (22.772)	9.977 (10.365)
Relaxation	22.337 (19.380)	5.053 (25.732)	11.236 (10.979)
WFH x Lockdown	44.551 (31.025)	−40.666 (32.006)	2.461 (11.375)
WFH x Relaxation	82.162** (33.147)	−71.085** (35.658)	−3.226 (12.238)
Demographics			
Being male	0.481 (7.208)	35.549*** (8.476)	−16.852*** (3.313)
Age	−0.487 (0.329)	0.032 (0.394)	0.770*** (0.171)
Educ.: secondary	−30.520** (14.125)	13.808 (19.345)	−1.354 (8.282)
Educ.: University	−16.929 (14.224)	−17.992 (19.927)	4.827 (8.470)
Married/cohabiting	−2.419 (13.008)	17.898 (15.891)	3.023 (7.191)
UK citizen	−9.482 (21.848)	−29.050 (23.100)	2.703 (10.857)
Family size	−5.488 (3.663)	2.888 (4.981)	2.678 (2.129)
# children	5.934 (5.785)	−10.015 (7.011)	−0.400 (3.272)
Self-employed	−29.138** (11.446)	−9.487 (12.311)	12.343** (5.732)
Weekly work hours	6.354*** (0.420)	−3.681*** (0.475)	−1.574*** (0.227)
Constant	256.564*** (45.422)	425.670*** (49.682)	35.200 (25.492)
Day f.e.	Yes	Yes	Yes
Region f.e.	Yes	Yes	Yes
Social status f.e.	Yes	Yes	Yes
Occupation f.e.	Yes	Yes	Yes
Health f.e.	Yes	Yes	Yes
Observations	1808	1808	1808
R-squared	0.244	0.100	0.146

The sample (CaDDI) is restricted to employed individuals who worked during the diary day. Robust standard errors in parentheses. WFH are defined as workers whose paid work activities were all reported at home. Dependent variables are the time spent in paid work, leisure, or unpaid work, measured in minutes per day. *** significant at the 1%; ** significant at the 5%; * significant at the 10%

lockdowns, while the correlation during the relaxation period is not statistically significant at standard levels.[13]

Regarding leisure, the picture is the opposite of that for paid work. We find that WFH relates to increased leisure time before the pandemic and during lockdowns, but the gap between WFH and WAFH disappears during the relaxation period. Specifically, computing partial correlations of WFH and leisure time, we find that WFH relates to 60.38 more minutes of leisure before the pandemic, and 19.72 more minutes during lockdowns. However, the correlation during the relaxation period is not statistically significant at standard levels. When we analyze unpaid work in Column (3), estimates suggest that the time spent in these activites by WFH and WAFH has not changed during the different phases of the Covid-19 pandemic, and that differences between WFH and WAFH are not statistically significant at standard levels.

[13] These partial correlations refer to "WFH + WFH x Lockdown" (difference between WFH and WAFH in the lockdown period), and to "WFH + WFH x Relaxation" (difference between WFH and WAFH in the relaxation period). Partial correlations are computed as the sum of estimated coefficients, while standard errors are computed using the Delta method.

4.3 Results by gender

Results in Table 4 are computed for the pooled sample of female and male workers. However existing research has documented gender differences in time allocation of WFH and WAFH before and during the Covid-19 lockdowns (Gimenez-Nadal et al., 2020; Pabilonia & Vernon, 2023). As a consequence, and with the objective of analyzing potential differences in the various correlations between WFH and worker time allocation before, during, and after lockdowns, we now estimate Eq. (1) by gender.

Estimates in Columns (1) and (2) of Table 5 display the outcomes concerning paid work time for females and males, respectively. Before Covid-19, female WFH individuals spent roughly 110.6 fewer minutes daily on paid work activities compared with their WAFH counterparts. With the onset of Covid-19 lockdowns, there was a general increase of about 42.9 min per day in paid work for the average female worker, irrespective of WFH status. However, the difference between WFH and WAFH females in paid work remained statistically significant, as female WFH spent about 52.15 fewer minutes in paid work activities than their WAFH counterparts. Furthermore, during the relaxation period, the interaction term between being a female WFH and the relaxation period was positive. As a consequence, there is no statistically significant difference between females WFH and those WAFH in the relation period, after adjusting for observable factors.

For males, the estimated WFH coefficient was not statistically significant at standard levels. Consequently, after accounting for observable factors, there was no discernible difference in the time spent on paid work between WFH and WAFH male workers during the pre-pandemic period. However, once accounting for the interaction terms and computing the correlations between WFH and paid work during lockdowns and during the relaxation period, we find that WFH relates to a significant decrease of about 31.49 min in paid work during lockdowns, but does not relate to changes in paid work during the relaxation period.

Estimates in Columns (3) and (4) focus on leisure time for females and males, respectively. None of the coefficients of interest were statistically significant at standard levels, neither were the partial correlations between WFH and leisure time during lockdowns, or during the relaxation period. For instance, we estimate that WFH relates to an increase of about 26.87 min in male leisure during lockdowns ($p = 0.054$, indicating a statistically significant increase at the 10% level only), which is the only significant correlation of interest we observe regarding leisure time estimates.

Columns (5) and (6) pertain to unpaid work time. For females, none of the coefficients were statistically significant at standard levels, except the one associated with the relaxation period that is marginally significant at the 10% level, suggesting a slight decrease in female unpaid work time during the relaxation period. These results imply similarity in unpaid work time between female WFH and WAFH workers before, during, and after lockdowns. Computing partial correlations, however, we observe that WFH relates to a small but statistically significant increase in unpaid work among females of about 6.63 min per day, while the partial correlation between WFH and female unpaid work time during the relaxation period is not statistically significant at standard levels. Conversely, estimates for males in Column

Table 5 By gender estimates on worker time allocation

	PAID WORK		LEISURE		UNPAID WORK	
VARIABLES	Women (1)	Men (2)	Women (3)	Men (4)	Women (5)	Men (6)
WFH	−110.628*** (36.334)	−17.630 (47.581)	41.213 (35.166)	54.312 (54.489)	13.881 (14.818)	−2.935 (13.073)
Lockdown	42.942* (23.111)	−30.403 (30.697)	23.425 (28.306)	21.999 (38.508)	−15.062 (14.483)	39.202** (16.777)
Relaxation	40.210 (25.294)	−8.626 (33.099)	−33.710 (33.581)	32.096 (42.048)	−27.979* (15.432)	49.469*** (17.853)
WFH x Lockdown	58.481 (38.987)	−13.861 (49.551)	−27.532 (38.464)	−27.445 (55.763)	−0.205 (16.717)	15.969 (15.000)
WFH x Relaxation	126.780*** (43.963)	7.240 (50.875)	−14.304 (45.109)	−83.216 (58.954)	6.026 (19.060)	0.542 (15.389)
Constant	140.500* (80.146)	343.010*** (42.312)	512.896*** (69.767)	426.094*** (73.039)	54.602 (36.288)	4.274 (40.290)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes
Day f.e.	Yes	Yes	Yes	Yes	Yes	Yes
Region f.e.	Yes	Yes	Yes	Yes	Yes	Yes
Social status f.e.	Yes	Yes	Yes	Yes	Yes	Yes
Occupation f.e.	Yes	Yes	Yes	Yes	Yes	Yes
Health f.e.	Yes	Yes	Yes	Yes	Yes	Yes
Observations	739	1,069	739	1,069	739	1,069
R-squared	0.267	0.269	0.153	0.115	0.213	0.125

The sample (CaDDI) is restricted to employed individuals who worked during the diary day. Robust standard errors in parentheses. WFH are defined as workers whose paid work activities were all reported at home. Dependent variables are the time spent in paid work, leisure, or unpaid work, measured in minutes per day. *** significant at the 1%; ** significant at the 5%; * significant at the 10%

(6) indicate increased time spent on unpaid work during lockdowns for both WFH and WAFH males. This trend persisted and became more pronounced after lockdowns during the relaxation period. However, the results do not support the conclusion that unpaid work activities differ between WFH and WAFH male workers. The results suggest that WFH is associated with a small increase in unpaid work during lockdowns of about 13.03 min per day only.

4.4 Discussion of time allocation estimates

In summary, contrary to research predating Covid-19 in the US and the UK, our study does not conclusively link WFH practices to decreased paid work time, increased unpaid work, or leisure times overall. We observed a reduction only in females' paid work time, and only before the Covid-19 period. Notably, the promotion and normalization of WFH appeared to instigate convergence among WFH females, given that, post-Covid-19 and during the relaxation period, female workers spent a comparable amount of time on paid work, regardless of WFH status.

A crucial observation pertains to the time saved by avoiding the commute to and from work. Previous research indicates that the average commuting time in the UK is approximately 50 min per day (Gimenez-Nadal et al., 2022). Individuals working from home do not have to undergo the daily commute, granting them additional time for various daily activities (Barrero et al., 2020). Our findings reveal that this surplus time does not manifest as an increase in paid work hours, leisure activities, or unpaid work. However, we did not explore other activities, such as personal care, childcare, caregiving, or free time. Examining alternative time use outcomes, such as wake-up times and bedtimes, could also provide insights into this specific issue. We leave this issue for future analyses.

Another noteworthy point concerns the influence of the number of children in the household. Estimates indicate that as the number of children increases, mothers spend less time on leisure activities, whereas fathers' time allocation appears unaffected. Other time allocation seems unrelated to the number of children. Essentially, our estimates suggest that mothers' leisure time is highly sensitive to the presence of children, as the time needed for childcare is taken from available leisure time. However, fathers' leisure time does not seem to be influenced by the presence of children. This aligns with existing research suggesting that despite some convergence, mothers continue to bear the primary responsibility for childcare in the household (Guryan et al., 2008; Ramey & Ramey, 2010; Goldin, 2014). As we did not specifically examine childcare, which would require restricting samples to mothers and substantially reducing sample sizes, we also leave this issue for future analyses.[14]

[14] We conducted certain robustness checks to assess the dependency of results on WFH definitions and methods used. First, we employed an alternative identification of WFH ('WFH (alternative)'), where WFH status was defined as a worker spending at least 1 hour in paid work activities at home, a more flexible WFH definition. Estimating Eq. (1) using this alternative definition (see Panel A of Appendix Table 13) leaves the conclusions unchanged. Second, to test the impact of weekdays on our analysis, we re-estimated Eq. (1) by excluding observations corresponding to weekend days, despite their status as workdays. The conclusions remain consistent. We also ran a sensitivity analysis by estimating Eq. (1) on full-time workers only. The results remain qualitatively robust, and the conclusions hold; see Table 14 in Appendix A.

Our findings align with existing research on WFH and worker time allocation decisions using the ATUS data of the US (Gimenez-Nadal et al., 2020; Restrepo & Zeballos, 2020, 2022; Pabilonia & Vernon, 2022, 2023). Gimenez-Nadal et al. (2020) report a negative correlation between WFH and paid work and a positive correlation between WFH and leisure before the pandemic. Similarly, Restrepo and Zeballos (2020) conclude that workers who WFH allocate less time to paid work and more to leisure. Pabilonia and Vernon (2022) reach similar conclusions. Moreover, our estimates also align with Restrepo and Zeballos (2022), as they find that, pre-pandemic, WFH was associated with increased leisure and decreased paid work time, whereas during the pandemic, WFH workers' paid work time changed significantly, and converged with that of WAFH workers. Our results are consistent with Restrepo and Zeballos (2022) and further suggest that this convergence is statistically significant, primarily among women. Additionally, Pabilonia and Vernon (2023) find that mothers who WFH spend less time on paid work compared to WAFH mothers, which aligns with our findings.

In summary, our analysis utilizing the CaDDI data for the UK corresponds with existing research focusing on WFH and time allocation in the US, using ATUS data from before the Covid-19 pandemic and during lockdowns. Our study contributes to this body of work by analyzing gender heterogeneity, highlighting that time allocation differences between WFH and WAFH are more pronounced among women, and by examining the context of the UK in contrast to the US.

5 Work from home and well-being

5.1 Empirical strategy

The well-being of workers in their work-related, leisure, and unpaid work activities is analyzed, distinguishing between WFH and WAFH, at the diary level, and net of observable demographics, and observable episode characteristics. For each individual i and each episode j done by that individual, the following equation is estimated using OLS:

$$W_{ij} = \gamma_0 + \gamma_1 T_i + \gamma_2 L_i + \gamma_3 R_i + \gamma_4 T_i \times L_i + \gamma_5 T_i \times R_i + \gamma_P' P_{ij} + \gamma_X' X_i + \varepsilon_{ij} \quad (2)$$

where W_{ij} represents the enjoyment experienced by individual i during episode j; T_i, L_i, R_i, and X_i are defined as in Eq. (1); P_{ij} is a vector of episode characteristics (episode done alone, with the spouse, with children); and ε_i is the error term. The interaction terms included in Eq. (2) are analogous to those included in Eq. (1) and, as a consequence, they should be interpreted analogously.

The estimations of Eq. (2) also incorporate the day of the week, region, social class, occupation, health, overall life satisfaction, secondary activity, and hour of the day fixed effects. Additionally, estimates include sample weights provided by the CaDDI data at the episode level, and we include robust-cluster standard errors (at the individual level) to account for potential correlation and heteroskedasticity. The equation is estimated first for the pooled sample of females and males, and then separately for females and for males.

Table 6 Pooled estimates on enjoyment

VARIABLES	PAID WORK EPISODES (1)	LEISURE EPISODES (2)	UNPAID WORK EPISODES (3)
WFH	0.264 (0.437)	−0.011 (0.288)	−0.290 (0.506)
Lockdown	−0.175 (0.432)	−0.061 (0.327)	−0.884 (0.566)
Relaxation	0.007 (0.445)	0.239 (0.352)	−0.863 (0.576)
WFH x Lockdown	−0.369 (0.481)	0.239 (0.321)	0.413 (0.555)
WFH x Relaxation	−0.456 (0.564)	−0.177 (0.369)	−0.264 (0.607)
Episode details			
Alone	0.091 (0.160)	−0.001 (0.148)	−0.038 (0.258)
With spouse	0.222 (0.203)	0.369*** (0.116)	−0.301 (0.219)
With child	0.411* (0.229)	0.166 (0.137)	0.261 (0.296)
Being male	0.252 (0.158)	−0.017 (0.117)	0.267 (0.234)
Constant	4.711*** (1.189)	5.962*** (0.771)	2.576** (1.286)
Demographics	Yes	Yes	Yes
Day f.e.	Yes	Yes	Yes
Region f.e.	Yes	Yes	Yes
Social status f.e.	Yes	Yes	Yes
Occupation f.e.	Yes	Yes	Yes
Health f.e.	Yes	Yes	Yes
Life satisfaction f.e.	Yes	Yes	Yes
Secondary activity f.e.	Yes	Yes	Yes
Hour of the day f.e.	Yes	Yes	Yes
Observations	14,581	13,186	1,608
R-squared	0.350	0.250	0.418

The sample (CaDDI-episode) is restricted to episodes of employed individuals who worked during the diary day. Robust-cluster (at the individual level) standard errors in parentheses. WFH are defined as workers whose paid work activities were all reported at home. The dependent variable is the enjoyment of paid work, leisure, or unpaid work episodes. *** significant at the 1%; ** significant at the 5%; * significant at the 10%

5.2 Pooled results

Table 6 illustrates the outcomes of estimating Eq. (2) over the pooled sample of females and males. Column (1) presents the estimations for enjoyment during paid work episodes, Column (2) shows the results for enjoyment during leisure episodes, and Column (3) shows estimates for enjoyment during unpaid work.

None of the point estimates of the coefficients of interest are statistically significant at standard levels. As a consequence, the results notably demonstrate that there is no statistically significant difference in enjoyment levels between paid work and unpaid work episodes for either WFH or WAFH workers, irrespective of the time period—before Covid-19, during lockdowns, or in the relaxation period. Furthermore, none of the partial correlations between WFH and enjoyment are significant at standard levels, supporting the conclusions derived from the point estimates shown in Table 6.

Table 7 By gender estimates on enjoyment

	PAID WORK EPISODES		LEISURE EPISODES		UNPAID WORK EPIDOSDES	
VARIABLES	Women (1)	Men (2)	Women (3)	Men (4)	Women (5)	Men (6)
WFH	0.009 (0.602)	0.676 (0.464)	−0.842** (0.367)	0.287 (0.448)	−0.480 (0.631)	0.246 (0.456)
Lockdown	0.368 (0.579)	−0.364 (0.482)	−0.500 (0.405)	−0.048 (0.517)	−0.016 (0.566)	−0.913 (0.601)
Relaxation	0.521 (0.541)	−0.009 (0.505)	−0.181 (0.410)	0.301 (0.527)	−0.171 (0.794)	−0.452 (0.636)
WFH x Lockdown	−0.360 (0.673)	−0.804 (0.546)	0.972** (0.408)	−0.027 (0.514)	0.382 (0.709)	0.231 (0.502)
WFH x Relaxation	−0.398 (0.601)	−0.857 (0.629)	1.023** (0.511)	−0.596 (0.529)	1.453 (0.889)	−0.437 (0.681)
Constant	6.596*** (1.248)	4.887*** (1.531)	3.112* (1.678)	5.886*** (1.114)	3.325 (2.265)	5.111*** (1.224)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes
Episode details	Yes	Yes	Yes	Yes	Yes	Yes
Day f.e.	Yes	Yes	Yes	Yes	Yes	Yes
Region f.e.	Yes	Yes	Yes	Yes	Yes	Yes
Social status f.e.	Yes	Yes	Yes	Yes	Yes	Yes
Occupation f.e.	Yes	Yes	Yes	Yes	Yes	Yes
Health f.e.	Yes	Yes	Yes	Yes	Yes	Yes
Life satisfaction f.e.	Yes	Yes	Yes	Yes	Yes	Yes
Secondary activity f.e.	Yes	Yes	Yes	Yes	Yes	Yes
Hour of the day f.e.	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5602	8979	4366	8820	726	882
R-squared	0.510	0.464	0.423	0.335	0.621	0.632

The sample (CaDDI-episode) is restricted to episodes of employed individuals who worked during the diary day. Robust-cluster (at the individual level) standard errors in parentheses. WFH are defined as workers whose paid work activities were all reported at home. The dependent variable is the enjoyment of paid work, leisure, or unpaid work episodes. *** significant at the 1%; ** significant at the 5%; * significant at the 10%

5.3 Results by gender

Because gender heterogeneity may be masking the results shown in Table 6, Table 7 shows estimates of Eq. (2) by gender. Columns (1) and (2) present the estimations for enjoyment during paid work episodes for females and males, respectively. Columns (3) and (4) exhibit the analogous estimates for leisure episodes, and Columns (5) and (6) show estimates for unpaid work episodes. Estimates by gender on enjoyment during paid work, and on enjoyment during unpaid work are similar to those in Table 6, as no coefficients of interest are statistically significant at standard levels. Furthermore, no partial correlations between WFH and enjoyment while doing paid work or while doing unpaid work are statistically significant at standard levels, irrespective of the time period considered. In summary, the results suggest no statistically significant difference in enjoyment levels between paid work and unpaid work episodes for either WFH or WAFH workers, regardless of gender or the pandemic period analyzed.[15]

However, differences are observed in how female workers derive enjoyment from their leisure episodes between WFH and WAFH. Specifically, before Covid-19, female WFH workers derived less enjoyment from their leisure episodes compared with their WAFH counterparts, aligning with existing research indicating that WFH practices blur the boundaries between work and leisure, negatively impacting workers. This difference is captured by the point estimate associated with being a WFH, in Column (3) of Table 7, which is negative and statistically significant at standard levels. However, our findings suggest that this distinction disappeared during and after lockdowns, as indicated by the positive and statistically significant interaction terms. In this line, partial correlations between WFH and enjoyment during lockdowns and during the relaxation period are not statistically significant at standard levels. Consequently, the results indicate that the Covid-19 pandemic acted as an equalizer for how female WFH and WAFH workers experienced leisure activities, even when considering companionship during leisure. (The estimates, as well as the partial correlations on leisure enjoyment for males, are all not significant, aligning with the results on paid work and unpaid work).

5.4 Discussion of well-being results

The well-being results shown in Table 6 for the pooled sample, and in Table 7 for the female and male samples, do not seem to align with the estimates on time allocation shown in Tables 4 and 5 for the pooled sample, and for the by-gender samples, respectively. Specifically, time allocation estimates suggest that the difference between WFH and WAFH females was sizeable and statistically significant before the Covid-19 pandemic, but not statistically significant afterwards. As a consequence, one would expect some statistically significant difference between WFH and WAFH workers in terms of enjoyment while doing paid work. We found no statistically significant differences between WFH and WAFH in terms of leisure

[15] Results are robust to the alternative identification of WFH ("WFH (alternative)"), and are also robust to estimates over weekdays only (see Table 15 in the Appendix A). We also conduct a sensitivity analysis by running the enjoyment analysis on full-time workers only; the results remain similar (see Table 16 in Appendix A).

time, but did find statistically significant differences between female WFH and WAFH in terms of enjoyment while doing leisure.

Regarding paid work, the fact that the enjoyment results were not statistically significant suggests that WFH used to be negatively related to the time spent in market work, but not to the instantaneous enjoyment experienced while doing such activities, before the pandemic. Furthermore, enjoyment results show that this not-statistically significant correlation between WFH and experienced enjoyment while doing paid work has remained so, whereas the difference in the time spent in paid work between WFH and WAFH females has converged. Thus, the different phases of the Covid-19 pandemic have played a moderating role in the time devoted to paid work by female WFH, but has not modified the correlation between WFH and enjoyment while doing paid work among these individuals.

Discrepancies in terms of leisure may point to a different scenario. The results show that despite the amount of leisure enjoyed by women, WFH is correlated with how enjoyable leisure is, and the normalization of WFH during the phases of the Covid-19 pandemic has played a moderating role in that correlation. Specifically, WFH females used to enjoy leisure less than their WAFH counterparts before lockdowns, aligning with existing literature suggesting that WFH blurs the barrier between work and family, ultimately decreasing well-being (e.g., Brindal et al., 2022). However, our enjoyment estimates suggest that this correlation vanished during the lockdowns and the relaxation period after the pandemic. Given the timing of the data, we cannot disentangle how trends are evolving, i.e., if the correlation is returning to the negative value found before the pandemic or if it is remaining not statistically significant. Future research using time use diaries and well-being data should consider these issues, using information for longer time periods since the pandemic.

These findings contrast with prior studies that have explored the correlation between WFH and various measures of well-being in both the US and the UK, before and during the Covid-19 pandemic, using either simulated scenarios (Hamermesh, 2020; Gimenez-Nadal et al., 2023) or time use diaries during the lockdowns (Foliano et al., 2022; Restrepo and Zeballos, 2023).

For instance, in the US before the pandemic, Gimenez-Nadal et al. (2020) found that WFH was associated with decreased negative feelings, while in the UK, our study does not find a statistically significant association between WFH and instantaneous enjoyment. Hamermesh (2020) concluded that time spent at home with others was related to increased well-being, measured through overall life satisfaction, whereas our results do not support such a conclusion in terms of instantaneous enjoyment while doing paid work and unpaid work. However, our estimates on leisure are partially consistent with Hamermesh (2020), as the gap in leisure enjoyment decreasing during the pandemic may be explained by more people being at home to enjoy joint leisure time. Additionally, Restrepo and Zeballos (2023) used the ATUS data and found that WFH positively impacted emotional well-being while working, but the correlation was not significant for leisure activities. Our estimates in the UK show a different pattern; we find no significant relationship between WFH and instantaneous enjoyment during paid work for the full sample or by gender. However, we do find a negative correlation between WFH and enjoyment during leisure activities that disappeared during lockdowns, a finding partially aligned with Restrepo and Zeballos (2023) in the US.

In the UK, Foa et al. (2020) and Foliano et al. (2022) reported decreased well-being driven by lockdowns, though not specifically focusing on WFH. Similar results were found by Möhring et al. (2021) and Zacher and Rudolph (2021) in Germany, and by Brindal et al. (2022) in Australia, although these studies did not use time use diaries.[16] Our results partially corroborate these findings, as we observe negative correlations between WFH and enjoyment in the pooled sample of women and men, although the coefficients of interest are not statistically significant at conventional levels.

In summary, our estimates for the UK using time use diaries from the CaDDI database indicate that both in terms of time allocation and well-being, the promotion of WFH practices during the Covid-19 pandemic and associated lockdowns appears to have equalized worker behaviors to some extent. Pre-existing differences between WFH and WAFH workers seem to have lessened or even vanished. However, the CaDDI data does not allow us to examine whether this trend persists in the long term. Future waves of time use surveys will be necessary to explore these ongoing trends.

6 Conclusions

Our study examines the relationships between WFH and Covid-19 phases on the one hand, and worker time use and enjoyment while doing paid work, leisure and unpaid work on the other, with a focus on differences across gender. The results suggest that, in general terms, WFH is not related to alterations in worker time-allocation patterns, but notable gender differences surface. Pre-pandemic, female WFH allocated less time to paid work than WAFH. However, temporal patterns in work and leisure fluctuated over time, aligning more closely during lockdowns, hinting at potential convergence.

This study explores the interconnections between WFH dynamics, individuals' time allocation, and their subjective experiences, centering specifically on the unique, gender-related work patterns that have surfaced. These observed patterns signify a potential overhaul in the conventional equilibrium between work and personal life, especially concerning women who are actively involved in WFH arrangements. This implies a substantial transformation in how women strike a balance between their professional commitments and personal life demands, signaling a necessity for comprehensive investigation into the root causes catalyzing these transformative shifts.

Comprehending these temporal transitions goes beyond unraveling how individuals organize their time; it serves as a crucial resource for both employers and policymakers. Unveiling these evolving patterns empowers employers to fine-tune work setups, aligning with the dynamic preferences and requirements of their workforce. For policymakers, these insights present an opportunity to design more impactful policies that foster flexible work structures and confront gender gaps within the evolving work terrain shaped by the diverse phases of the Covid-19 pandemic.

Limitations include defining WFH without distinguishing occasional from regular telecommuting, due to sparse data points per respondent. Second, the CaDDI data does not include information on the reasons why workers WFH, and thus part-time employment or

[16] Conversely, Recchi et al. (2020) found an increase in well-being during lockdowns, a paradox explained by the subjective valuation of remaining healthy and uninfected during the Covid-19 pandemic in France. We do not find support for this paradox using time use diaries from the UK.

endogenous WFH choices may be affecting our results. For example, we cannot identify if workers request WFH on certain days because of some external reason, such as light work schedules, some additional chores, or busy days. Relatedly, the lack of post-summer 2021 data limits our understanding of transitional WFH phases post-relaxation, and also entails potential seasonality issues, since the only relaxation period is in the summer. The study's cross-sectional nature raises concerns about establishing causal relationships, warranting future longitudinal studies for more robust conclusions. The well-being analysis is based on comparing ordinal values of a subjective measure across individuals, which may be problematic (see Bond and Lang (2019) and Bloem (2022)). Finally, the analysis centers on conventional time use outcomes, encompassing the cumulative time dedicated to paid work, leisure, and unpaid work, along with the temporal aspects and the enjoyment associated with these activities. Subsequent research endeavors should delve into alternative metrics, such as the percentage of work conducted from home as an indicator of remote work (WFH), the percentage of non-paid work tasks performed between the initial and final paid work episodes throughout the day, as a gauge of flexible work schedules, or wake-up time and bedtime as measures of overall daily activity time.

Data availability The data is available in the core collection of the UK Data Archive.

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Author contributions All authors contributed equally to the paper. All authors read and approved the final manuscript.

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Compliance with ethical standards

Conflict of interest The authors declare no competing interests.

7 Appendix A: Additional results

Tables 8–16

Table 8 Sample composition

Period	Survey time	N. observations	N. individuals
Pre Covid-19	Feb/Oct/Dec 2016	294	234
Lockdowns	May/Jun 2020	291	191
	Nov 2020	501	326
	Jan 2021	385	257
Relaxation	Aug/Sep 2021	337	202

The sample (CaDDI) is restricted to employed individuals who worked during the diary day

Table 9 Time use details

Activity	Code	Description
Paid work	117	Paid work including at home
	118	Formal education
	125	Work break
Leisure	110	Church, temple, synagogue, prayer
	111	Walking, jogging
	119	Recreational courses
	126	Shopping
	127	Watching TV, video, DVD, music
	128	Reading including e-books
	129	Playing sports, exercise
	130	Going out to eat, drink
	131	Walking, dog walking
	132	Playing computer games
	133	Eating or drinking in a restaurant or cafe
	134	Telephone, text, email, letters
	135	Cinema, theater, sport etc.
	136	Hobbies
Unpaid work	105	Preparing food, cooking etc.
	106	Cleaning, tidying, housework
	107	Clothes washing, mending
	108	Maintenance, DIY, etc.
	120	Voluntary work for organization
	123	Help, caring for cores adult
	124	Help, caring for no coresidents

Authors' computations

Table 10 Descriptive statistics of demographics

	WAFH		WFH		Diff.
VARIABLES	Mean	S.Dev.	Mean	S.Dev.	
Being male	0.569	0.495	0.539	0.499	0.030
Age	41.619	12.254	43.285	13.196	−1.666*
Educ: basic	0.064	0.245	0.031	0.172	0.033***
Educ: secondary	0.382	0.486	0.248	0.432	0.134***
Educ: University	0.554	0.497	0.721	0.449	−0.167***
Married/cohabiting	0.056	0.230	0.070	0.255	−0.014
UK citizen	0.686	0.464	0.883	0.322	−0.179***
Family size	2.806	1.257	2.646	1.271	−0.197***
# children	0.699	0.941	0.590	0.902	0.160**
Employee	0.903	0.296	0.865	0.342	0.109***
Self-employed	0.097	0.296	0.135	0.342	0.038***
Weekly work hours	36.351	9.445	35.973	9.462	−0.038
Health: very bad	0.002	0.048	0.001	0.031	0.378
Health: bad	0.024	0.154	0.021	0.143	0.001
Health: fair	0.275	0.447	0.258	0.438	0.003
Health: good	0.476	0.500	0.575	0.495	0.017***
Health: very good	0.223	0.416	0.146	0.353	−0.099***
N. Observations	875		933		

The sample (CaDDI) is restricted to employed individuals who worked during the diary day. Age is measured in years. WFH are defined as workers whose paid work activities were all reported at home. Difference defined as the average value for WAFH minus the average value for WFH. *** significant at the 1%; ** significant at the 5%; * significant at the 10%

Table 11 Averages of episode variables (females)

	PAID WORK EPSODES			LEISURE EPISODES			UNPAID WORK EPISODES		
VARIABLES	WAFH	WFH	Diff.	WAFH	WFH	Diff.	WAFH	WFH	Diff.
A. Pre Covid-19									
Average # episodes	47.029	42.979	4.050***	31.921	43.196	−11.28***	17.715	14.776	2.939**
Episode alone	0.217	0.397	−0.180***	0.309	0.256	0.053*	0.358	0.412	−0.054*
Episode with spouse	0.036	0.150	−0.114***	0.510	0.512	−0.002	0.402	0.351	0.051
Episode with child	0.007	0.086	−0.079***	0.152	0.123	0.029***	0.174	0.143	0.031
Episode at home	0.014	–	–	0.729	0.797	−0.068***	0.917	0.990	−0.073***
Episode at workplace	0.975	–	–	0.040	0.001	0.039***	0.012	0.000	0.012*
Enjoyment	4.081	5.446	−1.365***	5.685	5.687	−0.002	5.557	5.162	0.395**
N. episodes	4350	786		2564	860		653	218	
B. Lockdowns									
Average # episodes	51.679	48.464	3.215***	34.795	34.480	0.315***	13.757	13.876	−0.119
Episode alone	0.360	0.593	−0.233***	0.473	0.429	0.044	0.368	0.349	0.019
Episode with spouse	0.033	0.308	−0.275***	0.379	0.415	−0.036	0.418	0.492	−0.074***
Episode with child	0.022	0.122	−0.100***	0.102	0.138	−0.036**	0.170	0.155	0.015
Episode at home	0.037	–	–	0.848	0.921	−0.073***	0.908	0.986	−0.078***
Episode at workplace	0.955	–	–	0.044	0.002	0.042***	0.054	0.002	0.052***
Enjoyment	4.453	4.582	−0.129***	5.390	5.385	0.005***	5.093	4.964	0.129***
N. episodes	8864	13,785		4743	8366		994	1881	
C. Relaxation									
Average # episodes	49.370	53.827	−4.457***	29.445	35.285	−5.840***	11.436	17.648	−6.212***
Episode alone	0.274	0.886	−0.612***	0.353	0.525	−0.172***	0.423	0.667	−0.244***
Episode with spouse	0.067	0.092	−0.025***	0.437	0.314	0.123***	0.434	0.219	0.215***

Table 11 continued

VARIABLES	PAID WORK EPSODES			LEISURE EPISODES			UNPAID WORK EPISODES		
	WAFH	WFH	Diff.	WAFH	WFH	Diff.	WAFH	WFH	Diff.
Episode with child	0.012	0.020	−0.008**	0.062	0.021	0.041***	0.066	0.052	0.014
Episode at home	0.034	–	–	0.659	0.818	−0.159***	0.975	0.959	0.016
Episode at workplace	0.962	–	–	0.162	0.000	0.162***	0.007	0.000	0.007
Enjoyment	4.560	4.863	−0.303***	5.365	4.954	0.411***	5.147	4.660	0.487***
N. episodes	2728	2317		1216	1159		288	364	

The sample (CaDDI-episode level) is restricted to episodes of employed individuals who worked during the diary day. Difference defined as the average value for WAFH minus the average value for WFH. *** significant at the 1%; ** significant at the 5%; * significant at the 10%

Table 12 Averages of episode variables (males)

	PAID WORK EPSODES			LEISURE EPISODES			UNPAID WORK EPISODES		
VARIABLES	WAFH	WFH	Diff.	WAFH	WFH	Diff.	WAFH	WFH	Diff.
A. Pre Covid-19									
Average # episodes	51.705	52.829	−1.124***	34.174	45.963	−11.79***	8.693	11.247	−2.554***
Episode alone	0.354	0.568	−0.214***	0.439	0.358	0.081	0.433	0.197	0.236***
Episode with spouse	0.031	0.314	−0.283***	0.402	0.473	−0.071	0.403	0.664	−0.261***
Episode with child	0.002	0.084	−0.082***	0.045	0.178	−0.133***	0.025	0.197	−0.172***
Episode at home	0.013	–	–	0.740	0.818	−0.078**	0.906	0.988	−0.082***
Episode at workplace	0.982	–	–	0.070	0.000	0.070***	0.029	0.000	0.029*
Enjoyment	4.399	4.818	−0.419***	5.673	5.506	0.167***	4.935	5.092	−0.157***
N. episodes	7400	844		4046	679		384	78	
B. Lockdowns									
Average # episodes	51.088	47.739	3.349***	34.555	36.992	−2.437***	11.599	17.007	−5.408***
Episode alone	0.435	0.641	−0.206***	0.320	0.375	−0.055***	0.322	0.478	−0.156***
Episode with spouse	0.068	0.300	−0.232***	0.536	0.515	0.021***	0.516	0.415	0.101***
Episode with child	0.014	0.048	−0.034***	0.131	0.080	0.051***	0.144	0.077	0.067***
Episode at home	0.053	–	–	0.796	0.894	−0.098***	0.915	0.996	−0.081***
Episode at workplace	0.938	–	–	0.094	0.002	0.092***	0.051	0.000	0.051***
Enjoyment	4.925	4.786	0.139***	5.719	5.526	0.193***	5.561	4.920	0.641***
N. episodes	12,165	18,245		6775	12,482		815	2028	
C. Relaxation									
Average # episodes	53.224	51.016	2.208	42.476	36.671	5.805***	12.323	12.809	−0.486
Episode alone	0.342	0.605	−0.263	0.259	0.346	−0.087***	0.350	0.412	−0.062***
Episode with spouse	0.064	0.293	−0.229	0.462	0.508	−0.046***	0.462	0.519	−0.057

Table 12 continued

VARIABLES	PAID WORK EPSODES			LEISURE EPISODES			UNPAID WORK EPISODES		
	WAFH	WFH	Diff.	WAFH	WFH	Diff.	WAFH	WFH	Diff.
Episode with child	0.046	0.065	−0.019	0.188	0.126	0.062***	0.156	0.095	0.061***
Episode at home	0.041	–	–	0.622	0.822	−0.200***	0.775	0.938	−0.163***
Episode at workplace	0.942	–	–	0.196	0.035	0.161***	0.206	0.025	0.181***
Enjoyment	5.234	4.563	0.671	6.035	5.649	0.386***	5.420	5.067	0.353**
N. episodes	6319	4583		3750	2625		551	501	

The sample (CaDDI-episode level) is restricted to episodes of employed individuals who worked during the diary day. Difference defined as the average value for WAFH minus the average value for WFH. *** significant at the 1%; ** significant at the 5%; * significant at the 10%

Table 13 Estimates on worker time allocation, robustness checks

	PAID WORK		LEISURE		UNPAID WORK	
VARIABLES	Women (1)	Men (2)	Women (3)	Men (4)	Women (5)	Men (6)
A. ALTERNATIVE DEFINITION OF WFH (1 hour+)						
WFH (alternative)	−86.053** (35.188)	18.413 (36.536)	30.505 (33.410)	38.917 (47.267)	8.748 (14.184)	−4.104 (10.998)
Lockdown	28.788 (23.099)	−32.140 (31.529)	27.205 (28.571)	14.483 (39.408)	−14.628 (14.791)	40.540** (17.445)
Relaxation	25.301 (24.715)	−11.096 (33.453)	−24.660 (34.019)	7.764 (42.257)	−24.986 (15.605)	52.755*** (18.241)
WFH (alt.) x Lockdown	59.958 (37.521)	−37.262 (38.818)	−23.531 (36.650)	−10.038 (49.006)	2.908 (16.135)	13.440 (13.214)
WFH (alt.) x Relaxation	133.472*** (42.127)	−11.306 (40.538)	−24.120 (43.680)	−27.031 (52.866)	2.574 (18.414)	−5.773 (13.616)
All other controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	739	1069	739	1069	739	1069
R-squared	0.253	0.264	0.150	0.113	0.209	0.124
B. WEEKDAYS ONLY						
WFH	−82.116** (41.170)	−13.662 (58.903)	35.585 (40.933)	26.579 (68.390)	13.337 (17.880)	1.825 (14.138)
Lockdown	44.391* (26.815)	−10.413 (36.620)	1.307 (36.382)	−33.475 (42.528)	−18.823 (16.531)	63.343*** (22.194)
Relaxation	41.306 (28.548)	12.552 (38.515)	−47.469 (41.705)	−18.371 (45.834)	−30.314* (17.127)	77.715*** (23.692)
WFH x Lockdown	35.469 (44.307)	−26.407 (61.016)	−12.225 (45.156)	12.018 (69.257)	−4.343 (19.954)	10.330 (16.937)
WFH x Relaxation	112.072** (50.321)	4.338 (62.353)	−0.698 (52.919)	−67.718 (72.686)	0.838 (22.378)	−7.866 (17.204)
All other controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	542	801	542	801	542	801
R-squared	0.270	0.299	0.159	0.128	0.244	0.135

The sample (CaDDI) is restricted to employed individuals who worked during the diary day. Robust standard errors in parentheses. WFH are defined as workers whose paid work activities were all reported at home. Dependent variables are the time spent in paid work, leisure, or unpaid work, measured in minutes per day. *** significant at the 1%; ** significant at the 5%; * significant at the 10%

Table 14 Time allocation estimates on full-time workers

	PAID WORK		LEISURE		UNPAID WORK	
VARIABLES	Women (1)	Men (2)	Women (3)	Men (4)	Women (5)	Men (6)
WFH (alternative)	−175.455*** (41.379)	−49.916 (53.720)	47.869 (46.642)	92.513 (65.655)	31.920** (13.936)	−0.004 (11.736)
Lockdown	15.548 (26.774)	−43.286 (34.151)	38.194 (34.421)	17.208 (36.939)	3.059 (14.078)	41.081** (19.197)
Relaxation	4.239 (28.450)	−28.465 (36.387)	0.137 (40.866)	15.426 (40.443)	−10.543 (15.293)	51.189** (20.302)
WFH (alt.) x Lockdown	129.769*** (44.272)	19.146 (55.740)	−28.287 (49.762)	−60.932 (67.213)	−23.588 (16.161)	11.886 (13.836)
WFH (alt.) x Relaxation	234.400*** (50.305)	43.226 (56.492)	−42.658 (57.529)	−89.189 (68.717)	−30.158 (18.395)	−0.870 (14.318)
All other controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	605	964	605	964	605	964
R-squared	0.185	0.189	0.140	0.094	0.140	0.102

The sample (CaDDI) is restricted to employed individuals who worked during the diary day and are full-time workers. Robust standard errors in parentheses. WFH are defined as workers whose paid work activities were all reported at home. Dependent variables are the time spent in paid work, leisure, or unpaid work, measured in minutes per day. *** significant at the 1%; ** significant at the 5%; * significant at the 10%

Table 15 Estimates on enjoyment, robustness checks

	PAID WORK EPISODES		LEISURE EPISODES		UNPAID WORK EPIDOSDES	
VARIABLES	Women (1)	Men (2)	Women (3)	Men (4)	Women (5)	Men (6)
A. ALTERNATIVE DEFINITION OF WFH (1 hour+)						
WFH	−0.595 (0.608)	0.544 (0.438)	−0.977*** (0.361)	0.271 (0.428)	−0.535 (0.654)	−0.716 (0.625)
Lockdown	0.126 (0.610)	−0.447 (0.492)	−0.730* (0.383)	0.005 (0.523)	0.057 (0.593)	−1.253** (0.588)
Relaxation	0.397 (0.610)	0.015 (0.515)	−0.257 (0.408)	0.261 (0.518)	−0.248 (0.773)	−0.849 (0.629)
WFH x Lockdown	0.319 (0.653)	−0.533 (0.493)	1.197*** (0.380)	−0.111 (0.486)	0.159 (0.687)	1.280* (0.648)
WFH x Relaxation	0.153 (0.669)	−0.785 (0.575)	1.000* (0.510)	−0.357 (0.462)	1.682* (0.870)	0.867 (0.705)
All other controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5602	8979	4366	8820	726	882
R-squared	0.512	0.464	0.429	0.329	0.625	0.637
B. WEEKDAYS ONLY						
WFH	0.130 (0.647)	0.735 (0.560)	−0.909** (0.404)	−0.042 (0.493)	−2.068*** (0.746)	0.342 (0.587)
Lockdown	0.027 (0.814)	−0.582 (0.525)	−0.935* (0.513)	−0.331 (0.746)	0.227 (0.806)	−1.161* (0.696)
Relaxation	0.389 (0.760)	−0.505 (0.550)	−0.305 (0.488)	−0.130 (0.749)	−0.166 (1.221)	−0.653 (0.682)
WFH x Lockdown	−0.372 (0.754)	−0.947 (0.634)	1.235*** (0.459)	0.296 (0.559)	3.242*** (1.137)	−0.265 (0.643)
WFH x Relaxation	−0.329 (0.695)	−1.132 (0.782)	0.852 (0.564)	−0.075 (0.603)	0.668 (1.558)	−0.389 (0.901)
All other controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4015	6629	3251	6346	475	646
R-squared	0.523	0.532	0.483	0.344	0.742	0.691

The sample (CaDDI-episode) is restricted to episodes of employed individuals who worked during the diary day. Robust-cluster (at the individual level) standard errors in parentheses. WFH are defined as workers whose paid work activities were all reported at home. The dependent variable is the enjoyment of paid work, leisure, or unpaid work episodes. *** significant at the 1%; ** significant at the 5%; * significant at the 10%

Table 16 Enjoyment estimates on full-time workers

	PAID WORK EPISODES		LEISURE EPISODES		UNPAID WORK EPIDOSDES	
VARIABLES	Women (1)	Men (2)	Women (3)	Men (4)	Women (5)	Men (6)
WFH	0.003 (0.698)	0.942* (0.541)	−1.059*** (0.403)	0.234 (0.424)	0.170 (0.666)	0.409 (0.595)
Lockdown	0.531 (0.601)	−0.047 (0.498)	−0.545 (0.468)	−0.068 (0.586)	0.413 (0.535)	−1.126** (0.542)
Relaxation	0.649 (0.615)	0.279 (0.527)	−0.286 (0.465)	0.137 (0.587)	0.259 (0.809)	−0.852 (0.567)
WFH x Lockdown	−0.428 (0.753)	−1.158* (0.615)	1.133** (0.478)	−0.114 (0.493)	−0.262 (0.793)	−0.136 (0.686)
WFH x Relaxation	−0.335 (0.764)	−1.068 (0.680)	1.746*** (0.547)	−0.429 (0.475)	−2.642* (1.392)	−0.395 (0.736)
All other controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5079	7907	3457	7347	545	770
R-squared	0.512	0.516	0.432	0.331	0.718	0.671

The sample (CaDDI-episode) is restricted to episodes of employed individuals who worked during the diary day and are full-time workers. Robust-cluster (at the individual level) standard errors in parentheses. WFH are defined as workers whose paid work activities were all reported at home. The dependent variable is the enjoyment of paid work, leisure, or unpaid work episodes. *** significant at the 1%; ** significant at the 5%; * significant at the 10%

8 Appendix B: The timing of activities

Figures 1–6

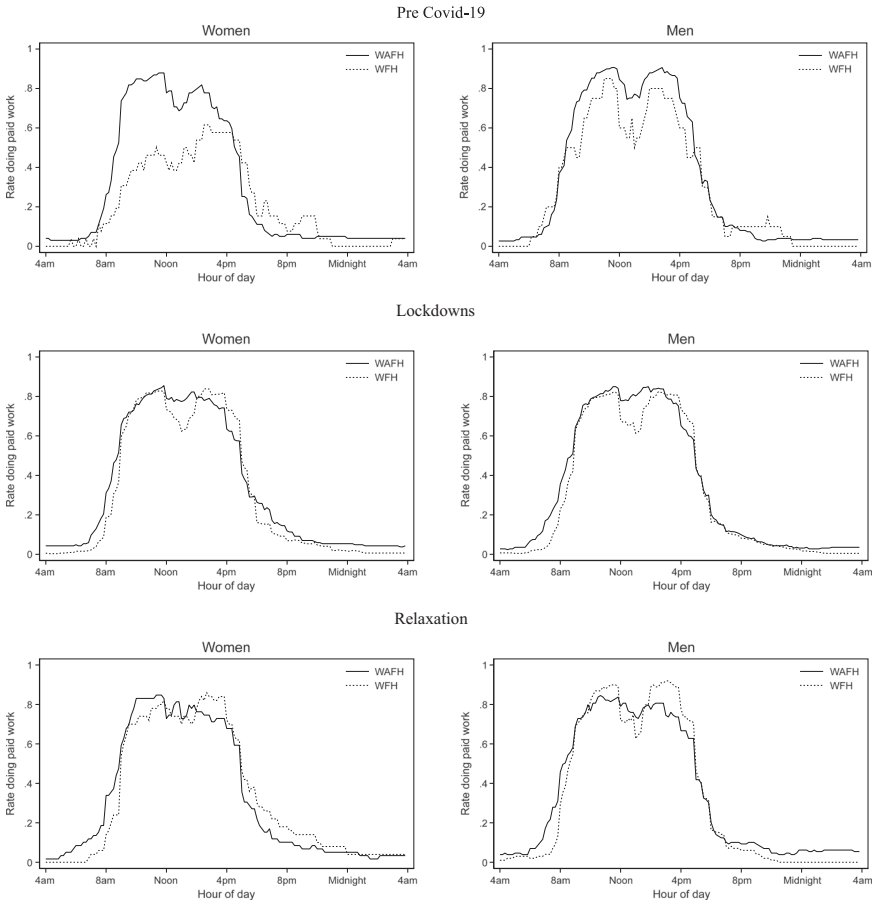

Fig. 1 The timing of paid work. The sample (CaDDI-episode) is restricted to employed individuals who worked during the diary day. WFH are defined as workers whose paid work activities were all reported at home

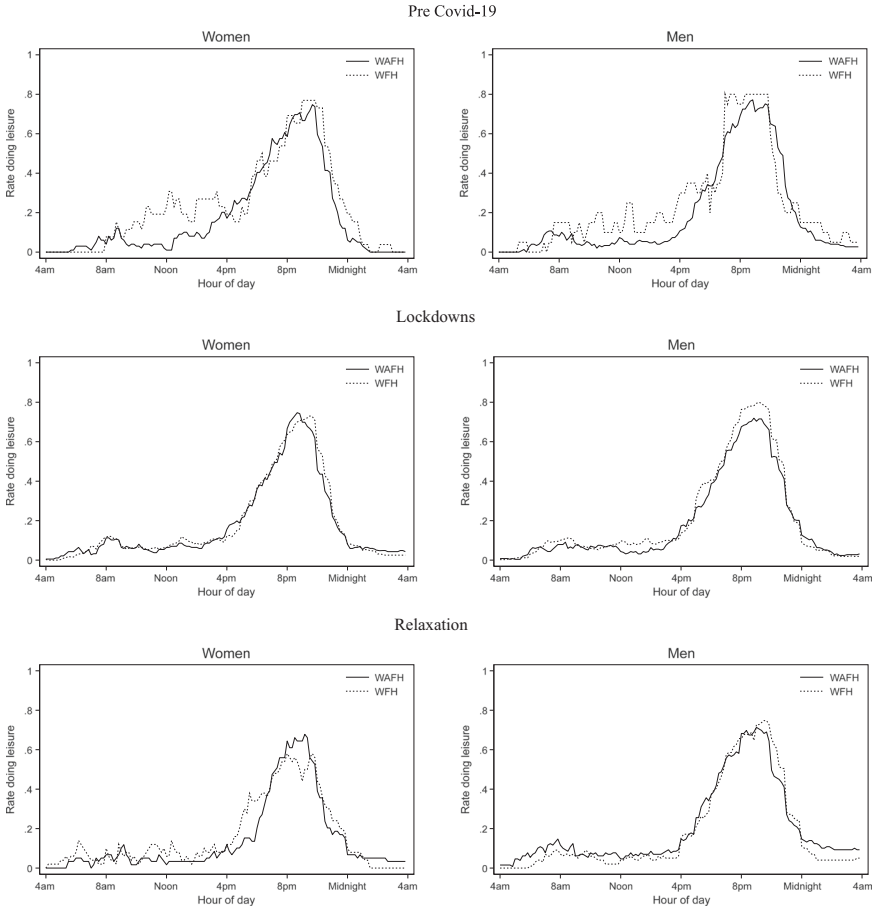

Fig. 2 The timing of leisure. The sample (CaDDI-episode) is restricted to employed individuals who worked during the diary day. WFH are defined as workers whose paid work activities were all reported at home

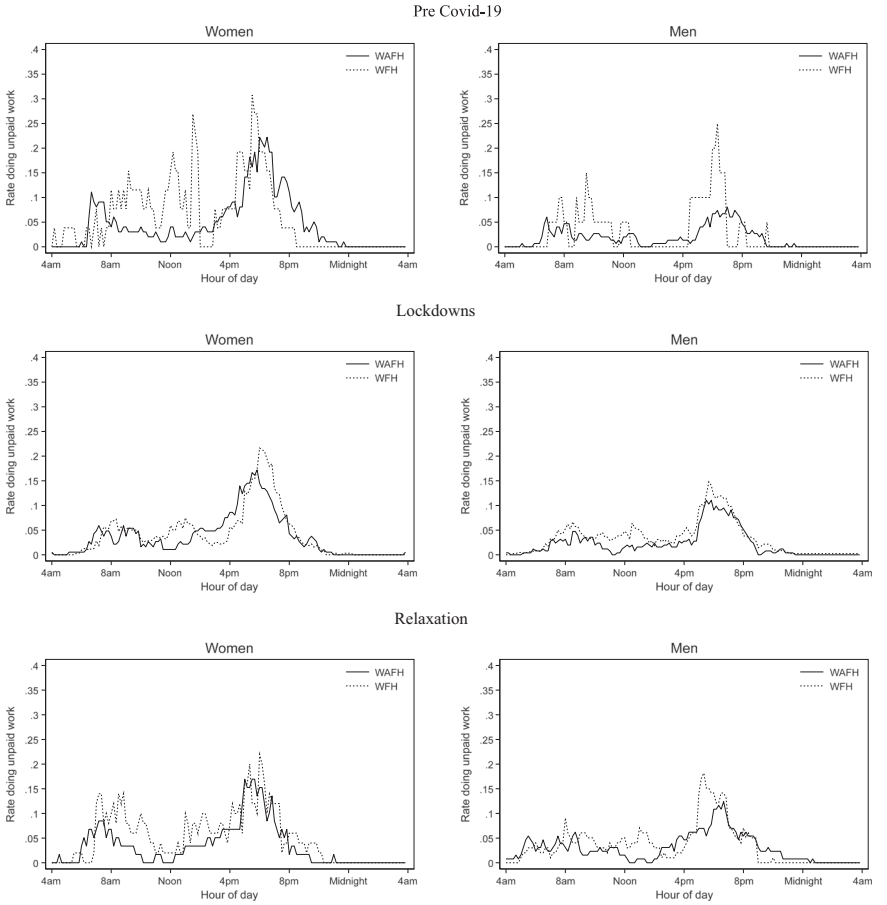

Fig. 3 The timing of unpaid work. The sample (CaDDI-episode) is restricted to employed individuals who worked during the diary day. WFH are defined as workers whose paid work activities were all reported at home

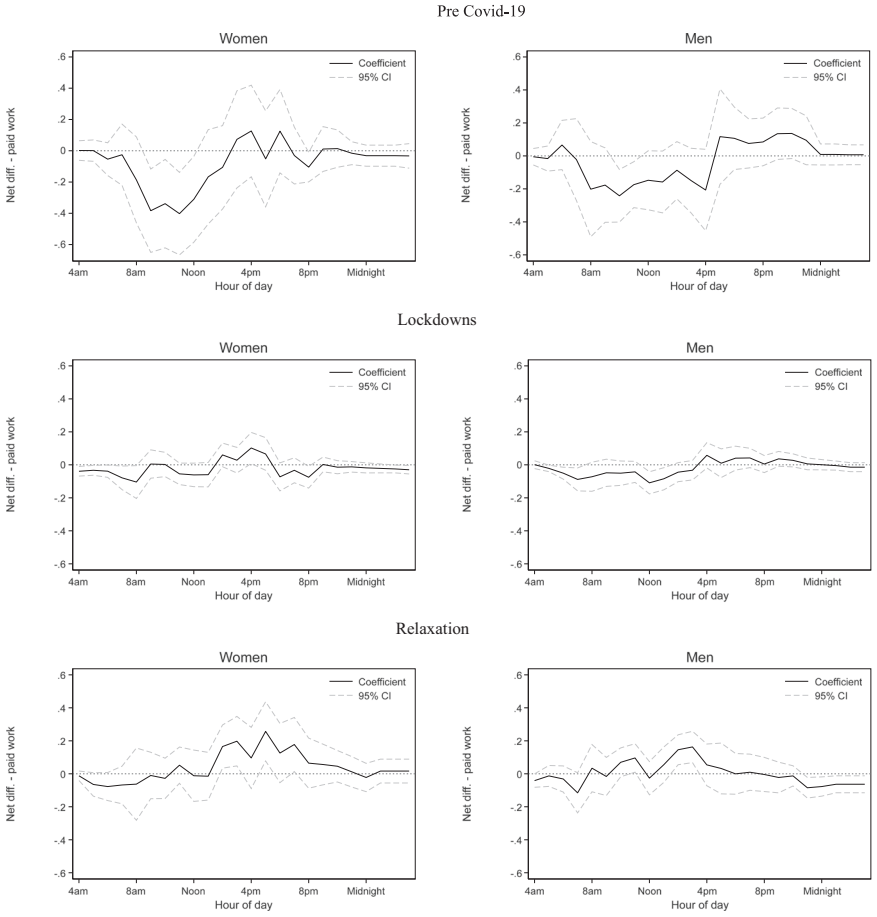

Fig. 4 Tempogram of paid work (net of observables). The sample (CaDDI-episode) is restricted to employed individuals who worked during the diary day. WFH are defined as workers whose paid work activities were all reported at home. Coefficients represent the difference in the rate of WFH and WAHF doing paid work, net of observables, each hour of the day

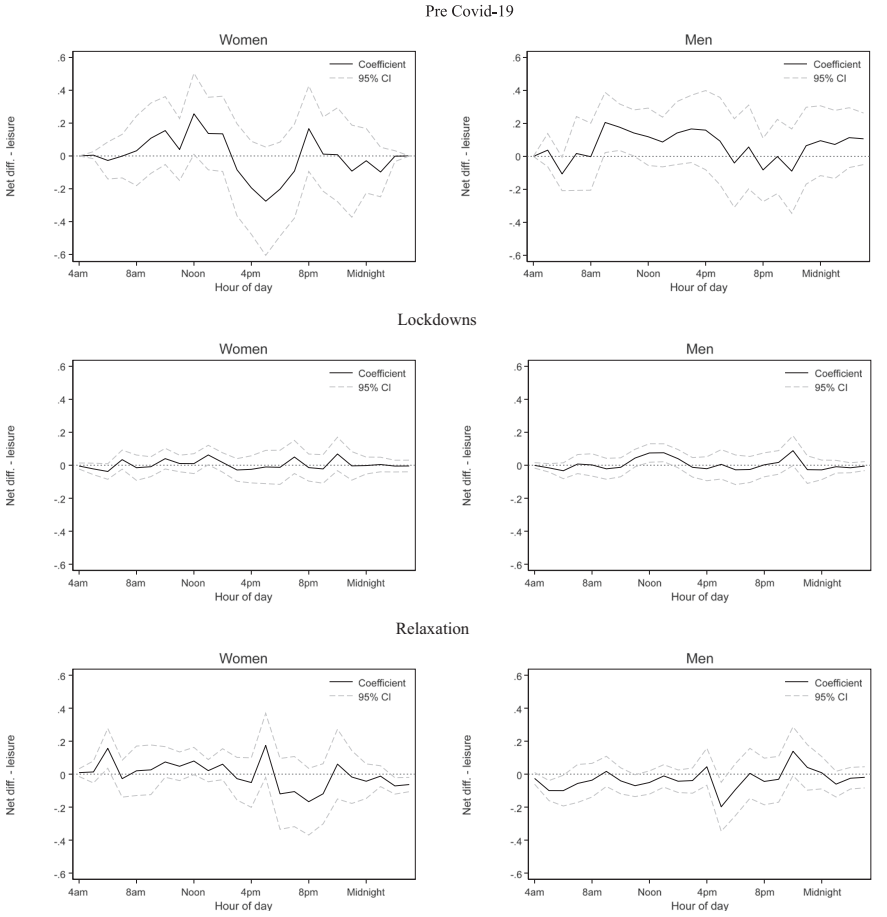

Fig. 5 Tempogram of leisure (net of observables). The sample (CaDDI-episode) is restricted to employed individuals who worked during the diary day. WFH are defined as workers whose paid work activities were all reported at home. Coefficients represent the difference in the rate of WFH and WAHF doing leisure, net of observables, each hour of the day

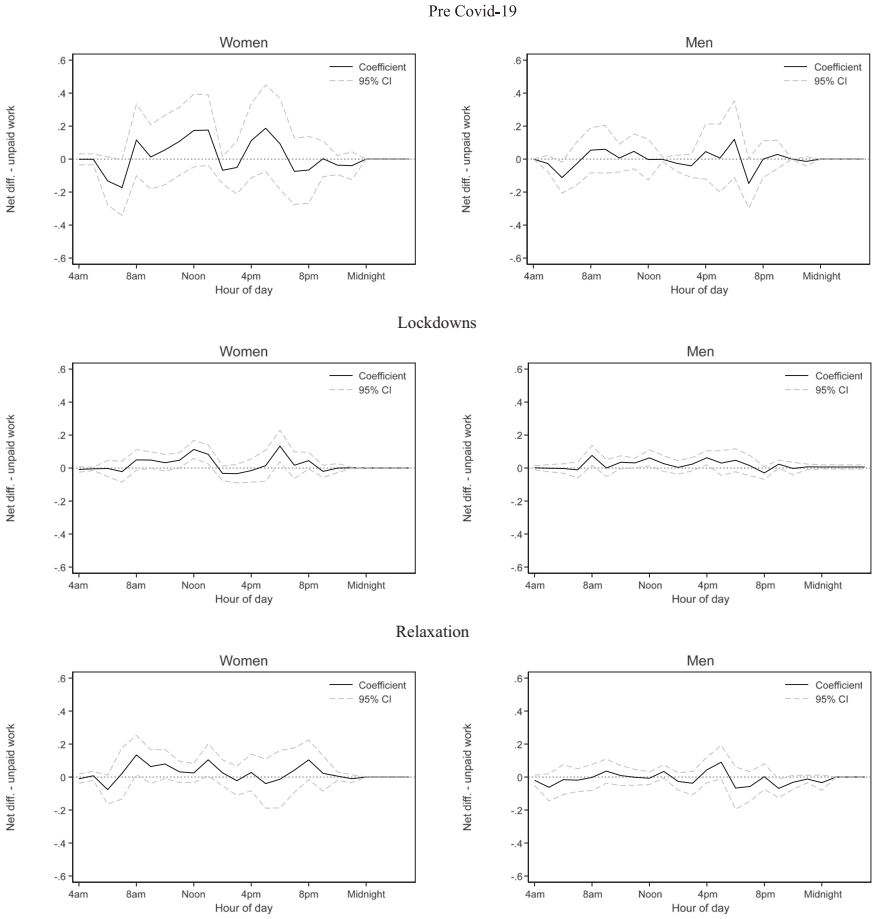

Fig. 6 Tempogram of unpaid work (net of observables). The sample (CaDDI-episode) is restricted to employed individuals who worked during the diary day. WFH are defined as workers whose paid work activities were all reported at home. Coefficients represent the difference in the rate of WFH and WAHF doing unpaid work, net of observables, each hour of the day

Our subsequent analysis compares the time allocation patterns of WFH and WAFH workers across paid work, leisure, and unpaid work activities throughout the day. This comparison allows us to investigate whether WFH workers exhibit a preference for adhering to regular working hours (e.g., mornings and afternoons) and when they allocate time to non-work activities (leisure and unpaid work), while accounting for observable factors. Figures 1, 2, and 3 show the proportion of WFH and WAFH workers doing paid work, leisure, and unpaid work, for each minute of the day, differentiating between females and males, and among the three time periods considered. However, these figures (often referred to as tempograms, e.g., Pabilonia & Vernon, 2022) represent raw differences, and not differences net of observable factors, which we will explore subsequently.

We adopt the approach outlined by Hamermesh (1999). For each individual i and hour of the day, we create a dummy variable indicating whether the individual is

engaged in the specific activity of interest (value 1) during that period, or not (value 0). Subsequently, we use OLS to estimate the following equation for each hour of the day:

$$H_i^h = \alpha_0 + \alpha_1 T_i + \alpha_X' X_i + \varepsilon_i \tag{3}$$

where H_i^h is the dummy variable taking value 1 if individual i is doing the corresponding activity in hour h, 0 otherwise; T_i is the dummy variable identifying WFH; X_i is a vector of demographics as in Eq. (1); and ε_i is the error term. Equation (2) is estimated separately for females and males, and also for each of the time periods considered (pre Covid-19, lockdowns, and relaxation). These estimates incorporate sample weights and fixed effects, akin to Eq. (1). Consequently, the coefficient α_1 delineates the difference in the activity engagement rate at hour h between the specified groups, adjusted for observable factors.

Figure 4 displays the coefficient α_1 for paid work, denoting the difference in the rate of WFH and WAFH workers engaging in paid work at each hour of the day, alongside the corresponding standard error. These figures, or tempograms, offer a visual overview of workers' activity distribution throughout the day. They serve as visual aids to explore differences between WFH and WAFH regarding their daily behaviors and time allocation.

The tempograms prior to Covid-19 resemble those discovered by Gimenez-Nadal et al. (2020) in the US. Notably, we observe a lower rate of both female and male WFH individuals engaging in paid work during regular hours in comparison to their WAFH counterparts. This disparity is particularly significant among females in the morning (between 9 am and 11 am, reaching a difference of about 40%). For males, the differences are more evenly distributed between 8 am and 4 pm, hovering around 20%. Conversely, there appears to be a slightly higher rate of WFH individuals engaging in paid work during the evening for both genders. These discrepancies diminish quantitatively during lockdowns, indicating a similar allocation of paid work time throughout the day for WFH and WAFH. However, slight differences persist in the morning, where WAFH have a slightly higher rate of engagement, and in the afternoon, where WFH show a slightly higher rate.

In contrast, during the relaxation period, distinct patterns emerge once again. While the morning differences remain relatively similar, a higher rate of WFH workers engages in paid work during the late afternoon and evening. Particularly among women, approximately 20% more WFH female workers, compared twith their WAFH counterparts, are engaged in paid work between 2 pm and 7 pm.

Figures 5 and 6 illustrate coefficient α_1 for leisure and unpaid work, respectively, presenting the difference in the rate of WFH and WAFH workers involved in these activities throughout the day. The trends observed for these non-work activities echo those revealed in Fig. 1. Specifically, prior to Covid-19, a higher proportion of WFH individuals engaged in leisure during the morning and afternoon, while the opposite was noted in the afternoon, coinciding with a higher rate of WFH engaged in paid work. Similar trends were noted for unpaid work, albeit with quantitatively smaller differences.

However, during lockdowns, differences for both leisure and unpaid work became quantitatively negligible, mirroring the patterns observed for paid work. This indicated a parallel allocation of daily activities by WFH and WAFH workers during

lockdown periods. Subsequently, post-lockdown during the relaxation period, some differences resurfaced but didn't reach the levels observed before the Covid-19 outbreak. A slightly higher rate of WFH females engaged in leisure and unpaid work was observed in the morning and afternoon, with the reverse trend occurring in the evening. For males, even during the relaxation period, differences in the morning were quantitatively minute, although WAFH engaged more in evening leisure compared with WFH.

In summary, these results highlight lower engagement rates in paid work during regular hours for both male and female WFH workers, with increased involvement in leisure and unpaid work during these hours relative to WAFH workers before the Covid-19 pandemic. During lockdowns, these differences diminished, indicating similar time allocation patterns between WFH and WAFH workers, regardless of gender. Post-lockdown, some distinctions resurfaced, notably with a higher rate of WFH females engaging in paid work during late afternoon and evening compared with their WAFH counterparts.

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