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Abstract

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Author note

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August 29, 2022

Abstract

Working from home (WFH) has become ubiquitous around the world. We ask how much workers actually value this job attribute. Using a stated-preference experiment, we show that German employees are willing to give up 7.7% of their earnings for WFH, but they value other job attributes more. For instance, the willingness-to-pay is 13.2% for reducing a commute of 45 to 15 minutes. WFH valuations are heterogeneous across workers and WFH substantially contributes to compensation inequality across education levels. Finally, valuations meaningfully interact with commuting distance and WFH reduces (but does not close) the gender gap in willingness-to-pay to avoid commuting.

JEL-Classification:

Keywords: working from home, working conditions, inequality, commuting, compensating wage differentials

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1 Introduction

Working from home (WFH) has been on the rise for years and became ubiquitous during the COVID pandemic. From an economic perspective, two key questions regarding WFH are how it impacts worker productivity and how much workers value WFH. Worker productivity may for instance benefit from increased work flexibility or suffer from missing spillovers from co-workers (e.g., Bloom et al., 2022; Catalini, 2018; Roche et al., 2022). At the same time, the perk value of WFH might be substantial for workers, for example due to time savings from less commuting (e.g., Barrero et al., 2021; Maestas et al., 2018; Mas and Pallais, 2017). This in turn may affect how firms compensate workers financially (Rosen, 1986). WFH may also affect which workers firms can hire in the first place, with the relevant talent pool including workers who would be good matches but who live far away from firm establishments (Clancy, 2020). While there is early evidence on the short-run productivity effects of WFH (e.g., Bloom et al., 2022; Choudhury et al., 2021), we only have relatively coarse evidence about how much workers actually value WFH as a non-wage job attribute relative to others (e.g., Mas and Pallais, 2017; Maestas et al., 2018). This is especially true for worker valuations of WFH after the onset of the COVID pandemic, which has fundamentally changed perceptions of WFH among firms and workers (Barrero et al., 2021).

In this paper, we report detailed evidence on workers' valuation of WFH relative to other non-wage job attributes more than two years into the COVID pandemic. Our data come from a stated-preference experiment among a representative sample of over 3,300 workers in Germany that we conducted in July 2022. The experimental setup follows Maestas et al. (2018): workers made choices between hypothetical jobs that randomly varied in terms of earnings and along several non-wage dimensions, including working from home options. Using this choice data, we back out clean estimates of how much workers value different non-wage job attributes, where valuations are measured in percent of earnings. Based on our experimental design, we can thus determine how much workers value WFH both generally and relative to other non-wage job attributes like schedule flexibility, number of paid days off, or commuting time.

Our main findings are as follows. First, workers have an economically significant willingness-to-pay for WFH, but they value other non-wage job attributes even more. On average, workers are willing to give up 5.4% (7.7%) of their earnings to obtain the option to work from home for up to 2 days (5 days) a week. These estimates are larger than survey-based estimates on workers' valuation of WFH for Germany (Aksoy et al., 2022) and close to experimental estimates in the US before the pandemic (Mas and Pallais, 2017; Maestas et al., 2018). To put workers' valuations of WFH into perspective, the average willingness-to-pay for maximum flexibility in terms of WFH (up to 5 days a week) amounts to only about 58% of the willingness-to-pay for reducing a

commute of 45 to 15 minutes, and about 63% of the willingness-to-pay for increasing the number of paid days off from 25 to 30 (the most common value of full-time workers in Germany). The average valuation of the option to work from home for up to 2 days a week is about the same as the valuation for work schedule flexibility. Overall, our willingness-to-pay estimates suggest that WFH is an important amenity for workers, but our data do not support the notion that during the pandemic, the availability of WFH options has become a job attribute dominating workers' valuation of alternative work arrangements.

Second, workers' willingness-to-pay for WFH as well as the prevalence for WFH are heterogeneous, both of which contributes to inequality. We find that female, young, high-educated, and high-earning individuals show a higher valuation of WFH. This pattern is especially pronounced for the willingness-to-pay to obtain full WFH options (up to 5 days per week). These heterogeneous valuations of WFH, together with the unequal distribution of WFH options across the wage distribution and across education groups, lead to the finding that WFH exacerbates existing inequalities. More specifically, we find that compensation inequality between high- and low-educated workers increases by 14% once the amenity value of WFH options in current jobs is taken into account.

We also find that workers who report having WFH as an amenity in their current job value WFH options much more than workers who report not having the option to work from home. Among workers who report having WFH as an amenity in their current job, the willingness-to-pay for WFH for up to 2 days (5 days) per week is around 10% (17%). The heterogeneity regarding actual WFH arrangements suggests that, in line with theory (Rosen, 1986), workers tend to sort into jobs based on their preference for WFH options.

We also provide evidence that WFH interacts meaningfully with commuting distance. With respect to the hypothetical jobs' commuting distance, we find that workers' willingness-to-pay for WFH is higher the longer the respective commute. Correspondingly, the presence of a WFH option reduces the willingness-to-pay to avoid longer commutes. This result suggests that firms may be able to attract workers with longer commutes at the same wage rate if they offer WFH or, correspondingly, attract workers with a given commuting distance at a substantially lower wage rate under WFH.

Finally, we also use our experiment to inform the debate on gender gaps in commuting (Le Barbanchon et al., 2021; Caldwell and Danieli, 2022). We experimentally confirm that, on average, women have a higher willingness-to-pay than men to avoid long commutes, with the gap increasing in commuting distance. Interestingly, WFH options reduce this gender gap, but do not close it. Among women in our

experiment, the willingness-to-pay to reduce a commute of 60 minutes to 15 minutes *under maximum flexibility regarding WFH* (up to 5 days per week) is about the same as men's willingness-to-pay for the same reduction *in the absence of any WFH option*.

The recent shift towards WFH during the pandemic has put WFH center stage (Dingel and Neiman, 2020; Alipour et al., 2021, 2022; Adams-Prassl et al., 2022; Barrero et al., 2021; Teevan et al., 2021), and our paper contributes to the current debate on the future of working from home (Clancy, 2020). There is emerging literature on the productivity effects of WFH and hybrid work. Several papers find positive short-run productivity effects of WFH (Angelici and Profeta, 2020; Bloom et al., 2015, 2022; Choudhury et al., 2021; Harrington and Emanuel, 2021), although there are worries that WFH may reduce spillovers at work that increase workers' productivity (e.g., Yang et al., 2022; Roche et al., 2022; Catalini, 2018). There is also evidence of directed technological change likely enabling more efficient working from home in the future (Bloom et al., 2021).

Importantly, a key theme of the literature on WFH is that it is a job amenity that workers value. Before the pandemic, Mas and Pallais (2017) and Maestas et al. (2018) used stated-choice experiments to elicit workers' willingness-to-pay for WFH in the United States. Datta (2019) followed their approach in the UK and found similar results. During the pandemic, Lewandowski et al. (2022) used a stated-choice experiment in Poland to estimate the willingness-to-pay for WFH. After the pandemic, Aksoy et al. (2022) use surveys to inform on workers' valuation of WFH around the world. We contribute to this literature by providing the first experimental estimates of worker valuations of WFH after life turned (almost) normal again post-COVID. The key insight from our paper is that workers perceive WFH to be an important amenity, but it is far from being a job attribute that would dominate workers' valuations of alternative work arrangements.¹ Specifically, workers are willing to give up much higher shares of their earnings to avoid long commutes or to have more paid days off relative to obtaining even maximum flexibility in terms of WFH options. Our main finding is in line with recent work finding surprisingly little evidence of excess reallocation of workers during the COVID recovery (Forsythe et al., 2022), despite predictions that the pandemic would dramatically and permanently change labor markets. We also investigate the interaction of WFH with other job amenities, most importantly commuting, as well as heterogeneities regarding worker characteristics, most importantly gender. Finally, we are also the first to show post-COVID experimental estimates for a large European economy with substantial capacity to work from home that is only slightly below the capacity for WFH in the United States (Dingel and Neiman, 2020; Alipour et al., 2020). In comparison to the survey-based estimate of Aksoy et al. (2022) for Germany, we

¹See Mas and Pallais (2020) for a survey about alternative work arrangements.

find substantially higher willingness-to-pay for WFH that is closer to experimental estimates for workers in the United States.²

Our results also contribute to the literature on compensating differentials for job amenities. This literature goes back at least to Adam Smith, with the theory of compensating differentials being formalized by Rosen (1986). Empirically, this literature suffers from well-known issues such as the comparability of workers and jobs in observational data and frictions in the labor market (e.g., Brown, 1980; Bonhomme and Jolivet, 2009). While there are a handful of recent exceptions that provide clean quasi-experimental estimates of compensating differentials for job (dis-)amenities from observational data (e.g., Lavetti and Schmutte, 2016; Lavetti, 2020; Wissmann, 2022), one part of the literature has turned to stated-choice experiments to elicit workers' willingness-to-pay for job characteristics (Eriksson and Kristensen, 2014; Mas and Pallais, 2017; Maestas et al., 2018; Felfe et al., 2021). This approach avoids well-known problems of hedonic wage regressions (that often produce wrong-signed estimates, including in our sample) in estimating worker valuations of amenities. We contribute to this literature by providing novel and clean estimates for workers' willingness-to-pay for WFH. At the same time, workers' willingness-to-pay should not be confounded with the equilibrium concept of compensating differentials. We bound the differential by comparing estimates for workers who sorted into jobs with the amenities to estimates for workers who did not. The idea is that the equilibrium compensating differential equals the *marginal* worker's willingness-to-pay for the amenity, which is bounded by these estimates.

We also show that the value of WFH interacts in important ways with commuting and that this interaction differs by worker characteristics such as gender. We finally contribute to this literature by eliciting workers' willingness-to-pay for other job amenities in Europe in a way that is comparable to evidence in the United States. For instance, we show that German workers display a somewhat lower willingness-to-pay for schedule flexibility but a higher willingness-to-pay for paid days off than American workers (Mas and Pallais, 2017; Maestas et al., 2018).

2 Setup

2.1 Experimental Approach

We ran an online experiment on a sample of German private-sector employees in July 2022. In this time period, there was no lockdown in Germany and, while COVID

²Instead of conducting a choice experiment, Aksoy et al. (2022) ask survey respondents the following question: "How much of a pay raise [cut] (as a percent of your current pay) would you value as much as the option to work from home 2 or 3 days a week?"

incidence rates remained relatively high, life was very close to normal again regarding pandemic measures. Thus, our experiment did not take place against the background of the big changes in labor demand induced by the pandemic (e.g., Forsythe et al., 2020; Hensvik et al., 2021).

We restricted the sampling to subjects aged 20 to 60 years. To recruit the subjects, we used the infrastructure of the data collection agency NORSTAT. The sample of subjects is broadly representative of the population of German private-sector workers in terms of age, gender and education. Following the pre-registered experimental design, we recruited a sample of 3,307 subjects. To each survey respondent, we administered ten stated-preference experiments, following Maestas et al. (2018).

In each of these experiments, we asked subjects to select between two jobs, each defined by a partially varying set of non-wage job attributes, hours, and wage. For each respondent, we use a description of the respondent's current job as a baseline profile. Before participating in the experiments, each respondent answered a short survey about current job characteristics. Each survey item corresponds to one of the non-wage job attributes in the experiment. Based on the respondents' baseline job, we created two hypothetical jobs (labelled "A" and "B") by randomly selecting two non-wage attributes (including hours) to vary across the two jobs. Within each of the two randomly selected attributes, we chose corresponding attribute values at random sequentially for both jobs without replacement. This procedure made sure that Job A and Job B actually varied in the selected attributes.

In the experiment, the hypothetical jobs were described by the following attributes. One-way commuting time to the workplace varied between 15, 30, 45, and 60 minutes. Options to work from home in a given job varied between "none", "up to 2 days per week", and "up to 5 days per week". We complemented the job profiles by three further non-wage attributes: flexibility of schedule (yes or no), number of paid days off (25, 30, or 35 days), and weekly work hours (varying between 15 and 60 in 5-hour increments). Finally, we included measures of work pressure for a companion paper (Nagler et al., 2022). The first attribute related to the presence of deadlines, while the second related to multitasking.³ In both cases, the job attributes were defined by statements whether the respective characteristic (presence of deadlines and/or multitasking) would apply "frequently" or just "occasionally." To minimize the risk for differential perceptions regarding unspecified job characteristics, we followed Maestas et al. (2018) and instructed respondents to assume that job attributes not mentioned were identical across jobs.

³The wording when presenting the job attributes in the experiment followed the wording of the respective items in the observational data used in Nagler et al. (2022).

Besides the two randomly selected non-wage attributes to vary in a given experiment, the wage always varied between Job A and Job B. Following Maestas et al. (2018), we anchored the randomly determined wage using the respondent’s actual hourly wage w . The anchoring was achieved by setting the wages of Job A and Job B as $\theta_A w$ and $\theta_B w$, respectively, where θ_A and θ_B follow a $N \sim (1, 0.01)$ distribution. We truncated both weights to lie between 0.75 and 1.25. In the choice experiments, the wage offer was converted back to the units in which the respondent originally reported their earnings (hourly, monthly, or yearly).⁴ We adapted the strategy used by Maestas et al. (2018) to limit the number of job pairs in which one of the jobs dominated the other on all varying dimensions. Figure A1 in the Appendix shows a screenshot of two hypothetical jobs between which participants had to choose.

In addition to the 10 choice experiments, we included two further survey questions that follow the “trick” questions in Maestas et al. (2018).⁵ Responses to the trick questions allow us to estimate the share of inattentive participants and test the robustness of our findings with respect to excluding inattentive respondents.⁶ Overall, 65.6% of respondents answered both attention checks correctly, somewhat above the share in Maestas et al. (2018).⁷ For further details on the design, see Appendix Section A.1.

Our experimental approach to elicit workers’ willingness-to-pay for job attributes has advantages over hedonic wage regressions since it avoids the well-known problems of using observational data to estimate compensating wage differentials (Bonhomme and Jolivet, 2009; Mas and Pallais, 2017; Maestas et al., 2018). In fact, when we use our survey data to estimate hedonic wage regressions, we find negative willingness-to-pay for WFH, in line with wrong-signed estimates for other job amenities in the literature (e.g., Brown, 1980).⁸ Our approach has the disadvantage of merely estimating workers’ willingness-to-pay for WFH. Compensating wage differentials are a market outcome and reflect the marginal workers’ willingness-to-pay for a job amenity. However, we can bound the compensating differential for the job amenity. The reason is that the marginal workers’ willingness-to-pay should lie between the willingness-to-pay of

⁴We asked the subjects in the survey if they are able to state their current (gross) income. If a given subject answered “no”, we did not ask for the current income, but randomly chose w . For details, see Section A.1 in the Appendix.

⁵When facing these questions, which appeared randomly (and non-consecutively) between the third and the last experiment, respondents were instructed to respond in a specific way, irrespective of what they believed was the true answer to the respective question.

⁶Figure A2 in the Appendix shows a screenshot of a trick question. When restricting the sample to subjects who passed both attention checks, the results are somewhat stronger than the baseline results (see Figure A3 in the Appendix).

⁷Another fact suggesting rather high levels of attention comes from the subset of choices where one of the jobs dominated the other in all dimensions (1958 cases). In these choices, the subjects selected the dominant job in 94.7% of all cases.

⁸See Appendix Figure A4.

workers who sorted into jobs without (weakly lower willingness-to-pay than marginal workers) and workers who sorted into jobs with the respective amenity (weakly higher willingness-to-pay than marginal workers).

Table 1 shows descriptive statistics. A majority of workers (68%) cannot work from home. 18% of workers can work from home up to 2 days per week, and around 14% have a WFH option on up to 5 days per week. These numbers reflect an increase in WFH opportunities compared to pre-pandemic times (Alipour et al., 2022; Destatis, 2022a). On average, men are slightly more likely to have a WFH option. There is a strong association between workers' education and the availability of WFH in their current job. The table also shows the distribution of other job amenities in our sample. More educated and male workers in our sample are more likely to have a flexible schedule and, on average, have a slightly higher number of paid days off. In addition, male and more educated workers are more likely to have longer commutes. The gender wage gap is close to the actual one in Germany (Destatis, 2022b).⁹ Table A1 in the Appendix shows descriptive statistics by age groups and wage quintiles.

2.2 Estimation Approach

We estimate the WTP for job characteristics following Maestas et al. (2018). That is, we assume that the binary choices of participants reflect a linear indirect utility function

$$V_{ijt} = \alpha + X'_{ijt}\beta + H'_{ijt}\theta + \delta \ln w_{ijt} + \epsilon_{ijt} \quad (1)$$

where V_{ijt} represents individual i 's indirect utility from alternative j and choice pair t . X_{ijt} represents the vector of non-wage job characteristics, H_{ijt} is a function of hours, and w_{ijt} is the wage rate. Using a logistic specification, we thus model the probability to select job j over job k as

$$P(V_{ijt} > V_{ikt}) = \frac{\exp[(X'_{ijt} - X'_{ikt})\beta + (H'_{ijt} - H'_{ikt})\theta + \delta(\ln w_{ijt} - \ln w_{ikt})]}{1 + \exp[(X'_{ijt} - X'_{ikt})\beta + (H'_{ijt} - H'_{ikt})\theta + \delta(\ln w_{ijt} - \ln w_{ikt})]} \quad (2)$$

The indifference condition between a job not having attribute r at wage w and one that has attribute r and pays $w - WTP^r$ is

$$\delta \ln w = \beta^r + \delta \ln(w - WTP^r) \quad (3)$$

⁹Note that the wage information is missing for 12.2% of all subjects. For details, see Appendix Section A.1.

Table 1: Sample descriptives

	All	Females	Males	Education		
				Low	Medium	High
Working from home						
No WFH	0.68	0.71	0.65	0.82	0.73	0.33
WFH up to 2 days	0.18	0.16	0.20	0.10	0.16	0.38
WFH up to 5 days	0.14	0.12	0.15	0.08	0.11	0.29
Flexible schedule	0.36	0.31	0.40	0.27	0.32	0.61
Paid days off	28.65	28.31	28.94	28.52	28.59	29.02
Commuting time						
0-15 minutes	0.32	0.36	0.29	0.37	0.32	0.24
16-30 minutes	0.37	0.37	0.37	0.37	0.39	0.33
31-45 minutes	0.19	0.16	0.21	0.17	0.18	0.25
46-60 minutes	0.08	0.07	0.09	0.07	0.08	0.11
>60 minutes	0.04	0.03	0.05	0.03	0.03	0.07
Weekly work hours	36.92	33.61	39.77	36.54	36.47	38.72
Gross hourly wage	19.52	17.10	21.53	17.24	18.27	26.17

Note: This table shows descriptives on the subjects' current job. We use these job characteristics to construct a subject-specific baseline job profile for the experiment. The number of participants is 3,307. High-educated workers are those with a college degree. Medium-educated workers are those with a high-school degree or a vocational degree. The share of females is 46.3%. The share of low- (medium-, high-) educated is 31.0% (50.2%, 18.8%). In the last row, we exclude subjects who did not report a wage for their current job (12.2% of respondents).

where the willingness-to-pay WTP^r for attributes that enter the indirect utility negatively would be negative. WTP^r is thus given by

$$WTP^r = w \left[1 - e^{\left(-\frac{\beta^r}{\delta}\right)} \right] \quad (4)$$

Following Maestas et al. (2018), we display all results in percent of w . This means that gaining a job attribute corresponds to a $100 \left[1 - e^{\left(-\frac{\beta^r}{\delta}\right)} \right]$ % wage increase. We compute standard errors, allowing for clustering within respondent, using the delta method.

We also use our estimates to inform on the consequences of WFH for inequality. To this end, we again follow Maestas et al. (2018). Building on Equation (4), we compute the log compensation (i.e., wage plus amenity value of WFH) for each worker

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 which we allow to differ between worker groups. To obtain standard errors, we perform a block (by respondent) bootstrap with 200 replications.

3 Workers' willingness-to-pay to work from home

3.1 Working from home is valued substantially, but it does not dominate other amenities

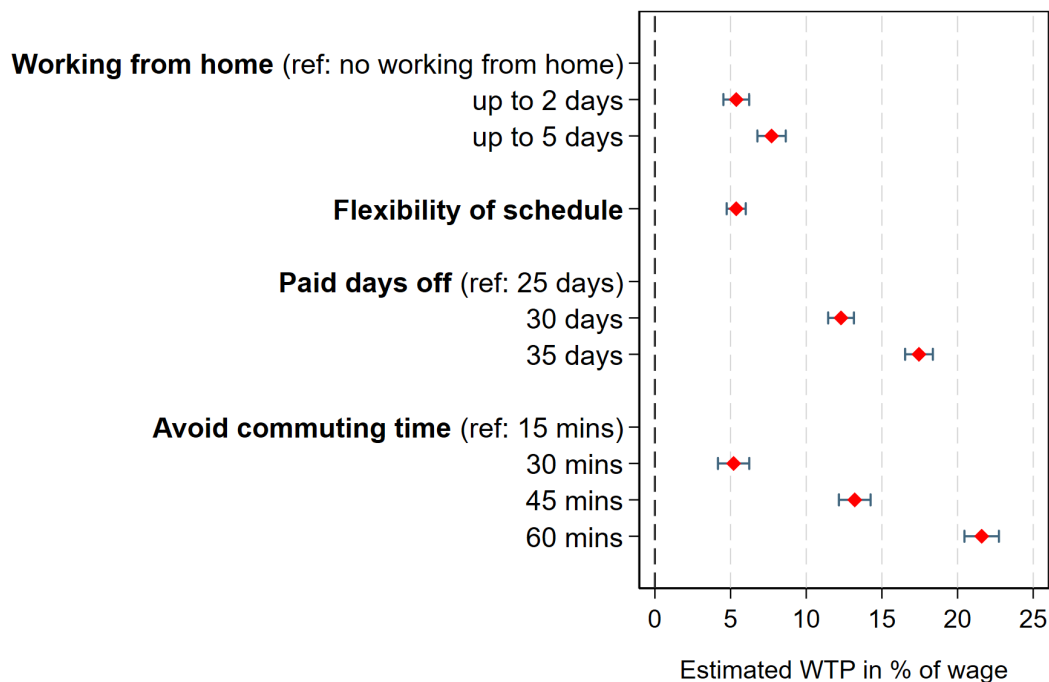
Figure 1 shows the baseline results from our stated-preference experiment, along with 95% confidence intervals. The first two rows show our estimates of the average willingness-to-pay to work from home for up to 2 days and up to 5 days per week, respectively. These are the job amenities we focus on in this paper. On average, workers are willing to give up 5.4% of their earnings to have the option to work from home for up to 2 days per week. This willingness-to-pay is substantially larger than a comparable recent survey-based estimate by Aksoy et al. (2022) for Germany (3.7%). To obtain the option to work from home for up to 5 days per week, workers in our sample are willing to give up around 7.7% of their earnings. This valuation is similar to the experimental estimate of the willingness-to-pay for WFH among call-center applicants in Mas and Pallais (2017) and somewhat higher than the pre-pandemic estimate from Maestas et al. (2018) for the United States whose experimental design we follow. Both the valuation for up to 2 and up to 5 days of WFH are precisely estimated.

Having established that the average worker in our sample has an economically significant willingness-to-pay for WFH, we benchmark workers' valuation for WFH against other job amenities. We focus on amenities for which the literature provides reference estimates of worker valuations, or that are highly relevant in the German labor market.

Below the estimates for WFH, Figure 1 shows how much workers in our sample value schedule flexibility, the number of paid days off, and avoiding longer commuting times. Regarding schedule flexibility, we estimate an average willingness-to-pay of 5.4% of earnings from a job with no flexibility. This estimate lies in between the results by Maestas et al. (2018) and the results by Mas and Pallais (2017). Hence, the average worker values a flexible work schedule about the same as the option to work from home up to 2 days per week.

Next, we turn to paid days off as a job amenity. The legal minimum in Germany is 20 paid days off for full-time workers, and the average worker in our sample reports

Figure 1: Willingness-to-pay for working from home and other job amenities



Note: This figure shows workers' average willingness-to-pay for specific job attributes in percent of earnings. The first two rows show workers' willingness-to-pay to work from home for up to two days and up to five days per week, respectively. The reference category is no option to work from home. The third line shows workers' willingness-to-pay to have schedule flexibility. The fourth and fifth line show estimates of workers' willingness-to-pay for 30 and 35 paid days off, respectively, relative to 25 days. The final three rows show workers' willingness-to-pay to avoid a commute of 30 minutes, 45 minutes, and 60 minutes, respectively. The reference category is a 15-minutes commute. The (red) diamonds indicate point estimates, the bars reflect 95% confidence intervals where standard errors allow for clustering at the respondent level. Each of the 3,307 respondents did participate in 10 stated-preference experiments. The number of observations is 33,070.

having 28.6 paid days off in her current job. We therefore used 25 paid days off as a reference category and present in Figure 1 estimates of workers' willingness to pay for 30 and 35 days, respectively. We estimate that workers are willing to give up 12.3% of their earnings in order to switch from a job with 25 paid days off to an otherwise identical job that features 30 paid days off. Hence, the valuation of 5 additional paid days off (starting from a level of 25 days) significantly exceeds the valuation of even the most flexible arrangement regarding WFH (up to 5 days per week). Interestingly, workers in Germany seem to have quite substantial valuations for additional paid days off even beyond a baseline of 30 days. The valuations of 30 and 35 paid days off (relative to 25) are similar to worker valuations of 10 and 20 paid days off in the United States (relative to no paid days off, see Maestas et al., 2018). The comparably high valuation of paid days off in Germany is consistent with large differences on average in workers' actual number of paid days off between the United States and Germany.

At the bottom of Figure 1, we report estimates of workers' willingness-to-pay to avoid commutes. The average worker in our sample is willing to give up 13.2% of earnings to reduce a commute of 45 minutes to 15 minutes. Again, this valuation is substantially larger than workers' willingness-to-pay for even the most flexible WFH option (up to 5 days per week).¹⁰

Figure 1 demonstrates that workers in Germany have an economically significant willingness-to-pay for WFH, but they value other non-wage job attributes even more. The average willingness-to-pay for maximum flexibility in terms of WFH (up to 5 days a week) amounts to only about 58% of the willingness-to-pay for reducing a commute of 45 to 15 minutes, and about 63% of the willingness-to-pay for increasing the number of paid days off from 25 to 30 (the most common value of full-time workers in Germany). The average valuation of the option to work from home for up to 2 days a week is about the same as the valuation for work schedule flexibility. We conclude that WFH is an important amenity for workers, but our data do not support the notion that COVID has led workers' valuations of alternative work arrangements to be dominated by the availability of WFH options.

3.2 Working from home is valued differently across workers and contributes to inequality

Are these average estimates reflective of workers' willingness-to-pay for WFH or do they mask important heterogeneities? Figure 2 reports results on this question. In Panel (a), we show workers' willingness-to-pay to work from home for up to 2 days per week. Workers' willingness-to-pay is slightly higher for female (6.1%) than for male (4.8%) workers. The largest valuation for WFH is among young individuals (6.6%), with workers above 50 valuing WFH least (2.9%). WFH is most popular among highly educated workers (7.9%) and least valued among low-educated workers (3.7%). Finally, the willingness-to-pay for WFH is highest among high-earning individuals (7.5%) and lowest in the bottom quintile of the wage distribution (3.9%).

Panel (b) repeats this analysis for willingness-to-pay to work from home up to 5 days per week. Workers' valuation of WFH is higher, at 7.7% on average. The heterogeneity of effects is even more pronounced, especially regarding age and education. For instance, workers aged 20-29 now value WFH at 10.6% of their earnings, while workers aged 50-60 value it at 4.5% of their earnings. Similarly, while highly educated workers display a willingness-to-pay of 12.2%, low-educated workers show a valuation of 5.7%.

We can also test whether our data are consistent with sorting, a prediction from classic theories of compensating differentials with heterogeneous workers (Rosen,

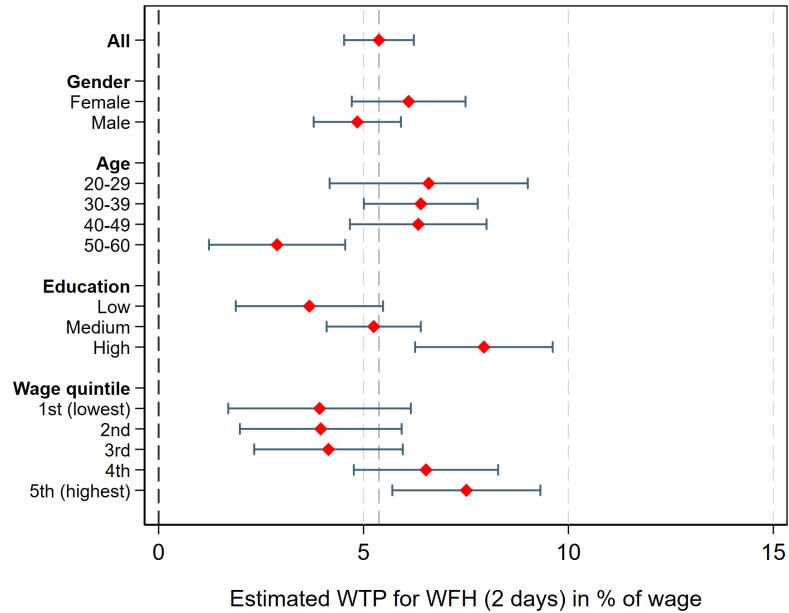
¹⁰In line with Maestas et al. (2018), we find that workers on average have a preference for a standard full-time week, conditional on their hourly wage.

1986). In Appendix Figure A5, we show that workers who can work from home in their current job show substantially higher willingness-to-pay to work from home for 2 days (10.3%) and 5 days (16.4%) than workers who do not (3.1% and 3.7%, respectively). This divide is consistent with workers sorting into WFH based on their preferences.¹¹ Taking Rosen (1986) seriously, these estimates also bound the compensating wage differential for WFH since the willingness-to-pay of workers who sorted into jobs with WFH should be above the willingness-to-pay of marginal workers, while the willingness-to-pay of workers who did not should be below.

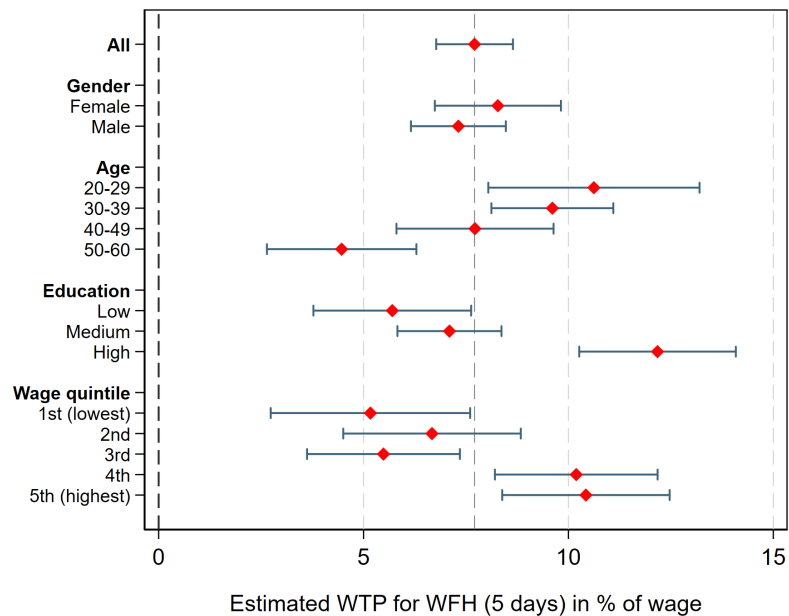
¹¹Similarly, in Appendix Figure A6, we show that workers who report a commuting time of more than 30 minutes in their current job show lower willingness-to-pay to avoid commuting.

Figure 2: Heterogeneity of estimates of willingness-to-pay to work from home

(a) Up to 2 days per week



(b) Up to 5 days per week



Note: Panel (a) and panel (b) show the workers' willingness-to-pay for working from home for up to two days per week and up to five days per week in percent of earnings, respectively. In each panel, the first row shows the average willingness-to-pay for all respondents in the sample. The following rows provide estimates for specific subgroups. When computing wage quintiles, we drop observations with missing information on the worker's wage in her current job (12.2% of respondents). The (red) diamonds indicate point estimates, the bars reflect 95% confidence intervals where standard errors allow for clustering at the respondent level.

Given the heterogeneities in the valuation of WFH shown in Figure 2 and the unequal distribution of WFH options in the current job across demographic groups (see Tables 1 and A1), a natural follow-up question is whether WFH contributes to compensation inequality in a meaningful way. In Figure 3 we show that this is the case for example for inequality between high- and low-educated workers. 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%.¹² 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 3. The only difference is that the relative importance of other job amenities seems to be higher in this case.

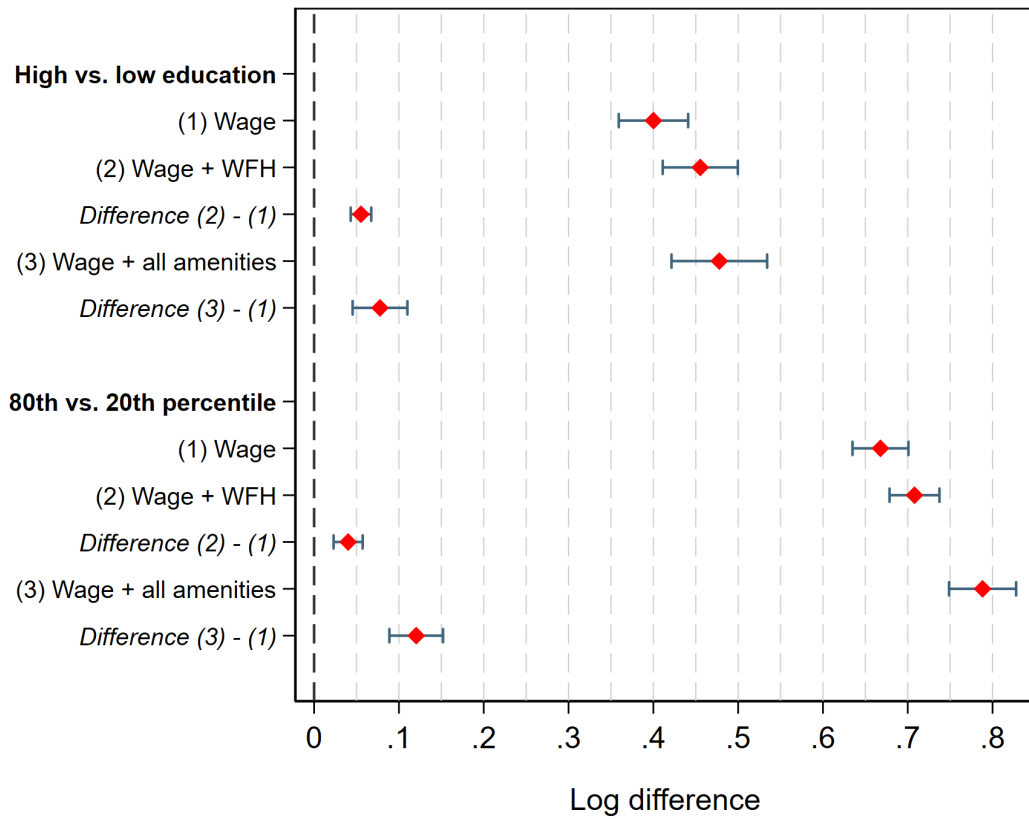
Thus, while the amenity value of WFH is not exceedingly large relative to other job attributes, its effect on inequality is substantial. Therefore, our results suggest that a further expansion of WFH opportunities for highly educated and high-earning workers might have important implications for compensation inequality. However, the extent to which a further expansion of WFH opportunities 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).

¹²We follow the methodology by Maestas et al. (2018). 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.

Figure 3: 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.

3.3 Working from home and commuting interact meaningfully

One of the main benefits of WFH for workers is arguably the reduction in commuting time associated with WFH (e.g., Barrero et al., 2021). Given that over 30% of our respondents commute more than 30 minutes to their work (one-way), the potential benefits from WFH in terms of saved commuting time are sizable. This is why the next step of our analysis is to investigate the relationship between working from home and commuting.

Panel (a) of Figure 4 shows the willingness-to-pay to avoid specific commuting times holding the hypothetical jobs' WFH arrangement constant. The first three lines, for example, show workers' willingness-to-pay to avoid a commute (relative to a 15 minutes commute) of 30 minutes, 45 minutes, and 60 minutes, respectively, when both jobs have no option to work from home. The panel shows that workers' willingness to pay to avoid commutes declines with WFH. At the most extreme, workers' willingness-to-pay to avoid a commute of 60 minutes is cut in half under the option to work from home up to 5 days, relative to no WFH option.¹³

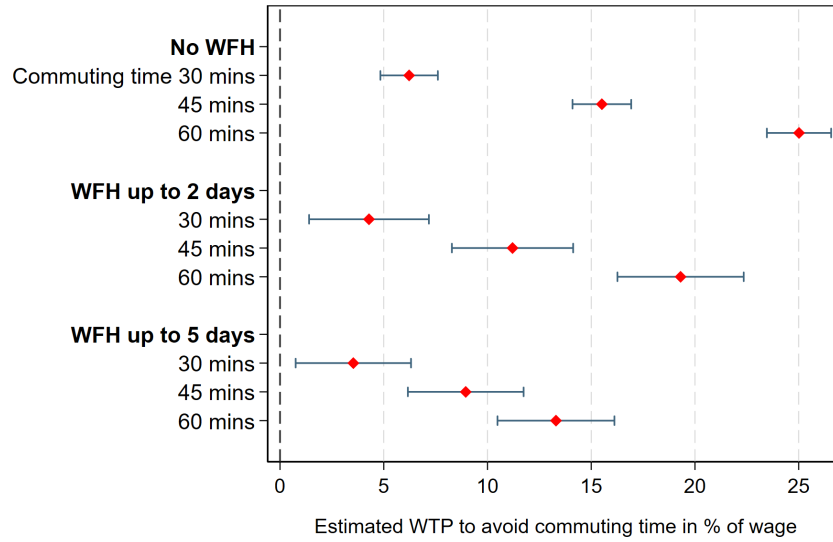
These results suggest that firms may be able to attract workers from further away at the same wage rate if they offer WFH or, correspondingly, attract workers with a given commuting distance at a substantially lower wage rate under WFH. In addition, through the lens of job search models, these results suggest that an expansion of WFH opportunities might change the matching between workers and firms, with potentially important welfare and distributional implications.¹⁴

¹³Figure A7 in the Appendix correspondingly shows estimates of workers' willingness-to-pay for WFH options holding both jobs' commuting distance constant. In line with the results above, worker valuations of WFH increase with commuting distance. At the most extreme, under a commute of 60 minutes workers value the option to work from home up to 5 days a week more than twice as much than under a commute of 15 minutes.

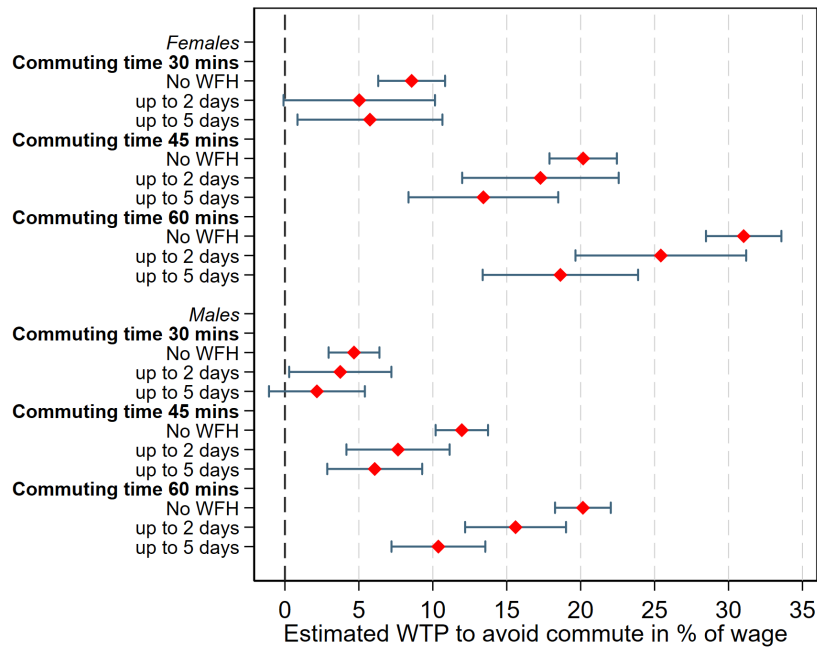
¹⁴For example, Dauth et al. (forthcoming) provide evidence that better (or more assortative) matching between workers and firms increases average earnings and earnings inequality.

Figure 4: WTP to avoid commute by WFH options and gender

(a) WTP to avoid commute by working from home option



(b) WTP to avoid commute by gender and option to work from home



Note: This figure shows the relationship between working from home and commuting. Panel (a) depicts the WTP to avoid a certain commuting time, holding the hypothetical jobs' WFH option constant. The reference category is a commute of 15 minutes. Panel (b) shows the WTP to avoid commuting, separately by gender, holding the hypothetical jobs' WFH option constant. The (red) diamonds indicate point estimates, the bars reflect 95% confidence intervals where standard errors allow for clustering at the respondent level.

Finally, we leverage our experiment to inform the debate around the gender gap in commuting. The motivation for this analysis stems from recent research showing a sizable gender gap in the willingness to accept jobs involving longer commutes that translates into marked gender gaps in important labor market outcomes (Le Barbanchon et al., 2021; Caldwell and Danieli, 2022). Regarding the focus of our paper, an interesting question is whether the option to work from home closes this gender gap in the willingness-to-pay to avoid commuting. This could for instance work through reducing family-work conflicts for mothers (Sherman, 2020).

Panel (b) of Figure Figure 4 provides an answer to this question. It shows the willingness to pay to avoid different commutes conditional on WFH options by gender. The first three rows of this figure, for example, show women’s willingness to pay to avoid a commute of 30 minutes (relative to a commute of 15 minutes) conditional on not having the option to work from home, conditional on the option to work from home for up to two days, and conditional on the option to work from home up to 5 days a week, respectively. The figure shows that under no WFH, women have a substantially higher willingness-to-pay to avoid commutes, in line with prior evidence.¹⁵ In addition, it shows that both for men and women, the willingness-to-pay to avoid commutes decreases substantially with WFH, especially for long commutes. Importantly, it finally shows that, while the differences between men and women in their willingness-to-pay to avoid commutes decrease under WFH, the gender gap does not disappear. Another insight from our study is therefore that even a strong increase in the availability of WFH options to workers is unlikely to close the gender commute gap. One reason for this result may be that even though workers value WFH, they still like to go to the office sometimes (Barrero et al., 2021).

4 Conclusion

How much do workers actually value working from home? In this paper, we report evidence from a stated-preference experiment among a representative sample of German employees conducted in July 2022, after the main phases of the COVID pandemic.

Our experimental data suggest that workers are willing to give up 5.4% of their earnings for WFH up to 2 days and 7.7% of earnings for WFH up to 5 days a week. While these estimates are economically sizable, it is important to put them into perspective by comparing them to workers’ valuations of other job amenities. This comparison reveals that the workers in our sample have an average willingness-to-pay

¹⁵Figure A8 in the Appendix experimentally replicates the finding that women have a substantially higher willingness-to-pay to avoid commuting, especially for longer commutes, when not conditioning on WFH options.

to avoid long commutes or to obtain additional paid days off that significantly exceeds the willingness-to-pay for any WFH option.

We however also demonstrate substantial heterogeneity in workers' willingness-to-pay to work from home. The valuation of WFH is substantially larger for female, young, high-educated, and high-earning workers. In line with theory, we also observe sorting on workers' willingness-to-pay into WFH: those who report having the option to work from home show a substantially higher valuation of this job attribute. We also find that WFH contributes to compensation inequality across education levels and across wage percentiles. Interestingly, the willingness-to-pay for WFH increases with commuting distance, and the option of WFH reduces the willingness-to-pay to avoid commuting. Finally, we show that WFH reduces the gender gap in willingness-to-pay to avoid commuting, but even a very flexible WFH option does not close the gap.

Taking stock, these results suggest that firms offering WFH might be able to attract talented workers who might otherwise live too far away to be willing to accept a job offer at the given wage. This is of particular interest in the light of expected increases in labor shortages, for example due to demographic change. Our estimates also suggest that WFH contributes to inequality. From an aggregate perspective, a further expansion of WFH opportunities might therefore have substantial welfare and distributional implications.

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A Appendix

A.1 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 $\{15, 20, 25, \dots, 55, 60\}$ 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.¹⁶ 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 $\{15, 16, \dots, 59, 60\}$. 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. If the (implied) hourly wage was below the current minimum wage in Germany, the survey

¹⁶The 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.

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 A1, 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
Arbeitsstunden	40 Stunden pro Woche	40 Stunden pro Woche
Urlaubstage	25 Tage pro Jahr	30 Tage pro Jahr
Termindruck	gelegentlich	gelegentlich
Multitasking: Mehrere wichtige Aufgaben gleichzeitig	gelegentlich	gelegentlich
Flexible Arbeitszeiten	nein	nein
Möglichkeit der Heimarbeit	2 Tage pro Woche	nein
Mittlere Dauer des Wegs zum Arbeitsplatz	45 Minuten	45 Minuten
Bruttoverdienst	€ 37,80 pro Stunde	€ 37,10 pro Stunde

	Job A	Job B
Welchen Job würden Sie bevorzugen?	<input type="radio"/>	<input type="radio"/>

Note: Panel (a) shows a screenshot of a choice between two hypothetical jobs. In English, the rows read: Work hours, 40 hours per week, 40 hours per week; Paid days off, 25 days per year, 30 days per year; Deadlines, occasionally, occasionally; Multitasking: multiple important tasks at the same time, occasionally, occasionally; flexible schedule, no, no; Option to work from home, 2 days per week, no; Mean commuting time to workplace, 45 minutes, 45 minutes; Gross earnings, 37.80 EUR per hour, 37.10 EUR per hour; Which job would you prefer?

Figure A2: Screenshot of trick question

Um zu zeigen, dass Sie alle Hinweise sorgfältig lesen, markieren Sie bitte bei der folgenden Frage die beiden Optionen

- "Freunde, Bekannte und Kolleg*innen nach Jobs fragen" und
- „Jobmessen“.

Ja, bitte ignorieren Sie den Wortlaut der Frage und markieren Sie die beiden genannten Optionen. Danke!

Welche der folgenden Möglichkeiten ist Ihrer Meinung nach bei der Jobsuche am effektivsten?

- ☐ Stellenanzeigen lesen (online oder print)
- ☐ Internet-basierte Jobsuche, Jobportale
- ☐ Freunde, Bekannte und Kolleg*innen nach Jobs fragen
- ☐ Initiativbewerbung, direkte Anfrage beim Arbeitgeber
- ☐ Suche über Soziale Medien, wie z.B. Facebook oder LinkedIn
- ☐ Andere Soziale Medien, wie z.B. Twitter
- ☐ Jobmessen
- ☐ Arbeitsvermittlung, Arbeitsagenturen
- ☐ Private Stellenvermittlungsagenturen

Note: Panel (a) shows a trick question. In English, it reads: To show that you are reading carefully, please mark these two options in the following question: Asking friends, acquaintances and colleagues for jobs; Job fairs. Yes, please ignore this question and simply mark these two options. Thank you! Which of the following methods do you think is most effective when searching for a job? Reading job ads (online or print); Internet-based job search, job portals; Asking friends, acquaintances and colleagues for jobs; Unsolicited application, directly asking an employer; Search through social media like facebook or LinkedIn; Other social media like Twitter; Job fairs; Public employment agency; Private employment agency.

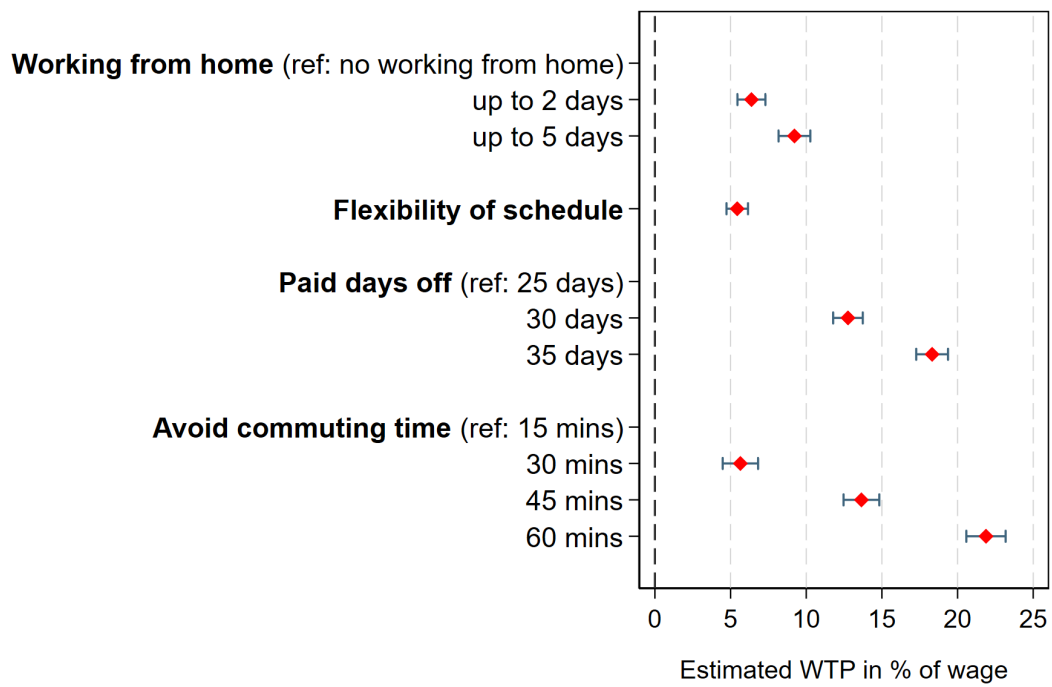
A.2 Further Results

Table A1: 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

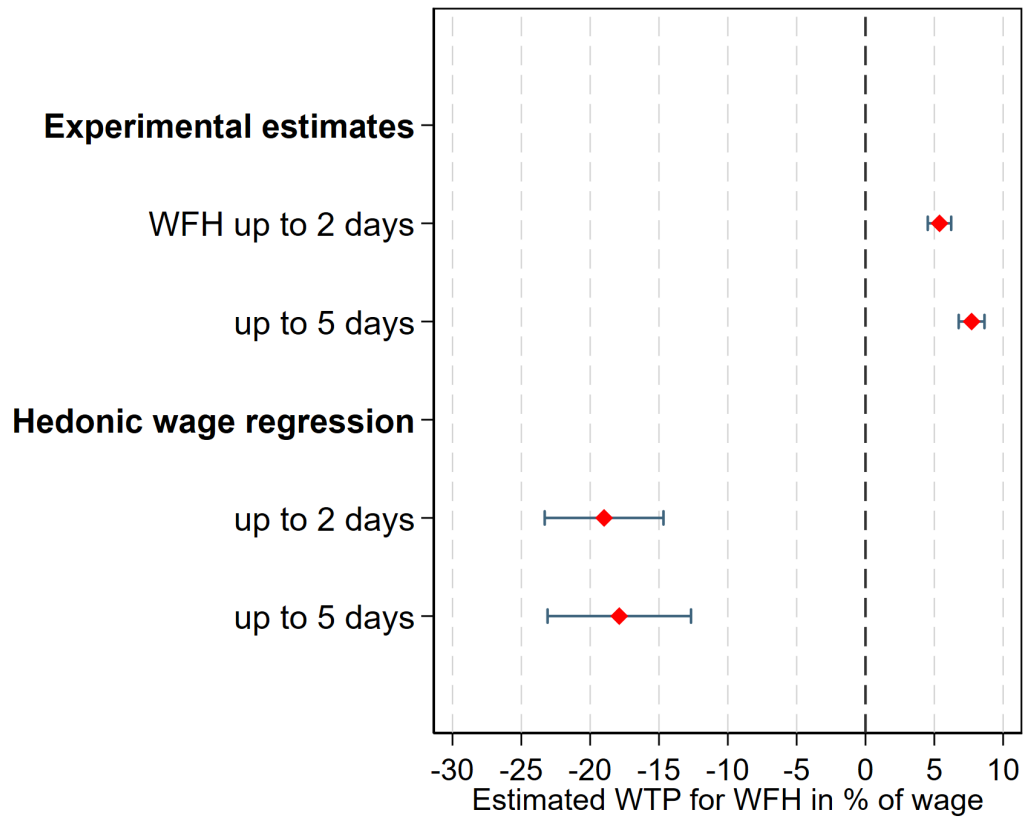
Note: The table shows descriptives on the participants' current job which we use as a baseline for the experiment. Number of participants is 3,307. The share of age groups 20-29 (30-39, 40-49, 50-60) is 9.9% (31.8%, 25.8%, 32.6%). In the last row, we exclude respondent where the hourly wage in the current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

Figure A3: Baseline results for respondents who passed attention checks



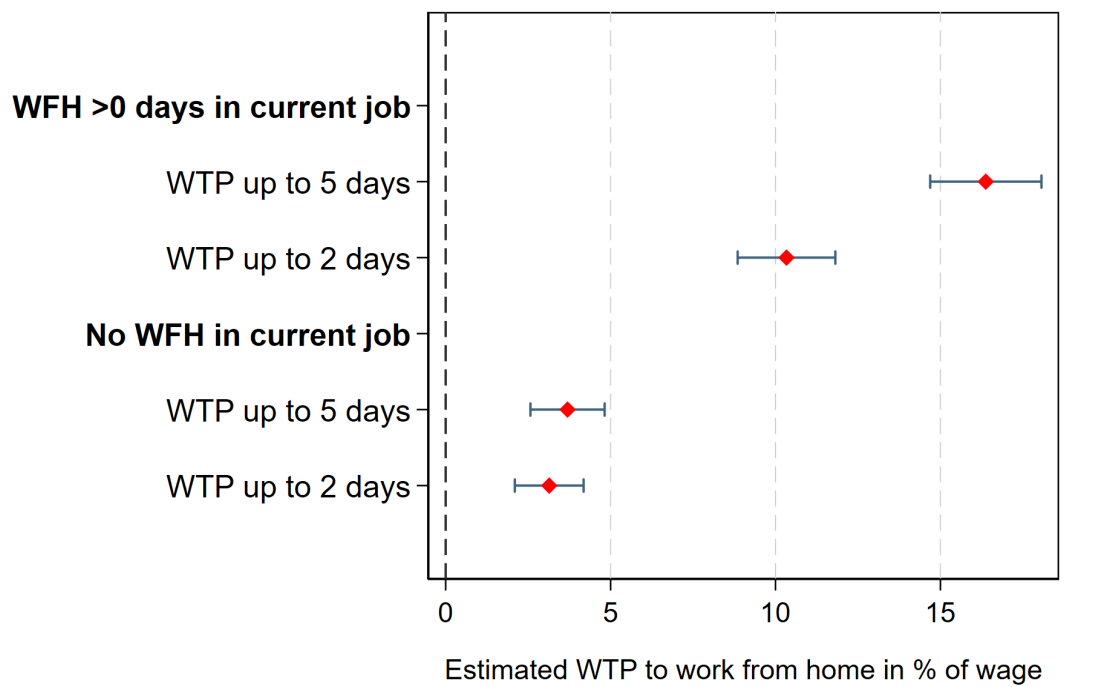
Note: The figure shows the baseline results for respondents who passed both attention checks. 65.6% of all respondents passed both attention checks. The (red) diamonds indicate point estimates, the bars reflect 95% confidence intervals where standard errors allow for clustering at the respondent level.

Figure A4: Hedonic wage regressions produce wrong-signed estimates



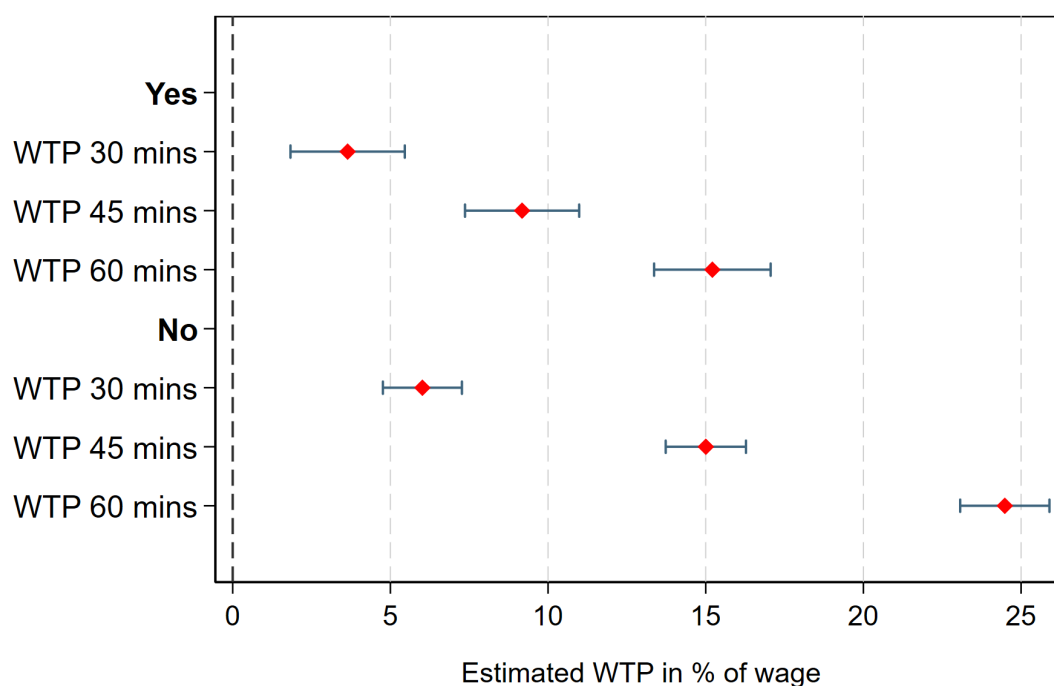
Note: The figure compares the WTP to work from home from the stated-preference experiment with estimates from a hedonic wage regression where we regress the log hourly wage on indicators for WFH, controlling for gender, 4 age groups, 3 education groups, and all other job attributes included in the experiment.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

Figure A5: Sorting: workers' willingness-to-pay for working from home by current WFH status



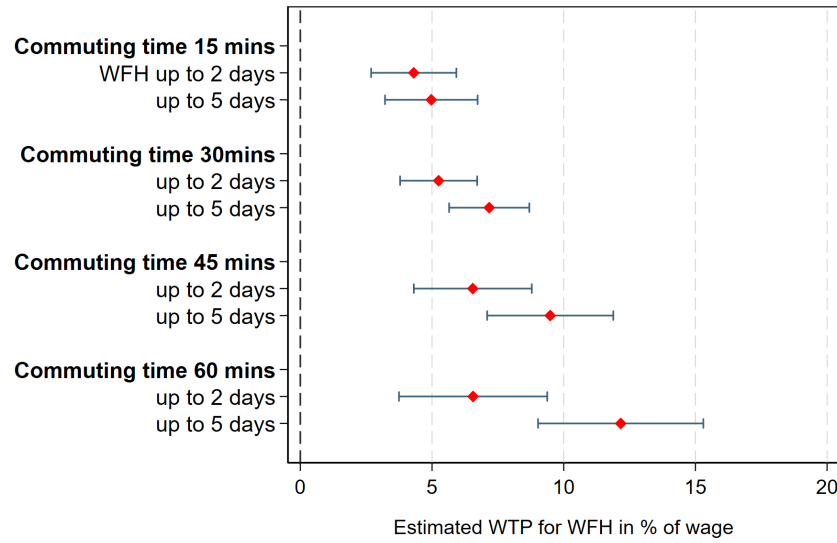
Note: The figure shows the WTP to work from home, separately for respondents who have the option to work from home in their current job and respondent who do not have to option to work from home in their current job. The (red) diamonds indicate point estimates, the bars reflect 95% confidence intervals where standard errors allow for clustering at the respondent level.

Figure A6: Sorting: workers' willingness-to-pay to avoid commute by whether they currently commute > 30mins



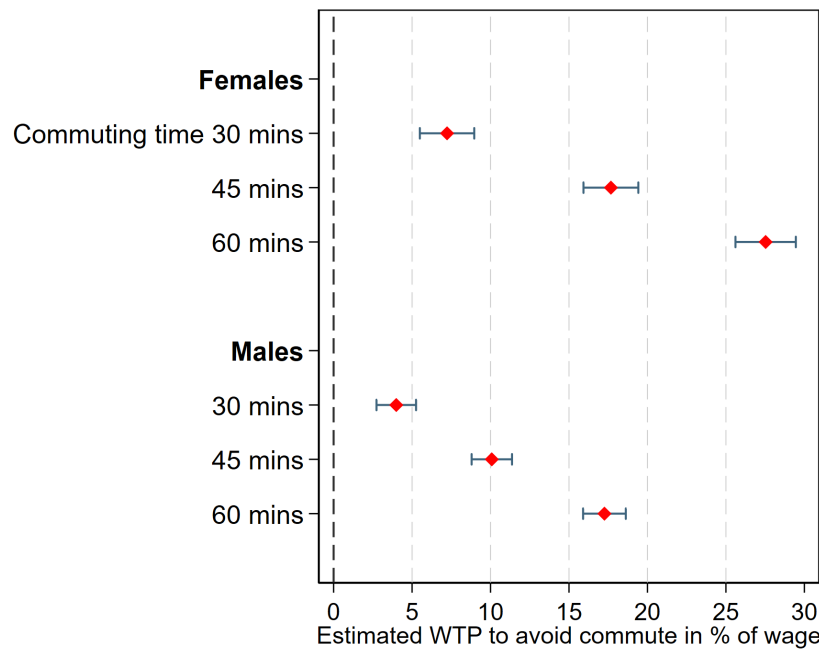
Note: The figure shows the WTP to avoid commuting, separately for respondents who commute more than 30 minutes to the workplace in their current job and respondents who do not commute more than 30 minutes to the workplace in their current job. The (red) diamonds indicate point estimates, the bars reflect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

Figure A7: WTP to work from home by commuting time



Note: This figure shows the relationship between working from home and commuting. It shows the WTP for WFH options, holding the hypothetical jobs' commuting time constant. The reference category is no WFH option. The (red) diamonds indicate point estimates, the bars reflect 95% confidence intervals where standard errors allow for clustering at the respondent level.

Figure A8: Gender differences in WTP to avoid commute



Note: This figure indicates the gender differences in WTP to avoid commute by WFH. It shows the WTP to avoid commuting separately for females and males, respectively. The (red) diamonds indicate point estimates, the bars reflect 95% confidence intervals where standard errors allow for clustering at the respondent level.