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ABSTRACT

Personality Traits, Remote Work and Productivity*

The future of teleworking ultimately depends on its impact on workers' productivity and wellbeing, yet the effect of remote working on productivity is not well understood. This paper investigates the link between personality traits and workers' productivity when working from home. We exploit a survey providing measures of the "Big Five" personality traits for more than 1700 recent teleworkers. We document strong links between personality, productivity, and willingness to work from home post-pandemic. Ceteris paribus, Conscientiousness and Openness to Experience are positively associated with a higher productivity from home, especially for females. On the other hand, the link between Extraversion and preference for teleworking is negative. These results suggest that a one-size-fits-all policy is unlikely to maximize neither firms' productivity nor workers' satisfaction.

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1. Introduction

The COVID-19 pandemic triggered a large and sudden exogenous shift towards working from home (WFH). Within a few months, the share of remote workers increased from 8.2% to 35.2% in the US (Bick et al., 2020), from 5% to more than 30% in the EU (Sostero et al. 2021). There is growing evidence that WFH will stick in the post-pandemic period (Bartik et al. 2020, Barrero et al., 2021, Erdsiek 2021, Criscuolo et al. 2021). The share of remote workers could further increase since it did not meet yet the share of jobs that can potentially be done from home (Bick et al., 2021). However, estimates of this remote job potential such as those provided by Dingel and Neiman (2020) are mostly based on technical feasibility. The prevalence of teleworking will ultimately also depend on its impact on workers' productivity and well-being. This impact remains ambiguous: some studies report an overall improvement in productivity (e.g., Barrero et al. 2021, Bloom et al. 2020) whereas some others document the opposite (e.g., Morikawa 2022, Kitagawa et al. 2021, Gibbs et al. 2021).

An explanation for this mixed evidence may lie in the transmission channel linking teleworking and productivity. In addition to direct mechanisms such as the quality of ICT infrastructure or the change in managerial oversight, teleworking can affect productivity through well-being (e.g., Angelici and Profeta 2020, Etheridge et al. 2020). On the one hand, WFH grants workers a larger autonomy, positively contributing to job satisfaction. It also reduces stress and fatigue associated with commuting (Clark et al., 2020). Moreover, time saved on commuting can be used for sleeping (Lee and Tipoe, 2021), potentially improving productivity for those experiencing sleep deprivation when working on site. On the other hand, isolation and difficulties to separate work and private life can have the opposite effect. WFH is also found to impact both mental and physical health outcomes (see Oakman et al. 2020 for a survey).

Overall, the balance of these pros and cons can greatly vary across individuals. The existing literature emphasizes the importance of gender and occupation for workers' productivity under WFH arrangement, but a large share of this heterogeneity remains unexplained.

This paper investigates the link between personality traits and workers' productivity when working from home. Non-cognitive skills, in particular personality traits, have been shown to play a key role in labour market outcomes (e.g., Heckman et al. 2006, Mueller and Plug 2006, Borghans et al. 2008, Heineck and Anger 2010, Heckman and Kautz 2012, Fletcher 2013). In the context of WFH, soft skills, for instance conscientiousness or emotional stability, are good candidates for explaining heterogeneity in relative productivity at the individual employee level.

We design and run a survey covering more than 1700 individuals who experienced teleworking during the COVID-19 pandemic in Latvia. The questionnaire, in addition to questions regarding self-declared productivity, includes a section dedicated to the measurement of the "Big Five" personality traits - Extraversion, Conscientiousness, Agreeableness, Emotional Stability and Openness to Experience. According to the literature, individual measures of these traits are stable over time and across situations, as well as insensitive to adverse life events, thus mitigating potential endogeneity problems (Heckman and Kautz 2012, Cobb-Clark and Schurer 2012). Besides, the Big Five measures are uncorrelated with purely cognitive skills (McCrae and Costa, 1994). We use the Ten-Item-Personality-Inventory (TIPI, Gosling et al. 2003), a widely used Big Five questionnaire compact enough to be introduced in large-scale surveys.

In a second stage, we investigate the correlation between personality traits and the preference for WFH in the post-pandemic period. The purpose is twofold. First, a common weakness of the literature focusing on the WFH/productivity is the reliance on self-reported productivity measures. Hence, one cannot fully rule out strategic manipulation or self-deception when those who like (respectively, dislike) teleworking overstate (respectively, understate) their "from home" productivity. At the same time, there is no reason for respondents to misreport their preferences, so the estimates regarding willingness to keep working remotely do not suffer from self-reporting bias. We identify several factors significantly linked to willingness to work remotely but not to productivity, or vice versa. This suggests that productivity estimates are not fully driven by misreporting. The second motivation for focusing on the willingness to keep working from home after the pandemic is related to widespread concerns among employers about adverse self-selection of employees into remote work arrangements (Emanuel and Harrington, 2021) and about the loss of monitoring opportunities (Erdsiek, 2021). Understanding who are the individuals willing to

maintain a flexible working arrangement can shed some light on the persistence of WFH in the medium run.

Finally, we study the reservation values for leaving/accepting remote work after the pandemic. Several papers provide evidence that workers are *on average* willing to give up part of their wage in exchange of the possibility to work from home (Mas and Pallais 2017, Maestas et al. 2018, Moens et al. 2022). Barrero et al. (2021) report that 40% of the US workers currently working from home would prefer to look for another job rather than going back full time in business premises. On the other hand, some other workers unsatisfied with WFH can have a strong preference for on-site work. For instance, 20% of the participants in the field experiment of Mas and Pallais (2017) would prefer to work exclusively on-site, even in the absence of wage penalty for working from home. This introduces an additional source of heterogeneity in the formation of reservation wages, partially driving the sizeable re-sorting of workers across firms, occupations and industries currently observed in the US. Our paper sheds some light on the factors driving this observed heterogeneity.

The Latvian context provides an ideal setup for studying teleworking. First, Latvia has a large but unexploited potential for teleworking. Dingel and Neiman (2021) estimate that 35% of jobs in Latvia could be done remotely, about the EU average. However, before the pandemic only 3% of the workforce was working remotely – one of the smallest figures in the EU (Eurostat, LFS data for 2019). Second, the Latvian government declared the state of emergency in March 2020, which introduced compulsory WFH for all private and public sector employees, except for cases where on-site work is indispensable due to the nature of the work. This led to a six-fold increase in the share of remote workers within a couple of months. This stringent policy constitutes a massive exogenous shock in the worker-level adoption of WFH.

Our results indicate that personality traits do matter for productivity in a remote work setup. Overall, conscientiousness plays an important positive role for productivity. Point estimates are statistically significant but also economically meaningful: a one inter-quartile-range increase in the Conscientiousness measure is associated with an 8.5 p.p. increase in the probability to report a better productivity from home (base rate = 31%). Similarly, Openness to Experience is also positively correlated with the productivity measure. These two traits are also positively associated with the willingness to work from home in the post-pandemic period.

This suggests that pro-teleworking employers will observe selection on personality traits into their workforce.

Given that conscientiousness is desirable to all employers, while openness to experience is desirable at least to employers in growing and/or innovative firms and organisations, this selection is positive from the employer perspective, mitigating employers' concern about adverse self-selection in flexible working arrangements. This provides support to the results of Felstead and Reuschke (2021), who find that the strongest performers are those who are keenest to continue to work at home. We however uncover a negative relationship between extraversion and preference for teleworking. Employers practicing remote work should invest in socialization measures to compensate the negative effect of teleworking on wellbeing of more extravert workers. Finally, we also uncover large heterogeneity across genders, the relationship between productivity and personality traits being stronger for female employees.

This set of results provides three main contributions to the literature. First, this paper extends the literature examining the influence of personality traits on labour market outcomes. The importance of personality traits for wage formation is now well documented (e.g., Nyhus and Pons 2005, Mueller and Plug 2006, Heineck and Anger 2010, Viinikainen et al. 2010, Fletcher 2013). This paper investigates the personality traits/productivity relationship in a teleworking context. In addition, in provides further evidence of the conditionality of this link based on gender.

Second, it complements the literature studying effects of WFH on productivity. Several papers document a heterogeneous effect of teleworking on productivity for different subgroups. For instance, Etheridge et al. (2020) conclude that the impact of WFH on productivity is heterogeneous across socio-economic categories, with low earners, self-employed and women suffering from the largest negative hit. Similarly, Lee and Tipoe (2021) observe an impact on productivity conditional on gender and age, women and younger workers experiencing the largest decline. We contribute to this literature by introducing personality traits in the analysis.

Third, this paper contributes to the recent strand of the literature examining the reallocation effect induced by the COVID-19 pandemic. Bloom et al. (2020) suggest that the pandemic is acting as a massive reallocation shock, permanently shifting the demand for a large

share of firms and hence to the employment structure. Basso et al. (2020) discuss the reallocation of workers between safe and unsafe (with respect to contagion) likely to take place in the near future. Our paper adds to this line of research by providing evidence that personality traits will also matter for workers' reallocation, personality traits being strongly correlated with the propensity to accept (or refuse) WFH.

The rest of the paper proceeds as follows. Section 2 provides a description of the related literature. Section 3 introduces the data and methodology, while the results are displayed in Section 4. Section 5 concludes.

2. Related literature

The literature focusing on the pandemic-induced shift towards remote work has emerged in three waves. First, designing effective labour market policies in time of crisis requires an improved monitoring of the situation. An initial strand of papers aims at measuring the extent of teleworking using real-time surveys to complement the usual periodical surveys. These studies provide either country-specific snapshots (e.g., Brynjolfsson et al. 2020 and Bick and Blandin 2020 for the US, Blom et al. 2020 for Germany) or multi-country comparative analysis (e.g., Adams-Prassl et al. 2020, Belot et al. 2020, Galasso and Foucault 2020). All these studies report a sharp and sudden increase of teleworking in advanced economies, with an important heterogeneity across occupations and industries, but also across the wage distribution.

A second series of papers constructs estimates of the *potential* share of teleworking. These works typically match a classification of occupations to surveys providing information on the tasks associated with each occupation (Boeri et al. 2020, Dingel and Neiman 2020, Gottlieb et al. 2021, Sostero et al. 2021). Jobs requiring tasks undoable from home are deemed non-suitable for remote work; Sostero et al. (2021) develop continuous indices of technical teleworkability and social interaction of occupations. In combination with data about the structure of the working population, it becomes possible to construct estimates of the total amount of "teleworkable" jobs. The results, again, indicate rather important cross-country heterogeneity. For instance, Dingel and Neiman (2020) indicate that more than 40% of jobs in the Sweden is suitable for WFH whereas it only slightly exceeds 20% in Turkey, Mexico, and Romania. The same study estimates a potential for WFH in Latvia amounting to 36%, about the same as in Germany.

This tasks-based approach provides mechanical estimates of the potential for remote work. Whether remote work becomes the "new normal" after the pandemic and catches up with this potential share depends on its effect on workers' productivity and well-being. A third strand of papers aims at estimating the WFH/productivity relationship. Before the pandemic, both Bloom et al. (2015) and Angelici and Profeta (2020) observe a positive effect of WFH and more generally flexible work arrangement on productivity. These results, however, concern mainly workers who switched to teleworking voluntarily, as well as enterprises with pro-WFH management.

Exploiting the global natural experiment caused by COVID-19 – hence mitigating self-selection issues – pandemic-era papers provide more ambiguous evidence.[1] A first wave of papers relies on employee surveys. Felstead and Reuschke (2021) and Etheridge et al. (2021) both conclude that *on average*, WFH did not impact workers' productivity in the UK, whereas Lee and Tipoe (2021) estimate an average decline in productivity of about 2 - 4 p.p. They however all point to large differences across workers and occupations, women and those in low-paying jobs experiencing the largest productivity drop. Etheridge et al. (2021) further observe a deterioration of mental health for employees experiencing productivity loss. In Japan, by contrast, Kitagawa et al. (2021) observe that, in comparison to those working on-site, workers who worked from home enjoyed better mental health but experienced larger productivity losses (mainly caused by poor WFH setups and communication difficulties).

Alternatively, another series of papers uses employer surveys (Bartik et al. 2020 and Ozimek 2020 in the US, Erdsiek 2021 in Germany) or a combination of both employee and employer surveys (Criscuolo et al. 2021 in a sample of 25 countries, Morikawa 2022 in Japan). If the overall impact of WFH on productivity reported in these papers remains unclear, all provide further evidence of a large heterogeneity across firms and workers. In particular, self-employed, low-paid workers and women are those most adversely hit in terms of productivity.

In this paper, we argue that personality traits are a driver of the workers' heterogeneous productivity changes. While cognitive skills have been recognized as an important determinant of wage since at least Becker (1964), the economic literature recently documented an equally

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[1] Note that both Bloom et al. (2015) and Angelici and Profeta (2020) measure worker's productivity using output provided by the employer, whereas virtually all "COVID-era" papers rely on self-assessed measure of productivity, as we do in this paper.

important role of non-cognitive skills – or "soft skills"- such as persistence, intrinsic motivation, and charm (e.g., Heckman et al. 2006, Mueller and Plug 2006, Borghans et al. 2008, Cobb-Clark and Tan 2011). Within the set of non-cognitive skills, personality traits have been shown to explain a large part of the variance in earnings and more generally to be good predictors of "success in life" (Heckman and Kautz, 2012).

The concept of personality traits is commonly operationalized using the Five Factor Model of Personality (Costa and MacCrae, 1992) – the so-called "Big Five" personality traits: Openness to Experience, Agreeableness, Extraversion, Emotional Stability and Conscientiousness (see Table 1 for definitions). Among the advantages of the Big Five several papers document its intra-individual stability over time, especially for adults (Roberts and DelVecchio 2000). The results of Cobb-Clark and Schurer (2012) is of particular relevance for our study: they observe that the Big Five personality traits are not much affected by adverse life events, such as divorce or death of a spouse. This mitigates concerns of endogeneity, the pandemic being unlikely to impact the measurement of personality traits.

Many studies document a significant relationship between the Big Five personality traits and labour market outcomes in various contexts (Mueller and Plug 2006, Nyhus and Pons 2005, Viinikainen et al. 2010, Anger and Heineck 2010, Heineck 2011, Fletcher 2013, Nandi and Nicoletti 2014, Gensowski 2018, Maczulskij and Viinikainen 2018, Collischon 2018). In general, these papers report a positive influence of Conscientiousness and Emotional Stability on wage, whereas Agreeableness is associated with lower wage. Most of these papers also indicate that relationships between wage and traits are often conditional on gender. The mechanism related personality to wage however remains an open question. In a lab experiment, Cubel et al. (2016) show that Conscientiousness is associated with better performance, suggesting that personality traits affect labour market outcomes through *productivity*.

To sum up, the literature indicates that WFH has a highly heterogeneous impact on worker's productivity, and the mechanism of this generating this heterogeneity is yet to be understood. At the same time, personality traits, in particular Conscientiousness, determine various labour market outcomes, including productivity. To the best of our knowledge, the existing literature did not consider the possible role of personality traits in productivity changes implied by WFH. This paper aims at filling this gap.

3. Data and method

3.1. Survey design

The data used in this study are drawn from a survey implemented in May and June 2021 in Latvia. The general aim of the survey is to collect information on employees' teleworking experience. Prevalence of WFH in Latvia was well below the EU average before the pandemic but increased six-fold over 2020. The target population is the set of employees who experienced teleworking during the pandemic. To reach this population, we used various channels: national news portals, social media (Facebook and Twitter) and radio advertisement. The survey (self-administered online) was available both in Latvian and in Russian, as Russian language is the mother tongue of about 35% of the population. More than 2000 respondents participated in the survey, among which we obtain more than 1700 fully completed questionnaires. To account for the potential bias introduced by the surveying channels, we weight the respondents by age and gender to match the official Central Statistical Bureau of Latvia's data on teleworking in 2021.

The survey consists of four blocks. The first block includes a series of questions related to respondents' teleworking experience, such as the place of stay during the pandemic (e.g., Latvia or abroad, in a rural or an urban area, in detached house or an apartment). The very first question asks whether the interviewee has been working only or mostly for at least one month from home during the pandemic. The survey is terminated for respondents answering "no".

Immediately after the first block, a question invites the respondent to compare her productivity at home and in office. We discuss this question in more detail below.

The second block of questions asks interviewees about their perception of the pros and cons associated with working from home. The first part is related to the difficulties experienced while teleworking (equipment, working conditions, communication with colleagues, impact on personal life, etc.), followed by questions about the support provided by the employer (mobile phone, laptop, payment for electricity, etc.). The second part asks the respondents to rate the importance of a battery of potential advantages of teleworking (more time together with family, more flexibility for time management, more time spent outdoor, etc.). The third part of this block focuses on commuting. It asks how many times per week the respondents used to go to

office before the pandemic, as well as the mode of transportation, the average time spent on commuting to office (both ways), and the money saved on commuting while teleworking.

The third block of questions focuses on individual and household characteristics. First, we collect information about age, gender, native language, and education level of the respondent. Next, we ask whether the respondent is living with a partner/spouse or not, as well as how many children aged below 18 live in the household. We proceed with the TIPI questionnaire. This series of ten questions, described below in details, provides us with measurement of the Big Five personality traits.

The very last block of the survey asks questions about the job's characteristics of the respondent (NACE section, public/private sector, part-time/full-time, managerial position, etc.).

The survey includes questions on three outcomes of interest. First, the main variable of interest is a self-reported measure of productivity. Despite the usual flaws, self-assessment of productivity is commonly used in the burgeoning WFH/productivity literature (e.g., Felstead and Reusch 2020, Criscuolo et al. 2021, Etheridge et al. 2021). Survey questions used in these papers asked the respondent to compare productivity *now* with that in a pre-pandemic reference period.[2] Besides recollection issues, the difference between two periods may capture productivity changes not related to WFH (e.g., changes in personal life, general "COVID-fatigue"). We design an alternative question to measure WFH-induced productivity change. Note that in our case, all respondents have experienced WFH during the pandemic. We thus ask the respondent to compare her productivity at home and in office. In other words, the answer to this question emphasises the difference in productivity across workplaces rather than over time. This makes it more suitable to evaluate the impact of WFH on productivity, since it implicitly requires the comparison of the current productivity to a counterfactual one in a different workplace. The precise question is hence "Where are you more productive?" The five possible answers are "In office", "In office (slightly)", "No difference", "At home (slightly)" and "At home" (plus a sixth answer, "Difficult to tell"). These answers show a progression

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[2] For instance, in Etherdige et al. (2020) the precise question is "Please think about how much work you get done per hour these days. How does that compare to how much you would have got done per hour back in January/February 2020?"

indicating the relative productivity at home with respect to productivity in office, giving an ordinal nature to the productivity variable. This question is introduced near the beginning of the questionnaire, immediately after the first block.

In line with the recent literature, we find high heterogeneity in terms of self-assessed productivity: a third of respondents is more productive in office, a third is more productive at home, and for another third, it does not make a difference (Table 1, panel A).

Table 1. Descriptive statistics – Outcome variables

A. Productivity: *Where are you more productive?*	In office	In office (slightly)	No difference	At home (slightly)	At home
	20.6%	16.2%	32.3%	9.9%	21.1%
B. Teleworking: *Where would you prefer to work post-pandemic?*	Only in office	Mostly in office	No difference	Mostly at home	Only at home
	6.5%	20.6%	9.9%	46.4%	16.7%
C. Reservation values, *EUR* *By how much should your monthly pay go up to make you change your mind?*					
5th percentile	100.0	0.0		50.0	100.0
Median	400.0	200.0		250.0	500.0
Mean	463.0	265.0		378.7	609.2
95th percentile	1000.0	750.0		1000.0	1500.0
Max	1000.0	1000.0		2000.0	2000.0
N Obs.	38	243		461	108

Notes: Panels A ($N = 1636$) and B ($N = 1702$) refer to samples used for estimation in Tables 2 and 3 below. Panel C excludes respondents indifferent between work in office or at home (($N = 169$), as well as those answering: "I would in any case choose to work in office (at home)" ($N = 191 + 506 = 697$). The top 1% is trimmed.

The second outcome of interest is the preference for WFH in the post-pandemic period. The question reads "Talking about the job you worked mostly remotely, and taking into account all difficulties and advantages, what would you choose post-pandemic: working from home or in office for the same remuneration (if you had the choice)?" The five possible answers are "Only from home", "Mostly from home", "Indifferent", "Mostly in office", "Only in office" (plus the same sixth answer as above, "Difficult to tell"). The order of these answers is similar to the one for the productivity question, the only difference being a slightly larger distance between the neutral answer and the two neighbouring options. However, distribution

of answers, unlike the productivity case, is strongly asymmetric: 63% of respondents prefer to work only or mostly from home, while just 27% support "pro-office" options (Table 1, panel B).

This question has two main aims. First, studying this preference variable addresses the question of *who* would like to keep working remotely in the post-pandemic period. Emanuel and Harrington (2021) provide evidence of negative self-selection of workers into remote jobs in pre-COVID time. This echoes a common employers' concern about the loss of monitoring opportunities (Erdsiek, 2021). By contrast, we will provide evidence for positive selection into teleworking. Second, this question rules out strategic manipulation, which may hamper the reliability of the previous productivity question. Some respondents may be tempted to declare, say, a higher productivity at home to support results presenting WFH in a favourable light. Self-deception could also affect the answer to the productivity question. The question about future work preferences mitigates these concerns.[3] This question appears at the end of the second block of the survey.

Finally, the third outcome of interest is the change in monthly wage required by the respondent to accept i) work in office for individuals willing to work from home; ii) work from home for individuals willing to work in office. The exact wording of the question (coming right after the one about the preference for WFH post-pandemic) is "By how much should your monthly pay go up to make you change your mind?" The aim of this question is to obtain a measure of the value (be it positive or negative) of WFH. Barrero et al. (2021b) show that many employees will likely change job if their employer returns to an on-site only working policy. Even though the formulation of the question in our survey does not rely on any revealed preference mechanism, the answers are of relevance to this key matching issue.

The descriptive statistics provided in Table 1 (panel C) suggests that reported values are realistic. Among those willing to work mostly from home (respectively, only from home), the median value of work from home is about one-third (respectively, two-thirds) of the median net monthly wage (740 euro, see CSB 2022a) in Latvia in 2021. Moreover, the two distributions (i.e., i) wage premium required by an employee willing to work from home to consider working

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[3] As an immediate evidence, note that less than half of those willing to work from home after the pandemic claimed that they are more productive when working from home (Table 1, panels A and B).

in office and ii) wage premium required by an employee willing to work in office to consider WFH) are very similar.

3.2. Measures of personality

The survey contains a section aiming at evaluating the personality of the respondent through the lens of the Five Factor Model of Personality (Costa and MacCrae, 1992). Table A1 (in Appendix A) provides definitions and further details. The psychometrics literature offers several standardized questionnaires allowing to build a measure for each of these five factors - Openness to Experience, Agreeableness, Extraversion, Emotional Stability and Conscientiousness. The most comprehensive test, the NEO PI-R is composed of 260 questions (Costa and MacCrae, 1992). For a large-scale survey, this is not an option. We rely on the Ten-Item-Personality-Inventory measure (TIPI, Gosling et al. 2003). This test, as suggested by the name, is composed of only ten questions, making it convenient for surveys, and has been widely used, including in economics (e.g., Heckman and Karapakula 2019, Alaref et al. 2020, Campos-Mercade 2021).

For each personality trait, TIPI includes two statements (one "positive" and one "negative"), and the respondent must indicate, on a Likert-type scale from 1 to 7, to what extent she agrees or disagrees with that statement. At the processing stage, the score for the "negative" statement is reversed: 1 is recoded to 7, 2 to 6 and so on, 7 to 1. The average of the two scores provides a unidimensional measure of the trait, ranging from 1 to 7 with increments of 0.5. For instance, the two statements related to Conscientiousness are "I see myself as dependable, self-disciplined" and "I see myself as disorganized, careless". As simple as this approach seems, Gosling et al. (2003) show that the performance of this test is only slightly below the popular 44-questions Big Five Inventory (BFI, see John and Srivastava, 1999). Besides, in a comparison of several Big Five personality traits measures, Furnham (2008) shows that TIPI measures correlate well with the scores obtained using the 60-questions NEO-FFI and outperforms other short measures.

Table A2 in Appendix A provides the correlation between the five personality traits measures in our data. None of the pairwise correlation is large, and all are in the range usually observed in the literature. These low correlations are consistent with the Big Five concept according to which each trait represents a distinct dimension. Finally, Figure 1 displays the

distributions of the five personality traits. Each trait shows substantial heterogeneity. Conscientiousness is skewed to the right, which is also observed for instance in Heineck and Anger (2010).

Figure 1. Personality traits – Distributions
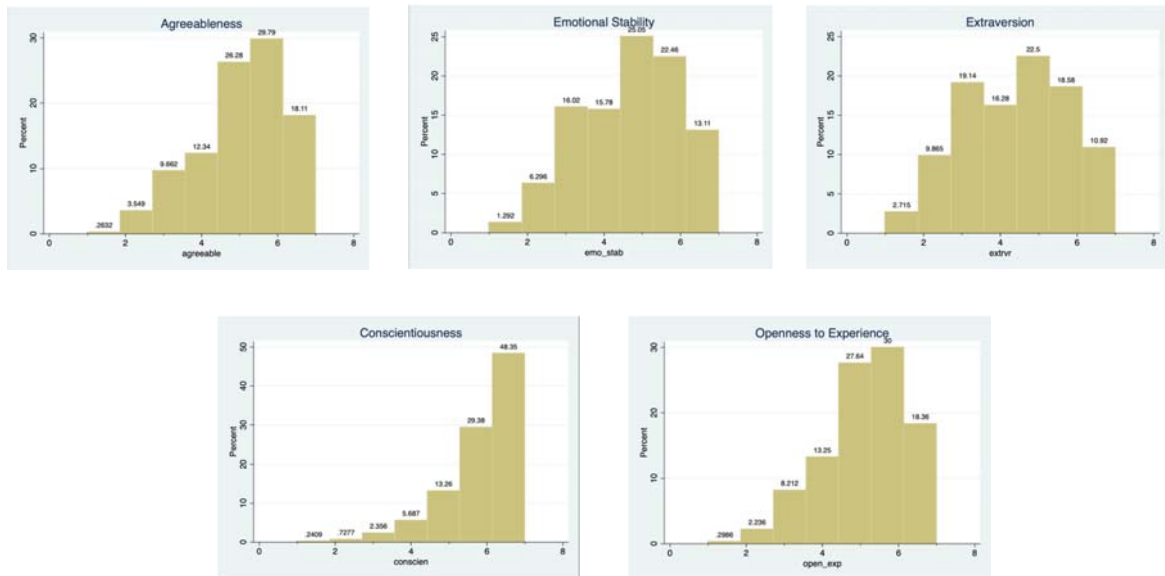
Tables A3 and A4 present the descriptive statistics for the Big Five personality traits – overall, by the self-reported relative productivity at home, as well as by the preference for teleworking after the pandemic. For all traits, within-groups standard deviations (SDs) are about the same as the overall SDs (ranging from 1.05 to 1.40), while absolute differences in means between "at home" and "in office" groups are much smaller (ranging from 0.03 to 0.38). Nevertheless, there is some descriptive evidence for significant association between some of the traits and the outcomes of interest in this paper – productivity of remote work and the preference for teleworking post-pandemic. For Conscientiousness, the difference in means between "at home" and "in office" outcomes is positive and significant at 1% level in the case of productivity and at 5% level in the case of willingness to work from home. For Openness to Experience, this difference is positive and significant at 5% level in the case of productivity, but for Extraversion – negative and significant at 1% level in the case of willingness to work from home.

3.3. Estimation methods

The primary objective of this paper is to estimate the relationship between personality traits and three outcomes of interest: (1) the productivity at home relative to the productivity in office; (2) willingness to WFH in the post-pandemic period; (3) the reservation values for leaving/accepting remote work after the pandemic. The first two dependent variables are 5-point ordinal categorical variables.[4] To account for this nature, we begin with an ordered logit model (see Wooldridge 2002; Long & Freese 2014), which assumes that observed outcomes, $y = 1, \dots, M$, are determined by an unobserved latent continuous variable $y^* = x\beta + e$ and cut points $\alpha_1 < \alpha_2 < \dots \alpha_{M-1}$. Here x is the vector of explanatory variables (without a constant) and $e|x$ is assumed to follow a logistic distribution, while the cut points and betas are model parameters to be estimated from data.

An advantage of the ordered logit model (but also its weakness) is simplicity and ease of interpretation: for every independent variable x_k, the single coefficient β_k determines the direction and the strength of the relation between x_k and the latent variable y^*.[5] In the context of this paper, y^* is not an artificial construct but has a meaningful interpretation: it indicates the perceived productivity at home for outcome (1) and the preferred proportion of working time to be performed from home for outcome (2). Formally, the ordered logit model relies on the *parallel lines* assumption: in the series of $M-1$ *cumulative logit models* with dependent variables

$$Y_m = 1 \iff y > m \text{ (for } m = 1, \dots, M-1),$$

the coefficients (except for the intercepts) are the same for all m and coincide with the ordered logit betas. However, in the context of this paper, like in many other applications (see Williams 2006, 2016; Fullerton 2009; Long & Freese 2014), the validity of the parallel lines assumption is a priori questionable. Plausibly, some factors feature an asymmetric effect, e.g., have a stronger impact on willingness to work mostly from home than on willingness to work mostly in office. Moreover, there might be two different latent variables – one responsible for productivity advantage of remote work and another governing the obstacles to productivity at

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[4] A larger value indicates a higher productivity from home (using the productivity in office as a benchmark). Similarly, for the willingness to work from home post-pandemic, a larger value indicates a stronger preference for WFH.

[5] As long as the impact of x_k on the observed outcomes is concerned, its direction coincides with the sign of β_k for the predicted probability of the highest outcome, is opposite for the lowest outcome and ambiguous in other cases.

home; some personality traits might affect only one of these variables or affect both but have effects of different magnitude.

To accommodate such situations, we use the *partial parallel lines* version of the generalised ordered logit model (Peterson & Harrell 1990; Williams 2006). In the first stage, we estimate (simultaneously) the above-mentioned series of cumulative logit models and test the parallel lines assumption for each of the explanatory variables.[6] In the second stage, we estimate the cumulative logits imposing the parallel lines restriction for those variables for which the hypothesis of equality of coefficients was not rejected in the first stage. In line with Wilson (2016), this approach results in a model less restrictive than the ordered logit model but nearly as parsimonious and, in addition, reveals some asymmetric effects in relationships between personality traits and productivity of teleworking.

In the case of a 5-point ordinal dependent variable, the generalized ordered logit however comes at the cost of estimating and reporting 4 sets of betas (or one set of betas and 3 sets of deviations from the parallel lines, a.k.a. *gammas*). For a 3-point dependent variable, the output of the generalized ordered logit differs from the one of the "standard" ordered logit just by one set of gammas (only for those variables not subject to the parallel lines restriction). To display the results in a compact and readable way, we first report the estimated coefficients obtained with the "standard" ordered logit. We then collapse the five categories down to three[7] and report the results of a generalized ordered logit model (both the coefficients and the marginal effects) using this alternative dependent variable.

A potential concern is the endogeneity of personality traits. For instance, one might suppose that the experience of the pandemic influences both personality traits and the self-assessment of productivity. Reverse causality may also be an issue. As virtually any paper in this literature, we cannot fully rule out this possibility. However, Big Five personality traits have been found to be virtually constant for working adults (e.g., Costa and McCrae, Roberts and DelVecchio 2000). Borghans et al. (2008) document changes up to early adulthood. In our sample, 99.5% of respondents are older than 20 years, which suggests that personality traits should not be malleable for most respondents. Further, Cobb and Clark (2012) show that

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[6] We use the *autofit* option of the Stata command gologit2 (Williams 2006).
[7] According to Hausman-type specification test (Table A6), this does not cause loss of significant information.

adverse employment, health, or family events do not lead to economically meaningful changes in personality traits.

In addition to personality traits, we consider five groups of controls. The first group is composed of age and gender. The second set aims at controlling commuting time and cost: a series of five dummies indicates the usual daily commuting time when working on site. It is complemented by a (log-transformed) continuous variable derived from a question about the commuting cost. The third group encompasses job characteristics. This includes a 10-section NACE classification, a dummy indicating whether the respondent holds a supervisory job, a dummy indicating whether the respondent has pre-COVID experience of WFH and a dummy indicating cross-border teleworking. Fourth, we consider a battery of additional personal characteristics, encompassing a set of education dummies (from secondary education to PhD) and a set of dummies indicating mother tongue (Latvian, Russian, Latvian and Russian, other). Finally, the fifth group includes several household-level characteristics, such as living with a spouse/partner or not, the number of children living in the household, and whether the respondent lives in a detached house or in an apartment.

We examine in a third part the determinants of the wage premium required to convince an individual preferring to work from home (from office) to switch to a strict in office policy (WFH policy). Positive values represent the value stated by individuals preferring to work from home in the post-pandemic period, while negative values represent the value stated by individuals preferring to work in office. We begin with a simple linear model, excluding cases with infinite subjective value of WFH). To account for censoring, we then successively apply three alternative approaches: (i) winsorization; (ii) interval regression; (iii) regression with double sample selection. Appendix B provides the details of these approaches.

4. Results

4.1. Main results

Table 2 summarises the five-categories ordered logit estimates for the personality trait variables (see Table A5 in Appendix A for the full set of estimated coefficients).[8] In columns (1) – (3), the dependent variable is the productivity at home relative to the productivity in office, while columns (4) – (6) present the results for willingness to work from home after the pandemic. For each dependent variable, three specifications are sequentially run, each introducing additional sets of controls.[9] Overall, the coefficients are remarkably stable across specifications. Conscientiousness is strongly linked with both the productivity measure and willingness to work from home: *ceteris paribus*, individuals with a higher level of conscientiousness are reporting a higher productivity from home as well as a higher willingness to keep working from home after the pandemic. Openness to Experience shows a similar behaviour, though with a lower significance. Extraversion, on the other hand, is only weakly negatively related to productivity. The relationship with willingness to work from home is however much stronger. These findings reported above are intuitive: workers with a high Openness to Experience are more likely to cope easily with the important changes associated with switching to WFH. On the other hand, extravert individuals may find it more difficult to remain physically isolated from colleagues.

Positive correlation between Conscientiousness and key labour market outcomes is well documented in the literature. For instance, Heineck (2011) provides evidence of a link between Conscientiousness and wage. Fletcher (2013) finds that a higher level of Conscientiousness is linked with a higher probability of being employed. Caligiuri (2000) observes that employees with a high level in this dimension receive better evaluations by their supervisors. A usual concern of employers is a possible negative selection of workers in teleworking. Observing that highly conscientious workers are more willing to work from home, where they are more productive, suggests that firms do not need to exert a very strict control on their employees choosing to telework. This finding is apparently conflicting with the results of Moens et al. (2022), who claim that individuals with a higher level of Conscientiousness

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[8] To address potential violations of the assumptions behind the ordered logit model, our main results are obtained using generalized ordered logit (see Tables 3, 5 and 6 below).

[9] We present these three specifications here, but results are qualitatively similar irrespective of the included controls as long as the commuting variables are included.

find job offers allowing for WFH less attractive. Even though the marginal effect they document is extremely small, a possible way to reconcile both studies is to observe that two studies have different target populations. In Moens et al. (2022), survey participants are employees "able to perform at least 10% of their job via telework", and they evaluate telework attractiveness *ex ante*, assessing alternative job offers with possibility to telework ranging from 0% to 80% in increments of 10%. The authors argue that highly conscientious individuals may fear not to perform well in a remote setup. On the other hand, all participants in our study have *already* experienced work *only or mainly from home* in 2020-2021 (85% of them – for at least 4 months), possibly alleviating their concern[10].

Table 2. Ordered logit regression results

Dep. Variable	Productivity			Preference for teleworking		
Pers. traits	(1)	(2)	(3)	(4)	(5)	(6)
Extravert	-0.081*	-0.075*	-0.049	-0.191***	-0.181***	-0.159***
	(0.042)	(0.042)	(0.042)	(0.042)	(0.042)	(0.043)
Agreeable	0.046	-0.001	0.003	-0.058	-0.069	-0.035
	(0.055)	(0.058)	(0.057)	(0.053)	(0.055)	(0.054)
Conscientious	0.264***	0.273***	0.287***	0.247***	0.248***	0.261***
	(0.054)	(0.055)	(0.055)	(0.058)	(0.059)	(0.057)
Emotional	-0.054	-0.044	-0.024	-0.037	-0.030	-0.009
stability	(0.039)	(0.04)	(0.04)	(0.041)	(0.041)	(0.041)
Open to	0.102**	0.088*	0.085*	0.092*	0.091*	0.105**
experience	(0.048)	(0.048)	(0.048)	(0.050)	(0.050)	(0.050)
Other controls						
Commuting	Yes	Yes	Yes	Yes	Yes	Yes
Age/gender	Yes	Yes	Yes	Yes	Yes	Yes
Other pers. char.	No	Yes	Yes	No	Yes	Yes
Household char.	No	Yes	Yes	No	Yes	Yes
Job characteristics	No	No	Yes	No	No	Yes
N. Obs.	1636	1636	1636	1702	1702	1702
Log pseudolik.	-2453.65	-2429.64	-2395.56	-2244.72	-2231.21	-2167.65
AIC	4941.30	4919.27	4877.12	4523.44	4522.42	4421.30
BIC	5033.10	5081.27	5109.32	4615.91	4685.60	4655.20
Pseudo R2	0.0363	0.0457	0.0591	0.0583	0.0640	0.0906

Notes: Five-categories ordered logit estimates. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$. Robust standard errors in parentheses.

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[10] Instead of the Big Five, Moens et al. (2021) use the HEXACO personality inventory, which, in addition to slightly different definitions of the Big Five traits, includes the Honesty/Humility dimension. Besides, their model specification implies that the estimated coefficient associated with Conscientiousness also captures (part of) the Honesty/Humility dimension, which may also explain this conflicting evidence.

Heineck and Anger (2010) previously found that both Extraversion and Openness to Experience are related to wages, but the direction of the relationship is different for males and females. We come back to heterogeneity by gender in the next subsection.

Our results are not only statistically significant but also of economic importance. Table 3 shows the average marginal effects of the personality traits, based on the specification with the whole set of controls. For ease of interpretation, we compute them after collapsing five outcome categories down to three.[11] In the Productivity models, answers "At home" and "At home (slightly)" are collapsed into "Higher at home", answer "No difference" is retained, while answers "In office" and "In office (slightly)" are collapsed into "Higher in office". The outcomes are collapsed in a similar way for the preference variable. Moreover, to address violations of the assumptions of the ordered logit model, we compute the marginal effects from generalized ordered logit regressions.[12]

We start by outlining the overall structure of the marginal effects. For each of the ten cases (five traits × two models), there are three effects (adding up to zero by construction): for the outcomes "at home", "in office" and "indifferent". The "at home" effects have the same sign as the estimated betas in the respective models (Table A7 in Appendix A), and the "in office" effects are of the opposite sign. In seven out of ten cases, the effects are *symmetric* (the "at home" and "in office" effects are of roughly equal size) and *polarised* (the "indifferent" effect is much smaller than each of the other two). In such cases, the "at home" effect almost completely characterises the situation. Three other cases refer to deviations from the parallel lines assumption (see panel Gamma_2 in Table A7 in Appendix A).

Among the Big Five personality traits, a one-unit increase in Conscientiousness has the strongest impact on both relative productivity of teleworking and willingness to work from home post-pandemic. The probability of the outcome "at home" goes up by 5.6 p.p. in the former case and by 5.5 p.p. in the latter.[13] The base rate for "More productive at home" being 31.0%, the relationship between Conscientiousness and productivity is hence economically

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[11] Table A6 provides results of Hausman-type specification test indicating that for both productivity and willingness to work from home, there is no systematic difference in coefficients of interest between five-categories and three-categories ordered logit models. This suggests that switching to three outcomes does not cause loss of significant information.

[12] See Table A7 in Appendix A for the full set of coefficients.

[13] In the relative sense, the effect on productivity is much stronger, because the base rate is half-smaller.

meaningful. Given that the inter-quartile range for Conscientiousness is 1.5 units, an individual with a score at the 75th percentile is 5.6×1.5 = 8.4 p.p. more likely to report a higher productivity at home than a similar individual with a Conscientiousness score at the 25th percentile.

Table 3. Marginal effects of personality traits

	Dependent Variable					
	Productivity			Preference for teleworking		
Pers. traits	Higher at home	No difference	Higher in office	Prefers at home	Indifferent	Prefers in office
Extravert [a]	-0.001	-0.018*	0.019*	-0.031***	0.004***	0.028***
	(0.009)	(0.009)	(0.010)	(0.009)	(0.001)	(0.008)
Agreeable [b]	-0.014	0.027**	-0.013	-0.019*	0.002	0.017*
	(0.012)	(0.011)	(0.013)	(0.011)	(0.001)	(0.010)
Conscientious [c]	0.056***	0.005**	-0.061***	0.055***	-0.024***	-0.032***
	(0.011)	(0.002)	(0.012)	(0.012)	(0.008)	(0.011)
Emotional stability	-0.003	0.000	0.003	-0.004	0.001	0.003
	(0.008)	(0.001)	(0.008)	(0.009)	(0.001)	(0.008)
Open to experience	0.017*	0.001	-0.018*	0.026**	-0.003**	-0.023**
	(0.010)	(0.001)	(0.010)	(0.010)	(0.001)	(0.009)
Base rates	0.310	0.323	0.367	0.630	0.099	0.271
N. Obs.	1636			1702		
Log pseudolik.	-1657.73			-1290.24		
Pseudo R2	0.0754			0.1320		

Notes: Marginal effects (averaged across the estimation sample) based on three-categories generalised ordered logit models. These show the change in predicted probabilities caused by a unit change in the score of respective traits (measured on a scale from 1 to 7). Other controls: Commuting, age, gender, education level, household characteristics, job characteristics (see Table A7). * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$. Robust standard errors in parentheses. [a] Deviation from the parallel lines assumption in the *Productivity* model, $p < 0.10$. [b] – same as [a], but $p < 0.05$. [c] – same as [b], but for the *Preference for teleworking* model.

Note that Conscientiousness features an asymmetric (though polarised) effect on the willingness to work from home post-pandemic: its impact on the probability of the outcome "in office" (−3.2 p.p. per unit) is substantially weaker than the above-mentioned 5.5 p.p. for "at home". The marginal effects for Openness to Experience have the same signs as those for Conscientiousness, but are smaller (1.7 and 2.6 p.p. for the outcome "at home") and less significant, especially in the productivity models.

Unlike Conscientiousness and Openness to Experience, Extraversion and Agreeableness appear as "pro-office" rather than "pro-home" traits. A one-unit increase in Extraversion is associated with a 2.8 p.p. rise in the probability to prefer work in office and a 3.1 p.p. fall in the probability to prefer work at home post-pandemic. The corresponding effects

of Agreeableness are +1.7 p.p. and −1.9 p.p. (and less significant). On the other hand, Extraversion features an asymmetric and non-polarised effect on productivity. A one-unit increase in Extraversion leads to a 1.9 p.p. increase in the probability to be more productive in office and to a 1.8 drop in the probability to report equal productivity at home and in office, while the effect on the "at home" outcome is virtually zero. The effect of Agreeableness on productivity is concentrated in the neutral outcome (+2.7 p.p. per unit, significant at 5%).[14] Finally, all effects of Emotional Stability are close to zero and not statistically significant.

Turning to the subjective value of work from home,[15] Table 4 depicts a similar story. Col. (1) and (2) are OLS regressions; col. (1) excludes respondents with "infinite" or extremely high value of either WFH or work from office (WFO) whereas col. (2) assigns them the 99th percentile of the observed value of working from home V_H (respectively, value of working from office V_O).

Col. (3) and (4) report the results of the interval regression model and the model with double sample selection outlined in Appendix B.[16] According to all models (1) – (4), Conscientiousness is positively related to the subjective value of work from home, whereas this relationship is negative for Extraversion. Using the estimate from col. (4), a one-unit increase in Conscientiousness is associated with an increase of the subjective value of WFH by a factor of exp(0.512) = 1.669, i.e. by 66.9%. For the median positive value of WFH (€300 per month), this translates into an economically meaningful monthly amount of €201.[17] A similar calculation for Extraversion reveals a smaller yet economically meaningful effect: a reduction of the subjective value of WFH by €79 per month.

In addition, probit selection models in col. (5) – (6) suggest that, other things equal, more conscientious workers are more likely (and more extravert workers – less likely) to have an "infinite" value of WFH, as well as *not* to have an "infinite" value of WFO. Finally, a positive association between the subjective value of WFH and Openness to Experience is

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[14] Note that ordered logit models (Table 2) do not reveal any significant effects of Agreeableness.

[15] Recall that this value is negative for those who prefer, post-pandemic, to work in office or mostly in office.

[16] Interval regression (3) with an upper limit of €10000 on the monthly values of WFH and WFO for censored observations produces results very similar to those of model (2), where these values are simply set to €2000 for WFH and €1000 for WFO. This suggests that the results are robust to varying the upper limit between €10000 and €2000.

[17] Likewise, for worker who prefers work from office, a one-unit increase in Conscientiousness, other things equal, reduces the subjective value of WFO by a factor of exp(−0.512) = 0.599, i.e. by 40.1%; starting from the median value of WFO (€200 per month), this means a reduction by €80.

present only in interval regressions and in the selection probit (6); plausibly, this trait tends to reduce the subjective value of work from office for those who prefer this mode.

Table 4. Personality traits and subjective value of work from home

Dep. Variable	Value of work from home (log)				Prob. of [not] "infinite" value of WFH [WFO]	
Pers. Traits	(1)	(2)	(3)	(4)	(5)	(6)
Extravert	-0.244*	-0.412***	-0.443***	-0.305**	-0.093***	-0.078**
	(0.129)	(0.109)	(0.116)	(0.129)	(0.029)	(0.038)
Agreeable	-0.230	-0.224	-0.245*	-0.215	0.016	-0.053
	(0.154)	(0.137)	(0.146)	(0.159)	(0.037)	(0.045)
Conscientious	0.434***	0.588***	0.648***	0.512***	0.063*	0.153***
	(0.159)	(0.144)	(0.154)	(0.169)	(0.038)	(0.044)
Emotional	-0.061	-0.023	-0.025	-0.042	0.011	0.002
stability	(0.127)	(0.106)	(0.112)	(0.126)	(0.029)	(0.036)
Open to	0.111	0.249*	0.292**	0.138	0.025	0.113***
experience	(0.143)	(0.127)	(0.135)	(0.141)	(0.032)	(0.043)
Controls/*Ex. Instr.*						
Small town [a]	No	No	No	No	Yes***	No
Latgale region [b]	No	No	No	No	No	Yes*
Commuting	Yes	Yes	Yes	Yes	Yes	Yes
Age/gender	Yes	Yes	Yes	Yes	Yes	Yes
Other pers. Char.	Yes	Yes	Yes	Yes	Yes	Yes
Household char.	Yes	Yes	Yes	Yes	Yes	Yes
Job characteristics	Yes	Yes	Yes	Yes	Yes	Yes
N obs.	991	1698	1698	1698		
Log pseudolikelih.	-2851.70	-5150.13	-4935.95	-4354.90		
AIC	5777.41	10374.27	9953.89	8943.81		
BIC	5958.66	10575.45	10176.82	9579.96		

Notes: * p < 0.10; ** p < 0.05; *** p < 0.01. Robust standard errors in parentheses. *Notes*: (1): OLS regression (excludes respondents with "infinite" or extremely high value of either WFH or WFO). (2): OLS regression; respondents with "infinite" or extremely high value of WFH (respectively, WFO) are assigned V_H = €2000 (respectively, V_H = −€1000) per month. (3): interval regression assuming an unknown V_H between €2000 and €10000 (respectively, –€10000 and –€1000) per month for the respondents with positive "infinite" or extremely high value of WFH (respectively, WFO). (4): model with double sample selection. (5) and (6): probit selection equations for (4); in (5), the dependent variable is reversed to make it pro-WFH, in line with other models. (5), (6) and (4) are estimated recursively using conditional mixed process technique (Roodman 2011). See Appendix B for modelling details. [a] Hansen J statistic p-value = 0.483. [b] Hansen J statistic p-value = 0.889.

Overall, the results in Table 4 are in line with Barrero et al. (2021), who document that 36% of workers in the US would start looking for a new job that allows some working from home if their current employer would impose a strict in-office policy. Our results nevertheless

indicate that the opposite also holds: some workers would strongly oppose to remain in a WFH setup after the pandemic.

4.2. Heterogeneity analysis by gender

The literature studying the relationship between work from home and productivity suggests a conditional effect based on gender (e.g., Etheridge et al. 2020, Lee and Tipoe 2021). In parallel, the literature investigating the role of personality traits on labour market outcomes documents as well different relationships for males and females. For instance, Heineck and Anger (2010) provide evidence that the impact of personality traits on wages is conditional on gender. As this paper builds on these two strands of the literature, we provide a heterogeneity analysis of the personality traits/productivity relationship based on gender. We reproduce the same analysis as above for males and females separately (using only the specification with the whole set of controls).

Table 5, 6 and 7 provide the results for productivity, willingness to work from home and subjective value of work from home, respectively. Conscientiousness and (to a smaller extent) Openness to Experience have a strong positive relationship with relative productivity of teleworking for women, while Extraversion and Agreeableness feature economically meaningful negative relationship. Noteworthy, the effects of Agreeableness and Openness to Experience do not concern the probability to be more productive in office; this asymmetry reflects deviations from the parallel lines assumption for these variables. For men, only Conscientiousness is barely significant, with much smaller point estimates than for women. Taken together, these results indicate that personality traits and productivity in WFH are more tightly related for females than for males.

Previously, Cubel et al. (2016) observed in a lab experiment that association between Extraversion and productivity is negative for women but positive for men. The same paper also documents a negative effect of Openness to Experience on productivity for females. In a WFH framework, we obtain opposite results. Considering the nature of the tasks used by Cubel et al. (2016), the following hypothesis can make these findings compatible: Openness to Experience is negatively related to productivity in routine tasks for females but is productivity enhancing when females face *changes* in working conditions. Studying whether this is a long-lasting effect would be interesting but is not possible in our setup.

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Conscientiousness features sizable positive effect on willingness to work from home post-pandemic for both genders (6 p.p. per unit of scale for men and 5.2 p.p. for women). Openness to Experience is also positively associated with willingness to work remotely post-pandemic, but only for women its effect (2.1 p.p. per unit of scale) is barely statistically significant. Extraversion for women and Agreeableness for men act in the opposite direction; both effects are economically meaningful (about 4 p.p. per unit of scale). However, the effect or Extraversion (respectively, Agreeableness) is not significant for men (respectively, for women). The only deviation from the parallel lines assumption concerns the effect of Conscientiousness for men, which is not significant for the outcome "in office".

Table 5. Marginal effects of personality traits on productivity, by gender

	Dependent Variable: Productivity					
	Men			Women		
Big Five person. Traits	Higher at home	No difference	Higher in office	Higher at home	No difference	Higher in office
Extravert	0.019	0.004	-0.023	-0.026***	-0.001	0.027***
	(0.018)	(0.003)	(0.021)	(0.008)	(0.001)	(0.009)
Agreeable [a]	0.011	0.002	-0.013	-0.027**	0.032***	-0.005
	(0.021)	(0.004)	(0.025)	(0.013)	(0.012)	(0.013)
Conscientious	0.030*	0.006	-0.036*	0.077***	0.004	-0.081***
	(0.018)	(0.004)	(0.021)	(0.012)	(0.002)	(0.013)
Emotional stability	-0.007	-0.001	0.008	-0.001	-0.000	0.001
	(0.017)	(0.003)	(0.020)	(0.008)	(0.000)	(0.009)
Open to Experience [b]	0.008	0.002	-0.010	0.038***	-0.025**	-0.013
	(0.016)	(0.003)	(0.021)	(0.012)	(0.012)	(0.012)
Base rates	0.297	0.306	0.397	0.318	0.334	0.349
N. Obs.	349			1287		
Log pseudolik.	-339.87			-1279.99		
Pseudo R2	0.1064			0.0941		

Notes: Marginal effects (averaged across the estimation sample) based on three-categories generalised ordered logit models. These show the change in predicted probabilities caused by a unit change in the score of respective trait (measured on a scale from 1 to 7). Other controls: Commuting, age, gender, education level, household characteristics, job characteristics (see Table A7). * p< 0.10; ** p< 0.05; *** p< 0.01. Robust standard errors in parentheses. [a, b] Deviation from the parallel lines assumption for women ([a] p < 0.01; [b] p < 0.05).

The overall structure of the gender-specific marginal effects is largely similar for willingness to work from home (Table 6) and productivity (Table 5), except for Agreeableness, which is significant only for women in the former case but only for men in the latter. Emotional Stability does not have any significant effects in both cases. Note that none of the (significant) personality traits switches sign across gender, unlike previous studies focusing on personality traits, gender and labour market outcomes (e.g., Heineck and Anger, 2010).

Table 6. Marginal effects of personality traits on willingness to work from home, by gender

Big Five personality traits	Men			Women		
	Prefers at home	Indifferent	Prefers in office	Prefers at home	Indifferent	Prefers in office
Extravert	-0.017	0.003	0.015	-0.038***	0.004**	0.034***
	(0.019)	(0.003)	(0.016)	(0.009)	(0.001)	(0.008)
Agreeable	-0.037*	0.005	0.032*	-0.011	0.001	0.010
	(0.022)	(0.003)	(0.019)	(0.012)	(0.001)	(0.011)
Conscientious [a]	0.060***	-0.042**	-0.018	0.052***	-0.006***	-0.046***
	(0.022)	(0.019)	(0.022)	(0.013)	(0.002)	(0.011)
Emotional stability	-0.012	0.002	0.010	0.001	-0.000	-0.001
	(0.019)	(0.003)	(0.017)	(0.009)	(0.001)	(0.008)
Open to experience	0.028	-0.004	-0.024	0.021*	-0.002*	-0.019*
	(0.021)	(0.003)	(0.018)	(0.011)	(0.001)	(0.010)
Base rates	0.637	0.108	0.255	0.626	0.093	0.281
N. Obs.	363			1339		
Log pseudolik.	-265.52			-1012.30		
Pseudo R2	0.1650			0.1318		

Notes: Marginal effects (averaged across the estimation sample) based on three-categories generalised ordered logit models. This shows the change in predicted probabilities caused by a unit change in the score of respective trait (measured on a scale from 1 to 7). Other controls: Commuting, age, gender, education level, household characteristics, job characteristics. * p< 0.10; ** p< 0.05; *** p< 0.01. Robust standard errors in parentheses.
[a] Deviation from the parallel lines assumption for men, p < 0.10.

Finally, regarding the subjective value of WFH (Table 7), positive effect of Conscientiousness and negative effect of Extraversion are strongly significant and economically meaningful for women in all specifications (W1)-(W4). Openness to Experience is positively associated with the subjective value of WFH for women, but this effect is smaller and significant only at the 10% level. Furthermore, women's Conscientiousness is positively (and Extraversion – negatively) associated both with likelihood to have an "infinite" value of WFH and with likelihood *not* to have an "infinite" value of WFO (col. (W5), (W6)).

For men, none of the traits appears as significant either in OLS model (M1) or in the model with double selection (M4). The interval regression model (M3) (which does not exclude respondents with "infinite" value of either WFH or WFO), as well as the selection probit (M6) for not having an "infinite" value of WFO, feature positive effect of Conscientiousness. Among men, these are the only two effects significant at the 5% level.

Overall, our findings suggest that role of personality traits in teleworking is stronger for female workers. Plausibly, this has to do with the gender differences in ten phenotypic

factors (a.k.a. *aspects*) of personality underlying the Big Five dimensions. Weisberg et al. (2011) find "significant gender differences appearing in both aspects of every Big Five trait". Moreover, for Extraversion, Openness, and Conscientiousness the gender differences are "either small or undetectable at the Big Five level", because they are of opposite directions at the aspect level (Weisberg et al. 2011). This means that a male and a female with similar measures of, say, Conscientiousness, likely differ strongly in the two underlying aspects - Industriousness and Orderliness. Hence, gender differences in the link between Conscientiousness and productivity from home (see Table 5) could be due to this link being mediated mainly by Orderliness rather than Industriousness.

5. Conclusion

This paper provides an analysis of the relationship between personality traits and workers' productivity while working from home. We design and run a survey targeting employees who experienced teleworking during the COVID-19 pandemic. This survey includes questions about productivity, but also a series of questions standard in the psychometrics literature allowing to measure personality traits along the "Big Five" dimensions.

We document that personality traits matter for changes in productivity when switching to WFH. In particular, individuals with high levels of Conscientiousness are much more likely to report a better productivity from home than from office: a one-unit increase on the Conscientiousness scale leads to a 5.6 p.p. increase in the probability to report a higher productivity at home. The base rate being 31%, the relationship between Conscientiousness and productivity is hence economically meaningful. Besides, Openness to Experience and Extraversion also do play a role. When disaggregating the analysis by gender, it appears that the relationship between personality traits and productivity is stronger for females than for males.

We also find that workers who, in the post-pandemic perspective, are not indifferent between working from home or from office, attach to the preferred mode of work a substantial value; Conscientiousness and Extraversion are important determinants of this value, especially among women.

Table 7. Heterogeneity analysis: Personality traits and subjective value of work from home by gender

Dep. Variable	Men						Women					
	Value of work from home (log)				Prob. Of [not] "infinite" value of WFH [WFO]		Value of work from home (log)				Prob. Of [not] "infinite" value of WFH [WFO]	
	(M1)	(M2)	(M3)	(M4)	(M5)	(M6)	(W1)	(W2)	(W3)	(W4)	(W5)	(W6)
Extravert	0.025	-0.233	-0.202	-0.010	-0.058	-0.022	-0.412***	-0.519***	-0.571***	-0.444***	-0.120***	-0.069*
	(0.279)	(0.236)	(0.238)	(0.277)	(0.065)	(0.115)	(0.134)	(0.118)	(0.118)	(0.132)	(0.030)	(0.040)
Agreeable	-0.400	-0.435*	-0.483*	-0.344	0.003	-0.156	-0.207	-0.117	-0.117	-0.173	0.025	0.006
	(0.330)	(0.258)	(0.260)	(0.304)	(0.074)	(0.130)	(0.165)	(0.162)	(0.162)	(0.165)	(0.042)	(0.050)
Conscientious	0.228	0.522*	0.576**	0.225	0.052	0.347***	0.580***	0.620***	0.664***	0.627***	0.097**	0.102**
	(0.337)	(0.266)	(0.275)	(0.505)	(0.090)	(0.103)	(0.181)	(0.172)	(0.172)	(0.180)	(0.043)	(0.049)
Emotional stability	0.091	-0.015	-0.063	0.031	-0.038	-0.101	-0.131	0.018	0.018	-0.103	0.051	0.015
	(0.300)	(0.234)	(0.238)	(0.307)	(0.070)	(0.098)	(0.125)	(0.116)	(0.116)	(0.125)	(0.031)	(0.039)
Open to experience	-0.072	0.324	0.395	-0.183	0.033	0.213*	0.284*	0.247*	0.276*	0.291*	-0.001	0.033
	(0.290)	(0.262)	(0.266)	(0.365)	(0.074)	(0.121)	(0.157)	(0.144)	(0.144)	(0.154)	(0.035)	(0.045)
N Obs.	229	363	363	363			762	1335	1335	1335		
Log pseudolik.	-653.22	-1082.77	-1863.14	-1658.54			-2180.44	-3039.26	-3039.26	-2649.16		
AIC	1376.45	2235.53	3804.27	3471.08			4430.88	8174.42	6158.52	5524.31		
BIC	1496.63	2371.83	3956.16	3770.95			4593.14	8361.50	6366.39	6111.54		

Notes: * p< 0.10; ** p< 0.05; *** p< 0.01. Robust standard errors in parentheses. Other controls: Commuting, age, gender, education level, household characteristics, job characteristics. (M1) and (W1): OLS regressions (exclude respondents with "infinite" or extremely high value of WFH or WFO). (M2) and (W2): OLS regression (respondents excluded in (M1) and (W1) are assigned $V_H = €2000$ ort $V_H = -€1000$ per month). (M3) and (W3): interval regressions. (M4) and (W4): models with double sample selection. (M5), (M6), (W5) and (W6): probit selection equations for (M4) and (W4). See Appendix B for modelling details.

The contribution of this paper is threefold. First, it documents a novel link between personality traits and labour market outcomes. The relationship between personality traits and productivity received some empirical support in the lab. We provide observational data evidence of this relationship in a teleworking context. Second, this paper contributes to the literature examining pandemic-induced productivity changes. The COVID-19 literature provides evidence of a heterogenous effect of teleworking on workers' productivity. We show that personality traits can explain part of this heterogeneity. Third, there is evidence that the pandemic is acting as a massive workers' reallocation shock, heavily impacting the employment structure and workers' willingness to have flexible working arrangement. Our paper shows that personality traits also matter for this reallocation effect. Overall, these results suggest that a one-size-fits-all policy is unlikely to maximize neither firms' productivity nor workers' satisfaction. It also highlights that when estimating firm-level ability in switching to remote work, characteristics of individual workers should be considered. In particular, employers practicing remote work should invest in socialization measures to compensate the negative effect of teleworking on wellbeing of more extravert workers. Finally, the personality measure that we use mitigates endogeneity issues thanks to its stability over time, allowing us to interpret the regression results beyond mere correlation. A direction for future works however lies in the exploitation of a setup allowing for a cleaner identification of the causal link between personality traits and productivity in WFH.

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Appendix A – Additional tables

Table A1. The Big Five dimensions and facets

Big Five dimension	Definition	Facets (and Correlated Trait Adjective)
Conscientiousness	"the tendency to be organized, responsible, and hardworking"	Competence (efficient) Order (organized) Dutifulness (not careless) Achievement striving (ambitious) Self-discipline (not lazy) Deliberation (not impulsive)
Extraversion	an orientation of one's interests and energies toward the outer world of people and things rather than the inner world of subjective experience; characterized by positive affect and sociability"	Warmth (friendly) Gregariousness (sociable) Assertiveness (self-confident) Activity (energetic) Excitement seeking (adventurous) Positive emotions (enthusiastic)
Openness to Experience	"the tendency to be open to new aesthetic, cultural, or intellectual experiences"	Fantasy (imaginative) Aesthetic (artistic) Feelings (excitable) Actions (wide interests) Ideas (curious) Values (unconventional)
Agreeableness	"the tendency to act in a cooperative, unselfish manner"	Trust (forgiving) Straightforwardness (not demanding) Altruism (warm) Compliance (not stubborn) Modesty (not show-off) Tender-mindedness (sympathetic)
Emotional Stability/Neuroticism	Emotional stability: "predictability and consistency in emotional reactions, with absence of rapid mood changes." Neuroticism: "a chronic level of emotional instability and proneness to psychological distress."	Anxiety (worrying) Hostility (irritable) Depression (not contented) Self-consciousness (shy) Impulsiveness (moody) Vulnerability to stress (not self-confident)

Notes: Definitions are from the American Psychology Association Dictionary. Table adapted from Almulund et al. (2011).

Table A2. Correlation between personality traits

	Extravertion	Agreeableness	Conscientiousness	Emotional Stability	Openness
Extravert	1				
Agreeable	0.1063	1			
Conscientious	0.0925	0.3035	1		
Emotional Stability	0.1205	0.2302	0.2142	1	
Openness	0.3601	0.1400	0.1343	0.1531	1

Table A3. Personality traits and productivity

	Where are you more productive?				
	In office	No difference	At home	Total	
	(1)	(2)	(3)	(4)	(3) − (1)
Extraversion					
Mean	4.49	4.32	4.38	4.40	−0.11
S.D.	1.34	1.37	1.49	1.40	
IQR	2.00	2.00	2.00	2.00	
Agreeableness					
Mean	4.97	5.19	5.13	5.09	0.16*
S.D.	1.23	1.09	1.25	1.20	
IQR	2.00	1.50	2.00	2.00	
Conscientiousness					
Mean	5.76	6.04	6.13	5.96	0.38***
S.D.	1.17	0.97	0.95	1.05	
IQR	1.50	1.50	1.50	1.50	
Emotional Stability					
Mean	4.63	4.77	4.67	4.69	0.04
S.D.	1.32	1.30	1.35	1.32	
IQR	1.50	2.00	1.50	1.50	
Openness to Experience					
Mean	5.10	5.09	5.25	5.14	0.15**
S.D.	1.10	1.13	1.17	1.14	
IQR	1.50	1.50	1.50	1.50	
N Obs.	592	535	509	1636	

Notes: Col. (1) corresponds to answers "In office" and "In office (slightly)". Likewise, col. (3) corresponds to answers "At home" and "At home (slightly)".
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table A4. Personality traits and willingness to work from home

	In office (1)	No difference (2)	At home (3)	Total (4)	(3) − (1)
	Preferred place of work post-pandemic				
Extraversion					
Mean	4.62	4.63	4.27	4.40	−0.36***
S.D.	1.33	1.26	1.43	1.40	
IQR	1.50	1.50	2.00	2.00	
Agreeableness					
Mean	5.16	5.18	5.02	5.07	−0.14*
S.D.	1.16	1.16	1.22	1.20	
IQR	1.50	1.50	2.00	2.00	
Conscientiousness					
Mean	5.86	5.73	6.03	5.95	0.17**
S.D.	1.13	1.10	1.00	1.05	
IQR	1.50	1.50	1.50	1.50	
Emotional Stability					
Mean	4.71	4.78	4.66	4.68	−0.05
S.D.	1.30	1.21	1.34	1.32	
IQR	2.00	1.50	2.00	1.50	
Openness to Experience					
Mean	5.10	5.17	5.13	5.13	0.03
S.D.	1.10	1.13	1.16	1.14	
IQR	1.50	1.50	1.50	1.50	
N Obs.	472	161	1069	1702	

Notes: Col. (1) corresponds to answers "Only in office" and "Mostly in office". Likewise, col. (3) corresponds to answers "Only at home" and "Mostly at home".
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

Table A5. Five-categories Ordered Logit regressions – Complete Table

Dep. Variable	Productivity			Preference for teleworking		
Model	(1)	(2)	(3)	(4)	(5)	(6)
Big Five personality traits						
Extravert	-0.081*	-0.075*	-0.049	-0.191***	-0.181***	-0.159***
	(0.042)	(0.042)	(0.042)	(0.042)	(0.042)	(0.043)
Agreeable	0.046	-0.001	0.003	-0.058	-0.069	-0.035
	(0.055)	(0.058)	(0.057)	(0.053)	(0.055)	(0.054)
Conscientious	0.264***	0.273***	0.287***	0.247***	0.248***	0.261***
	(0.054)	(0.055)	(0.055)	(0.058)	(0.059)	(0.057)
Emotional stability	-0.054	-0.044	-0.024	-0.037	-0.03	-0.009
	(0.039)	(0.04)	(0.04)	(0.041)	(0.041)	(0.041)
Open to experience	0.102**	0.088*	0.085*	0.092*	0.091*	0.105**
	(0.048)	(0.048)	(0.048)	(0.05)	(0.05)	(0.05)
Commuting Commuting time (both ways, vs. up to 30 minutes						
30 - 60 min	0.218	0.265*	0.216	0.223	0.239*	0.213
	(0.136)	(0.135)	(0.137)	(0.141)	(0.140)	(0.143)
1 - 2 hours	0.516***	0.548***	0.510***	0.720***	0.749***	0.769***
	(0.148)	(0.147)	(0.15)	(0.16)	(0.161)	(0.16)
2 - 3 hours	0.970***	0.961***	0.967***	1.031***	1.060***	1.052***
	(0.194)	(0.195)	(0.198)	(0.18)	(0.181)	(0.185)
> 3 hours	1.536***	1.505***	1.309***	1.365***	1.400***	1.269***
	(0.354)	(0.364)	(0.403)	(0.348)	(0.355)	(0.396)
commuting cost (log)	0.177***	0.174***	0.165***	0.236***	0.241***	0.216***
	(0.031)	(0.032)	(0.032)	(0.032)	(0.034)	(0.034)
Personal characteristics						
Male	-0.018	-0.007	-0.073	0.092	0.069	-0.048
	(0.125)	(0.127)	(0.131)	(0.135)	(0.137)	(0.139)
Age	0.003	-0.006	-0.005	-0.009**	-0.011**	-0.008
	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Education (vs BA)						
secondary general		-0.061	-0.221		-0.086	-0.391
		(0.311)	(0.317)		(0.358)	(0.35)
secondary professional		0.456*	0.381		0.499*	0.419
		(0.234)	(0.232)		(0.277)	(0.278)
college		0.185	0.219		0.237	0.274
		(0.259)	(0.26)		(0.265)	(0.273)
MA		0.038	0.045		-0.075	-0.039
		(0.113)	(0.115)		(0.118)	(0.12)
PhD		0.909**	1.017**		0.064	0.157
		(0.439)	(0.421)		(0.279)	(0.25)

Table A5. (Continued)

Native Language (vs. Latvian)				
Russian only	-0.296**	-0.410***	-0.060	-0.372**
	(0.133)	(0.149)	(0.138)	(0.156)
Latvian & Russian	-0.231	-0.264	0.009	-0.208
	(0.2)	(0.198)	(0.215)	(0.224)
Other	0.748	0.64	0.855*	0.616
	(0.57)	(0.55)	(0.443)	(0.419)
Household characteristics Family status (vs living with spouse)				
with partner	-0.183	-0.156	-0.093	-0.094
	(0.133)	(0.136)	(0.145)	(0.148)
no cohabiting partner	-0.065	-0.032	-0.215*	-0.16
	(0.128)	(0.126)	(0.128)	(0.127)
# children aged < 18 (vs None)				
1-2	-0.392***	-0.364***	-0.378***	-0.337***
	(0.114)	(0.114)	(0.117)	(0.118)
3+	-0.522**	-0.560**	-0.469**	-0.538**
	(0.234)	(0.252)	(0.208)	(0.217)
Detached house	0.311***	0.323***	0.061	0.113
	(0.118)	(0.12)	(0.118)	(0.12)
Job characteristics NACE (vs O - Publ. Adm)				
A		-0.048		-1.059
		(1.276)		(1.068)
BCDE		0.395		0.806**
		(0.282)		(0.376)
F		0.216		0.105
		(0.4)		(0.354)
GI		-0.233		0.3
		(0.372)		(0.34)
H		-0.676*		0.095
		(0.348)		(0.379)
JKL		0.129		0.436***
		(0.15)		(0.162)
MNP		-0.559***		-0.591***
		(0.184)		(0.176)
QRS		-0.394**		-0.413**
		(0.189)		(0.165)
Supervisory job		-0.189*		-0.372***
		(0.105)		(0.11)

Table A5. (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)
Worked remotely before COVID						
main job			1.021***			1.119***
			(0.238)			(0.221)
other job			0.347			0.446
			(0.302)			(0.299)
Cross-border teleworking			0.225			0.837***
			(0.302)			(0.295)
Cut points						
cut1	1.251***	0.516	0.622	-1.489***	-1.782***	-1.481***
	(0.452)	(0.501)	(0.503)	(0.475)	(0.487)	(0.497)
cut2	2.118***	1.400***	1.532***	0.305	0.027	0.384
	(0.455)	(0.503)	(0.504)	(0.472)	(0.489)	(0.496)
cut3	3.576***	2.887***	3.058***	0.819*	0.547	0.926*
	(0.464)	(0.51)	(0.509)	(0.472)	(0.489)	(0.497)
cut4	4.129***	3.449***	3.634***	3.233***	2.986***	3.501***
	(0.467)	(0.512)	(0.511)	(0.477)	(0.494)	(0.502)
N. Obs.	1636	1636	1636	1702	1702	1702
Log pseudolikelihood	-2453.651	-2429.637	-2395.56	-2244.718	-2231.208	-2167.651
AIC	4941.302	4919.274	4877.121	4523.436	4522.417	4421.302
BIC	5033.102	5081.274	5109.321	4615.909	4685.603	4655.203
Pseudo R2	0.0363	0.0457	0.0591	0.0583	0.064	0.0906

Notes: * $p< 0.10$; ** $p< 0.05$; *** $p< 0.01$. Robust standard errors in parentheses.

Table A6. Ordered logit specification tests: Five categories vs three categories

				P-values of adjusted Wald test		
Dep. Variable	Productivity			Preference for teleworking		
Model [a]	(1)	(2)	(3)	(4)	(5)	(6)
All coefficients [b]	0.838	0.722	0.155	0.011	0.049	0.136
Big Five coefficients [c]	0.772	0.885	0.938	0.530	0.248	0.289
Cut points [d]	0.474	0.669	0.746	0.153	0.070	0.004

Notes: [a] See Table A5 for models (1) – (6). [b] For each specification, the table reports p-value of the Hausman-type test of equality of all coefficients between the five-categories and three-categories ordered logit models. [c] For each model, the table reports p-value of the test of equality of the coefficients of the Big Five personality traits between the five-categories and three-categories ordered logit models. [d] For each model, the table reports p-value of testing the hypothesis ($\alpha_2 = \tau_1$ and $\alpha_3 = \tau_2$), where $\alpha_1 < \alpha_2 < \alpha_3 < \alpha_4$ and $\tau_1 < \tau_2$ are the cut points of the five-categories and the three-categories model, respectively.

Table A7. Three-categories generalized ordered logit regressions – Complete Table

Dep. Variable	Productivity			Preference for teleworking		
	(1)	(2)	(3)	(1)	(2)	(3)
Beta						
Big Five personality traits						
Extravert	-0.118**	-0.115**	-0.091*	-0.198***	-0.193***	-0.166***
	(0.048)	(0.049)	(0.049)	(0.047)	(0.048)	(0.049)
Agreeable	0.111*	0.071	0.065	-0.094*	-0.125**	-0.099
	(0.060)	(0.063)	(0.063)	(0.058)	(0.06)	(0.061)
Conscientious	0.269***	0.277***	0.296***	0.174***	0.174***	0.190***
	(0.056)	(0.057)	(0.057)	(0.066)	(0.066)	(0.066)
Emotional stability	-0.038	-0.032	-0.015	-0.046	-0.044	-0.021
	(0.041)	(0.041)	(0.041)	(0.046)	(0.046)	(0.046)
Open to experience	0.103**	0.088*	0.090*	0.117**	0.114**	0.140**
	(0.050)	(0.050)	(0.051)	(0.054)	(0.054)	(0.056)
Commuting						
Commuting time (both ways, vs. up to 30 minutes						
30 - 60 min	0.156	0.206	0.163	0.191	0.225	0.181
	(0.139)	(0.14)	(0.141)	(0.149)	(0.150)	(0.154)
1 - 2 hours	0.461***	0.489***	0.442***	0.784***	0.825***	0.826***
	(0.156)	(0.157)	(0.158)	(0.176)	(0.177)	(0.176)
2 - 3 hours	0.949***	0.932***	0.916***	1.552***	1.605***	1.479***
	(0.212)	(0.215)	(0.220)	(0.263)	(0.263)	(0.278)
> 3 hours	1.670***	1.638***	1.426***			2.530**
	(0.435)	(0.443)	(0.485)			(1.078)
commuting cost (log)	0.177***	0.169***	0.166***	0.239***	0.242***	0.224***
	(0.033)	(0.034)	(0.035)	(0.035)	(0.035)	(0.037)
Personal characteristics						
Male	-0.04	-0.039	-0.086	0.040	0.024	-0.053
	(0.131)	(0.132)	(0.136)	(0.144)	(0.145)	(0.151)
Age	0.003	-0.005	-0.004	0.007	0.003	0.004
	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)
Education (vs BA)						
secondary general		-0.077	-0.181		-0.264	-0.607*
		(0.310)	(0.325)		(0.358)	(0.350)
secondary professional		0.455	0.395		0.418	0.395
		(0.278)	(0.274)		(0.313)	(0.321)
college		0.021	0.032		0.409	0.420
		(0.281)	(0.286)		(0.311)	(0.311)
MA		0.036	0.034		-0.075	-0.048
		(0.115)	(0.116)		(0.130)	(0.134)
PhD		0.803*	0.883**		0.465	0.467
		(0.417)	(0.404)		(0.496)	(0.466)

Table A7. (Continued)

	(1)	(2)	(3)	(4)
Native Language (vs. Latvian)				
Russian only	-0.252*	-0.324**	-0.185	-0.483***
	(0.134)	(0.15)	(0.152)	(0.17)
Latvian & Russian	-0.127	-0.108	-0.3	-0.52*
	(0.195)	(0.192)	(0.214)	(0.219)
Other	0.922	0.847	1.025	0.821
	(0.651)	(0.645)	(0.785)	(0.683)
Household characteristics				
Family status (vs living with spouse)				
with partner	-0.153	-0.142	-0.132	-0.074
	(0.137)	(0.139)	(0.159)	(0.162)
no cohabiting partner	-0.085	-0.059	-0.242*	-0.189
	(0.138)	(0.137)	(0.151)	(0.154)
# children aged < 18 (vs None)				
1-2	-0.361***	-0.349***	-0.304**	-0.245*
	(0.117)	(0.118)	(0.132)	(0.137)
3+	-0.464*	-0.509*	-0.396*	-0.448*
	(0.248)	(0.26)	(0.242)	(0.262)
Detached house	0.345***	0.369***	0.053	0.123
	(0.125)	(0.127)	(0.136)	(0.143)
Job characteristics				
NACE (vs O - Publ. Adm)				
A		0.095		-0.785
		(0.938)		(0.941)
BCDE		0.405		0.538
		(0.295)		(0.38)
F		0.341		0.151
		(0.401)		(0.424)
GI		-0.289		0.206
		(0.367)		(0.445)
H		-0.933**		0.194
		(0.396)		(0.449)
JKL		0.062		0.360*
		(0.157)		(0.181)
MNP		-0.455**		-0.476*
		(0.19)		(0.196)
QRS		-0.283		-0.357*
		(0.184)		(0.198)
NA		-0.171		0.296
		(0.615)		(0.696)

Table A7. (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)
Supervisory job			-0.179			-0.394***
			(0.11)			(0.126)
Worked remotely before COVID						
main job			1.002***			1.829***
			(0.264)			(0.372)
other job			0.178			0.747*
			(0.304)			(0.455)
Cross-border teleworking			0.058			1.094***
			(0.357)			(0.426)
Gamma_2 (deviations from the parallel lines)						
Extravert	0.080*	0.082*	0.086*			
	(0.045)	(0.046)	(0.047)			
Agreeable	-0.135**	-0.137**	-0.138**			
	(0.055)	(0.056)	(0.057)			
Conscientious				0.094**	0.098**	0.103**
				(0.042)	(0.042)	(0.044)
Age				-0.016***	-0.016***	-0.016***
				(0.004)	(0.004)	(0.004)
Alpha						
Constant_1	-2.361***	-1.687***	-1.797***	-0.390	0.15	-0.244
	(0.512)	(0.559)	(0.556)	(0.547)	(0.574)	(0.589)
Constant_2	-3.488***	-2.838***	-2.998***	-0.809	-0.296	-0.728
	(0.529)	(0.571)	(0.568)	(0.519)	(0.554)	(0.580)
N. Obs.	1636	1636	1636	1702	1702	1702
Log pseudolikelihood	-1704.22	-1684.59	-1657.73	-1351.83	-1340.31	-1290.24
AIC	3442.43	3429.18	3401.45	2735.67	2738.63	2664.48
BIC	3534.23	3591.18	3633.65	2822.70	2896.38	2892.95
Pseudo R2	0.0495	0.0605	0.0754	0.0906	0.0983	0.1320

Notes: Assuming that the values of the dependent variable y are coded 1 (In office), 2 (No difference), 3 (At home), panel **Beta** reports, for each of the specifications (1)-(6), the coefficients of binary logit model with dependent variable $Y_1 = 1$ if $(y = 2 \mid y = 3)$, $Y_1 = 0$ if $y = 1$. Panel **Gamma_2** reports, for each of the specifications (1)-(6), "deviations from the parallel lines assumption", i.e. statistically significant differences between **Beta_2** and **Beta**, where **Beta_2** consists of the coefficients of binary logit model with dependent variable $Y_2 = 1$ if $y = 3$, $Y_2 = 0$ if $(y = 1 \mid y = 2)$. Panel **Alpha** reports the intercepts of the above-mentioned binary logit models.
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$. Robust standard errors in parentheses.

Appendix B –Analysis of the reservation value associated with WFH: technical details

In the survey, respondents stating a preference after the pandemic to work at home (or mostly at home) were asked "*By how much should your monthly pay go up to make you choose working in office?*" Of these respondents, 574 quoted some amount V_H (which we interpret as the *reservation value for leaving WFH,* or the subjective *value of WFH*), but 506 chose the answer "I would in any case choose to work at home", thus formally stating an "infinite" value of WFH. Plausibly, their value of WFH is just larger than any realistic wage premium their employers can offer.

Likewise, the respondents whose preferred mode of work after the pandemic is "in office" or "mostly in office" were asked "*By how much should your monthly pay go up to make you choose working from home?*" Among them, 288 respondents quoted their *value V_O of working from office* (WFO); for this group, we set $V_H = -V_O$. On the other hand, 191 respondents answered: "I would in any case choose to work in office", thus formally revealing an "infinite" V_O (hence, $V_H = -\infty$). Finally, we assign $V_H = 0$ for respondents indifferent between working from home or in office ($N = 169$).

To sum up, the value V_H of WFH is a specific number for 574+ 288 + 169 =1031 respondents, while it is "infinite" for 506 + 191 = 697 respondents. After excluding 30 observations with missing values of personality traits or other important variables, the working sample includes 1698 respondents. To account for censoring (the cases with infinite subjective value of WFH), we apply three approaches: (i) winsorization; (ii) interval regression; (iii) regression with double sample selection. Details of each approach follow below.

Under the *winsorization* approach, for the respondents with positive "infinite" value of WFH we assume that V_H equals the 99th percentile of the reported V_H, which is €2000 per month. This assumption applies also to respondents reporting $V_H > $ €2000. Likewise, for the respondents with positive "infinite" value of WFO, we set V_O to equal the 99th percentile of the reported V_O, which is €1000 per month (respectively, $V_H = -$€1000 per month). This assumption applies also to respondents reporting $V_O > $ €2000 euro per month. Given that the average net monthly wage for a fulltime worker in Latvia in 2021 was €939 (CSB 2022a), the wage premium of €1000 (let aside €2000) per month for changing the mode of work seems

indeed unrealistic for most workers. Winsorized values of V_H are realistic and available for all 1698 respondents from the working sample.

However, according to administrative data (CSB 2022b), average gross monthly earnings in 2021 exceeded €3000 for 5.3% of Latvia's employees, while just 0.8% earned more than €6000 (CSB 2022). This suggests that for non-negligible group of workers the subjective value of WFH can exceed €2000 per month, but an upper limit of €10000 per month seems reasonable for all practical purposes. Therefore, our *interval regression* (see Wooldridge 2002, sec. 15.2) approach assumes an unknown V_H between €2000 and €10000 (respectively, −€10000 and −€1000) per month for the respondents with positive "infinite" value of WFH (respectively, WFO). Outliers with $V_H > $€2000 per month or $V_O > $€1000 per month are treated in the same way.

Our third approach (regression with *double sample selection*) applies conditional mixed process (CMP) technique (Roodman 2011) to obtain maximum likelihood estimates of the value of WFH accounting for a) V_H *not* being positive "infinite" (or exceeding €2000 per month) and b) V_O *not* being positive "infinite" (or exceeding €1000 per month). The two selection processes being of nearly opposite direction (error correlation is −0.94), treating them as a single process (governed by a standard Heckman selection model) is not appropriate. Moreover, the two selection models are of interest *per se*, as they provide complementary evidence on willingness to work from home. Residence in a small town and residing in the Latgale region, which is the poorest region in Latvia, serve as instruments for the double selection model. Hansen J statistics p-values reported in Notes to Table 4 support the use of these instruments.

Under all approaches, for the econometric analysis of the covariates of the subjective value of WFH we use a log-transform of V_H: $\log V = \log(V_H)$ if $V_H > 0$; $\log V = -\log(|V_H|)$ if $V_H < 0$; $\log V = 0$ if $V_H = 0$. Note that all values of V_H are integers, and our transformation does not distinguish $V_H = \pm 1$ from $V_H = 0$ (in fact, there are just two cases with $V_H = \pm 1$).