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Home-based work, time allocations, and subjective well-being: gender differences in the United Kingdom

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Abstract

Telework and work from home practices have clear implications for workers' daily behaviors and well-being. This paper explores the differences between workers from home (WFH) and workers away from home (WAFH) time allocations during their workdays, and the instant enjoyment experienced while doing such activities, with a focus on gender differences. We use detailed information from the UK Time Use Survey for the years 2014–2015, which provides us with detailed records of time use along with measures of instantaneous enjoyment. The results show a statistically significant reduction in female and male paid work time associated with WFH, who spend more time than WAFH in unpaid work and leisure activities, but these factors vary between weekdays and weekends. The results also reveal a reduction in men's experienced enjoyment among WFH while doing paid work, and all WFH enjoy their leisure activities less than do WAFH. These results may improve our understanding of how the practice of WFH relates to worker time allocations during the day, to experienced well-being, and to gender differences in time allocation and well-being.

Keywords Gender difference · Work from home · Time use · Subjective well-being · UKTUS

JEL Classification J16 · J22

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1 Introduction

Workers' ability to telework and to work from home (WFH) has an impact on their behavior, in comparison to individuals who work away from home (WAFH).[1] This may lead to changes in the well-being of those who WFH, relative to those do not. Certain activities carried out in the company of others, such as leisure pursuits, are often perceived as more advantageous when contrasted with solitary activities (Kahneman et al. 2004; Kahneman and Krueger 2006). Conversely, activities like work, when performed alongside family members, could potentially introduce stress and interruptions. It is unclear whether confinements have increased intrahousehold inequality, as women and men may have different preferences for time use, work schedules, togetherness, and other factors that affect individual well-being. In this context, it is important to study potential gender differences in terms of WFH and WAFH, the timing of daily activities, and satisfaction.

Research has emerged in recent years, partially driven by the Covid-19 pandemic, confinements, and social isolation, analyzing the impact of telework and WFH practices on workers. For instance, Hamermesh (2020) analyzed togetherness and loneliness under a simulated lockdown in the US, showing that married individuals' time with their spouse increased during a lockdown, resulting in an increase in the couples' overall life satisfaction, while the opposite is the case for singles. Gimenez-Nadal et al. (2022) ran a similar analysis, studying the instant utility (i.e., experienced well-being) of individuals, finding that more time with the partner and children increase the experienced wellbeing of women, compared to that of men, and that instant utility is more sensitive to time spent together with the partner in the UK than in the US. On the other hand, Del Boca et al. (2020) study how confinements are associated with changes in couples' working arrangements (market work and housework). Their results reveal that women spent more time doing housework during lockdowns, regardless of the couples' paid work arrangements, while husbands' unpaid work depends on wives' paid work arrangements. Thus, the existing literature on the impact of WFH on time allocations suggests the existence of an asymmetric effect on women and men, which may be key in determining how WFH practices have affected household well-being.

Other authors have also analyzed the impact of WFH on workers' well-being, but the conclusions seem to be far from reaching a consensus. For instance, Brand et al. (2020), Recchi et al. (2020), Foa et al. (2020), and Long (2021) report a positive relationship between WFH and various dimensions of well-being (e.g., cognitive well-being). Conversely, other authors have found decreased worker well-being during isolation and WFH, partly driven by work-family conflicts, loneliness, and physical health (Brindal et al. 2022; Fujiwara et al. 2020; Hamermesh 2020; Möhring et al. 2021; Ruiz et al. 2021). Literature reviews on WFH, lockdowns, time allocation, and individual well-being are tallied in Gimenez-Nadal et al. (2022) and Restrepo and Zeballos (2022). Researchers have also studied other implications of

[1] For the sake of brevity, WFH refers to "work from home", or to "worker from home" throughout the paper. Similarly, WAFH refers to "work away from home", or to "worker away from home". We use this nomenclature following Bloom et al. (2022) and Restrepo and Zeballos (2022).

WFH during the pandemic, including employment and gender norms (Alon et al. 2020), couples' cooperation, chores and duties (Biroli et al. 2021), daily behaviors and infection risk during, pre-, and post-lockdown (Gershuny et al. 2021), labor and childcare in the household (Mangiavacchi et al. 2021), and daily time allocations (Restrepo and Zeballos 2022).

Despite that, WFH practices had been studied prior to the Covid-19 pandemic in different contexts and disciplines, although the assumed positive impacts of WFH, in terms of work-family flexibility, reduced pollution and congestion, and increased worker productivity are not robustly documented in the existing empirical literature (Edwards and Field-Hendrey 2002; Safirova 2002; Rhee 2008; Bloom et al. 2015; Bloom et al. 2022). For instance, WFH has often been found to reduce work-family conflicts, but some authors have found negative outcomes in terms of decreased work inclusion and co-worker satisfaction (Morganson et al. 2010; Golden and Fromen 2011). Furthermore, what little applied research analyzing the impact of WFH on individual time allocation decisions there is – and analysis of impacts on worker well-being – has shown only mixed results. Some authors have found that WFH work longer hours than WAFH (Peters and van der Lippe 2007; Golden 2008), while other authors have concluded the opposite (Wight and Raley 2009; Gimenez-Nadal et al. 2020). Thus, it is unclear whether the systematic promotion of WFH is beneficial for workers' well-being.

Within this framework, we empirically explore worker's time allocation decisions during their workdays, with a focus on the differences between WFH and WAFH, using detailed time use diaries from the UK Time Use Survey for the years 2014–2015. The results show a cut in paid work time associated with WFH, in line with prior studies analyzing market work time (Hamermesh 2020). Specifically, net of observable characteristics, the average woman (man) who works from home devotes about 130.9 (86.8) fewer minutes per day to paid work activities, relative to their WAFH counterpart. These differences correspond to cuts in paid work time of about 29.8% for women, and 17.7% for men WFH, compared to WAFH. Second, WFH is associated with an increase in unpaid work and leisure time. Women (men) WFH devote about 50.9 (35.5) more minutes per day to housework and unpaid work activities (i.e., increases of about 56.7% and 77.5%, relatively), and 55.6 (60.8) more minutes per day to leisure (increases of 30.4% and 30.6%, respectively), relative to their counterpart WAFH.

We analyze whether WFH is associated with different experienced utility during the day for workers. To that end, we assess the enjoyment experienced during episodes of paid work, unpaid work, and leisure, focusing on differences in enjoyment between WFH and WAFH. We observe that men WFH enjoy their paid work episodes less than do men WAFH, while the difference for women is not statistically significant. The results show no differences between WFH and WAFH in the enjoyment experienced while doing unpaid work activities, although both women and men WFH enjoy their leisure episodes less than do WAFH.

The contributions of the paper are, then, threefold. First, we compare the time allocation decisions of WFH and WAFH, with a focus on paid work time, unpaid work time, and leisure time. We thus complement existing research on time use (e.g., Biroli et al. 2021; Mangiavacchi et al. 2021; Restrepo and Zeballos 2022), by

comparing WFH and WAFH in the UK. The results may help planners and policymakers to anticipate the future impacts of promoting WFH as a part of work-family and self-employment policies (Molina 2021). Second, we focus not only on paid work activities and the labor market (Albanesi and Kim 2021; Brodeur et al. 2021), but also analyze other time uses that may be affected by WFH. We observe that WFH is related to the instant enjoyment levels obtained during paid work and leisure activities, but not during unpaid work activities. Third, our analysis reveals gender differences in how WFH may impact workers' instant enjoyment, therefore building on existing analyses that have not explored gender differentials, or have done so only in the US (Hamermesh 2020; Gimenez-Nadal et al. 2020).

The remainder of the paper is structured as follows. Section 2 describes the data and the variables used in the analysis. Section 3 describes the relationship between WFH, on the one hand, and paid work, unpaid work, and leisure, on the other. Section 4 compares the instant enjoyment experienced while doing these activities, and the differences in that enjoyment between WFH and WAFH. Section 5 concludes.

2 Data and variables

We use the UK Time Use Survey (UKTUS) for the years 2014–2015. The UKTUS is the official time use survey of the UK (Gershuny and Sullivan 2017) and provides socio-economic and time use information covering individual activities during the 24 h of the day, from 4 to 4 am of the next day.[2] The UKTUS survey covers information for all the household members aged 8 and older, who are asked to complete two time use diaries on two different days (one weekday and one weekend). Time use diaries produce more accurate estimates than surveys based on stylized questionnaires (Bonke 2005; Yee-Kan 2008) and thus have become the gold standard in the analysis of individual daily behaviors (see Harms et al. 2019).

The UKTUS allows us to define several categories of workers' uses of time. For our analysis, we focus on episodes of paid work, leisure, and unpaid work. We define paid work activities as activities including "paid work, main job", "second or other job", "travel as part of work" (excluding commuting time), "work breaks", and "other time at workplace". For leisure and unpaid work time, we follow the definition of Aguiar and Hurst (2007) and Gimenez-Nadal and Sevilla (2012). Leisure includes activities such as watching TV, sports, out-of-home leisure, gardening, pet care, socializing, and so on. Unpaid work time, or household work, is defined as those activities related to household chores and domestic activities (cooking, setting the table, washing, cleaning, laundry, ironing, clothing, repair, etc.).

[2] Unfortunately, more recent data is not available. Although the CaDDI data provides information on time uses during the Covid-19 period (https://www.timeuse.org/programmes-for-using-timeuse-data), the data collection method is different in comparison to the UK Time Use Survey and thus the two surveys are not directly comparable.

We follow the definition of WFH from Gimenez-Nadal et al. (2020), and define a dummy variable that takes value 1 for those individuals who report not having commuted to/from work on their working days, and value 0 otherwise.[3] One point of consideration is the potential challenge posed by endogenous self-selection into remote work (WFH) within the scope of this analysis. This arises from the possibility that individuals may fill in their diaries on specific days when engaging in WFH due to unique circumstances affecting their daily routines (e.g., a worker attending to a sick family member and consequently practicing WFH to manage work-related emails or calls). Conversely, individuals who can WFH may be commuting to work on the diary day. As a consequence, we must acknowledge selection into WFH as a data limitation, and extending the results to more routine WFH days may require the use of other data (e.g., Pabilonia and Vernon 2022).

The UKTUS includes information on enjoyment ratings of all episodes in the diary, intended to compute the instantaneous well-being experienced by individuals in their daily activities. In this sense, the day after the diary day (following the "day reconstruction method" of Kahneman et al. 2004; Kahneman and Krueger 2006), respondents provide a value for each activity, to the following question: "How much did you enjoy this time?", taking values from 1 ("not at all") to 7 ("very much").[4] Instantaneous well-being refers to the instant subjective enjoyment of individuals when doing specific activities, and captures "the moment-to-moment flow of pleasure or pain" (Kahneman and Krueger 2006). It is important to distinguish instantaneous well-being from other measures of subjective well-being, such as cognitive measures (e.g., overall life satisfaction). See Fritjers (2022) and Gimenez-Nadal et al. (2022) for recent reviews.

The initial sample consists of 11,421 respondents. We first restrict the sample to observations with both interview and diaries completed (8250 individuals). We retain employee workers only (5142 employees), and we drop non-working individuals and self-employed workers. Next, we omit employees with missing information on the key variables, as is standard practice; we also restrict the sample to individuals between 21 and 65 years old, to minimize the role of time allocation decisions over the life cycle (Aguiar and Hurst 2007; Gimenez-Nadal and Sevilla 2012), leaving a sample of 3074 employees. Finally, following Gimenez-Nadal et al. (2018), we retain employee workers who filled-in their diaries on working days, defined as those days when workers spent 60 or more minutes in paid work activities (excluding commuting), leaving a sample 2485 individuals (1195 men and 1290 women). It is important to note that the UKTUS includes diary data for two days per week (a weekday and a weekend) for each interviewed individual. Thus, the final individual sample consists of 3022 observations (1476 men, and 1546 women), since for 537 individuals (21.61% of the individuals in the sample, 281 men and 256

[3] We use three alternative definitions of WFH, exploiting the information available in the UKTUS regarding where activities take place. Thus, the first alternative defines WFH as those individuals who do some paid work at home. The second identifies WFH as those who spend at least 1 h doing paid work at home. The third identifies WFH as those who do all their paid work at home. Table 7 in the "Appendix" summarizes all three definitions of WFH used in the analysis.

[4] Because enjoyment is an ordinal variable and represents a subjective measure of well-being, comparisons across individuals in terms of such variable may be problematic (Bond and Lang 2019).

women) restrictions leave two valid diaries (one during the week, the other during the weekend), and then these individuals appear twice in the sample of individuals. Therefore, our final sample consists of 3022 observations corresponding to 2485 individuals.

At the diary level, for the 3022 observations (2485 individuals) in the individual sample, sample restrictions leave 104,615 episodes, of which 80,125 have non-missing information on enjoyment. Of the episodes with enjoyment data, 17,723 episodes correspond to paid work activities, 9804 episodes correspond to unpaid work, and 14,439 episodes correspond to leisure activities; the remaining episodes refer to other activities (e.g., personal care and sleeping, study, travel, childcare, etc.).

The UKTUS data allow us to define additional control variables at the individual level, including: the gender of respondents, age, formal education, native status, marital status, household composition (the number of family unit members, and the number of children), employment status (identifying part-time workers, and employees in the public sector), net monthly earnings (measured in pounds/1000), and the hours usually worked per week. For education, we define three dummies in terms of the maximum level of formal education completed: primary education, secondary education, and University education. The UKTUS allows us to define dummies identifying the following regions: "North East", "North West & Merseyside", "Yorkshire & Humberside", "East midlands", "West midlands", "East of England", "London", "South East", "South West", "Wales", "Scotland", and "Northern Ireland".

2.1 Descriptive evidence

Table 1 shows summary statistics of episode variables, on the sample of episodes of paid work, unpaid work, and leisure, and for men and women WFH and WAFH, along with *p*-values for the differences between them. All statistics are computed using sample weights defined at the episode level, provided by the UKTUS survey, aimed at providing average day effects, providing a balance in terms of demographic composition of the population. Focusing on paid work episodes, the average woman WAFH does 7.0 episodes of paid work per day, with the average episode lasting about 92.8 min, and reporting an average enjoyment of 4.8 out of 7. On the other hand, women WFH report 5.2 episodes of paid work per day, with an average duration of 65.7 min, and an average enjoyment during these episodes of 4.3 out of 7. Differences between WAFH and WFH in these variables are all statistically significant at standard levels. This indicates that women WAFH do more and longer paid work episodes per day than women WFH, and the enjoyment experienced during these activities is reported to be higher among WAFH than among WFH. On the other hand, among men, WAFH and WFH do 7.1 episodes of paid work per day, with the difference between them not being statistically significant at standard levels. However, the average duration of a paid work episode among WAFH is 103.9 min vs 74.2 min among WFH, with the difference being highly significant. The average enjoyment associated with paid work activities is greater among men WFH than

Table 1 Summary statistics of episode variables

Variables	Women				Diff *p*-value	Men				Diff *p*-value
	WAFH		WFH			WAFH		WFH		
	Mean	S.D	Mean	S.D		Mean	S.D	Mean	S.D	
Paid work episodes/day	6.985	6.018	5.172	4.149	(< 0.001)	7.089	6.300	7.134	6.584	(0.930)
Duration (in minutes)	92.832	90.869	65.652	55.427	(< 0.001)	103.900	103.350	74.233	66.329	(< 0.001)
Enjoyment	4.751	1.323	4.344	1.492	(< 0.001)	4.505	1.384	4.671	1.387	(0.095)
No. episodes	8118		829			7396		1380		
Unpaid work episodes/day	4.581	3.749	6.288	4.988	(< 0.001)	2.480	2.691	3.760	3.960	(< 0.001)
Duration (in minutes)	17.041	13.907	21.714	18.366	(< 0.001)	13.853	14.011	20.628	20.482	(< 0.001)
Enjoyment	4.524	1.881	4.547	1.620	(0.508)	3.921	2.429	4.292	2.101	(0.024)
No. episodes	5397		1021			2624		762		
Leisure episodes/day	5.572	4.213	6.676	4.559	(0.009)	5.356	3.907	6.898	5.195	(< 0.001)
Duration (in minutes)	35.282	31.719	37.241	38.266	(0.464)	38.873	31.462	45.139	40.401	(0.189)
Enjoyment	5.731	1.403	5.626	1.445	(0.196)	5.681	1.454	5.607	1.481	(0.392)
No. episodes	6428		1038			5638		1335		

The sample (UKTUS 2015) is restricted to episodes of paid work, unpaid work, and leisure of employees who filled in their diaries on working days, and with non-missing enjoyment information. *t*-test *p*-values, for the difference between WAFH and WFH, in parentheses

among men WAFH (4.7 vs 4.5, out of 7, respectively), but significant at the 10% level only.

Regarding the episodes of housework, or unpaid work, Table 1 shows that women WAFH do 4.6 episodes of unpaid work per day, lasting on average 17.0 min, and with an associated enjoyment level of 4.5 out of 7. Women WFH, on the other hand, do 6.3 episodes of unpaid work per day, with an average duration of 21.7 min, and a similar experienced enjoyment of 4.5. The differences in the number of episodes, and the duration of episodes are statistically significant, suggesting that women WFH do more and longer episodes of unpaid work, compared to women WAFH in the sample. However, the difference between WAFH and WFH in terms of the enjoyment associated with those episodes is not statistically significant at standard levels. For men, results are quite similar, as men WAFH do 2.5 episodes of unpaid work per day, lasting on average 13.9 min, vs 3.8 episodes of 20.6 min, on average, for men WFH, with differences being statistically significant at standard levels. Furthermore, men WFH seem to enjoy their unpaid work activities more than do men WAFH, with average enjoyment rates of 4.3 among WFH and 3.9 among WAFH, with the difference being statistically significant at standard levels.

Focusing on leisure activities, women WAFH (WFH) have 5.6 (6.7) episodes of leisure per day, with each period lasting on average 35.3 (37.2) minutes. Furthermore, the average enjoyment of these episodes is 5.7 and 5.6 for WAFH and WFH, respectively. Differences in these magnitudes are significant only for the number of periods of leisure, suggesting that women WFH have more episodes of leisure, but neither the duration nor the experienced enjoyment of these episodes differ between WFH and WAFH. For men, on the other hand, WAFH have 5.4 episodes of leisure per day, lasting on average 38.9 min, and reporting an average enjoyment of 5.7 out of 7. For men WFH, the average number of leisure episodes per day is 6.9, the average duration of each of these episodes is 45.1 min, and the average enjoyment experienced is 5.6 out of 7. Differences between WFH and WAFH are significant in the number of leisure episodes, suggesting that men WFH have more leisure episodes than their WAFH counterparts. The differences in the average duration of leisure episodes, and the average enjoyment of leisure episodes, are not statistically significant at standard levels.

Table 2 shows summary statistics of the main variables defined at the individual level, along with the demographic composition of the sample of respondents, for men and women WFH and WAFH, including *p*-values for the differences.[5] Additional summary statistics (e.g., the distribution of men and women WFH and WAFH

[5] It is crucial to acknowledge that Table 1 shows descriptive statistics at the diary level, focusing on episodes where enjoyment is non-null. In contrast, Table 2 shows descriptive statistics for the entire individual sample without imposing any restrictions on enjoyment. Additionally, the UKTUS provides sample weights defined on an individual basis, yet distinct sample weights are provided at the episode level. These two factors contribute to the divergence in magnitudes displayed between Tables 1 and 2.

across occupations, and the distribution of diary days) are shown in Tables 8 and 9 in the "Appendix".[6] Focusing on the daily minutes spent on these activities, the average paid work time of women WAFH (WFH) is 436.7 (309.9) minutes per day, while the corresponding average for men is 489.9 (399.6) minutes per day. The difference between WFH and WAFH is statistically significant at standard levels for both women and men ($p < 0.001$), suggesting that WFH spend less time in paid work activities than do WAFH. This difference seems consistent with opposite-direction differences between WFH and WAFH in unpaid work time, and in leisure time. Women WAFH spend every day, on average, 89.7 min in unpaid work activities, and 183.1 min in leisure activities, vs 146.9 and 231.8 min spent in those activities by WFH. These differences are statistically significant at standard levels ($p < 0.001$). Among men, WAFH spend, on average, 45.8 min in unpaid work, and 198.5 min in leisure, vs 83.5 and 256.2 min spent in unpaid work and leisure by WFH. Differences between men WFH and men WAFH are also statistically significant ($p < 0.001$).

Table 2 also shows some differences between WFH and WAFH in terms of demographics. On average, men and women WFH are slightly older than WAFH, more educated (e.g., a higher percentage have some University education), have a higher probability of cohabiting with a partner and having children, have larger homes (i.e., more rooms), and declare more weekly work hours and more earnings than WAFH. Women WFH are also more likely to work in the public sector than women WAFH. However, we find no differences in terms of full-/part-time status between WFH and WAFH.

3 WFH and worker time allocations

The first objective of our analysis is to compare the time allocation decisions of women and men WFH and WAFH and explore how these workers distribute their available time throughout their working days. Differences shown in Table 2 represent only raw differences between WFH and WAFH, and it is possible that certain worker attributes, such as socio-demographics, regional characteristics, and labor-related factors, may be driving these results. To partially overcome this issue, in this section we propose an empirical analysis, resembling that of Gimenez-Nadal et al. (2020) for the case of the US, to study the differences in the amount of time spent by men and women WFH and WAFH in paid work, unpaid work, and leisure activities, net of observable characteristics.

For a given observation i, consider that Act_i is the time spent by worker i in the reference activity (measured in minutes). We then estimate, by Ordinary Least Squares (OLS), the following equations:

[6] Table 8 shows that women WFH are more likely to work in public administration and educational occupations than WAFH, but are less likely in sales occupations, and health and social work occupations. Among men, there are more WFH in agriculture, forestry and fishery occupations, information and communications, scientists and technicians, education, and services occupations, and fewer WFH in manufacturing occupations. Table 9 shows that WFH are more likely observed during weekends than WAFH, and less during the week.

Table 2 Summary statistics of individual variables

Variables	Women				Diff *p*-value	Men				Diff *p*-value
	WAFH		WFH			WAFH		WFH		
	Mean	S.D	Mean	S.D		Mean	S.D	Mean	S.D	
Time allocations (in minutes)										
Paid work time	436.694	145.382	309.902	199.803	(<0.001)	489.893	132.449	399.615	215.983	(<0.001)
Unpaid work time	89.692	73.709	146.949	109.246	(<0.001)	45.838	57.157	83.520	88.495	(<0.001)
Leisure time	183.099	113.070	231.831	134.831	(<0.001)	198.485	121.583	256.175	149.751	(<0.001)
Demographics:										
Average enjoyment	3.951	2.313	3.888	2.326	(0.395)	3.681	2.494	4.272	2.121	(0.002)
Age	39.608	13.290	42.064	11.171	(0.023)	39.097	12.881	40.820	12.339	(0.053)
Basic education	0.048	0.213	0.028	0.165	(0.179)	0.050	0.219	0.034	0.182	(0.217)
Secondary education	0.476	0.500	0.373	0.485	(0.011)	0.477	0.500	0.412	0.493	(0.033)
University education	0.476	0.500	0.599	0.491	(0.002)	0.473	0.499	0.553	0.498	(0.008)
UK citizen	0.875	0.330	0.896	0.306	(0.548)	0.873	0.333	0.882	0.324	(0.814)
Married and living with	0.442	0.497	0.522	0.501	(0.013)	0.469	0.499	0.506	0.501	(0.334)
Single, never married	0.288	0.453	0.229	0.421	(0.053)	0.306	0.461	0.229	0.421	(0.019)
N. family unit members	2.940	1.260	3.056	1.206	(0.121)	3.061	1.265	3.061	1.419	(0.969)
N. children	0.493	0.804	0.665	0.866	(0.003)	0.554	0.893	0.684	1.014	(0.046)
N. children aged 0–4	0.191	0.453	0.216	0.494	(0.707)	0.259	0.567	0.276	0.587	(0.822)
Dwelling: house	0.821	0.384	0.891	0.313	(0.008)	0.811	0.392	0.848	0.360	(0.435)
N. rooms	4.623	1.683	5.084	1.764	(<0.001)	4.607	1.655	5.020	1.708	(0.002)
Tenure: Owned	0.666	0.472	0.772	0.421	(0.002)	0.639	0.480	0.710	0.455	(0.220)
Public sector worker	0.401	0.490	0.537	0.500	(<0.001)	0.220	0.415	0.241	0.429	(0.550)
Part time worker	0.360	0.480	0.387	0.488	(0.439)	0.118	0.322	0.119	0.325	(0.869)
Weekly work hours	32.764	11.814	35.045	14.770	(0.004)	38.872	10.406	40.963	12.796	(0.002)
N. cars	1.576	0.979	1.713	0.883	(0.019)	1.562	0.958	1.593	0.864	(0.660)

Table 2 (continued)

Variables	Women				Diff *p*-value	Men				Diff *p*-value
	WAFH		WFH			WAFH		WFH		
	Mean	S.D	Mean	S.D		Mean	S.D	Mean	S.D	
Household income	5.581	40.132	4.285	5.644	(0.873)	7.326	55.402	5.162	8.937	(0.789)
Earnings	1.335	4.487	1.993	4.458	(0.035)	1.872	6.057	3.113	12.613	(0.036)
No. observations	1356		190			1261		215		

The sample (UKTUS 2015) is restricted to employees who filled in their diaries on working days. "Weekly work hours" is measured in hours per week. "Household income" and "Earnings" is measured in pounds per month, net of taxes, divided by 1000. *t*-test *p*-values, for the difference between WAFH and WFH, in parentheses

$$Act_i = \beta_0 + \beta_1 T_i + \beta_2{}' X_i + \gamma + \eta + \alpha + \varepsilon_i, \quad (1)$$

where T_i is a dummy variable taking a value 1 if i is a WFH, 0 otherwise; X_i is a column-vector of individual-level controls, and ε_i is the error term. Terms γ, η, and α represent month, industry, and region fixed effects, respectively.[7] The dependent variable, Act_i, is defined in minutes per day.[8] All the equations are estimated separately for women and men in the individual sample of 3022 observations, and estimates include sample weights provided by the UKTUS survey, as well as robust standard errors.

Columns (1) and (2) of Table 3 show estimates on paid work time for women and men, respectively. The results suggest that, net of observed characteristics, women WFH spend about 130.9 fewer minutes in paid work activities than similar WAFH. Men WFH spend about 86.8 fewer minutes on paid work than WAFH, net of observed heterogeneity. These results are consistent with the descriptive results shown in Table 2, suggesting that women and men WFH work fewer hours than their WAFH counterparts. Furthermore, the coefficient of interest that determines differences between WFH and WAFH is different for women and men, according to a t-test ($p = 0.047$). Thus, it seems that the conditional correlation between being a WFH, and paid work time, is greater for women than for men.

Columns (3) and (4) of Table 3 show estimates on unpaid work time for women and men. Among women workers, being a WFH is associated with a statistically significant increase in unpaid work time of about 50.9 min per day, relative to the similar WAFH. The average man WFH, on the other hand, spends about 35.5 more minutes in unpaid work than the similar WAF. The difference between WAFH and WFH is greater for women than for men, although it is not statistically significant, according to a t-test ($p = 0.143$).

Columns (5) and (6) of Table 3 show the results of estimating Eq. (1) on leisure time. The estimates reveal a positive and statistically significant correlation between

[7] We define dummy variables for the month that diaries were filled in, for worker industry, and for the region of residence. Industries include the following categories, based on the UK Standard Industrial Classification (UK SIC 2007): "agriculture, forestry and fishery", "mining and quarrying", "manufacturing", "electricity, gas and steam supply", "water supply and wastes remediation", "construction", "sales and trade", "transport and storage", "accommodation and food", "information and communications", "financial and insurance", "real estate", "professionals, scientists and technicians", "administrative support", "public administration", "education", "health and social work", "arts, entertainment and recreation", "other services", "household workers", and "extraterritorial occupations". We have excluded day fixed effects from our analysis as they are unnecessary for calculating effects on an average day (Frazis and Stewart 2012). Nevertheless, the results remain robust when day fixed effects are included; estimates are available upon request.

[8] Because there may be individuals reporting zero minutes of unpaid work and leisure, an alternative would have been to estimate censored or truncated regressions, such as Tobit models (Tobin 1958). Nevertheless, prior research has shown that OLS and Tobit models produce similar estimates when studying time allocation decisions (Frazis and Stewart 2012; Gershuny 2012; Foster and Kalenkoski 2013). Additionally, these models are appropriate when variables are censored, and working with time use data, such censoring implies that individuals may want to spend less-than-zero minutes in activities. By assuming that no one can spend negative time in leisure and unpaid work, censoring is no longer needed, and then OLS and Tobit should give equivalent answers. Therefore, we have decided to rely on OLS estimates, as is common in the literature (Stewart 2013).

being a WFH, and the time spent in leisure activities. Among women, WFH spend about 55.6 more minutes per day in unpaid work activities than WAFH counterparts. Among men, WFH spend 60.8 more minutes per day in unpaid work activities, compared to WAFH, net of observable factors. Both coefficients are statistically significant at standard levels, although they are not statistically different, according to a *t*-test ($p = 0.747$).[9]

In conclusion, the estimations presented in Table 3 illustrate a discernible association between the practice of WFH and a decrease in allocated working hours that receive compensation. This reduction is somewhat counterbalanced by heightened involvement in uncompensated domestic labor and leisure pursuits. Nevertheless, nuanced disparities across genders are evident in these patterns. Specifically, WFH engenders a more pronounced decline in remunerated work hours for females in comparison to their male counterparts, and this discrepancy achieves a noteworthy level of statistical significance. Conversely, the increments in temporal allocations towards unpaid domestic duties and leisure activities manifest comparable magnitudes for both genders, achieving statistical significance. This outcome diverges from prior research positing a potential reinforcement of conventional gender roles through WFH, wherein women tend to assume a greater share of household responsibilities. Our results suggest that the 86.8 fewer minutes that men WFH spend in paid work are compensated by an increase of about 96.3 more minutes in leisure and unpaid work. When we account for the fact that WFH avoid spending time on commuting to/from work, estimates suggest that these times are compensated, and other daily activities may be barely affected by WFH. Among women, on the other hand, the 130.9 min reduction in paid work related to WFH is only partially compensated by a 106.5-min increase in unpaid work and leisure. Even disregarding commuting trips, estimates reveal a time gap associated with WFH among women that is not compensated by the activities considered in this paper. A potential explanation resides in childcare, which we do not study here (as that would require focusing exclusively on mothers, which we leave for further analyses). Such a suggestive result is in line with existing research on WFH and time allocations (Del Boca et al. 2020; Sevilla and Smith 2020).

These results are quantitatively similar to existing analysis on the US using the American Time Use Survey (Gimenez-Nadal et al. 2020; Pabilonia and Vernon 2022; Restrepo and Zeballos 2022). For instance, Gimenez-Nadal et al. (2020) found that US WFH devote about 95–101 fewer minutes to market work than do WAFH, close to our estimates in the UK, but that study does not encompass leisure and unpaid work in its analysis. The estimated correlations are, however, smaller than those in Restrepo and Zeballos (2022), who find that those who WFH before the pandemic spent between 307 and 299 fewer minutes in paid work than WAFH. On the other hand, the correlations in Pabilonia and Vernon (2022) are much smaller, using US time diaries.

In time-use research, the dependent variable is typically the amount of time (in minutes or hours) spent in a range of activities (e.g., Chu and Gershenson 2018; Gimenez-Nadal Molina and Velilla 2022; Hamermesh 2003; Price 2008), although

[9] For the sake of brevity, we only describe the main coefficients of interest.

Table 3 Estimates on worker time allocations

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Paid work time		Unpaid work time		Leisure time	
	Women	Men	Women	Men	Women	Men
Being a WFH	− 130.855***	− 86.753***	50.941***	35.542***	55.568***	60.759***
	(15.514)	(15.873)	(8.542)	(5.945)	(11.011)	(11.833)
Age	1.231	− 1.049	3.351***	1.166	0.716	5.209***
	(1.984)	(2.169)	(1.025)	(1.043)	(1.713)	(1.930)
Age squared	− 0.140	0.040	− 0.266**	− 0.057	− 0.046	− 0.512**
	(0.245)	(0.253)	(0.122)	(0.128)	(0.208)	(0.227)
Secondary education	29.779*	− 13.408	6.011	13.960**	− 31.083*	2.137
	(18.048)	(18.444)	(12.016)	(6.237)	(17.976)	(16.876)
University education	48.515***	− 19.288	− 0.263	14.332**	− 51.727***	− 0.068
	(18.722)	(18.911)	(12.325)	(5.988)	(19.144)	(17.329)
Immigrant	18.005	− 9.795	8.881	− 8.280	− 7.900	− 8.512
	(14.956)	(13.867)	(7.007)	(5.626)	(10.871)	(10.743)
UK citizen	12.510	− 11.229	− 5.366	− 8.625	4.423	15.457
	(14.998)	(14.460)	(7.948)	(7.469)	(11.008)	(11.834)
Married and living with	3.730	0.820	1.914	− 5.340	− 11.714*	− 6.638
	(8.275)	(9.197)	(4.736)	(4.084)	(6.729)	(7.943)
Number of family unit members	− 3.240	3.244	− 0.215	− 4.909***	− 2.169	− 0.709
	(3.619)	(4.070)	(2.183)	(1.730)	(3.216)	(3.538)
Number of children aged 0–4	− 3.290	10.587	− 3.143	0.992	− 24.815***	− 29.472***
	(9.201)	(9.421)	(5.456)	(3.762)	(7.530)	(6.799)
Number of children	− 4.666	− 5.044	5.954*	8.037***	− 11.370**	− 2.691
	(6.219)	(7.165)	(3.526)	(3.046)	(5.150)	(5.816)
Employee in the public sector	− 6.195	9.767	− 0.398	0.987	4.550	− 6.699

Table 3 (continued)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Paid work time		Unpaid work time		Leisure time	
	Women	Men	Women	Men	Women	Men
	(11.558)	(13.615)	(6.127)	(5.327)	(8.737)	(11.491)
Part time worker	−46.300***	−19.845	19.118***	10.383	8.375	15.145
	(12.493)	(18.697)	(6.011)	(7.413)	(9.080)	(16.834)
Net monthly earnings	1.329*	−1.117**	−0.572***	0.038	−0.080	0.182
	(0.702)	(0.541)	(0.207)	(0.183)	(0.414)	(0.406)
Hours usually worked per week	3.227***	3.475***	−0.605**	−0.334*	−1.675***	−1.769***
	(0.556)	(0.617)	(0.246)	(0.187)	(0.371)	(0.509)
Constant	279.349***	442.939***	40.871	32.272	283.132***	70.793
	(86.996)	(58.273)	(33.895)	(27.782)	(47.613)	(51.208)
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
No. Observations	1546	1476	1546	1476	1546	1476
R-squared	0.252	0.147	0.161	0.101	0.126	0.114

The sample (UKTUS 2015) is restricted to employees who filled in their diaries on working days. Robust standard errors in parentheses. The dependent variables are minutes spent in paid work (Columns (1–2)), unpaid work (Columns (3–4)), and leisure (Columns (5–6)). WFH are defined as those workers devoting zero minutes to commuting to/from work

*Significant at the 10%; **Significant at the 5%; ***Significant at the 1%

Table 10 in the "Appendix" shows, as robustness check, similar estimates of Eq. (1) but on the inverse hyperbolic sine transformation of Act_i, $\text{asinh}(Act_i)$, as dependent variable. The inverse hyperbolic sine transformation approximates the natural logarithm of a variable, and thus provides an approximation to the elasticity, which is appropriate in this context, given zero-valued dependent variables (Bellemare and Wichman 2020). The conclusions are similar to those shown in Table 3. Further, Table 11 in the "Appendix" shows estimates of Eq. (1) using the three alternative identifications of WFH as dependent variables. Results are also qualitatively similar.

Estimates of Eq. (1) include sample weights to estimate "an average day effect". However, workers may choose to WFH specifically during the weekend if they need to attend to any work responsibility, which may help them to work with greater flexibility than when commuting to the office. As a consequence, to study whether the estimated correlations between WFH and worker time allocations differ between weekdays and weekends, we estimate the following equation:

$$Act_i = \beta_0 + \beta_1 T_i + \beta_2 D_i + \beta_3 T_i D_i + \beta_4{}' X_i + \gamma + \eta + \alpha + \varepsilon_i, \quad (2)$$

where D_i is a dummy variable that takes value 1 if the diary day corresponding to observation i corresponds to a weekday (0 if it corresponds to a weekend); the remaining terms are defined as in Eq. (1).[10] Thus, coefficient β_1 in Eq. (2) represents the correlation between time allocations and WFH specifically on weekends, coefficient β_2 represents systematic differences in time allocations between weekdays and weekends, β_3 represents the additional correlation between time allocations and WFH that is specific to weekdays, and $\beta_1 + \beta_3$ represents the correlation between time allocations and WFH specifically on weekdays.

The main estimates of Eq. (2) are shown in Table 4. (Additional coefficients are available upon request.) Overall, results indicate that differences in time allocations between WFH and WAFH employees are larger during the weekend than on weekdays. For instance, focusing on weekends, the average woman (man) WFH spends about 210.3 (163.0) fewer minutes paid work than the similar woman (man) WAFH. On the other hand, she (he) spends about 96.8 (58.5) and 62.1 (79.8) more minutes in unpaid and leisure activities than the similar WAFH, respectively. On weekdays, women (men) WFH spend, on average, about 67.2 (22.3) fewer minutes in paid work, 17.3 (18.2) more minutes in unpaid work, and 37.6 (35.2) more minutes in leisure, compared to their WAFH counterparts. Results suggest that, although differences between WFH and WAFH exist in general terms, they are especially relevant during weekends, and WFH may be especially beneficial for workers who need to spend some time on paid work activities during these days, in terms of time allocations (i.e., they can handle quickly those paid work responsibilities, leaving them more time for leisure and unpaid work). Further research should build on this and focus on WFH and weekday/weekend worker allocations.[11]

[10] Estimates still include day fixed effects, to capture potential differences across weekdays, and between Saturday and Sundays.

[11] As an additional robustness check, we run pooled regressions for men and women, controlling for respondents' gender, and including an interaction term between being male/female and being a WFH. However, the results were not statistically significant, suggesting no gender differences in how WFH relates to changes in time allocations. Results are available upon request.

Table 4 Estimates on time allocations including weekday/weekend interactions

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Paid work time		Unpaid work time		Leisure time	
	Women	Men	Women	Men	Women	Men
Being a WFH	−210.332***	−162.974***	96.814***	58.484***	62.128***	79.791***
	(22.849)	(27.105)	(14.397)	(11.474)	(17.595)	(20.433)
Weekday	2.811	23.737**	4.779	−1.799	−26.099***	−30.634***
	(10.844)	(10.977)	(5.781)	(4.601)	(9.334)	(9.999)
Weekday X WFH	143.157***	140.671***	−79.473***	−40.301***	−24.560	−44.551*
	(30.241)	(31.846)	(16.726)	(12.959)	(22.033)	(24.315)
Constant	272.543***	435.783***	42.112	31.513	294.552***	86.042*
	(89.850)	(57.403)	(36.851)	(28.110)	(45.897)	(51.355)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
No. Observations	1546	1476	1546	1476	1546	1476
R-squared	0.276	0.189	0.185	0.115	0.138	0.133

The sample (UKTUS 2015) is restricted to employees who filled in their diaries on working days. Robust standard errors in parentheses. The dependent variables are minutes spent in paid work (Columns (1–2)), unpaid work (Columns (3–4)), and leisure (Columns (5–6)). WFH are defined as those workers devoting zero minutes to commuting to/from work

*Significant at the 10% level; **Significant at the 5% level; ***Significant at the 1% level

4 WFH and worker instant enjoyment

We want to determine whether policies encouraging or suggesting WFH may influence workers' well-being. To that end, we focus on the episode sample, and we specifically use the observations on enjoyment during paid work, unpaid work, and leisure episodes with non-missing information. For a given individual i and episode j, we estimate the following equation by OLS (for episodes of women and men separately), as follows:

$$E_{ij} = \beta_0 + \beta_1 T_i + \beta_2{}' X_i + \beta_3{}' P_{ij} + \beta_4 \overline{E_i} + \gamma + \eta + \alpha + \varepsilon_i, \quad (3)$$

where the dependent variable, E_{ij}, is the enjoyment reported by individual i while doing the activity reported in period j, P_{ij} is a column-vector of episode-level controls, and $\overline{E_i}$ represents the average enjoyment of individuals, to control for "base-level enjoyment" and thus partially net out systematic differences across respondents

in terms of enjoyment, and to partially control for the fact that individuals may select a job based on how it makes them feel.[12] The remaining terms are defined analogously to terms in Eq. (1).

Vector P_{ij} includes the duration of period j, two dummies capturing whether the partner (married or unmarried spouse) was present (value 1, 0 otherwise), or whether a household child was present (value 1; 0 otherwise), the cumulative paid work minutes since the beginning of the diary day (since 4am) to capture potential tiredness, dummies for the time band in which period j began, dummies for secondary activities done during period j, and dummies for the location while doing the corresponding activity at period j.[13] Equation (2) is estimated separately for episodes of paid work, unpaid work, and leisure time. All the estimates include sample weights at the episode level, provided by the UKTUS survey, and standard errors are clustered at the individual level.

Columns (1) and (2) of Table 5 show estimates of Eq. (3) for the episodes of paid work. Focusing on the main explanatory variable of interest, estimates show that, for women workers, WFH is negatively correlated with the enjoyment experienced while doing paid work, although the correlation is not statistically significant at standard levels. Among men, however, the coefficient is also negative and statistically significant at standard levels, indicating that men WFH experience less enjoyment while doing paid work than do men WAFH, net of observable factors. Regarding episode characteristics, the duration of the paid work episode is negatively correlated with the experienced enjoyment. The presence of the partner, or the presence of a household child, are not significant for women, but both are negative and highly significant for men, suggesting that men enjoy paid work episodes less when the partner or a child are present at that moment. The cumulative paid work time during the day is negative and not significant for women, but it is positive and significant for men.[14] Finally, individuals' average enjoyment is positively related to the extent that they enjoy their paid work activities, as expected.[15]

Columns (3) and (4) of Table 5 show the results of estimating Eq. (3) on episodes of unpaid work. WFH seems to be negatively correlated with the enjoyment experienced while doing unpaid work for both women and men, although the coefficients are not statistically significant at standard levels for either of them. The duration of

[12] To avoid potential endogeneity, for each activity of interest (i.e., paid work, unpaid work, and leisure), we define average enjoyment as the sum of (time X enjoyment) of each period, divided by the sum of times of periods, excluding the periods of the activity of interest. Results are robust to a general definition of average enjoyment that pools are activities together.

[13] The presence of the partner/child refers to whether the partner or a child are physically present during the activity. Then, for paid work, these variables are likely available only for WFH. Secondary activities in the UKTUS include: personal care, paid work, study, care and housework, volunteer work and meetings, social life and entertainment, sports and outdoors leisure, hobbies and games, mass media, and travel. Activity locations in the UKTUS include: at home, at workplace, travelling, outdoors/leisure, and other/unspecified.

[14] This counterintuitive estimate suggests that men enjoy more their paid work episodes during the day when they are more tired. However, this positive correlation may indicate that male workers leave less tedious tasks for the end of their workdays, that they enjoy their last paid work episodes because the end of the workday is approaching, or that they are satisfied with their productivity during the day.

[15] Estimates associated with the individual-level controls and fixed effects are available upon request.

the unpaid work episodes is not statistically significant. However, the presence of the partner is positive and statistically significant for both women and men, but the presence of a child is not significant. The cumulative paid work during the day is also not significant, and again the average enjoyment at the individual level is positive and highly significant for both women and men.

Columns (5) and (6) of Table 5 show the results of estimating Eq. (3) on leisure episodes. The estimated coefficients associated with the dummy identifying WFH are negative and highly significant for women and men, indicating that all workers enjoy their leisure episodes less when they are able to WFH, net of individual and episode observable characteristics.[16] The duration of the leisure episodes is positive and significant. Thus, it seems that the longer the leisure activity, the more the enjoyment experienced while doing it. The presence of the partner is also positive and highly significant for all, indicating that joint leisure is preferable to other forms of leisure, in line with Cosaert et al. (2022), Hamermesh (2020), and Gimenez-Nadal et al. (2022). The presence of a child is positive and highly significant for men, but not significant for women, and men seem to enjoy their leisure activities more in the presence of a child, while women appear indifferent to the presence of the child, in terms of the enjoyment experienced. Finally, the cumulative paid work seems to be negatively related to enjoyment only for men, and they seem to enjoy their leisure activities less when they have been working for longer periods, whereas the average enjoyment is positive and highly significant, as expected.

In summary, results in Table 5 indicate that WFH is related to decreased worker enjoyment while working among men. This suggests that men prefer WAFH, although the specific reasons remain unexplored, whereas women remain indifferent between WFH or WAFH in terms of the enjoyment experienced while working. Gender differences in occupation and employment (Dingel and Neiman 2020), work routines (Gimenez-Nadal et al. 2022), or togetherness (Cosaert et al. 2022; Hamermesh 2020) may explain this gender differential correlation, which we leave for further research. Furthermore, we find that WFH has spillover effects on worker well-being, as worker leisure episode enjoyment is also negatively correlated to WFH for women and men. Nevertheless, that correlation seems not to be different between women and men, suggesting that WFH in general terms enjoy their leisure activities less than do similar WAFH. Existing research has concluded that WFH has an impact on work schedules and creates a fuzzy line between work and non-work responsibilities, and our results suggest that, in such a scenario, leisure activities are less enjoyable for WFH in general terms, while men WFH also dislike paid work activities more, compared to similar WAFH.

[16] We have studied whether WAFH and WFH engage in different leisure activities, we found that the proportion of leisure activities of WFH and WAFH are not different. Results are available upon request.

Table 5 Main estimates on experienced enjoyment

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Paid work episodes		Unpaid work episodes		Leisure episodes	
	Women	Men	Women	Men	Women	Men
Being a WFH	−0.088	−0.156***	−0.089	−0.085	−0.123***	−0.182***
	(0.073)	(0.053)	(0.057)	(0.070)	(0.047)	(0.038)
Episode duration	−0.001***	−0.001***	0.000	−0.002	0.002***	0.003***
	(0.000)	(0.000)	(0.001)	(0.002)	(0.000)	(0.000)
With: Spouse	−0.152	−0.331**	0.225***	0.147**	0.065**	0.186***
	(0.121)	(0.132)	(0.046)	(0.063)	(0.031)	(0.031)
With: Child	0.100	−0.823***	0.022	0.057	0.068	0.184***
	(0.210)	(0.300)	(0.067)	(0.105)	(0.054)	(0.048)
Cumulative paid work since 4am	−0.001	0.001***	−0.002	0.001	−0.001	−0.001**
	(0.001)	(0.000)	(0.001)	(0.001)	(0.002)	(0.001)
Averaged enjoyment	0.762***	0.682***	0.831***	0.737***	0.605***	0.578***
	(0.021)	(0.021)	(0.024)	(0.031)	(0.018)	(0.016)
Constant	1.291***	0.212	−1.422***	−0.279	0.256	3.076***
	(0.481)	(0.357)	(0.431)	(0.939)	(0.679)	(0.456)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Starting time FE	Yes	Yes	Yes	Yes	Yes	Yes
Secondary activity FE	Yes	Yes	Yes	Yes	Yes	Yes
Episode location FE	Yes	Yes	Yes	Yes	Yes	Yes
No. Observations	8947	8776	6418	3386	7466	6973
R-squared	0.248	0.221	0.259	0.269	0.267	0.291

The sample (UKTUS 2015) is restricted to episodes of paid work (Columns (1–2)), unpaid work (Columns (3–4)), and leisure (Columns (5–6)) of employees who filled in their diaries on working days, and with non-missing enjoyment information. Robust standard errors in parentheses. The dependent variable is the enjoyment experienced while doing paid work activities (Columns (1–2)), unpaid work activities (Columns (3–4)), and leisure activities (Columns (5–6)). WFH are defined as those workers devoting zero minutes to commuting to/from work

*Significant at the 10% level; **Significant at the 5% level; ***Significant at the 1% level

While direct quantitative comparisons to existing analyses, using instant well-being, are not easy (as different surveys use different affective scales), results shown in Table 5 are qualitatively similar to those in Song and Gao (2020), who conclude that WFH is related to decreased instant happiness (using the American Time Use Survey). Conversely, results differ from estimates in the US by Gimenez-Nadal et al. (2020, 2022), Hamermesh (2020), and Vagni (2022), who found that WFH is related to increased instant happiness and life satisfaction, driven by togetherness and time spent with the partner and/or children.

An alternative analysis would rely on estimating individual fixed effects models, exploiting the diary structure of the episode sample as if it were a panel survey (Song and Gao 2020; Vagni 2022), to partially take into account the heterogeneity of time allocation decisions, as well as inter-personal differences in scales (Ferrer-i-Carbonell and Frijters 2004). However, being a WFH is an individual-constant variable for the individuals in the sample, which prevents us from estimating fixed effects models.[17]

We have run similar robustness checks as in the time allocations analysis, and we have re-estimated Eq. (3) using the three alternative definitions of WFH. The main results are shown in Table 13 in the "Appendix". Estimates suggest that the identification of WFH is important, as the extent to which individuals work from home seems to be a moderator to the correlation between WFH and enjoyment. For those who do some paid work at home (which is the closest identification to our default definition for WFH), the results are qualitatively similar to those shown in Table 5. However, when we define WFH workers as those who do at least 1 h of paid work at home, the results for paid work and unpaid work change slightly, whereas when we identify WFH workers as those who do *all* their paid work at home, the coefficients are not statistically significant (except for the enjoyment during leisure among men). These results suggest that doing *some* work at home may have an impact on worker enjoyment while doing paid work, but also during leisure. However, ignoring those workers who partly WFH when accounting for the definition of home-based work may produce different results. We leave such a sensitivity analysis for further research, as it lies beyond the scope of this study.[18]

Since we have found a range of correlations between time allocations and WFH for weekdays and weekends, we next study whether WFH is related to enjoyment differentially on those days. To do so, we estimate Eq. (4), as follows:

$$E_{ij} = \beta_0 + \beta_1 T_i + \beta_2 D_i + \beta_3 T_i D_i + \beta_4' X_i + \beta_5' P_{ij} + \beta_6 \overline{E_i} + \gamma + \eta + \alpha + \varepsilon_i, \quad (4)$$

where D_i is defined as in Eq. (2), and the remaining terms are defined as in Eq. (3).

The main coefficients are shown in Table 6. Results indicate a negative and statistically significant correlation between WFH and the enjoyment experienced while doing paid work, although for women that correlation is exclusively concentrated on weekends. For men, on the other hand, the negative correlation found in general terms in Table 5 holds for both weekdays and weekends, as the interaction term is not statistically significant. A similar result emerges for unpaid work episodes of women, as we

[17] To partially address such a data limitation, Table 12 in the "Appendix" shows estimates of Eq. (3) but excluding all individual-invariant variables and including, instead, dummy variables at the individual level for those individuals who appear twice (once during a weekday, and once during the weekend) in the sample. Otherwise, we could not include in the sample the dummy variable that identifies WFH. Results shown are similar to those in Table 3, since when including individual dummy variables, we find that being a WFH is related to decreased enjoyment of paid work activities for both men and women. This appears not to be significantly correlated with enjoyment during unpaid work activities at standard levels, and it is negatively related to the enjoyment experienced during leisure episodes, but only among women.

[18] We have also run pooled regressions for men and women, controlling for gender and including an interaction term between man or woman and being a WFH. The results were not statistically significant in general terms, suggesting no gender differences in how WFH relates to enjoyment. Results are available upon request.

document a significant and negative correlation between WFH and enjoyment, but it is exclusively concentrated on weekends, whereas for men that correlation is not significant for weekdays and weekends. Finally, regarding enjoyment while doing leisure, Table 6 shows that the negative correlation in Table 5 holds for both weekdays and weekends, since the interaction terms are not statistically significant at standard levels.

In summary, the results in Tables 5 and 6 indicate that, if anything, WFH is related to decreased enjoyment while doing paid work for men, but also while doing leisure activities for women and men. Therefore, we document no positive impact of WFH on experienced enjoyment, in contrast to existing results (e.g., Bloom et al. 2015; Gimenez-Nadal et al. 2022; Recchi et al. 2020; Foa et al. 2020; Long 2021). Instead, our results suggest that WFH may be detrimental for worker well-being, measured through experienced enjoyment. The results are suggestive evidence for WFH blurring the frontiers between paid work and other activities, which is potentially detrimental for workers, in line with recent conclusions by Fujiwara et al. (2020), Hamermesh (2020), Möhring et al. (2021), Ruiz et al. (2021), and Brindal et al. (2022). These results should be considered when designing policies encouraging WFH, as the hypothesized benefits of WFH may come with some negative consequences in terms of decreased worker well-being. The results also suggest that this is especially important for women who work during the weekend (Del Boca et al. 2020; Sevilla and Smith 2020).[19]

5 Conclusions

This paper explores how WFH relates to workers' time allocation decisions on workdays, and the instant enjoyment experienced, with a focus on differences between women and men. Using the UK Time Use Survey for the years 2014–2015, the results show that WFH is associated with a cut in paid work time for both and is also associated with increased unpaid work and leisure time, with these differences being statistically significant, and quantitatively relevant. Additionally, the cut in paid work time associated with WFH is greater for women than for men, revealing a potential gender difference, in line with Del Boca et al. (2020) and Sevilla and Smith (2020). Our results also show that these differences are driven by working days during the weekend, whereas differences on weekdays are smaller but still exist. The results also show that WFH relates to a decrease in men's experienced enjoyment while working in the labor market, in general terms, while for women that decrease is significant only during weekend working days. Similarly, WFH is also negatively related to women's enjoyment while doing unpaid work during weekends, but not on weekdays. On the other hand, WFH is related to decreased enjoyment of leisure activities for both men and women, and during both week and weekend workdays. These relationships suggest that promoting WFH may impact all workers' enjoyment differentially, especially for those who need to work

[19] As an additional result, we also estimated pooled regressions including the full episode sample, and interactions for the activity types considered (e.g., paid work, unpaid work, and leisure), to compare which activities workers enjoy more. Conclusions are similar to the main results, as we find that WFH enjoy less paid work, unpaid work, and leisure activities than WAFH, though in general terms leisure is more enjoyable than other activities, and paid and unpaid work are less enjoyable. Results are available upon request.

Table 6 Enjoyment estimates including weekday/weekend interaction

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Paid work episodes		Unpaid work episodes		Leisure episodes	
	Women	Men	Women	Men	Women	Men
Being a WFH	−0.455***	−0.219**	−0.472***	−0.153	−0.168**	−0.154***
	(0.110)	(0.086)	(0.093)	(0.111)	(0.071)	(0.058)
Weekday	0.112**	−0.026	−0.146***	0.019	−0.046	−0.076**
	(0.047)	(0.050)	(0.056)	(0.084)	(0.036)	(0.038)
Weekday X WFH	0.441***	0.073	0.492***	0.101	0.050	−0.055
	(0.119)	(0.097)	(0.112)	(0.139)	(0.090)	(0.074)
Constant	1.249***	0.234	−1.339***	−0.300	0.287	3.151***
	(0.482)	(0.359)	(0.443)	(0.944)	(0.678)	(0.458)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Episode controls	Yes	Yes	Yes	Yes	Yes	Yes
Starting time FE	Yes	Yes	Yes	Yes	Yes	Yes
Secondary activity FE	Yes	Yes	Yes	Yes	Yes	Yes
Episode location FE	Yes	Yes	Yes	Yes	Yes	Yes
No. Observations	8947	8776	6418	3386	7466	6973
R-squared	0.250	0.221	0.261	0.270	0.267	0.292

The sample (UKTUS 2015) is restricted to episodes of paid work (Columns (1–2)), unpaid work (Columns (3–4)), and leisure (Columns (5–6)) of employees who filled in their diaries on working days, and with non-missing enjoyment information. Robust standard errors in parentheses. The dependent variable is the enjoyment experienced while doing paid work (Columns (1–2)), unpaid work (Columns (3–4)), and leisure (Columns (5–6)). WFH are defined as those devoting zero minutes to commuting to/from work

*Significant at the 10%; **Significant at the 5%; ***Significant at the 1%

during the weekend, producing intrahousehold tensions. The results also suggest that WFH may negatively affect workers' well-being, in line with existing research suggesting that WFH and other flexible working practices distort the barriers between work and non-work activities, especially for women, thus negatively impacting welfare (Glass and Noonan 2016; Hilbrecht et al. 2008; Kim 2020; Kurowska 2020).

The current analysis presents several limitations. First, the identification of WFH is not standard in the literature. We follow a similar definition as in Gimenez-Nadal et al. (2020), and run certain robustness checks with alternative definitions. However, we must acknowledge measurement error and potential selection bias, as we may be identifying as WAFH individuals who can WFH on certain days but not during the diary day, or as WFH individuals who typically do not WFH, but do so during the diary day for specific and unobserved reasons. Second, the data is cross-sectional, and thus all the analysis is limited to conditional correlations only, as we cannot account for reverse causality and endogeneity. Thus, the results cannot be interpreted as showing causal links, but only

correlations, net of observable factors. Third, we do not yet have time use diaries collected during Covid-19 lockdowns. Hence, our conclusions should be taken with caution if extrapolated to lockdown scenarios. Fourth, enjoyment is an ordinal variable and represents a subjective measure of well-being (Bond and Lang 2019). Consequently, even though we control for individual, averaged enjoyment, comparisons across individuals may be problematic. A related concern is that individuals may select a job based on how it makes them feel; we only partially account for this issue in our analysis by controlling for individuals' average enjoyment. Finally, the results may suffer from bias arising from selection into employment, which we acknowledge as a data limitation.

Despite these limitations, the results shown in this paper are important for society, especially in a period when home-based work becomes more relevant for workers, employers, and policy makers, beyond purely speculative claims. The results are relevant for workers, as being a WFH has traditionally been associated with decreased work-family conflicts, since individuals who are able to WFH seem to be able to spend more time in unpaid work activities during the day and, particularly, during regular working hours. However, our results suggest that workers may experience a decrease in their daily enjoyment while WFH.

For firms, the results reveal decreased working hours associated with WFH and home-based workers, although the literature is not clear about whether this leads to decreased productivity (Ross and Zenou 2008; van Ommeren and Gutiérrez-i-Puigarnau 2011; Bloom et al. 2015). Meanwhile, recent research has shown that hybrid workers are more productive in the US (Bloom et al. 2022). Further research should investigate whether or not WFH are more productive than WAFH in other contexts, to complement existing findings. Finally, our results are important for planners and policy makers, who must regulate telework and WFH practices, and create policies associated with WFH in general terms, but also in periods of lockdown and confinement, as has happened in recent months.

Appendix: Additional results

See Tables 7, 8, 9, 10, 11, 12 and 13.

Table 7 Definitions of WFH

	Frequency	Percent
Default definition of WFH		
Individuals reporting zero commuting	405	13.40
Alternative definitions of WFH		
Some paid work at home	432	14.30
More than 1 h of paid work at home	336	11.12
All the paid work at home	181	5.99
N. of individuals	3022	

The sample (UKTUS 2015) is restricted to employees who filled in their diaries on working days

Table 8 Distribution of industries, by WFH status

Industry	Females				Diff *p*-value	Males				Diff *p*-value
	WAFH		WFH			WAFH		WFH		
	Mean	S.D	Mean	S.D		*p*-value	S.D	Mean	S.D	
Agr., forest., fish	0.003	0.051	0.005	0.071	(0.599)	0.006	0.077	0.022	0.148	(0.005)
Mining, quarrying	0.000	0.000	0.000	0.000	–	0.006	0.080	0.006	0.077	(0.868)
Manufacturing	0.057	0.232	0.054	0.226	(0.450)	0.154	0.361	0.071	0.258	(0.002)
Electr., gas, steam supply	0.007	0.083	0.014	0.118	(0.551)	0.013	0.115	0.006	0.078	(0.276)
Water supply, wastes	0.005	0.067	0.000	0.000	(0.359)	0.014	0.117	0.010	0.101	(0.901)
Construction	0.011	0.103	0.013	0.114	(0.570)	0.081	0.274	0.110	0.314	(0.315)
Sale and trade	0.152	0.359	0.063	0.244	(0.002)	0.129	0.335	0.115	0.319	(0.711)
Transport and storage	0.021	0.144	0.020	0.141	(0.976)	0.093	0.290	0.070	0.256	(0.177)
Accommodation and food	0.075	0.263	0.030	0.170	(0.063)	0.066	0.249	0.045	0.208	(0.202)
Inform. and communic	0.015	0.122	0.031	0.174	(0.113)	0.055	0.228	0.129	0.336	(<0.001)
Financial and insurance	0.034	0.182	0.021	0.145	(0.423)	0.046	0.209	0.034	0.182	(0.705)
Real estate	0.003	0.055	0.007	0.082	(0.599)	0.003	0.055	0.000	0.000	(0.409)
Proff., scient., techn	0.047	0.212	0.029	0.167	(0.419)	0.038	0.192	0.072	0.259	(0.023)
Admin. support	0.043	0.203	0.034	0.183	(0.443)	0.041	0.199	0.033	0.180	(0.782)
Public admin	0.060	0.238	0.112	0.316	(0.011)	0.067	0.250	0.035	0.183	(0.068)
Education	0.160	0.367	0.359	0.481	(<0.001)	0.075	0.263	0.121	0.326	(0.018)
Health and social work	0.272	0.445	0.179	0.385	(<0.001)	0.079	0.270	0.081	0.274	(0.776)
Arts, entert., recreation	0.016	0.127	0.000	0.000	(0.078)	0.022	0.147	0.004	0.062	(0.131)
Other services	0.018	0.133	0.028	0.166	(0.194)	0.010	0.099	0.036	0.187	(0.003)
N. individuals	1356		190			1261		215		

The sample (UKTUS 2015) is restricted to employees who filled in their diaries on working days. Industries coded in terms of the UK Standard Industrial Classification (SIC07). T-type test *p*-values, for the difference between WAFH and WFH, in parentheses

Table 9 Distribution of diary days, by WFH status

Day of week	Females				Diff *p*-value	Males				Diff *p*-value
	WAFH		WFH			WAFH		WFH		
	Mean	S.D	Mean	S.D		Mean	S.D	Mean	S.D	
Monday	0.129	0.336	0.112	0.317	(<0.001)	0.130	0.336	0.099	0.300	(<0.001)
Tuesday	0.158	0.365	0.138	0.346	(0.757)	0.159	0.366	0.125	0.332	(0.258)
Wednesday	0.170	0.376	0.102	0.303	(0.344)	0.145	0.352	0.114	0.318	(0.186)
Thursday	0.152	0.359	0.098	0.298	(0.011)	0.177	0.382	0.120	0.326	(0.145)
Friday	0.162	0.368	0.109	0.312	(0.029)	0.157	0.364	0.115	0.320	(0.062)
Saturday	0.134	0.341	0.205	0.405	(0.089)	0.124	0.330	0.234	0.425	(0.145)
Sunday	0.095	0.293	0.237	0.426	(0.013)	0.108	0.310	0.193	0.395	(<0.001)
N. individuals	1356		190			1261		215		

The sample (UKTUS 2015) is restricted to employees who filled in their diaries on working days. T-type test *p*-values, for the difference between WAFH and WFH, in parentheses

Table 10 Estimates on the 'asinh' transformation of time allocations

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Paid Work TIME		Unpaid work time		Leisure time	
	Women	Men	Women	Men	Women	Men
Being a WFH	−0.518***	−0.350***	0.461***	0.675***	0.243***	0.213*
	(0.055)	(0.052)	(0.118)	(0.148)	(0.087)	(0.114)
Constant	6.199***	6.851***	3.769***	1.677*	6.170***	5.419***
	(0.232)	(0.167)	(0.576)	(0.961)	(0.433)	(0.593)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1546	1476	1546	1476	1546	1476
R-squared	0.270	0.162	0.124	0.089	0.070	0.067

The sample (UKTUS 2015) is restricted to employees who filled in their diaries on working days. Robust standard errors in parentheses. The dependent variables are the inverse hyperbolic sine ('asinh') transformation of the minutes spent in paid work (Columns (1–2)), unpaid work (Columns (3–4)), and leisure (Columns (5–6)). WFH are defined as those workers devoting zero minutes to commuting to/from work

*Significant at the 10% level; **Significant at the 5% level; ***Significant at the 1% level

Table 11 Estimates on time allocations using alternative definition of WFH

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Paid work time		Unpaid work time		Leisure time	
	Women	Men	Women	Men	Women	Men
Panel A						
Doing some WFH	−54.111***	−71.534***	30.928***	30.725***	24.876**	39.163***
	(14.816)	(16.039)	(7.357)	(6.656)	(10.170)	(12.661)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1546	1476	1546	1476	1546	1476
R-squared	0.198	0.133	0.137	0.090	0.109	0.098
Panel B						
Doing at least 1 h of WFH	−79.213***	−88.995***	40.192***	37.727***	44.798***	42.081***
	(17.963)	(19.062)	(8.919)	(7.951)	(11.846)	(15.213)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1546	1476	1546	1476	1546	1476
R-squared	0.206	0.138	0.142	0.095	0.116	0.098
Panel C						
Full WFH	−210.948***	−190.544***	76.702***	63.440***	96.541***	116.732***
	(18.158)	(23.179)	(12.617)	(10.391)	(15.818)	(18.646)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1546	1476	1546	1476	1546	1476
R-squared	0.277	0.185	0.168	0.113	0.139	0.128

The sample (UKTUS 2015) is restricted to employees who filled in their diaries on working days. Robust standard errors in parentheses. The dependent variables are the minutes spent doing paid work (Columns (1–2)), unpaid work (Columns (3–4)), and leisure (Columns (5–6)). WFH are defined as those workers who do some paid work at home (Panel A); those workers who do at least 1 h of paid work at home (Panel B); or those workers who do all their paid work at home (Panel C). Additional coefficients are available upon request

*Significant at the 10% level; **Significant at the 5% level; ***Significant at the 1% level

Table 12 Enjoyment estimates including individual fixed effects

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Paid work episodes		Unpaid work episodes		Leisure episodes	
	Women	Men	Women	Men	Women	Men
Being a WFH	−0.582***	−0.254**	0.017	−0.196	−0.396***	0.075
	(0.158)	(0.108)	(0.130)	(0.204)	(0.102)	(0.075)
Constant	3.694***	6.789***	4.520***	2.468***	4.570***	5.494***
	(0.484)	(0.218)	(0.266)	(0.685)	(0.652)	(0.642)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Episode controls	Yes	Yes	Yes	Yes	Yes	Yes
Starting time FE	Yes	Yes	Yes	Yes	Yes	Yes
Secondary activity FE	Yes	Yes	Yes	Yes	Yes	Yes
Episode location FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8947	8776	6418	3386	7466	6973
R-squared	0.673	0.702	0.575	0.635	0.553	0.584

The sample(UKTUS 2015) is restricted to episodes of paid work (Columns (1–2)), unpaid work (Columns (3–4)), and leisure (Columns (5–6)) of employees who filled in their diaries on working days, and with non-missing enjoyment information. Robust standard errors in parentheses. The dependent variable is the enjoyment experience while doing paid work activities (Columns (1–2)), unpaid work activities (Columns (3–4)), and leisure activities (Columns (5–6)). WFH are defined as those workers devoting zero minutes to commuting to/from work. Variables that are constant within individuals are omitted

*Significant at the 10% level; **Significant at the 5% level; ***Significant at the 1% level

Table 13 Enjoyment estimates using alternative definition of WFH

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Paid work episodes		Unpaid work episodes		Leisure episodes	
	Women	Men	Women	Men	Women	Men
Panel A						
Doing some WFH	−0.028	0.119**	−0.047	−0.051	−0.145***	−0.185***
	(0.056)	(0.051)	(0.054)	(0.071)	(0.045)	(0.038)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Episode controls	Yes	Yes	Yes	Yes	Yes	Yes
Starting time FE	Yes	Yes	Yes	Yes	Yes	Yes
Secondary activity FE	Yes	Yes	Yes	Yes	Yes	Yes
Episode location FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8947	8776	6418	3386	7466	6973
R-squared	0.248	0.220	0.259	0.269	0.268	0.291
Panel B						
Doing at least 1 h of WFH	−0.222***	0.087	−0.128**	0.018	−0.114**	−0.113**
	(0.066)	(0.067)	(0.059)	(0.083)	(0.051)	(0.046)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Episode controls	Yes	Yes	Yes	Yes	Yes	Yes
Starting time FE	Yes	Yes	Yes	Yes	Yes	Yes
Secondary activity FE	Yes	Yes	Yes	Yes	Yes	Yes
Episode location FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8947	8776	6418	3386	7466	6973
R-squared	0.249	0.220	0.260	0.269	0.267	0.289
Panel C						
Full WFH	−0.023	−0.047	−0.121*	−0.069	−0.014	−0.220***
	(0.142)	(0.111)	(0.073)	(0.099)	(0.063)	(0.055)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Episode controls	Yes	Yes	Yes	Yes	Yes	Yes
Starting time FE	Yes	Yes	Yes	Yes	Yes	Yes
Secondary activity FE	Yes	Yes	Yes	Yes	Yes	Yes
Episode location FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8947	8776	6418	3386	7466	6973
R-squared	0.248	0.220	0.259	0.269	0.266	0.290

Table 13 (continued)

The sample (UKTUS 2015) is restricted to episodes of paid work (Columns (1–2)), unpaid work (Columns (3–4)), or leisure (Columns (5–6)) of employees who filled in their diaries on working days. Robust standard errors in parentheses. The dependent variable is the enjoyment experience while doing paid work activities (Columns (1–2)), unpaid work activities (Columns (3–4)), and leisure activities (Columns (5–6)). WFH are defined as those workers who do some paid work at home (Panel A); those workers who do at least 1 h of paid work at home (Panel B); or those workers who do all their paid work at home (Panel C)

*Significant at the 10% level; **Significant at the 5% level; ***Significant at the 1% level

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Declarations

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