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Will working from home eventually work? Revisiting survey evidence with an information experiment

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Abstract

We provide survey subjects with a mild information treatment about consequences of working from home (WFH) for productivity, life satisfaction and career prospects. With a spiking prevalence of WFH during the covid-19 pandemic, existing research utilizes stated preferences for WFH from surveys to argue that workers' preferences were permanently shifted. We put into empirical test the stability of stated preferences for WFH. We find robust treatment effects for stated preference for WFH, attitude towards WFH as well as self-assessed changes in productivity.

Keywords:

non-standard working arrangements, job satisfaction, gender

JEL Classification

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1 Introduction and motivation

We put into empirical test the stability of stated preferences for working from home (WFH). With a spiking prevalence of WFH during the covid-19 pandemic, existing research utilizes stated preferences for WFH from surveys to argue that workers' preferences were permanently shifted (Barrero et al., 2021b). Barrero et al. (2021a) even forecast from survey data, that 40% of US workers will leave their jobs if they are not offered an option to continue WFH after the pandemic. Yet, stated preferences are famous for confounding many factors on top of actual preferences (Zaller & Feldman, 1992). They are notorious for status quo bias (Johansson-Stenman & Svedsater, 2012; Quaife et al., 2018) and path-dependent in terms of individual experience (Johnston et al., 2017).

We field a large-scale real-time social survey with an information treatment. We provide participants with true information about the effects of WFH on productivity, chances of promotion, and life satisfaction using pre-pandemic causal evidence. We include a control group, which did not receive any information about the effects of WFH. We then ask participants about their preferred frequency of WFH, their attitude to WFH and their self-assessed changes in productivity due to WFH. If survey evidence was to inform future policy of firms and regulators, the respondents should not react to information treatment.

Our paper builds on three strands of burgeoning literature studying the WFH phenomenon. First, **the covid-19 pandemic experience has changed substantially the role of WFH in the modern societies**. Before the covid-19 pandemic, WFH prevalence was low: approximately 10% of the US and European labor force worked from home. WFH was found to cause difficulties in communication with co-workers and issues with work-life-balance, increase stress and probability to feel burnout (Hayes et al., 2020; Mas & Pallais, 2017; Rubin et al., 2020). The prevalence of WFH grew rapidly during the pandemic, though such an arrangement was not possible in many jobs (Dingel & Neiman, 2020; Felstead & Reuschke, 2023; Mueller-Langera & Gomez-Herrera, 2021). Barrero et al. (2021a, 2021b) argue that preference for WFH is currently higher and workers will opt out of jobs without permanent WFH provisions.

Second, **scholars and stakeholders alike ponder about the persistence of this change**. Mueller-Langera and Gomez-Herrera (2021) show that there was an increase in demand for and supply of WHF jobs. Some hike in the popularity of WFH was noticeable alrady in 2019, and continues after the covid-19 pandemic (see also Hansen et al., 2022). In surveys, workers invariably express positive preference for WFH, especially those who have experience with this work arrangement (Barrero et al., 2021a, 2021b). The workers are willing to give up a sizable share of earnings to WFH (Lewandowski et al., 2022). However, employers require a much higher discount, anticipating productivity drops. Using a randomized field experiment, Shinde et al. (2022) show that the negative productivity effects are economically large. Random assignment of WFH is detrimental to productivity. It is actually especially detrimental for the most productive workers. Kitagawa et al. (2021) argue that the decline in productivity occurs due to communication difficulties which are less pronounced among workers who collaborate *in situ*. Using a quasi-natural experiment, Emanuel et al. (2022) argue that frequency and quality of feedback is lower with WFH.

Likewise, self-reported productivity appears to have declined. For example, or the case of Japan, workers report productivity drop by as much as 30-40% Morikawa (2020). In the UK, Felstead and Reuschke (2023) provide evidence on the self-reported productivity gaps for workers who compare their outcomes from during the pandemic WFH episodes to the post-pandemic work *in situ*. They also show that roughly one in six workers report that their productivity has declined, but 90% would like to continue WFH even when there is no longer epidemiological need to do so.

Third, **there appears to be heterogeneity in popularity of WHF and its effects**. The effects of WFH on workers differ across job titles and previous experience with WFH. Etheridge et al. (2020) show that the workers who were able to flexibly adjust WFH and in situ report the largest declines in productivity when pandemic made it impossible to combine the two. They also show that the declines in productivity are associated with declines in mental health. Prior experience of WFH is associated with a lower decline in productivity (Felstead & Reuschke, 2023). However, pre-pandemic WFH was highly selective, with an eight-fold rise in popularity during the Spring of 2020.

Against this literature, we find that respondents react strongly to information about the effects of WFH. Treatment effects are statistically significant and economically large, even for variables that should not be affected by the treatment. These results indicate that discussions based on survey evidence should be taken with a grain of salt. The valuation of WFH responds to fundamentals, but also to narratives available to respondents.

The paper is structured as follows. We first describe the data in section 2 and our experimental design in section 3. We present results in section 4. This section reports also a battery of robustness checks to our main results. We conclude the paper with main policy implications of our study.

2 The data

We embedded our experiment in a large real-time labor survey in Poland, DIAGNOZA.plus (D+). D+ was established in May 2020 with the objective to collect timely and reliable data on labor market developments in Poland during the Covid-19 pandemic. With the outbreak of pandemic, timely data about economic and social developments were missing. Around the world, the academic community engaged in gathering data online; the examples include Bick and Blandin (2021) for the US (the Real-Time Population Survey, RTPS), Adams-Prassl et al. (2020) for a comparative study of the UK, US and Germany, Belot et al. (2020) for China, South Korea, Japan, Italy, the UK and the four largest states in the US. These and other studies typically relied on online panels (such as Qualtrics) and recruitment of participants via social media. The D+ project was a joint initiative of the University of Warsaw and several independent research centers specialized in labor economics.

The D+ survey is bi-monthly and it is implemented online. Participation is rewarded via lotteries, where the expected value is between USD 0.30 and USD 3, depending on the wave. The respondents are sourced through traditional media, social media (such as Facebook and Twitter) as well as through snowball sampling (the respondents are repeatedly encouraged to spread the information about D+ in their network of family members, friends and professional colleagues). In addition, the participants are invited from an online participant panel ANSWEO (a Polish online panel, similar to Qualtrics). The sample focuses on individuals who are likely to participate in the labor market. Thus, individuals above retirement age cannot join the survey. Individuals above 18 years of age, but whose primary activity is education, cannot join the survey. Table A1 presents sample sizes in D+ when compared to other online surveys used in the literature during the Covid-19 pandemic.

For each respondent, D+ collects information on various demographic characteristics: age, gender, education, and household structure. In each wave of D+, the questionnaire consists of two parts: a core questionnaire based on the labor force survey and an ad hoc module, different across waves. In this study we use the seventh wave of D+, which featured ad hoc questions about working from home. The seventh wave of D+ was fielded between June 18th and July 13th 2021. At that time, the cases of covid-19 had dropped considerably, reaching the lowest levels since the start of the pandemic, reinforcing the hopes

that the pandemic was nearing to an end. We collected 4557 responses, with 3714 respondents in the labor force. In this group, 1700 respondents were employed at the time of the survey and had some WFH experience.

3 The design

The WFH module contained two parts: a survey about previous experience of WFH during the pandemic, and the information treatment experiment. Survey questions were asked to salaried workers and self-employed in the week before the survey. These questions inquired on the policy at their firms for the next six months, and on whether they had WFH at all during the pandemic. Among those who had had any WFH experience, we asked about advantages and disadvantages, the investment required to secure WFH, and the share of tasks that could be perform remotely without detriment of productivity.[1]

Participants were randomly assigned to one of four conditions: a control treatment (who received no information) and three experimental treatments, who received true information about the implications of WFH. Assignment a control group or to one of the treatment conditions occurred when participants joined the survey. Incomplete surveys are random to treatment assignment.

Each experimental treatment had the same opening ("*Before the pandemic, in situations where WFH was possible, research has causally demonstrated that ...* ").[2] Three experimental treatments provided the following information:

> [t: Satisfaction] "*... individuals working from home on average report lower life satisfaction and increased feeling of loneliness.* "
>
> [t: Productivity] "*... there was no difference in productivity between individuals working from the office and those working from home.*"
>
> [t: Career] "*... workers working from home had a smaller chances for promotion than their colleagues working on site.*"

Content of our treatments' messages is based on the review of research papers regarding working from home. In particular, the "life satisfaction" treatment is mainly based on the insights from Mann and Holdsworth (2003) pointing out the negative emotional impact of teleworking. The "productivity" treatment is built on Etheridge et al. (2020) showing that workers when self-reported find no difference in their productivity between working in the office and at home. The "career" treatment comes from the result of Bloom et al. (2014) who found that controlling on performance WFH negatively affects promotion chances.

The randomized information treatment was displayed after completing the survey part of WFH module. The survey questions about WFH were neutral in form and context (see Appendix B), and thus should not introduce any priming effects. Even if participants were to be primed by these questions, note that it is orthogonal to treatment assignment, hence unlikely to bias our estimates.

First, we formally test if randomization was accurate across relevant covariates. The results are reported in Table 1. In addition, we use a comprehensive measure proposed by Imbens and Wooldridge (2009). They suggest a *normalized difference* to gauge covariate imbalance. This statistic is defined

[1] Full set of questions is reported in Appendix B.

[2] In addition, we provided a link to working paper version of Bloom et al. (2014) study, emphasizing that this is an *example* from this strand of literature. We did not monitor clicks on this link, but there were no meaningful differences in time to complete the survey between the control group and the treatment groups, which suggests that subjects did not read this study, at least not before completing the survey.

as $\Delta_{i,j} = (\bar{x}_i - \bar{x}_j)/\sqrt{(Var(x_i) + Var(x_j))}$. Values larger than 0.25 indicate potential problems with covariate balance. Column $\Delta_{i,j}$ presents the maximum value of this statistic among all pairwise comparisons in each row. The estimated values of $\Delta_{i,j}$ are much lower than the threshold. Indeed, the values never exceed 0.1 and are typically below 0.05. Thus, proportions (and mean) do not vary across treatments, which suggests that randomization was successful.

Table 1: Randomization results: covariate balance (means)

	All	t:Control	t:Satisfation	t:Productivity	t:Career	$\Delta_{i,j}$
Female	0.67	0.68	0.67	0.65	0.70	0.07
Age	34.60	34.50	34.83	34.55	34.50	0.02
Education Level						
Primary	0.04	0.04	0.04	0.05	0.04	0.04
High School	0.31	0.30	0.33	0.29	0.30	0.06
BA or higher	0.65	0.66	0.63	0.66	0.66	0.04
Married	0.65	0.65	0.66	0.63	0.64	0.04
Children in hh.	0.19	0.20	0.19	0.19	0.18	0.04
Urban	0.62	0.64	0.62	0.60	0.60	0.05

Notes: Table includes the proportion of people with a certain attribute in population, and in each treatment group.

We measured three outcomes. First, we ask "relative to 2019, how do you assess the effectiveness of your WFH". This question was asked to respondents who report having worked from home at all and who report working in the week prior to the survey. The responses were on a 7-point Likert scale, centered at no change (between -5% and +5%) and symmetrically moving away in 10 percentage point intervals up to a rise (decline) by more than 35%. We transform productivity change into a binary variable that equals one for increased productivity and zero otherwise.

Second, we ask "how frequently would you like to WFH after the pandemic is over".[3] The responses include: not at all, 1-2 times a month, once a week, twice a week, three times a week, and four or more times a week.[4] We transform WFH preference into a binary variable that equals one for individuals willing to WFH once a week or more frequently and zero otherwise (similar to Angelici & Profeta, 2020).

Third, we asked "what is your attitude towards WFH" with three possible responses: positive, neutral, and negative. We transform the attitude question into a binary variable that equals one for positive attitudes and zero otherwise.

Descriptive statistics for the three outcome variables are reported in Table 2, yielding a preliminary glimpse on the treatment effects. Participants in productivity treatment report a higher willingness to WFH more frequently and they express a more positive attitude towards WFH, when compared to the control group. Respondents in all three treatment groups were more likely to report an improvement in their productivity while WFH in comparison to the control group. Note that the number of answers for this item is lower. We only asked about productivity change among participants who experienced WFH during the pandemic.

[3] During the period of the survey, Poland averaged 103 new covid-19 cases per day, the lowest monthly average since April 2020 and new variants of this virus have not yet emerged.

[4] The questions and the responses are identical to Barrero et al. (2021b) to facilitate comparisons. We also asked "how often do you expect to WFH after the pandemic is over".

Table 2: Descriptive statistics

	Full sample	t:Control	t:Satisfaction	t:Productivity	t:Career
How has your productivity changed? (self-reported)					
Improvement in productivity	0.44	0.40	0.44	0.46	0.46
Number of observations	1700	447	434	402	417
How often would you like to work remotely?					
At least once a week (share)	0.64	0.63	0.64	0.65	0.63
Number of observations	3714	952	941	917	904
Attitude towards remote work (shares)					
Positive attitude towards WFH	0.58	0.56	0.59	0.59	0.58
Number of observations	3714	952	941	917	904

Notes: The original sample of D+ is restricted to individuals aged between 18 and 65 years old, who are not full time students nor formally retired. The question about self-assessed productivity change was asked only to those individuals who reported any WFH during the pandemic and were employed at the time of the survey.

4 Results

We use linear regression to estimate the following models:

$$outcome_i = \alpha + \beta T_i + \gamma X_i + \epsilon_i \quad (1)$$

where $outcome_i$ indicates each of the three outcome variables (perceived change in productivity, willingness to WFH at least once a week, and attitude towards WFH). T_i identifies the treatment assigned to individual i. The control group is the reference level. The variables X_i include personal and household characteristics such as gender, age, marital status, education (three levels), residence (urban status or not), and presence of children under five years old in the household.

Figure 1 reports treatment effects and mean outcomes to benchmark the estimated effects. The *satisfaction* message raises the self-assessed rise in productivity by 3.5 percentage points on a mean outcome of 44%, an effect of 8%. We find even larger effects for the *productivity* and *career* messages. We find similarly positive though smaller treatment effects for attitude to willingness to WFH and positive attitude to WFH. The *satisfaction* message has effects similar to *productivity* for willingness to WFH and attitude towards WFH. The effects of *career* message are large for self-assessed productivity (12%) and despite a smaller size – statistically significant for willingness to WFH (1.5%) and positive attitude for WFH (3%).

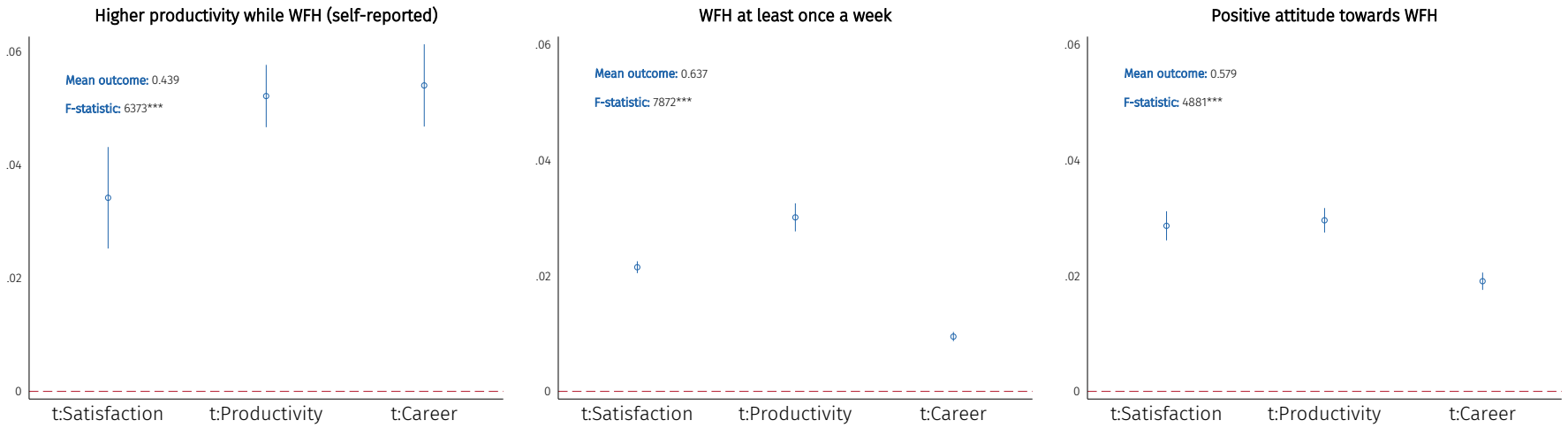
Note that all treatment effects are positive, that is the self-reported productivity, willingness to WFH and positive attitude towards WFH all rise relative to the control group. Meanwhile, while productivity treatment was neutral-to-positive in terms of emotional loading, satisfaction and career treatments were both negative. This result may seem counter-intuitive in the following manner hinted that with WFH individuals felt more lonely, their view of WFH could be less favorable. However, we find these effects consistent with the basic intuition that people's views are easily affected by factually meaningless information. From the original case of loss/gain framing by Tversky and Kahneman (1985) through a rich body of work to a recent and powerful example about fracking by Bayer and Ovodenko (2019), we see that providing people with information is tilting their stated preferences on a variety of issues. WFH is no exception from this rule, which hints that caution needs to be exercised when interpreting survey evidence about workers' willingness to "return" to work *in situ*. It seems that in our sample, informing people about pre-pandemic research in the field released a positive spin (some sense of a "warm glow"

about WFH). While our original starting point was that we expected no treatment effects, whether they are positive or negative is indeed of minor relevance.

To gauge the validity of our findings, we further explore if individual characteristics exhibit intuitive relationships with the three outcome measures. Our findings are aligned with our initial expectations, better educated people living in cities are more likely to want to work remotely in the future. Also workers in jobs where a larger share of tasks can be done remotely are more likely to prefer working from home in the future. The differences between men and women are not statistically significant.[5]

[5]We find, however, that women with children under the age of five in the household are more likely to prefer working on-site. We interpret this finding as arising from the difficulties in dissociating the working remotely experience from the lock-down, which resulted in additional burdens on the family.

Figure 1: Treatment effects



Notes: Treatment effects and 95% CI. Standard errors are clustered by treatment. All estimates account for differences in gender, education, age, presence of children under 5 years old in the household and urban status. Full results are available on the Online Appendix.

Heterogeneity of treatment effects with respect to respondent characteristics We re-estimate the main specification, splitting the sample along three additional lines: gender, presence of children under five years old in the household, and level of education. Splitting by gender could be relevant due to the uneven distribution of household chores. From one perspective, in normal times women stand to gain more from the possibility of WFH, hence they could be more reactive to the information treatments. From another perspective, women often faced a greater burden during the pandemic, as they were responsible for providing care for children during lock-down. The results shown in Figure A1 and additionally reported in Table A3 demonstrate that men and women differed in their responses to information treatments. The difference affects both the magnitude and the direction of effects. Indeed, the productivity treatment lead to an increase in all outcome variables for women, not so for men, and the increment was more pronounced. By contrast, the satisfaction treatment only lead to an increase in outcomes for men. The difference in sign can be attributed to the WFH experience. The decrease in life satisfaction mentioned in this treatment could have resonated stronger among women, who experience this double burden, than among men.

The analysis by education level also reveals interesting patterns. Among people with tertiary studies, all treatments are associated with an increase in the outcome variables with respect to the control treatment. The increases are of a similar size across treatments. By contrast, among those respondents with less than tertiary studies, the treatment effects tended to be negative, the exception being on productivity treatment. These differences mirror those existing between respondents with and without WFH experience since workers with tertiary studies are more likely to have jobs where WFH is possible.

For respondents with children, the career treatment had the strongest effects, not only compared to non-parents, but also when compared to other subpopulations. There is a combination of factors involved. First, sample size was smaller. Second, experiences of parents were more heterogeneous. In Poland, childcare facilities where mostly open during the pandemic, unless a case was detected in the pre-school. However, parents could choose not to risk a contagion by caring for children at home, which would difficult WFH for them. If the reaction to information treatments is related to how people experienced WFH, then this heterogeneity of experiences could lead to estimates with more variability among parents of pre-school children.

4.1 Robustness

Rebalancing to representative population structure Given that the D+ survey is fielded online, and given the methods used to attract and retain participants, one might be concerned that the resulting sample is not representative of the Polish population. Descriptive statistics displayed in Table A4 show that the sample in D+ is more female, younger and better educated than a representative sample of working-age Poles. These differences could jeopardize external validity.

We use covariate-balancing propensity score matching to obtain weights, which are used to reweigh the D+ sample so that it resembled the structure of Polish population. We estimate the propensity score via Generalized Method of Moments, which secures that the reweighed sample and the reference sample are exactly matched along a series of characteristics (Imai & Ratkovic, 2013). Comparing large international online survey to nationally representative samples for 17 countries, Smyk et al. (2021) show that this method is indeed effective in balancing the online samples on observable characteristics.

We take the structure of Polish population from the Labor Force Survey. Since our data cover June and July of 2021, we take the second quarter of 2021 of Polish LFS as the relevant sample. We match D+ and Polish LFS along the following variables: gender, age, place of residence (region and urban

status), employment status (two levels: working or not), education and household structure. The first three variables were selected to mirror the stratification procedure used by CSO. The last two variables address the differences in sample design between D+ and Polish LFS.

Results from estimating treatment effects with the use of the rebalancing weights are displayed in Table A5. While the point estimates are differ from those reported in Table A2, information treatment remains statistically significant and economically relevant.

Job characteristics Information on job characteristics is collected as a part of the core questionnaire in D+. The collected variables describe workers' job in the week prior to the survey (June/July 2021). We include these characteristics one by one, and report the results in subsequent columns of Table A7. First, *Firm size* is a dummy variable indicating whether the firm employs more than 50 workers. Subsequently, *Industry* is a set of seven dummy variables for sectors of economic activity: agriculture; mining and manufacturing; construction; trade, transport, restaurants and accommodation; information and communication, finance, real estate, and professional services; administrative services, public administration, education and health activities; and, other activities. *Sector* is a dummy variable which indicates whether the respondent works in a private firm (including self-employed) or for a public entity. *Full-time* indicates if the respondent has a full-time or a part-time employment contract.

Finally, we also adjust the regression for the extent to which a given job can be performed from home without detriment to productivity. These results are reported in column entitled *Tasks*. The control variable is a semi-continuous one, and is based on the ad hoc part of the questionnaire, where the participants assess individually their specific job (rather than the occupation per se).

The results reported in Table A7 show that information treatment is robust to including additional controls for the self-reported change in productivity as well as willingness to WFH. The results concerning the attitude towards WFH are robust to most controls, but become small and insignificant once we adjust for whether a given job can be performed outside premises.

Robustness to WFH experience We re-estimate the main specification, splitting the sample for individuals who report WFH experience during the covid-19 pandemic and for those who did not work from home during that time. The idea behind this alternative specification is that individuals who actually worked from home may have a better grasp of trade-offs associated with this working arrangement and thus be less affected by the information treatment.

In the first column of Table A6 we repeat for convenience the main results reported earlier in Figure 1 and Table A2. The participants in D+, who worked in the reference week, self-report if they had any WFH experience during the covid-19 pandemic. The next three columns narrow the sample to individuals who report working in the reference week, because only those individuals shared information about WFH experience during the covid-19 pandemic. We first report the results for the entire working population subsample and later split it to workers with (self reported) WFH experience and without it. The results confirm information treatments from the main subsamples, but they also emphasize heterogeneity between workers with and without WFH experience: the former respond negatively to information treatment, and the latter respond positively.

Continuous measurement of productivity change and wage change The (self-reported) change of productivity (WFH vs in situ) was declared by the participants as a continuous variable in the ad hoc WFH module of D+. For the purposes of the earlier analysis we re-coded it to a dummy variable taking on the

value of one when the participants reported a rise and zero otherwise. The variable *Productivity change* corresponds to question 7, see Online appendix A. The variable includes mid-points of the corresponding intervals. The estimates report effects in terms of percentage points of the productivity change. Table A8 shows that information treatment effects are confirmed for this semi-continuous outcome variable.

In addition, once the participants stated their attitude towards WFH, we inspected the acceptable wage change if WFH was set to two days a week. The variable *wage change* is a combination of questions 10, 11 and 12. It indicates how much will they be willing to resign (or required to accept) if respondents were to WFH at least once a week. Negative values of this variable indicate a more positive attitude towards WFH. Respondents with a neutral attitude towards WFH were assigned a value of zero. For the remaining respondent, the value of the wage compensation corresponds to the midpoints in their answers questions 11 or 12 (see Appendix B). The estimates report effects in terms of percentage point change in wages. Table A8 shows that information treatment effects are confirmed for this outcome variable.

5 Conclusions

Willingness to WFH proves to be easily affected by relatively mild information intervention. Our subjects received just one sentence of information about the consequences of WFH, and it produced statistically significant and economically large treatment effects. Arguably, our results represent lower bounds to the information treatment effects, as respondents could have failed to read in the information we provided or might have been already familiar with it before participating in our experiment.

Our results suggest that after covid-19 pandemic fades, the narratives about WFH – both positive and negative – may have important bearing on the actual preference for this working arrangement. Information received by the individuals is bound to be stronger and individuals are bound to be faced with it more frequently and in more salient ways than in our experiment. It will refer to the actual life events in their circle of family and friends affecting the perceived risk of loosing a job or prospects of reduced earnings, and thus it will be stronger than one sentence about experimental evidence from the past. It may be more numerous because of media covering the cases of both positive and adverse developments. Thus, the contemporaneous survey evidence about high preference for WFH ought to be treated with caution.

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Supplementary material

A D+ survey – additional information

Table A1: D+ as compared to other real-time surveys during the covid-19 pandemic

Authors	Country coverage	Sample size	# of waves
Baert et al. (2020)	Flanders	$\sim$ 3 800	1
Belot et al. (2020)	CN, KR, JP,IT, US, UK	$\sim$ 1000 per cn	1
Adams-Prassl et al. (2020)	UK, DE, US	$\sim$ 4000 / 5000 per cn	2
Morikawa (2020)	JP	$\sim$ 5000	1
DIAGNOZA.plus	Poland		7
May 2020		5020	
Jun/Jul 2020		6296	
Aug/Sep 2020		5224	
Oct/Nov 2020		3507	
Dec 2020/Feb 2021		6389	
Mar/May 2021		4996	
Jun/Jul 2021		4557	
Total		35989	

Notes: For D+, the table displays individuals with completed surveys. The sample is restricted to individuals aged between 18 and 65 years old, who are not full time students.

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B The questions concerning WFH in D+ questionnaire

The **core questionnaire** in every wave asks the question to all working individuals:

* During the past four weeks, including the week between Monday _____ and Sunday _____, have you ever worked?
  - from home [*answers: usually, occasionally, not at all*]
  - during the evenings [*answers: usually, occasionally, not at all*]
  - at night [*answers: usually, occasionally, not at all*]
  - on Saturday [*answers: usually, occasionally, not at all*]
  - on Sunday [*answers: usually, occasionally, not at all*]

The **WFH module** of D+ from the seventh wave (June/July 2021) contained two parts: a survey questionnaire and an information treatment experiment. The questions asked *before* the treatment were answered by respondents who had a job at the time of the survey.

1. Did your employer announce the rules for work organization for the next six months (that is, until the end of 2021)?
   - All employees are already working *in situ* or are expected to work *in situ* until the end of the year.
   - Some employees has returned or will return to work *in situ* and others will continue working remotely.
   - Some employees has returned or will return to work *in situ* and others will work in a hybrid model, combining the work *in situ* and and remotely.
   - The employer intends for a hybrid model for all employees.
   - The employer intends for a remote work for all employees.
   - My employer did not announce any plans.
2. Think about your current job. What fraction of tasks could you ...
   - perform from home with no detriment to productivity
   - perform from home, but with some detriment to productivity
   - perform only from the workplace [*answers have to add up to 100%*]
3. During the past year, that is between June 2020 and June 2021, have you ever worked from home?
   - Yes, at least from time to time
   - No, my job can only be done from the workplace
   - No, though my job can (at least partially) be done from home

If answer to Question 3 is *Yes, at least from time to time*, continue to Question 4. Otherwise move to the information treatment

4. Do you agree with the following statements?
   - I spent at least 15 hours in total to learn the tools which are necessary for me to work from home [Y/N]
   - I spent at least 250 PLN to acquire equipment, software or services to work from home [Y/N, 250 PLN $\approx$ 60 EUR at that time]
   - My employer provided support in arranging for the working space at home [Y/N]

- My employer covered the costs of my working from home (e.g., Internet access, electricity, equipment or software) [Y/N]

5. Which of the following would you view as downside of working from home? Please rank from the most disturbing to the least disturbing item. You may leave irrelevant items without a rank. [*The order of items was randomized between subjects.*]
   - Working when children are at home
   - No dedicated working space
   - No support in acquiring skills and learning new procedures related to working from home
   - No adequate equipment (e.g., computer, desk, chair, fast Internet access)
   - Difficulty in separating private and professional life
   - Difficulty in maintaining working relationships
   - Difficulty in communicating with my superiors
   - Difficulty in team work
   - An increase in work load (e.g. reporting)
6. Which of the following would you view as upside of working from home? Please rank from the most valuable to the least valuable item. You may leave irrelevant items without a rank. [*The order of items was randomized between subjects.*]
   - Ability to spend time with my family
   - Reduction in commute time
   - Reduction in commute cost
   - More flexibility in setting the start and finish times
   - Access to jobs from other locations than my residence
   - Less contact with my superiors and co-workers
   - Less space for abusive behaviors from superiors and co-workers
   - Lower living costs (lower living expenses for clothes, food, etc.)
   - Ease in focusing on work tasks
   - My company had to simplify procedures, which made my tasks well defined

Randomization to control group and three information treatment conditions

7. Comparing to 2019, how do you assess the productivity of WFH? [Only for individuals who answered *Yes, at least from time to time* to Question 3.]
   - My productivity is substantially higher – it has increased by more than 35%
   - My productivity is much higher – it has increased by 15-35%
   - My productivity is higher – it has increased by 5-15%
   - My productivity is has not changed much – it about +/- 5% of what it used to be
   - My productivity is lower – it has declined by 5-15%
   - My productivity is much lower – it has declined by 15-35%
   - My productivity is substantially lower – it has declined by more than 35%

Questions 8 to 10 were asked to all respondents.

8. When the pandemic is over, in 2022 or later, how often would you want to work from home?
   - Not at all

- 1-2 times a month
- Once a week
- Twice a week
- Thrice a week
- Four times a week or more

9. When the pandemic is over, in 2022 or later, how often do you expect to actually work from home?
   - Not at all
   - 1-2 times a month
   - Once a week
   - Twice a week
   - Thrice a week
   - Four times a week or more
10. When the pandemic is over, in 2022 or later, how would you feel about working from home 2-3 days a week?
   - I would be positive about this arrangement
   - I would be neither positive nor negative about this arrangement
   - I would be negative about this arrangement
11. Given that you would be positive about this development, would you agree to a wage cut? [Question asked only to individuals who answered *"I would be positive about this arrangement"* to Question 10.]
   - No
   - A wage cut by less than 5%
   - A wage cut by 5% to 10%
   - A wage cut by 10% to 13%
   - A wage cut by 15% to 25%
   - A wage cut by 25% to 35%
   - A wage cut by more than 35%
12. Given that you would be negative about this development, what compensation in terms of wage would you expect?[Question asked only to individuals who answered *"I would be negative about this arrangement"* to Question 10.]
   - None
   - A raise by less than 5%
   - A raise by 5% to 10%
   - A raise by 10% to 13%
   - A raise by 15% to 25%
   - A raise by 25% to 35%
   - A raise by more than 35%

C Full set of results from the paper

Table A2: Detailed results from Figure 1

	Better productivity while WFH (self-reported)	WFH at least once a week	Positive attitude towards WFH
Treatment effects:			
t:Satisfaction	0.034***	0.021***	0.029***
	(0.003)	(0.000)	(0.001)
t:Productivity	0.052***	0.030***	0.030***
	(0.002)	(0.001)	(0.001)
t:Career	0.054***	0.009***	0.019***
	(0.002)	(0.000)	(0.000)
Demographics:			
Women=1	0.004	-0.022	-0.005
	(0.013)	(0.022)	(0.013)
Age	-0.003***	-0.005***	-0.003*
	(0.000)	(0.001)	(0.001)
Education level			
High school	0.031	0.097**	0.055**
	(0.117)	(0.026)	(0.016)
B.A. or higher	-0.024	0.279***	0.188**
	(0.143)	(0.042)	(0.037)
Married or cohabiting=1	0.042	0.009*	-0.004
	(0.026)	(0.003)	(0.005)
Children under 5=1	-0.019	-0.053**	-0.046
	(0.050)	(0.013)	(0.028)
Lives in a city=1	0.007	0.092***	0.091***
	(0.020)	(0.013)	(0.014)
Constant	0.502**	0.551***	0.485***
	(0.136)	(0.019)	(0.024)
Observations	1700	3714	3714
Mean outcome	0.439	0.637	0.579
R-squared	0.008	0.072	0.039
F-statistic	6373.1	7871.7	4881.0
P-value	0.000	0.000	0.000

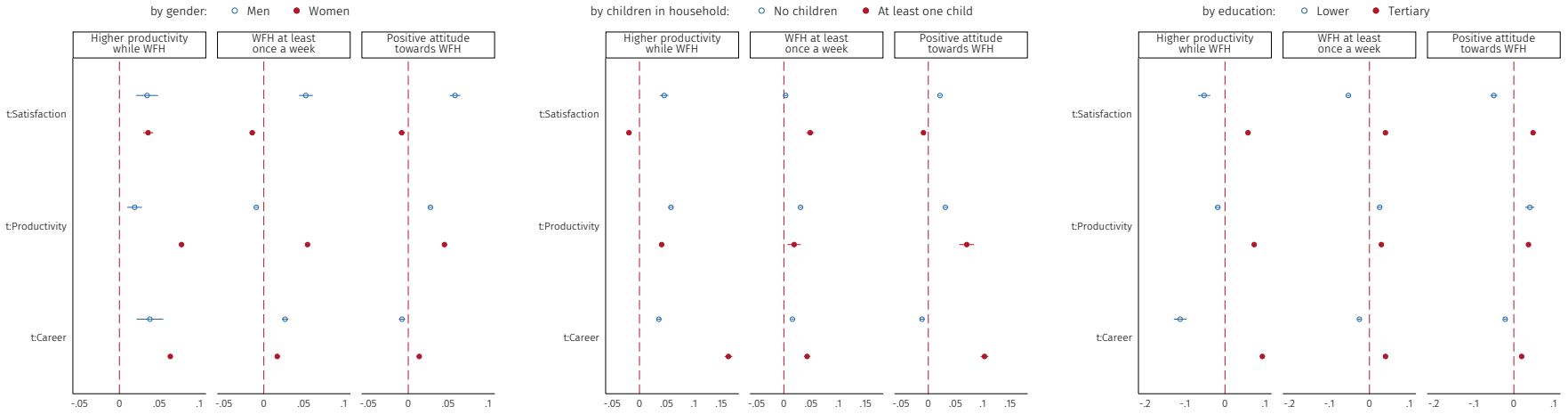
Notes: standard errors clustered by treatment reported in parentheses. F-statistic and the p-value correspond to the test that all treatment effects are equal to zero. *, **, *** indicate $p - values$ smaller than .10, .05 and .01, respectively.

Table A3: Heterogeneity analysis

	Higher productivity while WFH		WFH at least once a week		Positive attitude toward WFH	
Heterogeneity by gender						
t:Satisfaction	0.034***	(0.004)	0.052***	(0.002)	0.045***	(0.003)
... × Women=1	-0.001	(0.003)	-0.045***	(0.003)	-0.024***	(0.003)
t:Productivity	0.015**	(0.003)	-0.001	(0.001)	0.018***	(0.001)
... × Women=1	0.060***	(0.002)	0.049***	(0.001)	0.018***	(0.002)
t:Career	0.038***	(0.005)	0.022***	(0.001)	0.007**	(0.002)
... × Women=1	0.025**	(0.005)	-0.019***	(0.002)	0.018***	(0.002)
Women=1	-0.016**	(0.003)	-0.018***	(0.002)	-0.007	(0.003)
Observations	1700		3714		3714	
R-squared	0.009		0.073		0.040	
Heterogeneity by Education level						
t:Satisfaction	-0.054***	(0.006)	-0.013***	(0.000)	-0.024***	(0.001)
... × Tertiary studies=1	0.110***	(0.005)	0.054***	(0.000)	0.083***	(0.001)
t:Productivity	-0.019**	(0.003)	0.043***	(0.001)	0.031***	(0.002)
... × Tertiary studies=1	0.089***	(0.003)	-0.020***	(0.001)	-0.002	(0.002)
t:Career	-0.114***	(0.007)	-0.002**	(0.000)	0.026***	(0.001)
... × Tertiary studies=1	0.207***	(0.006)	0.018***	(0.001)	-0.010***	(0.001)
Tertiary studies=1	-0.109	(0.103)	0.268***	(0.027)	0.171***	(0.018)
Observations	1700		3714		3714	
R-squared	0.012		0.072		0.041	
Heterogeneity by presence of children						
t:Satisfaction	0.043***	(0.003)	0.009***	(0.000)	0.018***	(0.001)
... × Children under 5=1	-0.063***	(0.004)	0.066***	(0.002)	0.054***	(0.001)
t:Productivity	0.056***	(0.001)	0.020***	(0.001)	0.016***	(0.001)
... × Children under 5=1	-0.024***	(0.002)	0.050***	(0.001)	0.067***	(0.002)
t:Career	0.035***	(0.001)	0.004***	(0.000)	-0.007***	(0.001)
... × Children under 5=1	0.127***	(0.004)	0.029***	(0.002)	0.140***	(0.003)
Children under 5=1	-0.027	(0.013)	-0.089***	(0.001)	-0.109***	(0.001)
Observations	1700		3714		3714	
R-squared	0.011		0.072		0.041	

Notes: The original sample of D+ is restricted to individuals aged between 18 and 65 years old, who are not full time students nor formally retired. The question about self-assessed productivity change was asked only to those individuals who reported any WFH during the pandemic and were employed at the time of the survey.

Figure A1: Heterogeneity analysis



Notes: The original sample of D+ is restricted to individuals aged between 18 and 65 years old, who are not full time students nor formally retired. The question about self-assessed productivity change was asked only to those individuals who reported any WFH during the pandemic and were employed at the time of the survey.

Table A4: Distribution of characteristics before and after balancing

	LFS 2021q2	D +	
		Unweighted	Weighted
Women	0.50	0.67	0.52
Age	42.27	34.60	43.61
Education: BA or higher	0.30	0.65	0.33
Lives in a city	0.27	0.62	0.31
Employed	0.72	0.80	0.72
Observations	42284	3714	3714

Notes: Table reports average values of covariates. The first column indicates values from Polish labor force survey - second quarter of 2021. The second and third columns present values from Diagnoza+ before and after reweighting.

Table A5: Treatment effects using the rebalancing weights

	Better productivity while WFH (self-reported)	WFH at least once a week	Positive attitude towards WFH
Treatment effects:			
t:Satisfaction	-0.129***	0.033***	0.047**
	(0.014)	(0.005)	(0.009)
t:Productivity	-0.061	0.105***	0.079***
	(0.036)	(0.006)	(0.004)
t:Career	0.038**	0.014	-0.006
	(0.012)	(0.012)	(0.011)
Observations	1700	3714	3714
Mean outcome	0.389	0.444	0.442
R-squared	0.063	0.148	0.077
F-statistic	66.5	969.2	10422.9
P-value	0.003	0.000	0.000

Notes: standard errors clustered by treatment reported in parentheses. F-statistic and the p-value correspond to the test that all treatment effects are equal to zero. *, **, *** indicate $p - values$ smaller than .10, .05 and .01, respectively. All specifications include the full set of demographic characteristics presented in Table A2, omitted, available upon request.

Table A6: Heterogeneity of treatment effects for WHF experience

	All in labor force	Worked in reference week		
		w/ WFH experience	w/o WFH experience	Both groups
Outcome: WFH at least once a week				
t:Satisfaction	0.021***	0.004***	0.020***	0.012***
	(0.000)	(0.000)	(0.001)	(0.000)
t:Productivity	0.030***	0.005***	0.082***	0.031***
	(0.001)	(0.001)	(0.003)	(0.001)
t:Career	0.009***	-0.008***	0.059***	0.020***
	(0.000)	(0.001)	(0.003)	(0.001)
Observations	3714	1700	1058	2758
Mean outcome	0.637	0.826	0.333	0.637
R-squared	0.072	0.024	0.054	0.091
F-statistic	7871.7	141.8	2216.4	1753.1
P-value	0.000	0.001	0.000	0.000
Outcome: Positive attitude towards WFH				
t:Satisfaction	0.029***	0.032***	-0.009***	0.017***
	(0.001)	(0.002)	(0.001)	(0.000)
t:Productivity	0.030***	0.047***	0.037***	0.040***
	(0.001)	(0.001)	(0.003)	(0.001)
t:Career	0.019***	-0.031***	0.064***	0.006***
	(0.000)	(0.000)	(0.002)	(0.001)
Observations	3714	1700	1058	2758
Mean outcome	0.579	0.723	0.347	0.579
R-squared	0.039	0.009	0.044	0.050
F-statistic	4881.0	3279.0	1329.0	2865.0
P-value	0.000	0.000	0.000	0.000

Notes: standard errors clustered by treatment reported in parentheses. F-statistic and the p-value correspond to the test that all treatment effects are equal to zero. *, **, *** indicate $p - values$ smaller than .10, .05 and .01, respectively. All specifications include the full set of demographic characteristics presented in Table A2. Estimates from the first column correspond to those presented in Figure 1 and Table A2. The observations in the column *w/ WFH experience* correspond to those who indicated (in June/July 2020) that they worked remotely at some point during the pandemic. Workers in the *w/o WFH experience* had not worked remotely during the pandemic.

Table A7: Treatment effects after adding job characteristics

	None	Firm size	Industry	Full-time	Sector	Tasks	All
Outcome: Better productivity while WFH (self reported)							
t:Satisfaction	0.034***	0.033***	0.032***	0.034***	0.034***	0.030***	0.025***
	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
t:Productivity	0.052***	0.050***	0.051***	0.053***	0.051***	0.037***	0.032***
	(0.002)	(0.002)	(0.003)	(0.001)	(0.001)	(0.003)	(0.002)
t:Career	0.054***	0.053***	0.055***	0.053***	0.053***	0.044***	0.041***
	(0.002)	(0.005)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)
Observations	1700	1700	1700	1700	1700	1700	1700
Mean outcome	0.439	0.439	0.439	0.439	0.439	0.439	0.439
R-squared	0.008	0.014	0.012	0.010	0.010	0.041	0.055
F-statistic	6373.1	268.7	304.2	3491.9	55862.1	157.7	115.1
P-value	0.000	0.000	0.000	0.000	0.000	0.001	0.001
Outcome: Positive attitude towards WFH							
t:Satisfaction	0.012***	0.015***	0.007***	0.012***	0.012***	-0.001	-0.001
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
t:Productivity	0.031***	0.035***	0.032***	0.032***	0.032***	0.007**	0.008*
	(0.001)	(0.001)	(0.003)	(0.001)	(0.002)	(0.001)	(0.004)
t:Career	0.020***	0.023***	0.020***	0.020***	0.020***	-0.003*	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Observations	2758	2758	2758	2758	2758	2758	2758
Mean outcome	0.637	0.637	0.637	0.637	0.637	0.637	0.637
R-squared	0.091	0.101	0.126	0.095	0.092	0.384	0.391
F-statistic	1753.1	1337.6	56986.6	1536.8	748.7	65.0	30.0
P-value	0.000	0.000	0.000	0.000	0.000	0.003	0.010
Outcome: WFH at least once a week							
t:Satisfaction	0.017***	0.020***	0.014***	0.017***	0.017***	0.007***	0.008**
	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.002)
t:Productivity	0.040***	0.043***	0.040***	0.040***	0.040***	0.020***	0.022**
	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.001)	(0.004)
t:Career	0.006***	0.009***	0.009**	0.006***	0.007***	-0.012***	-0.010**
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.003)
Observations	2758	2758	2758	2758	2758	2758	2758
Mean outcome	0.579	0.579	0.579	0.579	0.579	0.579	0.579
R-squared	0.050	0.055	0.070	0.052	0.051	0.230	0.233
F-statistic	2865.0	485.9	95.9	49389.8	2044.1	225.0	145.0
P-value	0.000	0.000	0.002	0.000	0.000	0.000	0.001

Notes: standard errors clustered by treatment reported in parentheses. F-statistic and the p-value correspond to the test that all treatment effects are equal to zero. *, **, *** indicate $p - values$ smaller than .10, .05 and .01, respectively. All specifications include the full set of demographic characteristics presented in Table A2. Estimates from the first column correspond to those presented in Figure 1 and Table A2, omitted, available upon request.

Table A8: Treatment effects on continuous variables

	Productivity change		Wage change	
	(1)	(2)	(1)	(2)
t:Satisfaction	-0.416***	-0.745***	0.033*	0.110
	(0.053)	(0.082)	(0.011)	(0.048)
t:Productivity	0.599***	-0.245*	-0.403***	-0.281***
	(0.028)	(0.090)	(0.014)	(0.043)
t:Career	-0.124	-0.691**	-0.158***	-0.007
	(0.099)	(0.135)	(0.010)	(0.039)
Demographics	Yes	Yes	Yes	Yes
Job	No	Yes	No	Yes
Observations	1700	1700	2758	2758
Mean outcome	8.559	8.559	1.282	1.282
R-squared	0.008	0.077	0.009	0.035
F-statistic	630.2	37.0	320.0	345.7
P-value	0.000	0.007	0.000	0.000

Notes: standard errors clustered by treatment reported in parentheses. F-statistic and the p-value correspond to the test that all treatment effects are equal to zero. *, **, *** indicate $p - values$ smaller than .10, .05 and .01, respectively. All specifications include the full set of demographic characteristics presented in Table A2. Specification in columns (2) include also the controls for job characteristics detailed in Table A7. Detailed results are available upon request.