Pre-Analysis Plan: Willingness-to-Pay for Job Attributes in Germany*

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Contents

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1 Introduction

1.1 Abstract

In this pre-analysis plan, we describe a choice experiment that induces exogenous variation in job attributes. The key features of the experimental design follow Maestas et al. [2018]. We aim at identifying workers' willingness to pay for certain job attributes. First, we plan to analyze the willingness to pay for job attributes indicating high work pressure (i.e., the extent to which a job is characterized by frequent deadlines and multitasking). Second, we plan to investigate willingness to pay for other job attributes, in particular of commuting time and the option to telecommute, and how these dimensions interact in shaping the subjects' willingness to pay for each job attribute.

1.2 Motivation

This pre-analysis plan refers to an online choice experiment that allows us to elicit workers' preferences over jobs under exogenous variation in job attributes. The experimental design aims at identifying the workers' willingness to pay for two types of job attributes. First, we consider attributes that are associated with high work pressure. This experimental evidence is meant to extend a recent working paper that draws on detailed worker-level survey data for Germany [Nagler et al., 2021]. The evidence shows that the prevalence of work characteristics that are arguably related to work-related pressure has increased substantially during the last decades and that such job characteristics are associated with a sizable wage premium even within narrowly defined occupations. We also document that, in line with theories of compensating differentials, workers in high-pressure, high-paying jobs report several disamenities including worse mental health outcomes. Given that competing explanations for the observed wage premium cannot be ruled out, the experiment is meant to complement the analysis of the survey data. The experimental design aims at identifying workers' willingness to pay for two high-pressure job attributes that are consistently available across time in our observational data: the extent to which a job is characterized by frequent deadlines, and the extent of multitasking.

Second, we consider workers' willingness to pay for other job attributes. These attributes are, on the one hand, motivated by recent changes in labor markets that happened in the past two years of the COVID pandemic. Here, we

specifically focus on workers' willingness to pay to decrease commuting time and the option to telecommute, and how both dimensions interact in shaping the subjects' willingness to pay (WTP) for changes in both job attributes. On the other hand, we include job characteristics such as the number of paid days off that differ substantially between the United States (where there is evidence on workers' willingness to pay for such job attributes, see Maestas et al. 2018) and Germany or Europe more generally. We will likely report the experimental evidence in two different papers (an extended version of Nagler et al. [2021], and a separate paper on the other job attributes, in particular on commuting/telecommuting).

Our experimental design follows Maestas et al. [2018], who use a survey experiment to estimate the WTP of workers for alternative work arrangements and various non-wage characteristics of jobs. Maestas et al. [2018] study ten non-wage job attributes, ranging from hours and schedule flexibility to physical job demands and autonomy at work. The only attribute that captures work pressure in their data is pace of work ("relaxed" vs. "fast-paced"). The paper identifies the WTP for telecommuting, but does not consider commuting distance to the workplace or commuting time. We adapt their experimental design to separately identify the WTP to avoid characteristics associated with high pressure in the workplace and the WTP for other job attributes such as the option to telecommute.

The idea of this stated preference method is to randomize job characteristics and observe the choices individuals make when facing the tradeoff between hypothetical jobs with different characteristics that also differ in pay. The resulting data allow us to identify the workers' average willingness to pay for the presence of certain job characteristic in those hypothetical choices.

We are currently planning to run the experiment on a sample of German employees. To recruit the subjects, we plan to use the infrastructure of the data collection agency NORSTAT.

2 Experimental Design

2.1 Online Experiment

We consider the following job characteristics. To capture work pressure, we define two job attributes that are consistently available in our observational data. The first attribute relates to the presence of deadlines and pressure to perform, while the second attribute relates to multi-tasking. The wording when present-

ing the job attributes in the experiment follows the wording of the respective items in the surveys used in Nagler et al. [2021]. In both cases, the job attributes are defined by statements whether the respective attribute would apply "frequently" or just "occasionally." Commuting time to the workplace is presented in minutes and varies between 15, 30, 45, and 60 minutes. Options to telecommute in a given job are given as "none", "2 days per week", or "5 days per week". We complement the job profiles by three further non-wage attributes: control over schedule, number of paid days off, and hours.

To each survey respondent, we administer a series of ten stated-preference experiments. In each of these experiments, survey respondents are asked to select between two jobs, each defined by a partially varying set of non-wage job characteristics, hours, and monetary compensation. To minimize the risk for differential perceptions regarding unspecified job characteristics, we follow Maestas et al. [2018] and instruct respondents to assume that any job attributes not mentioned are identical across jobs.

For each respondent, we use a description of the respondent's current job as a baseline profile. To facilitate the derivation of the baseline profile, before participating in the experiments, each respondent answers a short survey about current job characteristics. Each survey item corresponds to one of the non-wage job attributes in the experiment. Based on the respondents' baseline job, we create hypothetical Job A and Job B by randomly selecting two non-wage attributes (including hours) to vary across the two jobs. Within each of the two randomly selected attributes, we choose corresponding attribute values at random sequentially for both jobs without replacement. This makes sure that Job A and Job B actually vary in the selected attributes. To limit the variation in selected attributes, we proceed as follows. If hours are selected to vary, we add to the baseline weekly hours (determined to be the value from $\{15, 20, 25, \ldots, 55, 60\}$ that is closest to the stated hours) of each job a number randomly chosen from the set $\{-10, -5, 0, 5, 10\}$. Regarding paid days off, we set the baseline value to the value from $\{25, 30, 35\}$ that is closest to the number stated in the survey, and (if selected to vary) randomly choose from these values. Regarding commuting time (in minutes), we set the baseline value as follows:

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

- 60 if value selected in survey is "46-60 minutes"
- 60 if value selected in survey is "60+ minutes"

If selected to vary, we randomly choose the commuting time from the set $\{15, 30, 45, 60\}$. Regarding options to telecommute, subjects choose in the survey between "none", "2 days per week", and "5 days per week". We set the baseline values correspondingly and (if selected to vary) randomly select from that set. The variation in all other non-wage attributes is binary (deadlines and multi-tasking: "frequently" vs. "occasionally"; control over schedule: "yes" vs. "no").[1]

In addition to the two randomly selected non-wage attributes to vary in a given experiment, the wage always varies between Job A and Job B. Following Maestas et al. [2018], we anchor the randomly determined wage using the respondent's actual hourly wage w. The anchoring is achieved by setting the wages of Job A and Job B as $\theta_A w$ and $\theta_B w$, respectively, where θ_A and θ_B follow a $N \sim (1, 0.01)$ distribution. We truncate both weights to lie between 0.75 and 1.25. The wage offer is converted back to the units in which the respondent originally reported their earnings (hourly, monthly, or yearly) in the choice experiment. We adapt the strategy used by Maestas et al. [2018] to limit the number of job pairs in which one of the jobs dominates the other on all varying dimensions.

To limit the impact of mistakes when subjects enter their current earnings, we proceed as follows. First, we ask them in the survey if they are able to state their current (gross) income. If a subjects answers "no", we do not ask for the current income, but randomly choose an hourly baseline wage from the set $\{15, 16, \ldots, 59, 60\}$. If a subjects answers "yes", the survey asks the subjects to state their gross (hourly, monthly, or yearly) earnings, and we use the (implied) hourly wage as baseline value. If the (implied) hourly wage is below the current minimum wage in Germany, the survey asks the respondent to check her entry and correct it if necessary. Irrespective of whether the subjects adjusts the stated wage, the subjects are allowed to proceed. If the (implied) stated hourly wage (after possible correction) is below €15, the baseline wage is set to €15. If the (implied) stated wage is above €60, the baseline wage is set to €60.

In addition to the 10 choice experiments, we include two further survey questions that follow the "trick" questions in Maestas et al. [2018]. When facing

[1] Regarding the presence of deadlines and multi-tasking requirements, subjects select in the survey between "never", "occasionally", and "often". The baseline values are set to "occasionally" if the subject has chosen either "never" or "occasionally", and "often" if the subject chose "often".

these questions, which appear randomly (and non-consecutively) between the third and the last choice experiment, respondents are instructed to respond in a specific way, irrespective of what they believe is the true answer to the respective question. Responses to the trick questions allow us to estimate the share of inattentive participants and test the robustness of our findings with respect to excluding inattentive respondents.

In terms of implementation, in each experiment we display the hypothetical jobs with all characteristics side by side. We instruct respondents to either select "Prefer Job A," or "Prefer Job B." Each respondent makes the binary decision between Job A and Job B in 10 distinct sequential experiments.

2.2 Sampling

We plan to run the experiment on a sample of German private sector employees. We restrict the sampling to subjects aged 20 to 60 years. To recruit the subjects, we plan to use the infrastructure of the data collection agency Norstat. We aim at drawing a sample of subjects that is broadly representative of the population of German private-sector workers in terms of age and gender.

2.3 Exclusions

We will only consider subjects who completed the entire experiment. We will follow Norstat's guidelines for researchers and exclude from the sample of completes all subjects that provided data that do not meet basic quality standards (for instance, due to speeding). Based on responses to the trick questions, we will define three groups of completes (conditional on fulfilling the basic quality standards): all survey respondents, those answering correctly at least one of the trick questions, and those answering correctly both of the trick questions. We did not pilot the experiment, and therefore cannot estimate the share of inattentive subjects in an experiment like ours. We plan to report as main results the findings from the full sample, and those from the remaining two subsamples as robustness checks. However, in case we find evidence suggesting that noise induced by inattentive subjects dilutes the WTP estimates in the full sample, we might report the WTP estimates from the restricted samples as main results. In that case, we will report the result for the full sample in an online appendix or online document unrelated to the paper.

As stated before, the subjects will choose between job A and B in ten con-

secutive experiments. To insure against the possibility of subject becoming less attentive over time, we plan to test if our results change if we exclude from the estimation sample observations that emerge from the last rounds. For that purpose, we will exclude the last rounds in a stepwise manner (exclude observations only from round 10, from rounds 9 and 10, ..., from rounds 6 to 10). In case we find that our main results do not change by excluding the final rounds, we will summarize the findings from this exercise in the paper, but we do not commit to report the different estimates. In case we find that including the final rounds dilutes our estimates of the WTP, we might report the WTP estimates from a restricted sample as main results. In that case, we will report the full-sample results in an online appendix or online document unrelated to the paper, and describe the results from the stepwise process of excluding the final rounds.

2.4 Planned Sample Size

We plan to recruit a sample of 3,300 subjects. Each subject will perform a series of 10 choice experiments, resulting in a planned sample size of 33,000 choices between jobs A and B.[2]

2.5 Minimum Detectable Effects

We do not have any baseline data and thus cannot provide minimum detectable effect sizes. However, assuming that our key variables are distributed similarly as the key variables in Maestas et al. [2018], we are confident that we will be able to detect relatively small effects. For instance, Maestas et al. [2018] estimate that a switch from a fast-paced to a relaxed job (holding all other job characteristics constant) is equivalent to a 4.4 percent wage increase. Similarly, they estimate that the option to telecommute (without a differentiation on how intensely this option may be used by the worker) is equivalent to a 4.1 percent wage increase. These estimates are based on a sample of 1,815 survey respondents and significant at the one percent level. Given our planned sample size of 3,300 respondents, we expect to be able to identify wage premia for our high-pressure variables and the commuting-related variables of less than 4 percent.

[2] We may use an option to increase the sample size, most likely by another 1,000 subjects, that was offered to us by the data collection agency.

3 Empirical Analysis

3.1 Estimation Approach

We will estimate the WTP for certain job characteristics following Maestas et al. [2018]. We assume that the binary choices observed reflect a linear indirect utility function

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

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

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

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

$$\delta \ln w = \beta^r + \delta \ln(w - WTP^r), \tag{3}$$

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

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

3.2 Presentation of Results and Planned Research Reports

General remarks We will present our estimates in terms of $1 - e^{\left(-\frac{\beta^r}{\delta}\right)}$, meaning that, if attribute r is added to a job, utility-wise this is equivalent (in the case of $WTP^r < 0$) to a $100\left(1 - e^{\left(-\frac{\beta^r}{\delta}\right)}\right)$% wage decrease.

Regarding the type of analyses, including robustness checks and complementary analyses, we will follow Maestas et al. [2018]. We plan to produce two separate papers. The first one will focus on the WTP to avoid work pressure, whereas the second one will focus on other job characteristics, especially commuting/telecommuting.

Paper on WTP to avoid work pressure Regarding the extension of Nagler et al. [2021] by the evidence from the stated choice experiment, besides reporting the WTP for the full sample, we plan to run an exploratory analysis considering subsamples of subjects according to stress-related health status. To elicit the subjects' self-reported stress-related health, we let the subjects (after completing the stated-choice experiment) answer a series of four health questions. These questions read as follows:

"In your current job, do you feel that you are mostly up to the task in terms of quantity of work, or do you feel under- or overwhelmed?" Response options: Mostly up to the task; mostly overwhelmed; mostly underwhelmed; don't know.

"During the past 12 months, did you frequently experience any of the following on work days?" Response options: Sleep problems; general feelings of tiredness, fatigue or weariness; feeling nervous or irritable; feeling physically exhausted; feeling mentally exhausted; none of these; don't know.

"Does it frequently happen at work that ..." Response options: Work is emotionally taxing; reaching personal limit often; hard to relax after work; none of these; don't know.

"During the past two years, or since you started on your current job: Have stress and work pressure increased, did they stay constant, or have they decreased?" Response options: Increased; stayed constant; decreased; don't know.

We will consider the following responses as indicating that the respective subjects suffers from work-related stress and related health problems: overwhelmed by too much work, sleep problems, feeling tired, feeling nervous, mentally exhausted, work emotionally taxing, reaching personal limit often, hard to relax after work, stress has increased over past 2 years. We do not have baseline data and thus do not know how responses will be distributed, and we also do not know the share of subjects who will skip (some of) these health-related questions (by clicking "don't know"). We therefore do not want to fully tie our hands on how to split the sample into subsamples of subjects less and more strongly affected by work-related stress. To keep things simple, we plan to count the number of items indicating work-related stress for each subjects, and use a cut-off for this number that divides the sample in two roughly equal subsamples. We will then estimate the WTP to avoid work pressure in the different subsamples. If we find that the two subsamples do not differ in the WTP, we might also consider alternative sample splits defining subsamples of subjects who report to be affected by work-related stress more strongly (higher number of respective items marked), and compare them to subjects who report that they are less (or

not at all) affected.

We will exclude from the analysis of how work-related stress affects the WTP to avoid work pressure subjects who answer any of the health questions inconsistently (for instance, by marking in the second question any of the items indicating some health problem and also indicating "none of these"). We expect that less than 20 percent of all subjects will skip one or more of the health questions. If this turns out to be true, we will exclude from the analysis of how work-related stress affects the WTP all subjects who skip any of the four health questions. If more than 20 percent of subjects skip health questions, we may use a weaker exclusion criterion (for instance, exclude subjects who skipped more than one question).

Paper on WTP for other job characteristics The second paper will deal with the WTP for other job characteristics, especially a telecommute option, the WTP to reduce commuting time, and how the interaction between both job characteristics affects the respective WTP. The analysis is motivated by the observation that the increased availability of telecommute options in the aftermath of the Covid-19 pandemic may fundamentally change how workers perceive telecommuting and commuting time to the workplace as job (dis-)amenities. A first question we plan to analyze is how the WTP for a telecommute option changes when commuting time increases. We will study this question by using WTP estimates among the subset of experiments where the designated commuting time does not change between job opportunities. A second question we want to analyze is how the WTP to avoid commuting changes under the opportunity to work from home. To do so, we will estimate workers' WTP to avoid commuting in the subset of choices where the telecommuting possibility is the same across both jobs. In addition, we will estimate workers' WTP for a certain number of days off, for a certain number of hours, and for the option to set their own schedule. These estimates are motivated by the fact that these characteristics largely differ between the US and Europe on average.

References

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