Working from Home, Commuting, and Gender
ONLINE APPENDIX

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A Appendix

A.1 Representativeness of Experimental Sample

Table A1: Comparison between sample and population

	Sample	Population
Working from home		
No WFH	0.68	0.78
WFH up to 2 days	0.18	0.09
WFH up to 5 days	0.14	0.13
Commuting time		
0-30 minutes	0.69	0.69
31-60 minutes	0.27	0.25
>60 minutes	0.04	0.06
Paid days off	28.65	31.80
Weekly work hours	36.92	34.70
Gross hourly wage	19.52	22.65

Note: This table gives a comparison between our sample and the population in key dimensions. The data for the population stem from the German Statistical Office. Working from Home: `https://www.destatis.de/DE/Themen/Arbeit/Arbeitsmarkt/Qualitaet-Arbeit/Dimension-3/home-office.html`, Commuting time: `https://www.destatis.de/DE/Themen/Arbeit/Arbeitsmarkt/Qualitaet-Arbeit/Dimension-3/zeitaufwand-weg-arbeit.html`, Paid days off: `https://www.destatis.de/DE/Themen/Arbeit/Arbeitsmarkt/Qualitaet-Arbeit/Dimension-2/genommene-Urlaubstage.html`, Weekly work hours: `https://www.destatis.de/DE/Themen/Arbeit/Arbeitsmarkt/Qualitaet-Arbeit/Dimension-3/woechentliche-arbeitszeitl.html`, Hourly wages: `https://www.destatis.de/DE/Themen/Arbeit/Arbeitsmarkt/Qualitaet-Arbeit/Dimension-2/stundenlohnl.html` All links were last accessed on January 11, 2024 and usually relate to the year 2022; only the data on commuting patterns is from 2016.

A.2 Experimental Details

To limit the variation in selected attributes, we proceeded as follows. If hours were selected to vary, we added to the baseline weekly hours (determined to be the value from $\{15, 20, 25, \ldots, 55, 60\}$ that is closest to the stated hours) of each job a number randomly chosen from the set $\{-10, -5, 0, 5, 10\}$. Regarding paid days off, we set the baseline value to the value from $\{25, 30, 35\}$ that is closest to the number stated in the survey, and (if selected to vary) randomly choose from these values.[1] Regarding commuting time (in minutes), we set the baseline value as follows:

- 15 if value selected in survey is "0-15 minutes"
- 30 if value selected in survey is "16-30 minutes"
- 45 if value selected in survey is "31-45 minutes"
- 60 if value selected in survey is "46-60 minutes"
- 60 if value selected in survey is "60+ minutes"

If selected to vary, we randomly chose the commuting time from the set $\{15, 30, 45, 60\}$. Regarding options to telecommute, subjects chose in the survey between "none", "2 days per week", and "5 days per week". We set the baseline values correspondingly and (if selected to vary) randomly select from that set. The variation in all other non-wage attributes was binary (deadlines and multi-tasking: "frequently" vs. "occasionally"; control over schedule: "yes" vs. "no"). Regarding the presence of deadlines and multi-tasking requirements, subjects chose in the survey between "never", "occasionally", and "often". The baseline values were set to "occasionally" if the subject had chosen either "never" or "occasionally", and "often" if the subject had chosen "often".

To limit the impact of errors when subjects enter their current earnings, we proceeded as follows. First, we asked the subjects in the survey if they are able to state their current (gross) income. 402 (12.16%) of all subjects answered "no". If a given subject answered "no", we did not ask for the current income, but randomly chose an hourly baseline wage for the experiment (in Euros) from the set $\{15, 16, \ldots, 59, 60\}$. If a given subject answered "yes", the survey asked the subject to state her gross (hourly, monthly, or yearly) earnings, and we used the (implied) hourly wage as baseline value.

[1] The legal minimum number of paid days off in Germany is 20 days for full-time employees, while most workers have 30 paid days off per year.

If the (implied) hourly wage was below the current minimum wage in Germany, the survey asked the respondent to check her entry and correct it if necessary. Irrespective of whether the subjects adjusted the stated wage, the subjects were allowed to proceed. If the (implied) stated hourly wage (after possible correction) was below €15, the baseline wage for the experiment was set to €15. If the (implied) stated wage was above €60, the baseline wage for the experiment was set to €60. In cases where we need the actual earnings of a person (e.g., hourly wage descriptives in Tables 1 and A2, heterogeneity in WTP by wage quintile, inequality analysis, hedonic wage regressions), we restricted the sample to subjects with non-missing wage data and set the lower bound to the current minimum wage in Germany (10.45 Euros per hour) and the upper bound to 60 Euros.

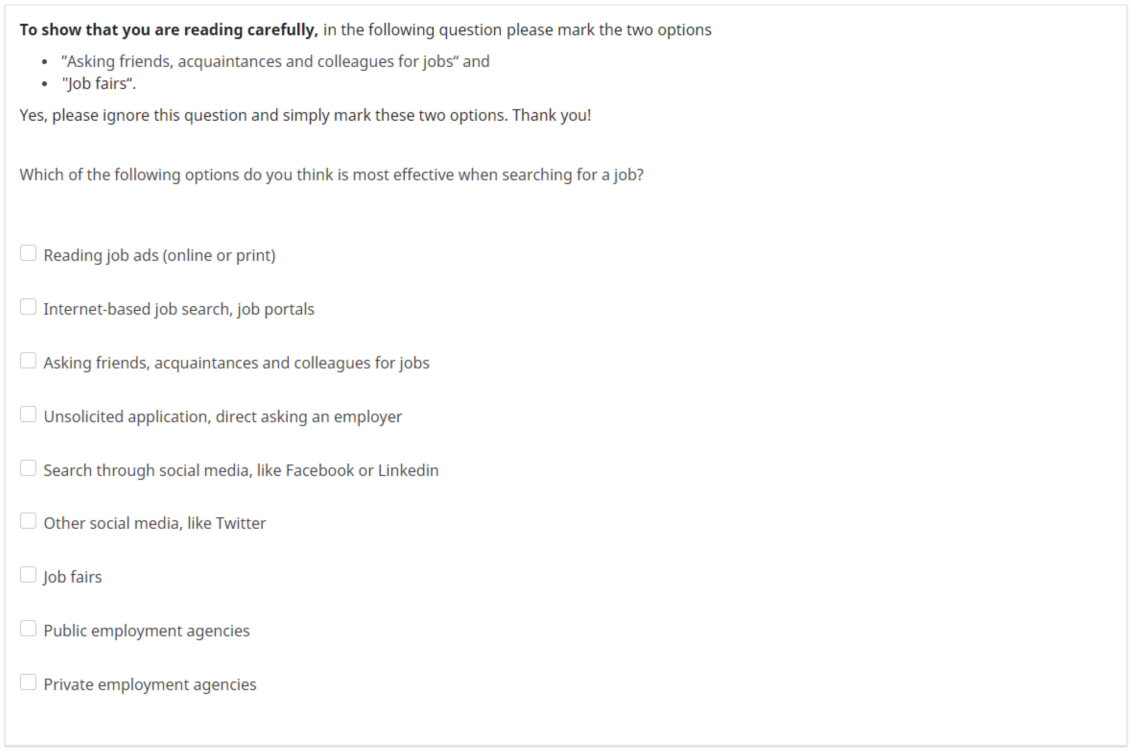
Figure A1: Screenshot of choice between two hypothetical jobs

	Job A	Job B
Work hours	40 hours per week	40 hours per week
Paid days off	30 days per year	30 days per year
Deadlines	often	often
Multitasking: Multiple important tasks at the same time	occasionally	often
Flexible schedule	no	no
Option to work from home	5 days per week	2 days per week
Mean commuting time to the workplace	45 minutes	45 minutes
Gross earnings	€ 5007 per month	€ 5685 per month

	Job A	Job B
Which job would you prefer?	○	○

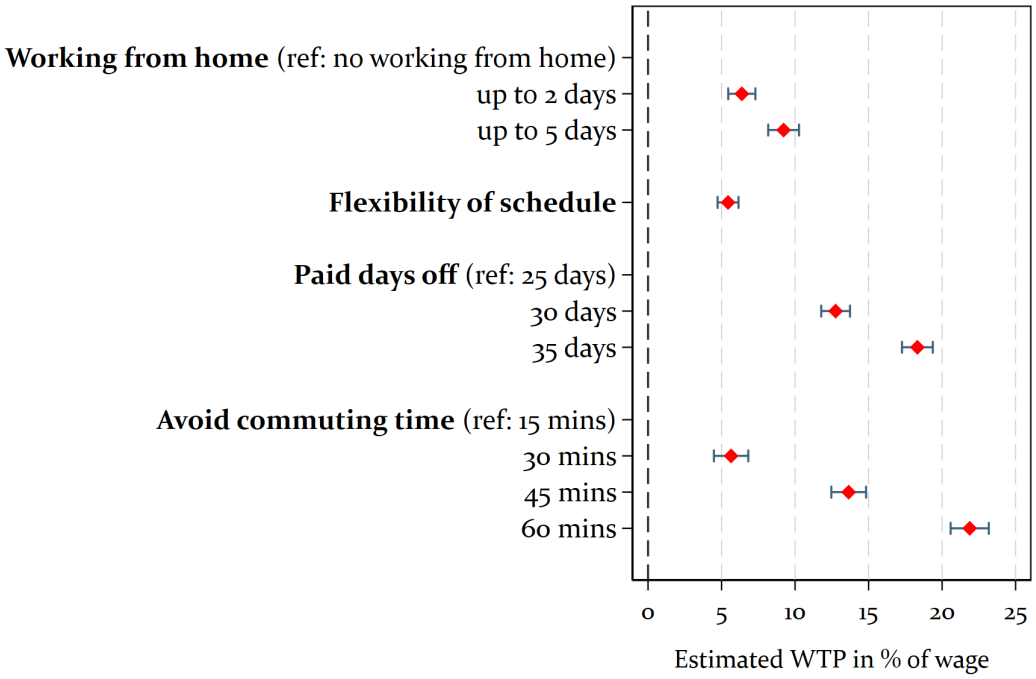
Note: This figure shows a screenshot of a choice between two hypothetical jobs, translated to English.

Figure A2: Screenshot of trick question



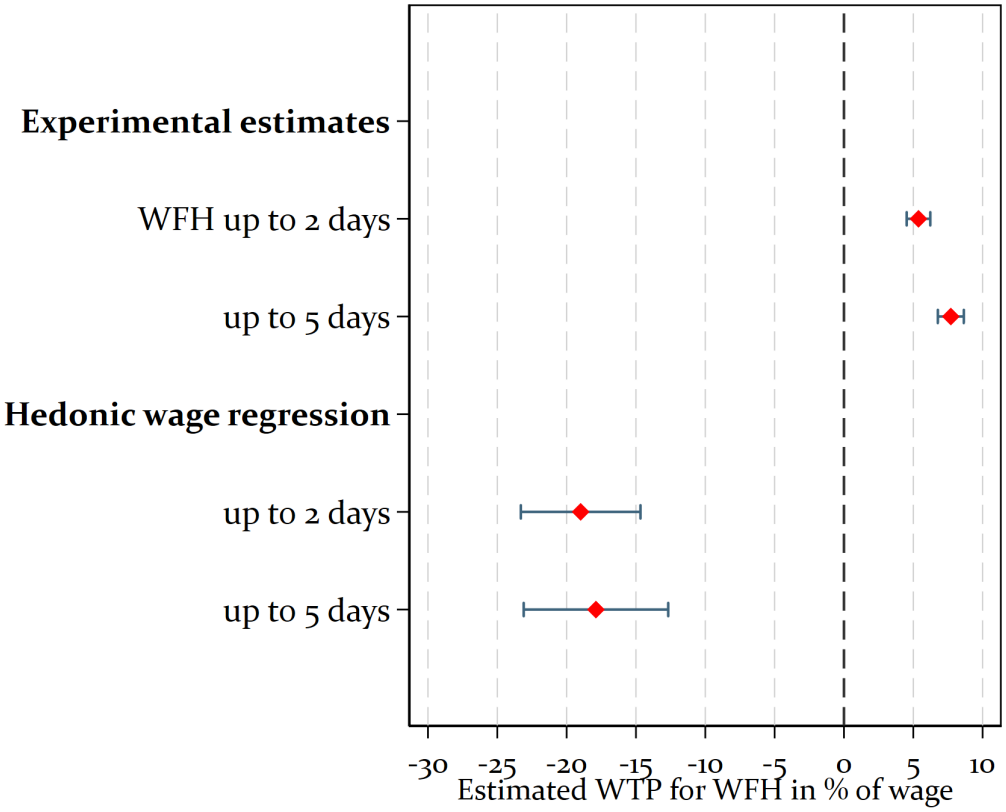
Note: This figure shows a trick question.

Figure A3: Baseline results for respondents who passed attention checks



Note: The figure shows the baseline results for respondents who passed both attention checks. 65.6% of all respondents passed both attention checks. The (red) diamonds indicate point estimates, the bars reflect 95% confidence intervals where standard errors allow for clustering at the respondent level. Number of observations: 21,680.

Figure A4: Hedonic wage regressions produce wrong-signed estimates



Note: The figure compares the WTP to work form home from the stated-preference experiment with estimates from a hedonic wage regression where we regress the log hourly wage on indicators for WFH, controlling for gender, 4 age groups, 3 education groups, and all other job attributes included in the experiment. The (red) diamonds indicate point estimates, the bars reflect 95% confidence intervals where standard errors allow for clustering at the respondent level. Number of observations: 33,070.

A.3 Further results on average valuations and heterogeneities

Table A2: Sample descriptives by age group and hourly wage quintile

	Age group				Hourly wage quintile (1st=lowest)				
	20-29	30-39	40-49	50-60	1st	2nd	3rd	4th	5th
Working from home									
No WFH	0.63	0.60	0.68	0.78	0.84	0.85	0.75	0.58	0.34
WFH up to 2 days	0.24	0.25	0.17	0.11	0.08	0.08	0.15	0.28	0.35
WFH up to 5 days	0.14	0.16	0.14	0.11	0.08	0.07	0.09	0.14	0.31
Flexible schedule	0.40	0.40	0.35	0.31	0.23	0.23	0.30	0.41	0.66
Paid days off	28.27	28.54	28.69	28.83	26.95	28.25	29.19	29.37	29.80
Commuting time									
0-15 minutes	0.28	0.31	0.33	0.34	0.39	0.36	0.32	0.29	0.21
16-30 minutes	0.39	0.39	0.37	0.35	0.35	0.39	0.38	0.41	0.36
31-45 minutes	0.21	0.19	0.18	0.19	0.15	0.15	0.20	0.19	0.26
46-60 minutes	0.10	0.08	0.09	0.08	0.07	0.08	0.06	0.08	0.11
>60 minutes	0.03	0.04	0.04	0.04	0.04	0.03	0.04	0.02	0.07
Weekly work hours	38.26	37.59	36.55	36.15	36.19	36.35	36.83	37.46	39.17
Gross hourly wage	18.56	20.27	19.87	18.82	11.07	14.02	17.19	21.11	34.41

Note: The table shows descriptives on the participants' current job which we use as a baseline for the experiment. Number of participants is 3,307. The share of age groups 20-29 (30-39, 40-49, 50-60) is 9.9% (31.8%, 25.8%, 32.6%). In the last row, we exclude respondent where the hourly wage in the current job is missing (12.2% of respondents).

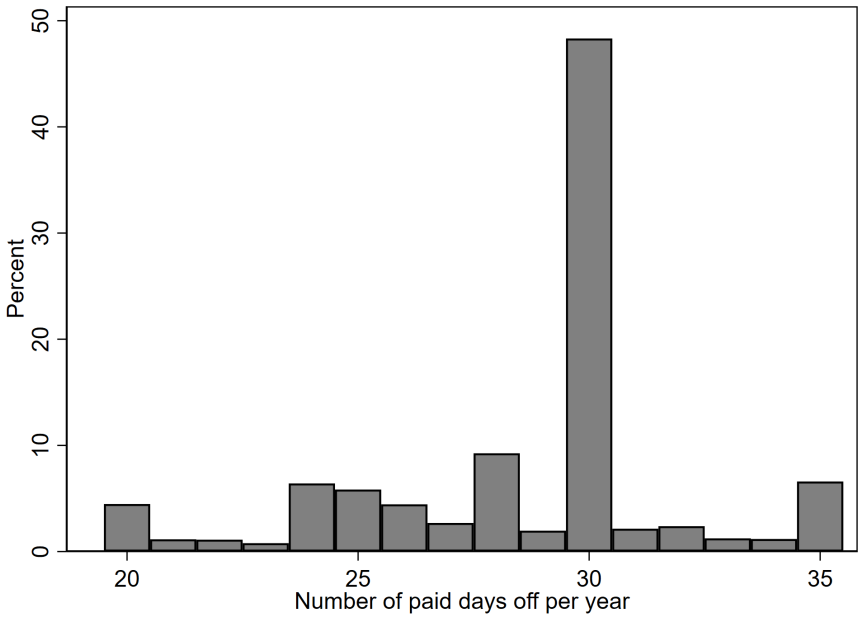
Table A3: Descriptives on attributes of hypothetical jobs

	Mean	SD	N
Hourly wage	22.04	10.95	33070
No WFH	0.58	0.49	33070
WFH up to 2 days	0.23	0.42	33070
WFH up to 5 days	0.19	0.39	33070
Commuting time 15 minutes	0.30	0.46	33070
Commuting time 30 minutes	0.34	0.47	33070
Commuting time 45 minutes	0.20	0.40	33070
Commuting time 60 minutes	0.16	0.37	33070
Flexible schedule	0.40	0.49	33070
25 paid days off	0.29	0.45	33070
30 paid days off	0.55	0.50	33070
35 paid days off	0.16	0.36	33070
Weekly work hours	37.04	8.73	33070

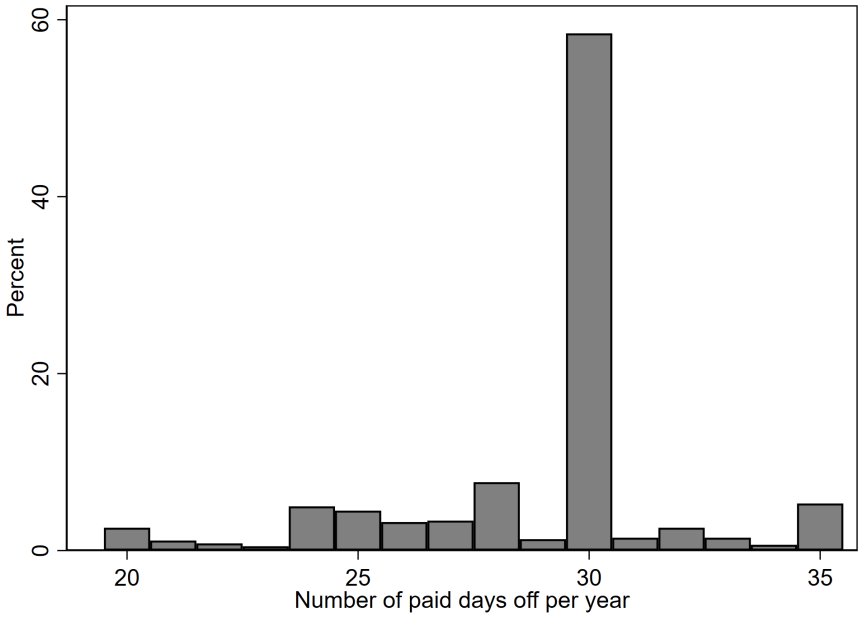
Note: The tables shows descriptives of attributes of hypothetical jobs in the choice experiment. Note that the table only shows attributes of hypothetical job i. Summary statistics on the respective alternative job k are very similar since job attributes are drawn from the same distribution.

Figure A5: Distribution of paid days off among survey respondents

(a) All workers



(b) High education



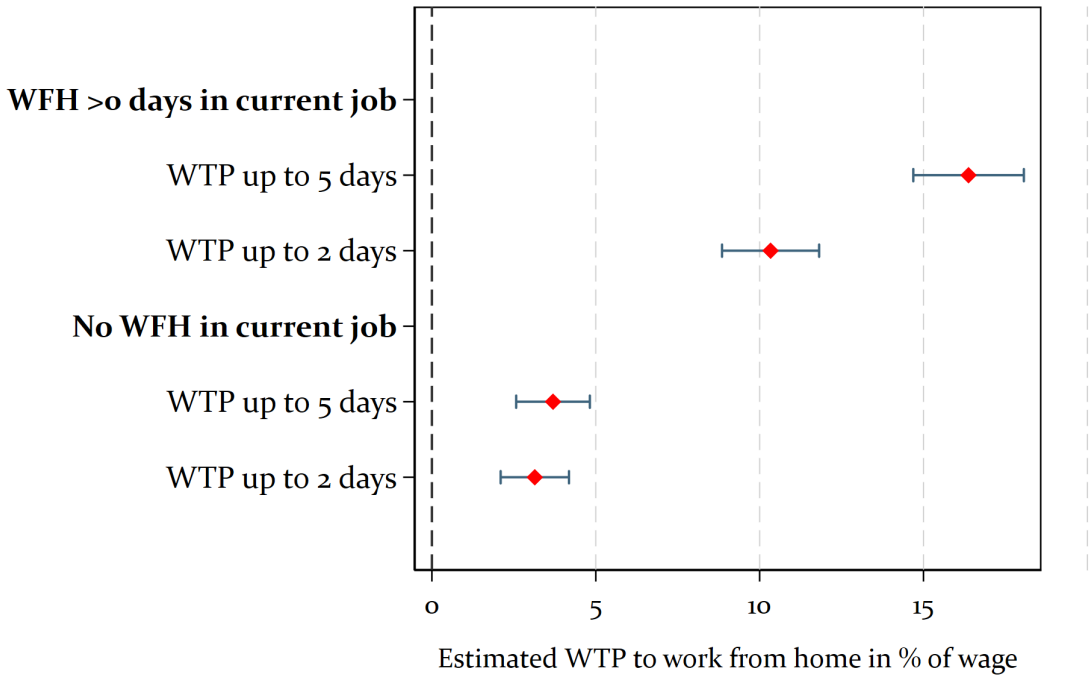
Note: The figure shows the distribution of the number of paid days off in the current job among survey participants. Panel (a) includes on all workers. Panel (b) focuses on those with a high level of education. The minimum legal number of paid days off is 20 in Germany.

Table A4: Logit estimates

	Dep. var.: Choice of job j over job k				
	(1)	(2)	(3)	(4)	(5)
	All	Females	Males	Females	Males
Δ Log earnings	7.45***	6.71***	8.20***	7.56***	9.17***
	(0.14)	(0.20)	(0.21)	(0.26)	(0.26)
Δ Flex. of schedule	0.41***	0.44***	0.39***	0.48***	0.47***
	(0.03)	(0.04)	(0.04)	(0.05)	(0.04)
Δ WFH (5 days)	0.60***	0.58***	0.62***	0.35***	0.54***
	(0.04)	(0.06)	(0.05)	(0.11)	(0.10)
Δ WFH (2 days)	0.41***	0.42***	0.41***	0.36***	0.41***
	(0.03)	(0.05)	(0.05)	(0.10)	(0.09)
Δ 30 paid days off	0.98***	1.00***	0.97***	1.15***	1.16***
	(0.04)	(0.05)	(0.05)	(0.07)	(0.06)
Δ 35 paid days off	1.43***	1.37***	1.50***	1.69***	1.72***
	(0.04)	(0.06)	(0.06)	(0.08)	(0.07)
Δ Commuting time 30mins	-0.40***	-0.50***	-0.33***	-0.77***	-0.44***
	(0.04)	(0.06)	(0.06)	(0.09)	(0.08)
Δ Commuting time 45mins	-1.05***	-1.30***	-0.87***	-1.78***	-1.17***
	(0.05)	(0.07)	(0.06)	(0.10)	(0.09)
Δ Commuting time 60mins	-1.81***	-2.16***	-1.55***	-2.87***	-2.01***
	(0.05)	(0.08)	(0.07)	(0.13)	(0.11)
Δ Commuting time 30mins x WFH (2 days)				0.16	0.13
				(0.13)	(0.11)
Δ Commuting time 45mins x WFH (2 days)				0.33**	0.33***
				(0.14)	(0.13)
Δ Commuting time 60mins x WFH (2 days)				0.44***	0.30**
				(0.16)	(0.14)
Δ Commuting time 30mins x WFH (5 days)				0.30**	0.21*
				(0.14)	(0.12)
Δ Commuting time 45mins x WFH (5 days)				0.84***	0.47***
				(0.16)	(0.14)
Δ Commuting time 60mins x WFH (5 days)				1.33***	0.89***
				(0.19)	(0.15)
Pseudo R2	0.19	0.19	0.20	0.23	0.24
N	33,070	15,320	17,750	15,320	17,750

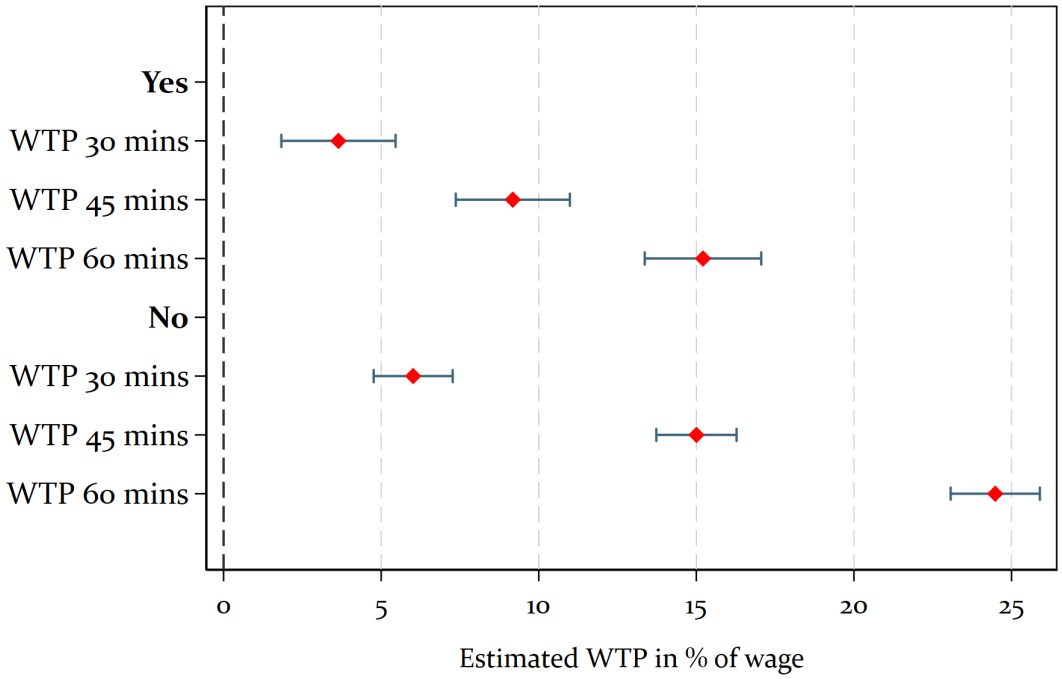
Note: The table shows coefficients of logit estimates of the probability of choosing job j over job k as a function of differences in log earnings and job characteristics between both jobs. Standard errors (clustered at subject level) in parentheses. The willingness-to-pay for a positive job attribute is computed by the formula $100\left[1-e^{\left(-\frac{\beta^r}{\delta}\right)}\right]$, where β^r is the coefficient on the respective job attribute and δ is the coefficient of Δ Log earnings. The standard error of the WTP is computed with the delta method.

Figure A6: Sorting: workers' willingness-to-pay for working from home by current WFH status



Note: The figure shows the WTP to work from home, separately for respondents who have the option to work from home in their current job and respondent who do not have to option to work from home in their current job. The (red) diamonds indicate point estimates, the bars reflect 95% confidence intervals where standard errors allow for clustering at the respondent level. Number of observations: 10,570 with WFH >0 and 22,500 with No WFH.

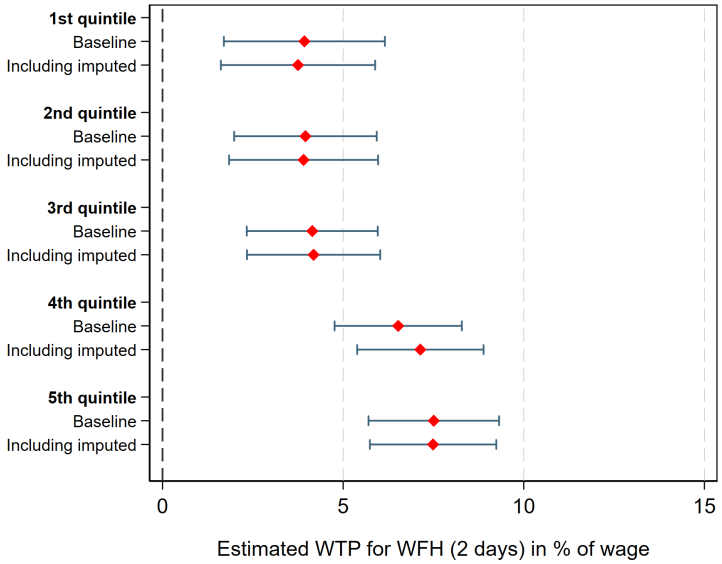
Figure A7: Sorting: workers' willingness-to-pay to avoid commute by whether they currently commute > 30mins



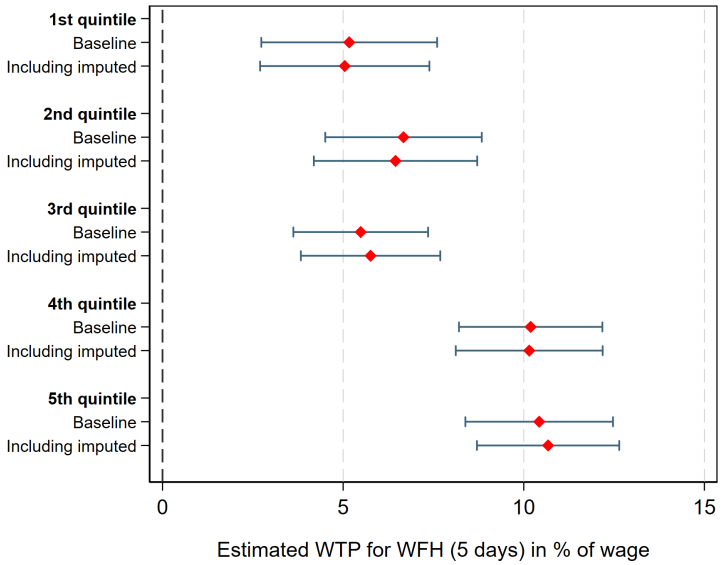
Note: The figure shows the WTP to avoid commuting, separately for respondents who commute more than 30 minutes to the workplace in their current job and respondents who do not commute more than 30 minutes to the workplace in their current job. The (red) diamonds indicate point estimates, the bars reflect 95% confidence intervals where standard errors allow for clustering at the respondent level. Number of observations: 10,210 with commuting time >30 minutes and 22,860 with commuting time <30 minutes.

Figure A8: Heterogeneity of WTP for WFH with imputed wages

(a) WTP for 2 days of WFH



(b) WTP for 5 days of WFH



Note: The Figure compares heterogeneities in WTP across observed wage quintiles in our baseline estimation with heterogeneity estimates where we predict missing wages using demographic information and job charactetristics with the help of a random forest algorithm (3,000 trees, minimum leaf size of 25 and a random selection of 3 variables at each step). Number of observations: 29,050 in baseline and 33,070 with imputation.

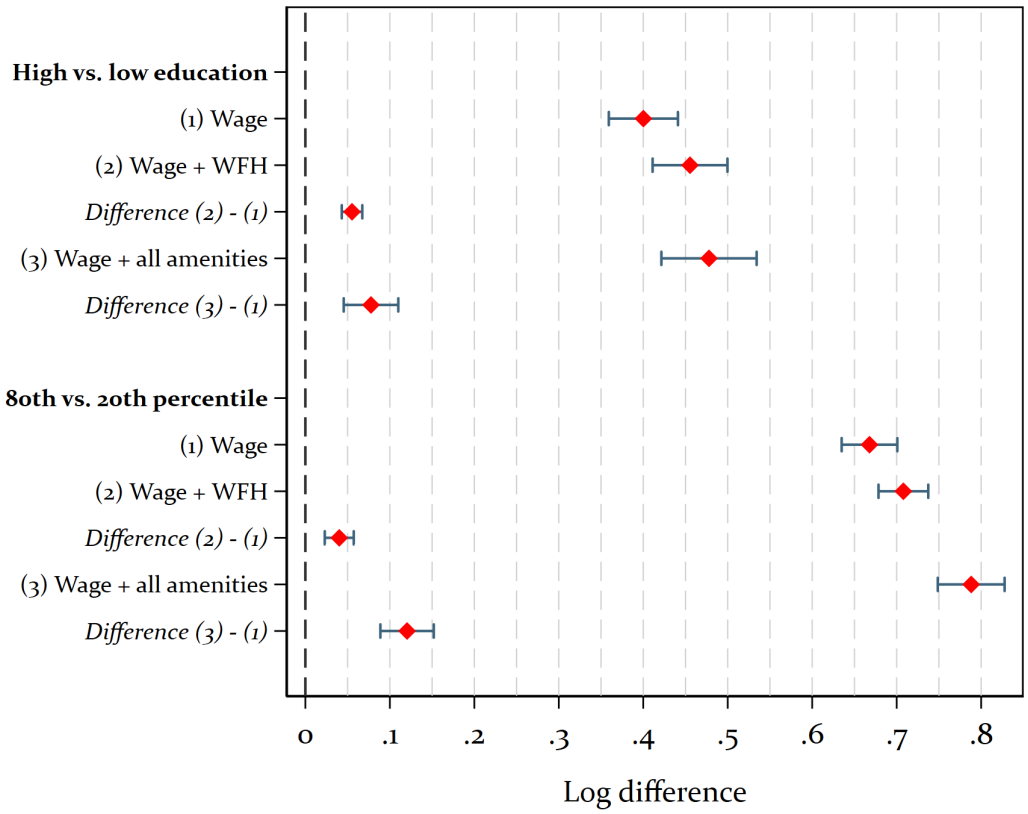
A.4 WFH and inequality

In this section, we show the implications of our estimates for inequality. In Figure A9 we show that this is the case for example for inequality between high- and low-educated workers. We follow the methodology by Maestas et al. (2023). Note that equation (4) gives an expression for the amenity value of a given job attribute: $w\left[1-e^{\left(-\frac{\beta^r}{\delta}\right)}\right]$. Building on equation (4), we compute the log of a worker's compensation (i.e., wage plus amenity value of WFH) as $ln\left[w+w\left[1-e^{\left(-\frac{A^2\beta^2+A^5\beta^5}{\delta}\right)}\right]\right]$, where A^2 and A^5 are indicators for being able to WFH up to 2 or up to 5 days, respectively, and β^2 and β^5 are the corresponding estimated marginal utilities. We allow the marginal utilities of WFH options and the marginal utility of the wage (δ) to differ between groups. Standard errors are computed with a block (by respondent) bootstrap, with 200 replications.

The wage gap between high- and low-educated workers amounts to 40 log points in our sample. Taking into account the amenity value of WFH, inequality increases to 45.5 log points, an increase by almost 14% The figure shows that the estimated impact of WFH on compensation inequality (i.e., the difference between the two inequality measures) is highly statistically significant. As a comparison, taking into account the amenity value of *all* job characteristics simultaneously, inequality increases to 47.8 log points. We find very similar results for the compensation inequality between the 80th and the 20th wage percentile in our sample, as shown in the bottom half of Figure A9. The only difference is that the relative importance of other job amenities seems to be higher in this case.

Thus, while the amenity value of WFH is not exceedingly large relative to other job attributes, its effect on inequality is substantial. Therefore, our results suggest that a further expansion of WFH opportunities for highly educated and high-earning workers might have important implications for compensation inequality. However, the extent to which a further expansion of WFH oportunities for workers up in the wage ladder will actually translate into an increase in compensation inequality depends on how the gains from WFH will be shared between workers and firms (Barrero et al., 2022).

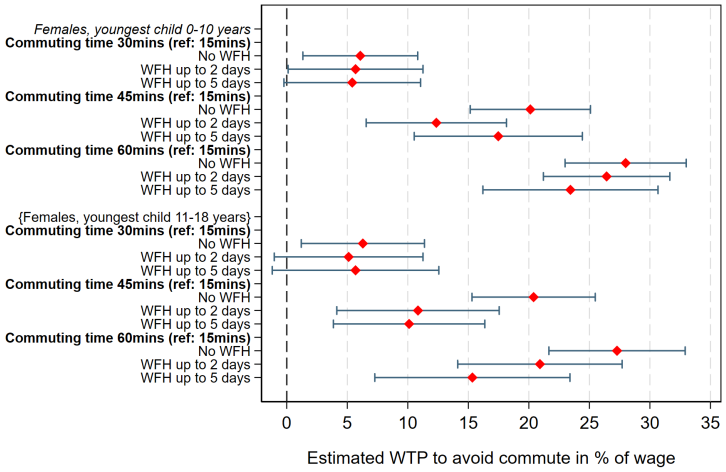
Figure A9: Working from home increases inequality



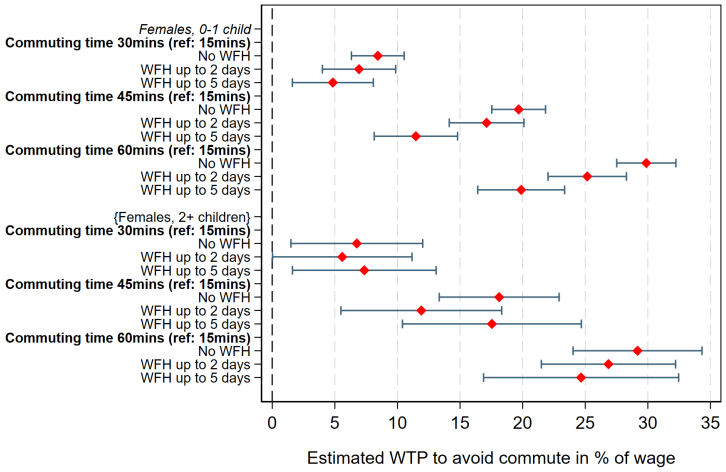
Note: This figure depicts the impact of WFH and other job attributes on compensation inequality between high-educated and low-educated workers and between workers at the 80th percentile and workers at the 20th percentile of the hourly wage distribution. The respective first row depicts the gap in log hourly wages between the groups. The respective second row depicts compensation inequality between the groups, taking into account the amenity value of WFH options in current jobs. The respective fourth row depicts compensation inequality, taking into account the amenity value of WFH options, schedule flexibility, paid days off, and commuting time. We restrict the sample to respondents where the hourly wage in the current job is non-missing. Standard errors are computed with a block (by respondent) bootstrap, with 200 replications. The bars reflect the corresponding 95% confidence intervals.

Figure A10: Female Sample: Splits by Children's Characteristics

(a) By Children's Age



(b) By Number of Children



Note: The Figure shows the link between the WTP to avoid commuting by WFH arrangements, separately for females with children of different age, referring to the youngest child (Panel A), and for females with a different number of children (Panel B). Number of observations: 2,460 females with youngest child 0-10 years, 2,160 females with youngest child 11-18 years, 12,850 females with 0-1 child, 2,260 females with 2 or more children.

References

Barrero, J. M., N. Bloom, S. J. Davis, B. H. Meyer, and E. Mihaylov (2022): "The Shift To Remote Work Lessens Wage-Growth Pressures," *NBER Working Paper No. 30197*.

Maestas, N., K. J. Mullen, D. Powell, T. von Wachter, and J. D. Wenger (2023): "The Value of Working Conditions in the United States and Implications for the Structure of Wages," *American Economic Review*, 113, 2007–2047.