Personality traits, remote work and productivity

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Abstract. This article investigates the link between personality traits and workers' productivity when working from home (WFH). We exploit a survey conducted in Latvia in 2021, providing measures of the "Big Five" personality traits for more than 1,700 recent teleworkers. Other things being equal, Conscientiousness is positively associated with reporting higher productivity for WFH. Moreover, Conscientiousness and Openness to Experience are positively linked with willingness to WFH post-pandemic. These results suggest that pro-teleworking employers will observe positive selection into their workforce based on personality traits. On the other hand, the link between Extraversion and preference for WFH is negative. Our findings suggest that a one-size-fits-all policy is unlikely to maximize either firms' productivity or workers' satisfaction.

Keywords: personality traits, work from home, productivity, amenity value, learning curve, Latvia.

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 per cent to 35.2 per cent in the United States (Bick, Blandin and Mertens 2023) and from 5 per cent to more than 30 per cent in the European Union (EU) (Sostero et al. 2023). There is growing evidence that WFH will persist in the post-pandemic period (Bartik et al. 2020; Barrero, Bloom and Davis 2021; ILO 2021; Erdsiek 2021; Criscuolo et al. 2023; Adrjan et al. 2021; Aksoy et al. 2023; Hansen et al. 2023). The share of remote workers could further increase, since it has not yet reached the potential share of jobs that can potentially be done from home (Bick, Blandin and Mertens 2023). Estimates of this teleworking potential, such as those provided by Dingel and Neiman (2020), are usually based on technical feasibility. The prevalence of teleworking will ultimately depend on its impact on workers' productivity. However, this impact is ambiguous, with some studies reporting an overall improvement in productivity (e.g. Barrero, Bloom and Davis 2021; Criscuolo et al. 2023; Zhang, Gerlowski and Acs 2022; Deole, Deter and Huang 2023; Emanuel, Harrington and Pallais 2023), while others document the opposite effect (e.g. Bloom et al. 2020; Barber et al. 2021; Kitagawa et al. 2021; Morikawa 2022; Yang et al. 2022; Emanuel and Harrington 2024; Gibbs, Mengel and Siemroth 2023). This suggests that WFH has a highly heterogeneous impact on workers' productivity. A large share of this heterogeneity remains unexplained.

This article investigates the relationship between personality traits and workers' WFH productivity. Non-cognitive skills, particularly personality traits, have been shown to play a key role in labour market outcomes (e.g. Heckman, Stixrud and Urzua 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, such as Conscientiousness or Emotional Stability, emerge as factors that could explain heterogeneity in relative productivity at the individual employee level.

As a first stage, we designed and conducted a survey covering more than 1,700 individuals who experienced WFH during the COVID-19 pandemic in Latvia. The restrictions following the Latvian Government's declaration of a state emergency in March 2020 led to a sudden and exogenous sevenfold increase in the share of remote workers, from 2.6 per cent in 2019 to 18.3 per cent in May 2020. This created a large-scale natural experiment on the adoption of WFH, reducing self-selection concerns.

Our main variable of interest is a self-reported measure of productivity. We asked respondents to assess their *relative* productivity when working from the office (WFO) compared with their WFH productivity. This formulation offers two main advantages. First, unlike many other studies, it avoids recollection bias by not comparing present productivity with a past reference period. Second, it mitigates inflated self-assessed productivity due to overconfidence, as respondents were asked to compare their productivity in two alternative hypothetical work setups.

The survey included a section measuring the "Big Five" personality traits – Openness to Experience, Conscientiousness, Extraversion, Agreeableness and Emotional Stability. Individual measures of these traits have been shown to remain stable over time and across situations, as well as being insusceptible to adverse life events, which mitigates potential endogeneity problems (Almlund et al. 2011; Heckman and Kautz 2012; Cobb-Clark and Schurer 2012). We use the Ten-Item Personality Inventory (TIPI) (Gosling, Rentfrow and Swann 2003), which is a widely used Big Five questionnaire, compact enough to be introduced in large-scale surveys.

In a second stage, we investigated the link between personality traits and the preference for WFH in the post-pandemic period. There are widespread concerns among employers about adverse self-selection of employees into remote work arrangements (Emanuel and Harrington 2024) and 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 term.

Third, we studied 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 for the possibility of WFH (Mas and Pallais 2017; Maestas et al. 2018; Barrero, Bloom and Davis 2021; Barrero et al. 2022; Moens et al. 2024; Aksoy et al. 2023). On the other hand, other workers unsatisfied with WFH may have a strong preference for on-site work. For instance, 20 per cent of the participants in the field experiment conducted by Mas and Pallais (2017) would prefer to work exclusively on-site, even in the absence of a wage penalty for WFH. 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 United States. Our article sheds some light on the factors driving this heterogeneity.

The Latvian context is ideal for studying teleworking. First, Latvia has a large yet unexploited potential for teleworking. Dingel and Neiman (2020) estimate that 35 per cent of jobs in Latvia could be done remotely, which is similar to the EU average. However, in 2019, before the pandemic, only 3 per cent of the workforce worked remotely – one of the smallest figures in the EU.[1] Second, the Latvian Government declared a state of emergency in March 2020, which introduced compulsory WFH for all private and public sector employees, except for cases where on-site work was indispensable. This led to a rapid sevenfold increase in the share of remote workers: WFH had been virtually non-existing in February 2020 but had nearly reached its estimated potential a few months later. The stringent WFH policy thus constituted a massive exogenous shock in terms of workers adopting this working arrangement.

Our results indicate that personality traits do matter for productivity in a remote work setup. Overall, the trait of Conscientiousness plays an important positive role for productivity. Point estimates are statistically significant but also economically meaningful: a one-standard-deviation increase in the Conscientiousness score is associated with a 6-percentage-point (p.p.) increase in the probability of reporting higher productivity from home (base rate = 31 per cent). Both the traits of Conscientiousness and Openness to Experience are also positively associated with willingness to WFH in the post-pandemic period. This suggests that pro-teleworking employers will observe selection into their workforce based on personality traits.

Given that Conscientiousness is a desirable personality trait to all employers, while Openness to Experience is desirable at least to employers in growing and/or innovative firms and organizations, this selection is positive from the employer perspective, mitigating their concerns about adverse self-selection in flexible working arrangements. This supports the results obtained by Felstead and Reuschke (2023), who find that the strongest performers are those keenest to continue to WFH. We, however, uncover a negative relationship between Extraversion and preference for teleworking. This suggests that employers applying remote work arrangements should invest in socialization measures to mitigate the negative effects of teleworking on the well-being of more extravert workers. We also quantify quite strong adaptation effects: both (self-reported) relative WFH productivity and willingness to WFH post-pandemic increase during the first six months of teleworking. Although our data are cross-sectional, this is in line with the learning curve of adjusting to telecommuting found by Gajendran and Harrison (2007).

Our results provide three main contributions to the literature. First, this article adds to the literature examining the influence of personality traits on labour market outcomes. The importance of personality traits for wage determination is now well documented (e.g. Heckman, Stixrud and Urzua 2006; Mueller and Plug 2006; Borghans et al. 2008; Heineck and Anger 2010; Fletcher 2013; Collischon 2020). We investigate the personality traits–productivity relationship in the context of WFH.

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[1] Eurostat, "Employed Persons Working from Home as a Percentage of the Total Employment, by Sex, Age and Professional Status (%)", https://doi.org/10.2908/LFSA_EHOMP (accessed 28 May 2025).

Second, this article complements the literature studying effects of WFH on productivity. Several articles document a heterogeneous effect of teleworking on productivity for different subgroups. For instance, Burdett et al. (2024) conclude that the impact of WFH on productivity is heterogeneous across socio-economic categories, with low earners, self-employed workers and women most negatively affected. Similarly, Barber et al. (2021), Lee and Tipoe (2021), Deole, Deter and Huang (2023) and Gibbs, Mengel and Siemroth (2023) observe an impact on productivity conditional on gender, age and family structure. We contribute to this literature by introducing personality traits into the analysis.

Third, this article 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 acted as a massive reallocation shock, permanently shifting the demand for a large share of firms and hence the employment structure. Basso et al. (2022) discuss the reallocation of workers from unsafe to safe jobs (in terms of contagion) that is likely to take place in the near future. Our article provides evidence that personality traits also matter for workers' reallocation, being strongly correlated with the propensity to accept (or refuse) WFH.

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

2. Related literature

The pandemic-induced shift towards remote work has generated a vast body of literature aiming to estimate the WFH–productivity relationship. However, several papers had examined this relationship before the pandemic. A meta-analysis by Gajendran and Harrison (2007) found no correlation between teleworking and self-rated worker performance, but a positive correlation between WFH and supervisor-rated or objectively measured performance. In line with this result, Bloom et al. (2015) and Angelici and Profeta (2024) measured workers' productivity using performance data provided by the employer and observed a positive effect on the productivity of WFH and flexible work arrangements more generally. However, these results mainly concern workers who switched to teleworking voluntarily, as well as firms with pro-WFH management.

Exploiting the global natural experiment created by COVID-19 – hence mitigating self-selection issues – pandemic-era papers provide more ambiguous evidence. Many studies using objective or manager-rated performance measures find a negative (on average) link between teleworking and productivity. These include Bloom et al. (2020), Morikawa (2022) and Erdsiek (2021) for firms in the United Kingdom, Japan and Germany, respectively; Barber et al. (2021), Yang et al. (2022) and Gibbs, Mengel and Siemroth (2023) for professionals in the United States and India; and Emanuel and Harrington (2024) for call centre workers in the United States. By contrast, a positive link between teleworking and performance is found by Criscuolo et al. (2023) for firms in 25 countries, by Zhang, Gerlowski and Acs (2022) for small businesses in the United States, and by Emanuel, Harrington and Pallais (2023) for software engineers in the United States. Evidence from studies based on self-rated productivity is also mixed. For the United Kingdom, Felstead and Reuschke (2023) and Burdett et al. (2024) conclude that, on average, WFH did not affect workers' productivity. On the other hand, Lee and Tipoe (2021) document a small decline in productivity, while Deole, Deter and Huang (2023) find a positive link between WFH frequency and productivity. Workers in the United States report, on average, higher productivity from home (Barrero, Bloom and Davis 2021), while the opposite holds for Japanese workers (Kitagawa et al. 2021; Morikawa 2022). All these papers indicate large differences across workers, while women, parents of school-age children and those in low-paying jobs experience the largest productivity drop.

From another angle, Aksoy et al. (2023) find that most workers in the 27 countries covered by their survey were positively surprised by their WFH productivity and valued

the option of WFH two to three days per week at 5 per cent of pay on average. They find this *amenity value* of WFH to be higher for women, people with children and those with longer commutes.

In this article, we argue that personality traits can (partially) explain workers' heterogeneous productivity changes. While cognitive skills have been recognized as an important determinant of wages since at least Becker (1964), the economic literature has recently documented an equally important role for non-cognitive skills – or "soft skills" – such as persistence, intrinsic motivation and charm (e.g. Heckman, Stixrud and Urzua 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 McCrae 1992) – the so-called "Big Five" personality traits being Openness to Experience, Conscientiousness, Extraversion, Agreeableness and Emotional Stability (see table SA1 in supplementary online Appendix A for definitions). Among the advantages of the Big Five traits, several papers document their intra-individual stability over time, especially for adults (Roberts and DelVecchio 2000). They are found not to be affected much by adverse life events, such as involuntary job loss, divorce or the death of a spouse (Cobb-Clark and Schurer 2012; Anger, Camehl and Peter 2017; Elkins, Kassenboehmer and Schurer 2017). 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 (e.g. Mueller and Plug 2006; Viinikainen et al. 2010; Heineck and Anger 2010; Heineck 2011; Fletcher 2013; Nandi and Nicoletti 2014; Gensowski 2018; Collischon 2020). In general, these papers report a positive influence of Conscientiousness and Emotional Stability on wages, whereas Agreeableness is associated with lower wages. Most of these papers also indicate that relationships between wages and traits are often conditional on gender. The meta-analysis by Alderotti, Rapallini and Traverso (2023) further confirms these relationships. In a laboratory experiment, Cubel et al. (2016) show that Conscientiousness is associated with better performance, suggesting that personality traits affect labour market outcomes through *productivity*. In the WFH context, Parra, Gupta and Cadden (2022) find that remote work exhaustion is positively associated with neuroticism (i.e. low Emotional Stability) but negatively associated with Agreeableness and Conscientiousness.

To sum up, the literature indicates that WFH has a highly heterogeneous impact on workers' productivity. Although several factors such as occupation, gender and family structure have been highlighted, a large part of this heterogeneity remains unexplored. At the same time, personality traits, in particular Conscientiousness, determine various labour market outcomes, including productivity. This article investigates the possible role of personality traits in productivity changes implied by WFH.

3. Data and methodology

3.1. Survey design

We use data from a web-survey conducted in Latvia in May and June 2021 to collect information on employees' teleworking experience. The prevalence of WFH in Latvia had been well below the EU average before the pandemic, but it increased sevenfold over 2020. Employees who experienced teleworking during the pandemic were the target population. We limited sample selection bias linked to the use of a specific medium by employing various channels to reach this population: national news portals, social media (Facebook and Twitter – now X), radio advertisements and several institutional bodies (e.g. Latvian

Association of Local and Regional Governments). The self-administered online survey was available in both Latvian and Russian, which is the native language of about 35 per cent of the population. More than 2,000 respondents participated in the survey, from which we obtained more than 1,700 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 Latvian Central Statistical Bureau's data on teleworking in 2021.[2]

The survey consisted of four blocks. The first block included 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 a detached house or an apartment). The very first question asked whether the interviewee had been working only or mostly from home for at least one month during the pandemic. The survey went no further for respondents who answered "no".

The second block contained questions related to commuting. It asked how many times per week the respondents used to go to the office before the pandemic, the mode of transport used, the average time spent commuting to the office and the money saved on commuting while teleworking.

The third block of questions focused on individual and household characteristics. First, we collected information about the age, gender, native language and education level of the respondent. Next, we asked whether the respondent was living with a partner/spouse or not, as well as how many children aged below 18 lived in the household. We then proceeded with the TIPI questionnaire. This series of ten questions, provided in table SA2 in supplementary online Appendix A and described below in detail, provides us with measurements of the Big Five personality traits.

The last block of the survey asked questions about the respondent's job characteristics (including NACE classification,[3] public/private sector, part-time/full-time and supervisory position).

3.2. Outcome variables

The survey included questions on three outcomes of interest: productivity, preference for WFH in the post-pandemic period and reservation values for leaving/accepting remote work after the pandemic. Our main variable of interest is a self-reported measure of productivity, as is often the case in other papers in the WFH/productivity literature (e.g. Burdett et al. 2024; Felstead and Reuschke 2023; Criscuolo et al. 2023). The survey questions used in these other papers asked respondents to compare their productivity *now* with their productivity in a pre-pandemic reference period.[4] Besides recollection bias, the difference between two periods may capture productivity changes not related to WFH (e.g. changes in personal life, general "COVID fatigue"). We designed an alternative question to measure the WFH-induced productivity change.[5] We thus asked respondents to compare their productivity at home and in the office.

The precise question read, "Are you more productive when working in office or from home?" The five possible answers were "In office", "In office (slightly)", "No difference", "From home (slightly)" and "From home". These answers show a progression, indicating relative productivity at home with respect to productivity in the office and giving an ordinal nature to the productivity variable. To facilitate readability and exposition of the

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[2] Central Statistical Bureau, "Employees Working Remotely by Age Groups and Sex 2020Q2–2025Q1", https://data.stat.gov.lv/pxweb/en/OSP_PUB/START__EMP__NB__NBLA/NBL270c (accessed 20 May 2025).

[3] NACE is the statistical classification of economic activities in the EU, derived from the French title *Nomenclature statistique des activités économiques dans la Communauté européenne*.

[4] For instance, in Burdett et al. (2024), 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?" (p. 6).

[5] Note that in our case, all respondents had experienced WFH during the pandemic, and that a large share of individuals who switched to WFH were forced to do so, mitigating self-selection concerns.

results, throughout the analysis we collapse the five categories down to three by merging the answers "In office" and "In office (slightly)", as well as "From home (slightly)" and "From home".

This question aims to capture the difference in productivity across workplaces rather than over time. This makes it more suitable for evaluating the impact of WFH on productivity, since the question asks for a comparison of current productivity with productivity in a counterfactual workplace (in office or from home). This approach also mitigates inflated self-assessed productivity due to overconfidence, as respondents must compare their own productivity in two alternative work setups. The productivity question was placed near the beginning of the questionnaire, immediately after the first block. Before this question, there were no questions about the respondent's attitude towards remote work or willingness to work remotely after the pandemic. This way, the survey design minimized (if not excluded) strategic manipulation by pro-teleworking respondents, who otherwise could have been tempted to overstate their productivity at home.

Descriptive statistics for the productivity variable are provided in table 1 (panel A). In line with the recent literature, we find high heterogeneity in terms of self-assessed productivity: a third of respondents are more productive in office, a third are more productive at home, and for another third, where they work does not make any difference.

The second outcome of interest is the preference for WFH in the post-pandemic period. 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

Table 1. Descriptive statistics: Outcome variables

	In office	No difference	From home	Total
A. Productivity *Are you more productive when working in office or from home?*				
Share (%)	36.7	32.3	31.0	100.0
N	592	536	510	1 638
B. Preferred mode of work *How would you prefer to work post-pandemic?*				
Share (%)	27.1	9.8	63.1	100.0
N	472	161	1 071	1 704
C. Reservation values (in EUR), by preferred mode of work post-pandemic *By how much would your monthly pay need to go up to make you change your mind?*				
10th percentile	50.0	0.0	100.0	
Median	200.0	0.0	300.0	
Mean	306.4	0.0	429.4	
90th percentile	600.0	0.0	1 000.0	
Max.	2 000.0	0.0	2 000.0	
N	276	161	557	994
D. Top 1% of reservation values or [*I would in any case choose to WFO (WFH)*]				
N	195		511	706

Notes: All percentages are weighted shares in the population of teleworkers working only or mostly from home. Panel A reports the shares after excluding non-response (3.9 per cent of the sample). Panel C presents reservation values stated by respondents, after trimming the top 1 per cent. A reservation value equal to zero is assigned to individuals indifferent between WFO or WFH.

Source: Our own calculations based on our survey data.

and Harrington (2024) provide evidence of negative self-selection of call centre workers into remote jobs pre-COVID. This echoes employers' concerns about the loss of monitoring opportunities.[6] By contrast, we 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.[7]

This question related to preference for WFH and read, "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 were "Only from home", "Mostly from home", "Indifferent", "Mostly in office" and "Only in office". As for the productivity question, we merge "Only from home" and "Mostly from home" together, and "Mostly in office" and "Only in office" together. As panel B of table 1 shows, the distribution of answers greatly differs from the productivity question and is strongly asymmetric: 63 per cent of respondents would prefer to work only or mostly from home, while just 27 per cent support "pro-office" options.

Lastly, the third outcome of interest is the change in monthly wage required by the respondent to accept: (i) WFO for individuals willing to WFH; and (ii) WFH for individuals willing to WFO. The exact wording of the question (coming right after the one about the preference for WFH post-pandemic) was "By how much would your monthly pay need to 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, Bloom and Davis (2021) and Barrero et al. (2022) show that many employees would be likely to change jobs if their employer returned to an on-site-only working policy. Even though the formulation of the question in our survey did 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) suggest that reported values are realistic. Among those willing to work mostly or only from home, the median value of WFH is €300, or 32 per cent of the average net monthly wage in Latvia in 2021.[8] Moreover, the wage premium required by an employee with a preference for WFH to consider WFO substantially exceeds the wage premium required by an employee preferring WFO to consider WFH. This is consistent with the fact that switching from WFH to WFO implies additional monetary and time costs associated with commuting. The overall average monthly amenity value of WFH (after trimming the top 1 per cent) is €174, while the median amenity value is €100 (18.5 per cent and 10.6 per cent of the average net monthly wage, respectively). As we were asking about working "mostly or only" from home, these results are in line with the average (across 27 countries) amenity value of WFH for 2–3 days per week being 5 per cent of pay (Aksoy et al. 2023).

3.3. Measures of personality

The survey contained a section aiming to evaluate the personality of the respondent through the lens of the Five-Factor Model of Personality (Costa and McCrae 1992). The psychometrics

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[6] Erdsiek (2021, 5) reports that, in Germany, this was the case for 44 per cent of firms in the information economy and for 54 per cent of manufacturing firms. However, Criscuolo et al. (2023, 64) find such a concern for less than 20 per cent of the managers surveyed in 25 countries across all sectors.

[7] As immediate evidence, note that less than half of those willing to WFH after the pandemic claimed that they are more productive when WFH (table SA3 in supplementary online Appendix A).

[8] Average net monthly wage = €939 – see, Central Statistical Bureau of Latvia, "Average Monthly and Median Wages and Salaries (Euro; Changes, Compared to Previous Period (Per Cent)) 1990–2024", https://data.stat.gov.lv/pxweb/en/OSP_PUB/START__EMP__DS__DSV/DSV010 (accessed 20 May 2025). Our survey did not ask the respondents about their earnings.

literature offers several standardized questionnaires designed to build a measure for each of the five factors. The most comprehensive test, the Revised NEO Personality Inventory (NEO PI-R), is composed of 260 questions (Costa and McCrae 1992). For a large-scale survey, this is not an option. We rely on the TIPI measure (Gosling, Rentfrow and Swann 2003). This test is composed of only ten questions, making it convenient for surveys, and it has been widely used in economics (e.g. Heckman and Karapakula 2019; Alaref, Brodmann and Premand 2020; Campos-Mercade et al. 2021).

For each personality trait, TIPI includes two statements (one "positive" and one "negative"). The respondents must indicate, on a Likert-type scale from 1 to 7, to what extent they agree or disagree with the statements. The score for the "negative" statement is reversed: 1 is recoded to 7, 2 to 6 and so on. 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 looks, Gosling, Rentfrow and Swann (2003) show that the performance of this test is only slightly below the popular 44-questions Big Five Inventory (John and Srivastava 1999). Comparing several Big Five personality traits measures, Furnham (2008) shows that TIPI measures correlate well with the scores obtained using the 60-questions NEO Five-Factor Inventory (NEO-FFI) and outperforms other short measures.

Figure 1 displays the (standardized) distributions of the five personality traits. Each trait shows substantial heterogeneity. Conscientiousness is skewed to the left, which is also observed, for instance, by Heineck and Anger (2010). Table SA4 in supplementary online Appendix A provides the correlation between the five personality trait measures in our data. None of the pairwise correlations 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.

To address potential concerns that the selection into the sample is related to productivity (e.g. procrastinating people are more likely to fill out an online survey rather than work) or personality traits (e.g. Conscientiousness could be related to procrastination but also to completing the survey once started), we perform two checks. First, we generate a dummy variable *workday* for submitting the survey on weekdays during the common working hours. Regressing *workday* on personality traits, we do not find any significant association with Conscientiousness or other traits significant in our results.[9] Second, k-density plots for the z-scores of the Big Five personality traits in our working sample (figure 1) do not reveal any substantial differences with similar plots in Heineck and Anger (2010, 539) based on nationally representative data for Germany.

4. Econometric analysis

4.1. Estimation methods

The primary objective of this article is to estimate the relationship between personality traits and three outcomes of interest: (1) productivity at home relative to productivity in the office; (2) willingness to WFH in the post-pandemic period; and (3) the reservation values for leaving/accepting remote work after the pandemic. The first two dependent variables are three-point ordinal categorical variables.[10] To account for this nature, we implement an ordered logit model (see Long and Freese 2014).

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[9] The only trait significantly (but only at the 10 per cent level) linked to submitting the survey during the "normal" working time is Emotional Stability.

[10] A larger value indicates a higher productivity from home (using productivity in office as a benchmark). Similarly, for willingness to WFH post-pandemic, a larger value indicates a stronger preference for WFH. Results using a five-point scale are qualitatively similar.

Figure 1. Personality traits: Distributions
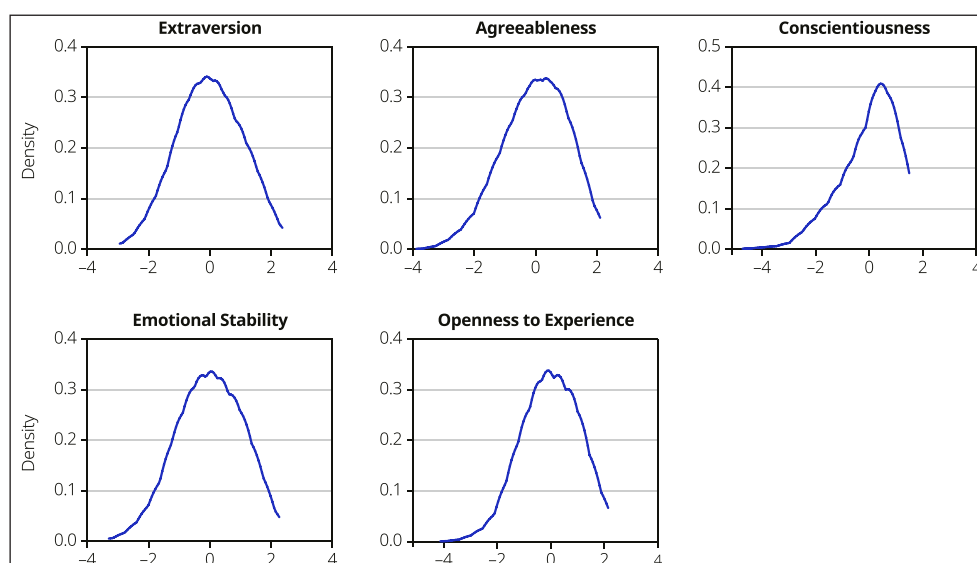
Notes: This figure presents kernel density estimates (using Epanechnikov kernel with bandwidth 0.5) for the *z*-scores of the Big Five personality traits. The test score for each of the five traits ranges from 1 to 7. For comparability, each score is converted to a *z*-score by subtracting its mean and dividing by its standard deviation, so that one unit of the x-axis corresponds to one standard deviation of the original test score. *N* = 1,704.

Source: Our own calculations based on our survey data.

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. However, Big Five personality traits are near constant for working adults (e.g. Costa and McCrae 1992; Roberts and DelVecchio 2000). In addition, Cobb-Clark and Schurer (2012) show that adverse employment, health or family events do not lead to economically meaningful changes in personality traits.[11]

In addition to personality traits, we consider five groups of controls. The first group is composed of age and sex. The second group contains controls for 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 ten-section NACE classification, a dummy indicating whether the respondent holds a supervisory job, a four-category measure of total duration of WFH over the pandemic period, a dummy indicating whether the respondent has pre-COVID-19 experience of WFH and a dummy indicating cross-border teleworking. Fourth, we consider a battery of additional personal characteristics, including a set of education dummies (from secondary education to doctorate) and a set of dummies indicating native language (Latvian, Russian and other). Lastly, 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.

For the third outcome of interest, we examine the determinants of the wage premium required to convince an individual preferring WFH (WFO) to switch to a strict WFO policy (WFH policy). Positive values represent the value stated by individuals preferring WFH in the post-pandemic period, while negative values represent the value stated by individuals preferring

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[11] A potential concern is that workers may have sorted into jobs depending on their amenability to WFH based on their personality traits. However, the extent and suddenness of the COVID-19 shock makes such sorting highly unlikely. In Latvia, the share of the workforce working remotely increased sevenfold, reaching about 20 per cent of the working population.

WFO. We begin with a simple linear model, excluding cases with infinite subjective value of WFH. To account for censoring, we then sequentially apply two alternative approaches: (i) winsorization; and (ii) interval regression.[12]

4.2. Results

Table 2 summarizes the three-category ordered logit estimates for the personality trait variables. In the "Productivity" panel, the dependent variable is productivity at home relative to productivity in the office, while the "Preference for WFH" panel presents the results for willingness to WFH after the pandemic.

Conscientiousness is strongly linked with both the productivity measure and willingness to WFH: all other things being equal, individuals with a higher level of Conscientiousness report higher productivity from home as well as higher willingness to keep WFH after the pandemic. To better understand this result, figure SA1 in supplementary online Appendix A displays the share of respondents reporting that they are more productive at home (in the office) by quartile of Conscientiousness. Almost half the respondents in the bottom quartile of Conscientiousness report being more productive in the office, compared to just 29 per cent in the top quartile. On the other hand, respondents in the upper part of the distribution are 8 p.p. more likely to report being more productive at home.

Agreeableness, Extraversion and Openness to Experience are not related to productivity from home. However, Agreeableness and Extraversion feature negative associations with willingness to WFH post-pandemic, while the opposite is true for Openness to Experience.

Table 2. Ordered logit regression results: Personality traits

Dependent variable	Productivity			Preference for WFH		
Personality traits	Coefficient	Marginal effects		Coefficient	Marginal effects	
		Higher in office	Higher from home		Prefers in office	Prefers from home
Extraversion	−0.040 (0.060)	0.008 (0.012)	−0.008 (0.011)	−0.211*** (0.069)	0.040*** (0.013)	−0.041*** (0.013)
Agreeableness	−0.020 (0.070)	0.004 (0.014)	−0.004 (0.013)	−0.140* (0.074)	0.027* (0.014)	−0.027* (0.014)
Conscientiousness	0.321*** (0.061)	−0.065*** (0.012)	0.060*** (0.011)	0.271*** (0.062)	−0.052*** (0.013)	0.052*** (0.011)
Emotional stability	−0.002 (0.055)	0.000 (0.011)	0.000 (0.010)	−0.014 (0.061)	0.003 (0.012)	−0.003 (0.012)
Openness to experience	0.079 (0.058)	−0.016 (0.012)	0.015 (0.011)	0.134** (0.064)	−0.026** (0.013)	0.026** (0.012)
Base rates		0.367	0.310		0.271	0.631
N	1 638			1 704		

*, ** and *** indicate statistical significance at the 10, 5 and 1 per cent levels, respectively.

Notes: Three-category ordered logit estimates. Marginal effects (averaged across the estimation sample) show the change in predicted probabilities caused by a one-standard-deviation change in the score of the respective trait (measured on a scale of 1 to 7). Regressions include the following set of controls: WFH duration (four categories); commuting to the office (time and cost); age, gender and family status (three categories); number of children (younger than 18) in the household (three categories); native language; educational attainment (six categories); dummy for living in a detached house; job characteristics: NACE classification (ten categories), supervisory position, pre-COVID experience of WFH and cross-border teleworking. Robust standard errors appear in parentheses.

Source: Our own calculations based on our survey data.

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[12] Supplementary online Appendix B provides details of these approaches.

These findings 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. Respondents with a high score for Agreeableness plausibly prefer working in the office as a way of manifesting their loyalty to employers or managers.

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 wages. 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 of this trait receive better evaluations from their supervisors. A potential concern among employers is that of a possible negative selection of workers into teleworking. Observing that highly conscientious workers are more willing to WFH, where they are more productive, suggests that firms do not need to exert very strict controls on employees choosing this arrangement.[13]

Our results are not only statistically significant but also of economic importance, as suggested by the marginal effects reported in table 1. Among the Big Five personality traits, a one-standard-deviation increase in Conscientiousness has the strongest impact on both relative productivity of WFH (up by 6 p.p.) and willingness to WFH post-pandemic (up by 5 p.p.) (see table 2).[14] The base rate for "More productive at home" being 31.0 per cent, the relationship between Conscientiousness and productivity is hence economically meaningful. The marginal effect of Openness to Experience on willingness to WFH post-pandemic (2.6 p.p. per one-standard-deviation increase in the score) is smaller than that of Conscientiousness, yet not negligible, especially from the perspective of WFO: it amounts to about 10 per cent of the respective base rate (27.1 per cent). In other words, employees with low Openness to Experience are an important resource for employers who want to keep WFH rates at modest levels.

Unlike Conscientiousness and Openness to Experience, Extraversion and Agreeableness appear to be "pro-office" rather than "pro-home" traits. A one-standard-deviation increase in Extraversion is associated with a 4.0 p.p. rise in the probability to prefer WFO and a 4.1 p.p. fall in the probability to prefer WFH post-pandemic. The corresponding effects of Agreeableness are a 2.7 p.p. rise and a 2.7 p.p. fall, respectively, and are less significant. On the other hand, we do not find a significant association between relative productivity of WFH and Extraversion or Agreeableness. Lastly, all effects for Emotional Stability are close to zero and not statistically significant.

The importance of personality traits for the WFH productivity and willingness to WFH is further reinforced by the fact that our results hold after accounting for the presence of children in the household, as well as for very strong adaptation effects reported in table SA5 in supplementary online Appendix A. In line with other studies (Barber et al. 2021; Shockley et al. 2021; Deole, Deter and Huang 2023; Emanuel, Harrington and Pallais 2023; Gibbs, Mengel and Siemroth 2023), the presence of children in the household significantly (by up to 10 p.p.) reduces the probability of reporting higher productivity at home than at the office. On the other hand, among workers with WFH experience of up to three months, the probability of reporting a positive impact of WFH on productivity is 15–17 p.p. lower than for otherwise similar employees with WFH experience of more than six months. This is in line with the learning curve of adjusting to telecommuting found by Gajendran and Harrison (2007).

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[13] This finding is apparently in conflict with the results of Moens et al. (2024), who claim that individuals with a higher level of Conscientiousness find job offers allowing for WFH less attractive (although the marginal effect they document is extremely small). However, in Moens et al. (2024, 329), survey participants are employees "able to do at least 10 per cent of their job through telework", and they evaluate telework attractiveness ex ante. By contrast, all participants in our study had *already* experienced work *only or mainly from home* in 2020–21.

[14] In a relative sense, the effect on productivity is much stronger, because the base rate is half the base rate for willingness to WFH post-pandemic.

Turning to the (subjective) amenity value of WFH,[15] table 3 depicts a similar story. Columns (1) and (2) are ordinary least squares (OLS) regressions. Column (1) excludes respondents with "infinite" or extremely high values of either WFH or WFO, whereas column (2) assigns them the 99th percentile of the observed value of WFH, V_H (value of WFO, V_O).

Column (3) reports the results of the interval regression model outlined in supplementary online Appendix B.[16] According to all models (1)–(3), Conscientiousness is positively related to the subjective value of WFH, whereas this relationship is negative for Extraversion. Using the estimate from column (2), a one-standard-deviation increase in Conscientiousness is associated with an increase of the subjective value of WFH by a factor of exp(0.650) = 1.916 – that is, by 91.6 per cent. For the median positive value of WFH (€300 per month, see table 1, panel C), this translates into an economically meaningful monthly amount of €275. A similar calculation for Extraversion reveals a smaller yet economically meaningful effect: a reduction of the subjective value of WFH by 41 per cent, or €123 per month.

Similarly, for workers who prefer WFO, a one-standard-deviation increase in Conscientiousness, other things being equal, reduces the subjective value of WFO by a factor of exp(−0.650) = 0.522 – that is, by 47.8 per cent. Starting from the median value of WFO (€200 per month), this means a reduction of €96.

Overall, the results in table 3 are in line with Barrero, Bloom and Davis (2021), who find that 36 per cent of workers in the United States would start looking for a new job that allowed some WFH if their current employer imposed a strict WFO policy. Our results nevertheless indicate that the opposite also holds: some workers would strongly oppose remaining in a WFH setup after the pandemic.

Table 3. Personality traits and subjective value of WFH

Dependent variable	Value of WFH (log)		
Personality traits	(1)	(2)	(3)
Extraversion	−0.299*	−0.529***	−0.576***
	(0.177)	(0.153)	(0.161)
Agreeableness	−0.241	−0.341**	−0.348**
	(0.182)	(0.165)	(0.174)
Conscientiousness	0.444***	0.650***	0.692***
	(0.166)	(0.152)	(0.161)
Emotional stability	−0.098	0.002	0.007
	(0.167)	(0.139)	(0.146)
Openness to experience	0.071	0.246*	0.269*
	(0.161)	(0.147)	(0.155)
N	994	1 698	1 698
AIC	5 796.60	10 409.84	10 083.52

*, ** and *** indicate statistical significance at the 10, 5 and 1 per cent levels, respectively.

Notes: (1): OLS regression (excludes respondents with "infinite" or extremely high values for either WFH or WFO). (2): OLS regression; respondents with "infinite" or extremely high values for WFH (WFO) are assigned V_H = €2,000 (V_H = −€2,000) per month. (3): interval regression assuming an unknown V_H between €2,000 and €10,000 (−€10,000 and −€2,000) per month for the respondents with positive "infinite" or extremely high value for WFH (WFO). Regressions include the following set of controls: WFH duration (four categories); commuting to the office (time and cost); age, gender and family status (three categories); number of children (younger than 18) in the household (three categories); native language; educational attainment (six categories); dummy for living in a detached house; job characteristics: NACE classification (ten categories), supervisory position, pre-COVID-19 experience of WFH and cross-border teleworking. Robust standard errors appear in parentheses. AIC = Akaike information criterion.

Source: Our own calculations based on our survey data.

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[15] Recall that this value is negative for those who prefer, post-pandemic, to work mostly or only in the office.
[16] Interval regression (3) with an upper limit of €10,000 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 €2,000. This suggests that the results are robust to varying the upper limit between €10,000 and €2,000.

5. Conclusion

This article has provided an analysis of the relationship between personality traits and workers' WFH productivity. We designed and conducted a survey targeting employees who experienced teleworking during the COVID-19 pandemic. The survey not only included questions about productivity, but also a series of questions that are standard in the psychometrics literature to measure personality traits along the "Big Five" personality traits.

We find that personality traits matter for changes in productivity when switching to WFH. Individuals with high levels of Conscientiousness are much more likely to report higher productivity from home than from the office: a one-standard-deviation increase on the Conscientiousness scale leads to a 6 p.p. increase in the probability of reporting higher productivity at home. The base rate being 31 per cent, the relationship between Conscientiousness and productivity is hence economically meaningful. Furthermore, Conscientiousness, Openness to Experience and Extraversion also play a role in willingness to WFH post-pandemic. Moreover, workers who in the post-pandemic perspective are not indifferent to where they work attach substantial value to the preferred mode of work; Conscientiousness and Extraversion are important determinants of this value. The positive association of Conscientiousness and Openness to Experience with willingness to WFH could be expected given the existing literature on the role of these traits in various labour market outcomes. However, the negative association between Extraversion and the willingness to WFH is less straightforward. Extravert individuals are sociable and oriented towards the outer world of people. We can hypothesize that, for these individuals, live communication with workplace colleagues and taking part in the everyday life of the group are very important. WFH thus makes their working life less enjoyable, in line with the results by Bellmann and Hübler (2021), who document a negative correlation between Extraversion and job satisfaction in a remote work setup.

The contribution of this article is threefold. First, it documents a novel link between personality traits and labour market outcomes. The relationship between personality traits and productivity had previously received some empirical support in laboratory experiments (Cubel et al. 2016). We provide evidence in the form of observational data on this relationship in a teleworking context. Second, this article contributes to the literature by examining pandemic-induced productivity changes. The COVID-19 literature provides evidence of a heterogeneous effect of teleworking on workers' productivity. We show that personality traits can explain part of this heterogeneity. Third, there is evidence that the pandemic has acted as a massive worker reallocation shock, heavily affecting the employment structure and workers' preference for flexible working arrangements (Bick, Blandin and Mertens 2023). Our article 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 either firms' productivity or workers' satisfaction. They also indicate that workers' individual characteristics matter for firm-level ability to switch to remote work. Employers practising remote work should invest in socialization measures to compensate for the negative effects of teleworking on the well-being of more extravert workers.

Our study faces several limitations that can be overcome in future work. First, 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. Other institutional contexts may allow for a clearer identification of the causal link between personality traits and productivity in WFH. Our survey does not cover the entire population but focuses on workers who have experienced WFH, and thus we cannot fully rule out self-selection. Exploiting administrative population data, such as the data used in the pre-COVID-19 era by Heineck and Anger (2010) can alleviate this issue. Second, although the relative productivity measure that we use builds upon the existing literature, it remains a self-reported measure. As explained in section 2, using self-assessed or observed measures of productivity may lead to conflicting results. Studying the link between personality traits and observed productivity would thus be useful to confirm our findings. Third, our dataset is cross-sectional, preventing

us from studying dynamics over time. Our survey was implemented relatively early in the pandemic. One could hypothesize that relative productivity is not time-constant. For instance, Bloom et al. (2015) document that WFH is initially appealing to workers, but that the appeal quickly fades, in particular because of mental health issues associated with loneliness. As such, it would be interesting to exploit longitudinal data.

Acknowledgements

Competing interests

The authors declare that they have no competing interests.

References

Adrjan, Pawel, Gabriele Ciminelli, Alexandre Judes, Michael Koelle, Cyrille Schwellnus, and Tara Sinclair. 2021. "Will It Stay or Will It Go? Analysing Developments in Telework during COVID-19 Using Online Job Postings Data". OECD Productivity Working Papers, No. 2021–30. Paris: OECD.

Aksoy, Cevat Giray, Jose Maria Barrero, Nicholas Bloom, Steven J. Davis, Mathias Dolls, and Pablo Zarate. 2023. "Working from Home around the World". CEP Discussion Paper No. 1920. London: Centre for Economic Performance.

Alaref, Jumana, Stefanie Brodmann, and Patrick Premand. 2020. "The Medium-Term Impact of Entrepreneurship Education on Labor Market Outcomes: Experimental Evidence from University Graduates in Tunisia". *Labour Economics* 62 (January): Article No. 101787. https://doi.org/10.1016/j.labeco.2019.101787.

Alderotti, Giammarco, Chiara Rapallini, and Silvio Traverso. 2023. "The Big Five Personality Traits and Earnings: A Meta-Analysis". *Journal of Economic Psychology* 94 (January): Article No. 102570. https://doi.org/10.1016/j.joep.2022.102570.

Almlund, Mathilde, Angela Lee Duckworth, James Heckman, and Tim Kautz. 2011. "Personality Psychology and Economics". In *Handbook of the Economics of Education*, Vol. 4, edited by Eric A. Hanushek, Stephen Machin and Ludger Woessmann, 1–181. Amsterdam: Elsevier.

Angelici, Marta, and Paola Profeta. 2024. "Smart-Working: Work Flexibility without Constraints". *Management Science* 70 (3): 1680–1705. https://doi.org/10.1287/mnsc.2023.4767.

Anger, Silke, Georg Camehl, and Frauke Peter. 2017. "Involuntary Job Loss and Changes in Personality Traits". *Journal of Economic Psychology* 60 (June): 71–91. https://doi.org/10.1016/j.joep.2017.01.007.

Barber, Brad M., Wei Jiang, Adair Morse, Manju Puri, Heather Tookes, and Ingrid M. Werner. 2021. "What Explains Differences in Finance Research Productivity during the Pandemic?" *Journal of Finance* 76 (4): 1655–1697. https://doi.org/10.1111/jofi.13028.

Barrero, Jose Maria, Nicholas Bloom, and Steven J. Davis. 2021. "Why Working from Home Will Stick". NBER Working Paper No. 28731. Cambridge, MA: National Bureau of Economic Research.

Barrero, Jose Maria, Nicholas Bloom, Steven J. Davis, Brent H. Meyer, and Emil Mihaylov. 2022. "The Shift to Remote Work Lessens Wage-Growth Pressures". NBER Working Paper No. 30197. Cambridge, MA: National Bureau of Economic Research.

Bartik, Alexander W., Zoe B. Cullen, Edward L. Glaeser, Michael Luca, and Christopher T. Stanton. 2020. "What Jobs Are Being Done at Home during the COVID-19 Crisis? Evidence from Firm-Level Surveys". NBER Working Paper No. 27422. Cambridge, MA: National Bureau of Economic Research.

Basso, Gaetano, Tito Boeri, Alessandro Caiumi, and Marco Paccagnella. 2022. "Unsafe Jobs, Labour Market Risk and Social Protection". *Economic Policy* 37 (110): 229–267. https://doi.org/10.1093/epolic/eiac004.

Becker, Gary S. 1964. *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education*. New York: Columbia University Press.

Bellmann, Lutz, and Olaf Hübler. 2021. "Working from Home, Job Satisfaction and Work–Life Balance – Robust or Heterogeneous Links?" *International Journal of Manpower* 42 (3): 424–441. https://doi.org/10.1108/IJM-10-2019-0458.

Bick, Alexander, Adam Blandin, and Karel Mertens. 2023. "Work from Home before and after the COVID-19 Outbreak". *American Economic Journal: Macroeconomics* 15 (4): 1–39. https://doi.org/10.1257/mac.20210061.

Bloom, Nicholas, Philip Bunn, Paul Mizen, Pawel Smietanka, and Gregory Thwaites. 2020. "The Impact of Covid-19 on Productivity". NBER Working Paper No. 28233. Cambridge, MA: National Bureau of Economic Research.

Bloom, Nicholas, James Liang, John Roberts, and Zhichun Jenny Ying. 2015. "Does Working from Home Work? Evidence from a Chinese Experiment". *Quarterly Journal of Economics* 130 (1): 165–218. https://doi.org/10.1093/qje/qju032.

Borghans, Lex, Angela Lee Duckworth, James J. Heckman, and Bas ter Weel. 2008. "The Economics and Psychology of Personality Traits". *Journal of Human Resources* 43 (4): 972–1059. https://doi.org/10.3368/jhr.43.4.972.

Burdett, Ashley, Ben Etheridge, Li Tang, and Yikai Wang. 2024. "Worker Productivity during Covid-19 and Adaptation to Working from Home". *European Economic Review* 167 (August): Article No. 104788. https://doi.org/10.1016/j.euroecorev.2024.104788.

Caligiuri, Paula M. 2000. "The Big Five Personality Characteristics as Predictors of Expatriate's Desire to Terminate the Assignment and Supervisor-Rated Performance". *Personnel Psychology* 53 (1): 67–88. https://doi.org/10.1111/j.1744-6570.2000.tb00194.x.

Campos-Mercade, Pol, Armando N. Meier, Florian H. Schneider, and Erik Wengström. 2021. "Prosociality Predicts Health Behaviors during the COVID-19 Pandemic". *Journal of Public Economics* 195 (March): Article No. 104367. https://doi.org/10.1016/j.jpubeco.2021.104367.

Cobb-Clark, Deborah A., and Stefanie Schurer. 2012. "The Stability of Big-Five Personality Traits". *Economics Letters* 115 (1): 11–15. https://doi.org/10.1016/j.econlet.2011.11.015.

Cobb-Clark, Deborah A., and Michelle Tan. 2011. "Noncognitive Skills, Occupational Attainment, and Relative Wages". *Labour Economics* 18 (1): 1–13. https://doi.org/10.1016/j.labeco.2010.07.003.

Collischon, Matthias 2020. "The Returns to Personality Traits across the Wage Distribution". *Labour* 34 (1): 48-79. https://doi.org/10.1111/labr.12165.

Costa, Paul T., and Robert R. McCrae. 1992. "Normal Personality Assessment in Clinical Practice: The NEO Personality Inventory". *Psychological Assessment* 4 (1): 5–13. https://doi.org/10.1037/1040-3590.4.1.5.

Criscuolo, Chiara, Peter Gal, Timo Leidecker, Francesco Losma, and Giuseppe Nicoletti. 2023. "The Role of Telework for Productivity during and post COVID-19". *Economie et Statistique/Economics and Statistics*, No. 539: 51–72. https://doi.org/10.24187/ecostat.2023.539.2097.

Cubel, Maria, Ana Nuevo-Chiquero, Santiago Sanchez-Pages, and Marian Vidal-Fernandez. 2016. "Do Personality Traits Affect Productivity? Evidence from the Laboratory". *Economic Journal* 126 (592): 654–681. https://doi.org/10.1111/ecoj.12373.

Deole, Sumit S., Max Deter, and Yue Huang. 2023. "Home Sweet Home: Working from Home and Employee Performance during the COVID-19 Pandemic in the UK". *Labour Economics* 80 (January): Article No. 102295. https://doi.org/10.1016/j.labeco.2022.102295.

Dingel, Johnathan I., and Brent Neiman. 2020. "How Many Jobs Can Be Done at Home?" *Journal of Public Economics* 189 (September): Article No. 104235. https://doi.org/10.1016/j.jpubeco.2020.104235.

Elkins, Rosemary K., Sonja C. Kassenboehmer, and Stefanie Schurer. 2017. "The Stability of Personality Traits in Adolescence and Young Adulthood". *Journal of Economic Psychology* 60 (June): 37–52. https://doi.org/10.1016/j.joep.2016.12.005.

Emanuel, Natalia, and Emma Harrington. 2024. "Working Remotely? Selection, Treatment, and the Market for Remote Work". *American Economic Journal: Applied Economics* 16 (4): 528–559. https://doi.org/10.1257/app.20230376.

Emanuel, Natalia, Emma Harrington, and Amanda Pallais. 2023. "The Power of Proximity to Coworkers: Training for Tomorrow or Productivity Today?" NBER Working Paper No. 31880. Cambridge, MA: National Bureau of Economic Research.

Erdsiek, Daniel. 2021. "Working from Home during COVID-19 and beyond: Survey Evidence from Employers". ZEW Discussion Paper No. 21-051. Mannheim: ZEW – Leibniz-Centre for European Economic Research.

Felstead, Alan, and Darja Reuschke. 2023. "A Flash in the Pan or a Permanent Change? The Growth of Homeworking during the Pandemic and Its Effect on Employee Productivity in the UK". *Information Technology & People* 36 (5): 1960–1981. https://doi.org/10.1108/ITP-11-2020-0758.

Fletcher, Jason M. 2013. "The Effects of Personality Traits on Adult Labor Market Outcomes: Evidence from Siblings". *Journal of Economic Behavior & Organization* 89 (May): 122–135. https://doi.org/10.1016/j.jebo.2013.02.004.

Furnham, Adrian. 2008. "Relationship among Four Big Five Measures of Different Length". *Psychological Reports* 102 (1): 312–316. https://doi.org/10.2466/pr0.102.1.312-316.

Gajendran, Ravi S., and David A. Harrison. 2007. "The Good, the Bad, and the Unknown about Telecommuting: Meta-Analysis of Psychological Mediators and Individual Consequences". *Journal of Applied Psychology* 92 (6): 1524–1541. https://doi.org/10.1037/0021-9010.92.6.1524.

Gensowski, Miriam. 2018. "Personality, IQ, and Lifetime Earnings". *Labour Economics* 51 (April): 170–183. https://doi.org/10.1016/j.labeco.2017.12.004.

Gibbs, Michael, Friederike Mengel, and Christoph Siemroth. 2023. "Work from Home and Productivity: Evidence from Personnel and Analytics Data on Information Technology Professionals". *Journal of Political Economy Microeconomics* 1 (1): 7–41. https://doi.org/10.1086/721803.

Gosling, Samuel D., Peter J. Rentfrow, and William B. Swann, Jr. 2003. "A Very Brief Measure of the Big-Five Personality Domains". *Journal of Research in Personality* 37 (6): 504–528. https://doi.org/10.1016/S0092-6566(03)00046-1.

Hansen, Stephen, Peter John Lambert, Nicholas Bloom, Steven J. Davis, Raffaella Sadun, and Bledi Taska. 2023. "Remote Work across Jobs, Companies, and Space". NBER Working Paper No. 31007. Cambridge, MA: National Bureau of Economic Research.

Heckman, James J., and Ganesh Karapakula. 2019. "The Perry Preschoolers at Late Midlife: A Study in Design-Specific Inference". NBER Working Paper No. 25888. Cambridge, MA: National Bureau of Economic Research.

Heckman, James J., and Tim Kautz. 2012. "Hard Evidence on Soft Skills". *Labour Economics* 19 (4): 451–464. https://doi.org/10.1016/j.labeco.2012.05.014.

Heckman, James J., Jora Stixrud, and Sergio Urzua. 2006. "The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior". *Journal of Labor Economics* 24 (3): 411–482. https://doi.org/10.1086/504455.

Heineck, Guido. 2011. "Does It Pay to Be Nice? Personality and Earnings in the United Kingdom". *Industrial and Labor Relations Review* 64 (5): 1020–1038. https://doi.org/10.1177/001979391106400509.

Heineck, Guido, and Silke Anger. 2010. "The Returns to Cognitive Abilities and Personality Traits in Germany". *Labour Economics* 17 (3): 535–546. https://doi.org/10.1016/j.labeco.2009.06.001.

ILO. 2021. *Working from Home: From Invisibility to Decent Work*. Geneva.

John, Oliver P., and Sanjay Srivastava. 1999. "The Big Five Trait Taxonomy: History, Measurement, and Theoretical Perspectives". In *Handbook of Personality: Theory and Research*, 2nd ed., edited by Lawrence A. Pervin and Oliver P. John, 102–138. New York, NY: Guilford Press.

Kitagawa, Ritsu, Sachiko Kuroda, Hiroko Okudaira, and Hideo Owan. 2021. "Working from Home and Productivity under the COVID-19 Pandemic: Using Survey Data of Four Manufacturing Firms". *PLOS One* 16 (12): Article No. e0261761. https://doi.org/10.1371/journal.pone.0261761.

Lee, Ines, and Eileen Tipoe. 2021. "Changes in the Quantity and Quality of Time Use during the COVID-19 Lockdowns in the UK: Who Is the Most Affected?" *PLOS One* 16 (11): Article No. e0258917. https://doi.org/10.1371/journal.pone.0258917.

Long, J. Scott, and Jeremy Freese. 2014. *Regression Models for Categorical Dependent Variables Using Stata*. 3rd ed. College Station, TX: Stata Press.

Maestas, Nicole, Kathleen J. Mullen, David Powell, Till von Wachter, and Jeffrey B. Wenger. 2018. "The Value of Working Conditions in the United States and Implications for the Structure of Wages". NBER Working Paper No. 25204. Cambridge, MA: National Bureau of Economic Research.

Mas, Alexandre, and Amanda Pallais. 2017. "Valuing Alternative Work Arrangements". *American Economic Review* 107 (12): 3722–3759. https://doi.org/10.1257/aer.20161500.

Moens, Eline, Elsy Verhofstadt, Luc Van Ootegem, and Stijn Baert. 2024. "Disentangling the Attractiveness of Telework to Employees: A Factorial Survey Experiment". *International Labour Review* 163 (2): 325–348. https://doi.org/10.1111/ilr.12424.

Morikawa, Masayuki. 2022. "Work-from-Home Productivity during the COVID-19 Pandemic: Evidence from Japan". *Economic Inquiry* 60 (2): 508–527. https://doi.org/10.1111/ecin.13056.

Mueller, Gerrit, and Erik Plug. 2006. "Estimating the Effect of Personality on Male and Female Earnings". *Industrial and Labor Relations Review* 60 (1): 3–22. https://doi.org/10.1177/001979390606000101.

Nandi, Alita, and Cheti Nicoletti. 2014. "Explaining Personality Pay Gaps in the UK". *Applied Economics* 46 (26): 3131–3150. https://doi.org/10.1080/00036846.2014.922670.

Parra, Carlos M., Manjul Gupta, and Trevor Cadden. 2022. "Towards an Understanding of Remote Work Exhaustion: A Study on the Effects of Individuals' Big Five Personality Traits". *Journal of Business Research* 150: 653–662. https://doi.org/10.1016/j.jbusres.2022.06.009.

Roberts, Brent W., and Wendy F. DelVecchio. 2000. "The Rank-Order Consistency of Personality Traits from Childhood to Old Age: A Quantitative Review of Longitudinal Studies". *Psychological Bulletin* 126 (1): 3–25. https://doi.org/10.1037/0033-2909.126.1.3.

Shockley, Kristen M., Malissa A. Clark, Hope Dodd, and Eden B. King. 2021. "Work–family Strategies during COVID-19: Examining Gender Dynamics among Dual-Earner Couples with Young Children". *Journal of Applied Psychology* 106 (1): 15–28. https://doi.org/10.1037/apl0000857.

Sostero, Matteo, Santo Milasi, John Hurley, Enrique Fernandez-Macías, and Martina Bisello. 2023. "Teleworkability and the COVID-19 Crisis: Potential and Actual Prevalence of Remote Work across Europe". *IZA Journal of Labor Policy* 13 (1): 1–25. https://doi.org/10.2478/izajolp-2023-0006.

Viinikainen, Jutta, Katja Kokko, Lea Pulkkinen, and Jaakko Pehkonen. 2010. "Personality and Labour Market Income: Evidence from Longitudinal Data". *Labour* 24 (2): 201–220. https://doi.org/10.1111/j.1467-9914.2010.00477.x.

Yang, Longqi, David Holtz, Sonia Jaffe, Siddharth Suri, Shilpi Sinha, Jeffrey Weston, Connor Joyce et al. 2022. "The Effects of Remote Work on Collaboration among Information Workers". *Nature Human Behaviour* 6 (1): 43–54. https://doi.org/10.1038/s41562-021-01196-4.

Zhang, Ting, Dan Gerlowski, and Zoltan Acs. 2022. "Working from Home: Small Business Performance and the COVID-19 Pandemic". *Small Business Economics* 58: 611–636. https://doi.org/10.1007/s11187-021-00493-6.