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ABSTRACT

Mission of the Company, Prosocial Attitudes and Job Preferences: A Discrete Choice Experiment*

We conduct a discrete choice experiment to investigate how the mission of high-tech companies affects job attractiveness and contributes to self-selection of science and engineering graduates who differ in prosocial attitudes. We characterize mission by whether or not the company combines its profit motive with a mission on innovation or corporate social responsibility (CSR). Furthermore, we vary job design (e.g. autonomy) and contractible job attributes (e.g. job security). We find that companies with a mission on innovation or CSR are considered more attractive. Women and individuals who are more altruistic and less competitive feel particularly attracted to such companies.

JEL Classification:	J81, J82, M52
Keywords:	mission of the company, sorting, discrete choice experiment, job characteristics, social preferences

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1. Introduction

Each organization has a mission: a motive for its existence. Organizations in the private sector naturally have a profit motive, but they often have broader objectives that play a key role in their long-term strategy, such as being innovative or being socially responsible.[1] For example, Tesla prominently advertises its mission "to accelerate the world's transition to sustainable energy", and Philips advertises its mission "to make a healthier, more sustainable world". An organization's mission has strong implications for those who are employed in the organization as it affects what they work on, how their work impacts on society, and the criteria by which their performance is judged. Employees and employers therefore have a shared interest in creating a match between employees' preferences and values and the organization's mission.[2]

Recently, economists and organizational psychologists have started to assess whether corporate social responsibility affects worker behavior. For instance, Burbano (2021) and Cassar (2019) show that workers provide extra effort when their employer donates to charities, and that the effort response to employer charitable giving is strongest among prosocial individuals.

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[1] Having objectives besides profit does not imply sacrificing profits, as the objectives can be related to a strategy to ensure long-term profitability. Barnett and Salomon (2006) analyze financial performance of 61 socially responsible investment funds and find a u-shaped relation between the number of social screens used and financial performance. Gartenberg et al. (2019) show that companies that are perceived high in purpose by their employees have systematically higher stock market performance, provided management clearly communicates the firm's purpose. Flammer (2015) exploits a regression-discontinuity design to show that corporate social responsibility leads to superior financial performance. Possible channels are higher labor productivity and sales growth.

[2] An often-voiced concern is that workers who do not subscribe to the organization's mission are less satisfied with their job, less motivated, and more likely to leave the organization. According to a recent report by Deloitte on millennials: "In organizational cultures without perceived purpose, only one out of five millennials are satisfied at work" (Smith and Turner, 2017).

In light of this evidence, we conjecture that prosocial workers not only respond to social corporate responsibility of their employer in terms of effort provision and attachment, but sort into such firms. Specifically, we hypothesize that firms with a mission on innovation and sustainability attract applicants with prosocial attitudes as altruistic individuals are expected to care about positive welfare effects that are induced by innovation and about the sustainability and future prosperity of society. Competitive individuals, on the other hand, may feel more at ease in companies that merely focus on making profit, as this focus will likely be reflected in a drive to outperform competitors that shapes a competitive corporate culture with incentive systems and career policies based on clearly defined performance metrics (e.g. sales, profits). Such sorting effects induced by a company's mission are particularly important for organizations in the high-tech sector who compete strongly for graduates in science and engineering. We therefore investigate the role of company's mission for recruiting prospective employees in the high-tech sector.

We conduct a hypothetical discrete choice experiment among master students in science and engineering at the two largest technical universities of the Netherlands (N=1498). We investigate whether companies with a focus on innovation or corporate social responsibility (CSR) and sustainability are considered more attractive employers, and whether the mission of the company affects the composition of the workforce with respect to prosocial attitudes, competitiveness and university grade point average. We design a discrete choice experiment in which respondents choose five times among three hypothetical jobs that differ in job design (i.e. autonomy at work, teamwork, and workload), contractible attributes (i.e. wage, performance pay, and job security), and, importantly, mission of the company. We sketch jobs in companies that focus exclusively

on maximizing profit, or that in addition to profit focus on innovation or on CSR and sustainability. Moreover, we include a non-profit organization to investigate how applicants value working in a commercial company versus working in a company without profit motive. Respondents trade off these job attributes by ranking the three jobs of each choice set. In addition, we collect information on their background characteristics, personality, and economic preferences.

Our findings can be summarized as follows. First, mission matters. Keeping all other job aspects constant, potential job applicants prefer to work in commercial organizations that aim to be innovative, as well as in organizations that show corporate social responsibility. At the same time, they do not express a clear preference for working in non-profit organizations over organizations that view making profit as their sole purpose. Commercial organizations with social objectives therefore have a competitive advantage in the labor market. Workers are on average willing to forgo 170 euros in terms of net monthly salary to work in a company that focuses on innovation, and 220 euros to work in a company that focuses on CSR and sustainability. The magnitude of this effect is large but in line with findings in other studies (Kesternich et al., 2020, Burbano, 2016, Montgomery and Ramus, 2011, and Maestas et al., 2018). Second, a company's mission potentially affects the composition of the pool of applicants. Non-profit organizations and commercial organizations with social objectives attract more women and applicants who tend to be less competitive and more prosocial than organizations that focus exclusively on profit. We find no evidence that this comes at the cost of attracting less talented individuals, as measured by respondents' grade point average or self-efficacy.

The attractiveness of a job also depends on other attributes than the focus of the company. Potential job applicants also highly value autonomy and work in

multidisciplinary teams. This is consistent with the idea that workers care about perceived job meaning: according to Cassar and Meier (2018), perceptions of job meaning depend on the organization's mission, autonomy in decision making, and feelings of competence and relatedness. As predicted by standard economic theory, we find that job applicants also care about wages, job security, and workload. Performance pay is valued neither negatively nor positively. We also find some interesting heterogeneity in preferences for job attributes. High job autonomy is specifically valued by relatively competitive individuals and women. A generous salary makes the job more attractive, but especially so for competitive and selfish individuals. Finally, as we might expect, teamwork is particularly valued by individuals who have high trust in others, and job security is particularly valued by risk averse individuals.

The main contribution of this paper is that we investigate workers' preferences for organizations' mission and the heterogeneity of these preferences by traits such as prosociality. Closely related studies on the importance of organizations' mission for the attractiveness of job offers are Montgomery and Ramus (2011) and Maestas et al. (2018), who conduct hypothetical choice experiments to study job preferences. Montgomery and Ramus (2011) conduct their study among MBA students and find that they care about organizations' ethical reputation and environmental sustainability. Maestas et al. (2018) target a sample representative for the US population. Their choice-experiment includes job attributes such as teamwork, autonomy, work pressure and meaningful work. Their findings correspond to ours, except that they find a negative valuation of teamwork and do not find significant gender differences in the valuation of meaningful work. Our study differs from both above mentioned studies by examining preference heterogeneity by personality traits and economic preferences.

Another contribution is that we focus on students in science and engineering who are about to enter the labor market. These students potentially have a high impact on technological innovation and economic growth in their later careers (Murphy et al., 1991). Their societal impact will, however, also depend on the mission of the organizations they end up working for. This makes studying their job preferences highly relevant. Moreover, given the social relevance of high-tech products, companies in high-tech sectors have ample opportunities to communicate their relevance for society to potential job applicants.

The paper proceeds as follows. The next section describes the related literature. Section 3 describes the discrete choice experiment and its theoretical background, the measurement of personality characteristics and social and economic preferences, and the main characteristics of the sample. In sections 4 and 5, we discuss the estimation method and results, respectively. Section 6 concludes.

2. Related Literature

Our study relates to several recent hypothetical choice experiments that study workers' job preferences. Notable examples are Eriksson and Kristensen (2014), Mas and Pallais (2017), and Wiswall and Zafar (2018). These studies focus on contractible job attributes such as fringe benefits and flexible working time arrangements, but do not investigate company mission and job design.[3] Moreover, these studies have examined

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[3] Exceptions are the papers by Montgomery and Ramus (2011) and Maestas et al. (2018), which we discussed in the introduction. A number of studies on job preferences of health care workers in Africa include job attributes such as public vs. private sector and opportunities to help other people (Lagarde and Blaauw, 2016, Doiron et al., 2014, and Kolstad, 2011). However, these studies are conducted in a markedly different context than ours, and are silent on the selection effects of the mission of the organization.

preference heterogeneity by demographic characteristics, but not by economic preferences and personality traits.

Our paper also relates to field experiments that investigate workers' preferences for meaning, defined as a job that has some purpose for others. Chandler and Kapelner (2013) find that subjects are more likely to accept a job if it is described as more meaningful. Kesternich et al. (2020) exploit a similar manipulation of the job description and find that meaning reduces reservation wages, but only for those who previously indicated that they find meaning important (by 18%) and those who are unemployed (by 14%). Guzman et al. (2020) experimentally manipulate invitations to participate in an entrepreneurship competition. They find that messages that emphasize the contribution to society motivate women and individuals from altruistic cultures to apply, while men and individuals from less altruistic cultures are more responsive to messages that emphasize the opportunity to win money. Although the choice to participate in an entrepreneurship competition is not the same as job choice, their results also suggests that women and altruistic individuals care more about contributing to society in their work.

Closely related field experiments investigate workers' preferences for working in organizations that donate to charity. Burbano (2016) informs randomly chosen workers on two online marketplaces about the social activities of the firm (contributions to charity), and find that this information reduced their wage demands by 12 to 44 percent. Burbano (2021) also finds that employer charitable giving increases gig workers' feelings of attachment to their employer. Hedblom et al. (2019) conduct a field experiment in a data-entry firm. They show that when a firm advertises its pro-social practice to charge clients with charitable causes at cost price, it receives more applications and attracts more

productive employees. Moreover, they show that employees are more productive when they work on projects for charitable organizations.

Other studies exploit naturally occurring data to examine workers' preferences for CSR. Bode et al. (2015) analyze data from a large consultancy firm. They find that employees who participate in consultancy projects for charitable organizations are more likely to stay with the firm. Carnahan et al. (2015) examine how law firms' CSR initiatives influence occupation changes of attorneys after the 9/11 terrorist attacks. The idea is that shocking events such as terrorist attacks increase the desire to act prosocially, stimulating individuals to reconsider their career choices. They find that attorneys born in New York City are more likely to quit the profession after the attacks than officemates born outside New York City, who are less likely to be psychologically affected by the attacks. Importantly, this effect is attenuated by pro-bono legal services of the law firms, suggesting that prosocial activities help to reduce turnover of employees who care about their impact on society. Consistent with this interpretation, firms with higher levels of CSR also have lower turnover to different occupations or to startup law firms (Carnahan et al., 2017). One difference between these studies and ours is that our discrete choice experiment allows us to assess the value of a company's mission relative to several other job attributes, and that we investigate preference heterogeneity by individuals' prosocial and competitive attitudes. A second difference is that both studies relate prosocial incentives to charitable giving and not to the sustainability of the production process or product innovation.

A closely related issue is how workers' effort depends on prosocial activities of the organization. Evidence from lab experiments shows that prosocial incentives, such as working for the benefit of a charity of their own choice, increase workers' effort (e.g.

Ariely et al., 2009; Carpenter and Gong, 2016; Cassar, 2019; Gerhards, 2015; Imas, 2014; Tonin and Vlassopoulos, 2015, 2010). However, Fehrler and Kosfeld (2014) find that this effect is limited to subjects who self-selected into the environment, while Cassar (2019) finds that improving the match between workers' preferred and actual charity does not lead to additional effort (in contrast to the findings of Carpenter and Gong, 2016, and Gerhards, 2015). Recent field experiments also show that charitable contributions can backfire when they are perceived as instrumental (Cassar and Meier, 2021), or when they induce moral licensing (List and Momeni, 2021).

A main contribution of our paper is that we investigate how worker heterogeneity in character traits, such as prosociality, affects sorting of workers into firms. Previous literature in economics has highlighted the role of individuals' prosociality as a determinant of choice between the public and private sector, see e.g. Banuri and Keefer (2016), Buurman et al. (2012), Dur and Zoutenbier (2014, 2015), Gregg et al. (2011), Hanna and Wang (2017), Jacobsen et al. (2011), and Kolstad and Lindkvist (2013). We extend this research by pointing at how the mission of organizations in the private sector affects sorting patterns. A number of recent related studies have investigated how job advertisements influence the pool of applicants in public sector jobs. Ashraf et al. (2020) conduct a field experiment in the recruitment of health workers in Zambia. They experimentally vary whether the job advertisement emphasizes career prospects or contribution to society, and find that emphasizing career prospects attracts individuals who provide more services and produce better health outcomes. Likewise, Dal-Bó et al. (2013) find that a higher advertised salary for public sector workers in Mexico attracts workers who are more productive. Deserranno (2019) experimentally manipulates wage information on advertisements for the position of health worker in Uganda. She finds that

advertising the position's maximum wage attracts a larger applicant pool than when the minimum or average wage is advertised. However, those applicants are on average less pro-social, display weaker performance and higher turnover.

We also relate to the literature in management and personnel psychology on applicant attraction. An important concept in this literature is Person-Organization fit (P-O fit), which is often operationalized as the match between individuals' values and their perception of the organization's values (Evertz and Süss, 2017; Kristof, 1996). According to meta-analyzes by Chapman et al. (2005) and Uggerslev et al. (2012), perceptions of P-O fit are key drivers of applicant attraction. Only few studies, however, have investigated fit between individuals' prosocial values and organizations' mission.[4]

3. Methods

3.1. Experimental design

3.1.1. Discrete choice experiment
Discrete choice experiments have three important advantages over naturally occurring revealed preference data. First, discrete choice experiments allow the researcher to vary job attributes exogenously, which is rarely observed in naturally occurring data. Second, in experimental data *all* available choice options are observed, including the options that are not chosen. Studies on actual behavior are typically not able to identify all options available. Third and related, discrete choice experiments allow the researcher to estimate

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[4] Gully et al. (2013 experimentally vary job advertisements by extending the desired applicant profile with social and environmental consciousness. They find that the modified job advertisement makes the organization more attractive for job seekers who desire to make a significant societal impact through work. Evans and Davis (2011) and Zhang and Gowan (2012 study the role of CSR in applicant attraction, and its relation to other-regarding values and ethical predispositions, respectively. They specifically define CSR as legal compliance, fair treatment of stakeholders, and transparency, which is narrower than what we have in mind.

the effect of job attributes independent of their supply. In real-world markets, organizations may not provide certain attributes because they believe that they are not important, or because providing them does not help to build a sustainable competitive advantage.

An obvious concern of discrete choice experiments is their external validity. Hainmüller et al. (2015) provide a validation of this methodology by comparing preferences for migrant characteristics derived from discrete choice experiments with actual voting behavior in referenda on naturalization. They show that experimentally elicited stated preferences are close to revealed preferences when the experimental design forces participants to make trade-offs, as is the case in our design. More generally, they conclude that respondent engagement with the choices to be made is a key factor for the reliability of the results. Closer to our setting, Montgomery and Wittink (1980) find a strong relation between job preferences of MBA students elicited from a discrete choice experiment and real job choice 4 months later. Wiswall and Zafar (2018) show that choices in a hypothetical choice experiment relate to actual job choice 4 years after graduation. Maestas et al. (2018) also find evidence that choices in their hypothetical choice experiment correspond with the characteristics of workers' current job.

We design our discrete choice experiment specifically for MSc students. Focusing on this group has a number of advantages. First, MSc students are about to enter the labor market. They therefore have strong incentives to think carefully about their job preferences, resulting in high engagement with the survey topic. Second, students are a homogeneous group in terms of age and stage of their career, which facilitates the interpretation of the results. Third, although we consider it a disadvantage that students

have limited or no work experience, we avoid status quo bias that may arise in a sample of experienced workers.

The core of our discrete choice experiment consists of the rankings respondents make among three hypothetical jobs in five different choice sets. Figure 1 shows a screenshot to illustrate how we present the task to participants. The screen shows a choice set with three jobs, which respondents are asked to rank according to their preferences. Each of the five choice sets is presented on a separate screen. This design balances respondent load and the amount of information we collect. We opt for a rank-order design instead of ratings, since we want to force individuals to make choices.[5]

Jobs are fully described by eight attributes. The values of the job attributes are randomly drawn from the set of possible values. Hence all jobs are randomly generated, so that each respondent evaluates different choice sets. The randomization is subject to two constraints. First, we rule out that a job attribute takes on three times the same value in a choice set. This ensures that there is variation in each attribute within each choice set, which increases the information implicit in respondents' choices.[6] Second, we rule out two implausible combinations of job attributes. If work is conducted on one's own, pay-for-performance is never based on team performance, but always on individual performance. Vice versa, if work is conducted in teams, performance pay is not based on individual performance. Although these combinations are theoretically possible (profit-sharing, pay based on peer assessment), including them might well confuse respondents.

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[5] An alternative would be to impose that respondents cannot give jobs the same rating, but this increases complexity without providing much additional information.
[6] Note that this procedure does not preclude the possibility that subjects incidentally see the same job twice in a choice set, but this happened in only two out of 7,490 choice sets. More generally, 36 subjects evaluate the same job in different choice sets.

One might be concerned that respondents find it daunting to compare jobs that differ in eight dimensions. This complexity may increase noise in the answers, but it also adds realism as in practice jobs also differ along several important dimensions.

3.1.2. Choice of attributes and attribute values

Jobs differ in eight attributes, which can be grouped into three categories:

1. Mission of the company: focus of the company.

2. Job design: autonomy, teamwork and workload.

3. Contractible attributes: salary, performance pay, and job security.

The final attribute we include in the experiment is occupation (Research and Development, Management, Sales). The effects of occupation are relevant for employers in high-tech sectors, but they are also context-specific and therefore less interesting from a scientific perspective. We include occupation in the analyses, but do not report the results for ease of presentation.[7]

We based our selection of job attributes on practical relevance. As a starting point, we screened job advertisements of more than 100 national and international companies present on one of the largest job fairs for MSc students in engineering in the Netherlands, which takes place annually at the Eindhoven University of Technology. We used this information to discuss the importance of several job attributes with recruiters in the high-tech sector as well as employer representatives of the sector.

Table 1 provides an overview of job attributes and the corresponding values. We designed attribute values in such a way that they are realistic and sufficiently specific to

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[7] Results are available upon request.

allow for meaningful comparisons. We are particularly interested in the focus of the company. We distinguish between two dimensions: profit motive and contribution to society. On the one extreme, we pitch an organization that is strongly driven by profit. The other extreme is a non-profit organization, which encompasses a wide variety of organizations (e.g. government, charity, university, research institute). Commercial organizations with a pro-social mission fall in between: they combine a profit motive with a mission on innovation and/or CSR and sustainability.

Furthermore, we quantified job attributes as much as possible. We used our discussions with recruiters and employers in the high-tech sector to determine what variation in attribute values would be realistic. For example, starting salaries of MSc graduates in the sector typically hoover between 1800 and 2200 euro net per month. Likewise, performance pay components, when present, are usually around 10% of the base wage in this sector. We also took care to make abstract attributes such as autonomy and teamwork as specific as possible. In case we had to trade off realism and specificity of attribute values we gave priority to the latter. This procedure resulted in stylized descriptions of attribute values that are more extreme than what we observe in practice (e.g. high-skilled work always entails some team component). However, we think that by making abstract attributes explicit and/or quantifiable we help respondents to understand their importance and to express their preferences.

3.2. Measurement of personality characteristics

We collect information on a variety of background characteristics such as age, gender, nationality (defined as country of birth) and study specialization (i.e. master program).

Moreover, after respondents filled out the discrete choice experiment, the survey continues measuring the following personality characteristics and economic preferences:

Altruism: We use two questions proposed by Falk et al. (2021) to measure altruism:

1. "How would you assess your willingness to share with others without expecting anything in return, for example your willingness to give to charity?" (Extent of agreement expressed on a continuous scale from 0 to 10.)

2. "Imagine the following situation: Today you unexpectedly received 1000 Euro. How much of this amount would you donate to charity? (Any value between 0 and 1000 is allowed)"

Falk et al. (2021) identify these questions as the best available survey measures of altruism, since they are the best predictors of altruistic behavior in an incentivized experiment (transfers in a dictator game with a charitable organization as recipient). Our measure of altruism is the first principal component of these two questions. [8]

Competitiveness: We measure competitiveness with a selection of items from the Revised Competitiveness Index (Houston et al. 2002). We use the following three items:

1. I try to avoid competing with others (reversed)

2. I don't like competing against other people (reversed)

3. I like competition

The full scale consists of fourteen items, but we select three items to reduce survey length. We base the selection of these items on an analysis of the full scale, exploiting data from an unrelated laboratory experiment with university students (N=240) where we elicited

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[8] Our results are comparable when we use either of the two measures.

the full scale [9]. We select the three items that jointly show the highest correlation with the full scale (0.94 for the items mentioned above). Respondents express their extent of agreement with each of those statements on a five-point scale.

Trust: We measure trust by asking subjects to what extent they agree with the following statements (five-point scale):

1. On the whole, one can trust people

2. Nowadays, one can't rely on anyone (reversed)

3. If dealing with strangers, it is better to be careful before one can trust them (reversed)

Those items are taken from the German Socio-Economic Panel (SOEP) and are validated by Fehr et al. (2002).

Grade: We measure academic achievement with the grade obtained in the master program so far. Grades in the Netherlands are always expressed on a scale 1 (lowest) to 10 (highest), where 5.5 is the minimum passing grade. Only 2.4% of the sample reports an average grade below 5.5, and roughly 50% of all grades are between 7 and 8 (bounds included).

Self-Efficacy: We measure self-efficacy with a selection of items from the New General Self-Efficacy Scale (Chen et al., 2001). We use the following three items:

1. I will be able to achieve most of the goals that I have set for myself.

2. I will be able to successfully overcome many challenges.

3. Compared to other people, I can do most tasks very well.

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[9] Results are available upon request. The sample of this lab experiment mainly consist of business and economics student.

While the original scale consists of 14 items, we selected three items based on the same data and procedure we used to select items from the competitiveness index. The three items we selected have a 0.95 correlation with the original 14-item scale.

Risk tolerance: We measure individuals' attitude towards risk by a widely used subjective risk question (see Falk et al., 2021, and Dohmen et al., 2011, for validation of this measure). Respondents indicate on a continuous scale from 0-10 to what extent the following statement applies to them: "How do you see yourself: are you a person who is generally willing to take risks, or do you try to avoid taking risks?"

3.3. Data

Our sample consists of MSc students in science and engineering at the two largest technical universities of the Netherlands: Delft and Eindhoven. In the Netherlands, MSc programs in science and engineering take two years. We approached both first and second-year MSc students. The surveys were conducted in March 2015 (Eindhoven) and July 2016 (Delft). Both universities gave us permission to approach the MSc students *once* through the central university emailing system. Moreover, Eindhoven University of Technology allowed us to ask students for their permission to contact them once more in the future. We collected 595 and 903 valid responses (15% and 10% of the approached population in Eindhoven and Delft, respectively). Table 2 provides descriptive statistics of the main variables. Overall, respondents of the two universities are comparable in terms of observable characteristics. At both universities, non-Dutch students predominantly come from China and India (13% of the sample in Delft and 14% in Eindhoven) and other European countries (10% in Delft and 9% in Eindhoven).

We also collected descriptive statistics on the population of registered MSc students of both universities. Compared to the overall population, it seems that women are overrepresented in our sample (Delft: 36% in the sample vs 27% in the population; Eindhoven: 27% in the sample vs 20% in the population). Students with Dutch nationality are somewhat underrepresented (Delft: 61% in the sample vs 68% in the population; Eindhoven: 64% in the sample vs 82% in the population).[10]

Table 3 reports correlations between the various personal characteristics, personality traits, and preferences. Most correlations have the expected sign. For example, competitive individuals score higher on self-efficacy, are less altruistic, and more willing to take risks. Women tend to be less competitive than men. As expected, self-efficacy and grades are positively correlated (r=0.15).

4. Econometric Framework

To exploit all available information in the choices respondents make, we estimate mixed rank-ordered logit models. This model is developed to analyze choices individuals make in a number of different choice situations.[11] The analysis of such data requires methods that deal with the discrete and ordinal nature of choice data, as well as the correlation that arises naturally across choice situations. Since an individual's preferences influence choices in all choice situations, individuals' choices cannot be treated as independent

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[10] Information on population statistics is derived from the institutions' registration of students enrolled in their MSc programs. The population of students enrolled in master programs is not necessarily the same as the population we approached. For instance, our sample includes exchange students, which may explain why we have relatively more non-Dutch students. In the absence of more detailed information, it is not possible to make precise comparisons.
[11] Useful introductions to mixed logit models are Revelt and Train (1998), Layton (2000), Lancsar et al. (2017) and Hensher and Greene (2003).

observations. Mixed rank-ordered logit models address this in a natural way by allowing the preference parameters to differ over individuals, hence relaxing the independence of irrelevant alternatives (IIA) assumption (Layton, 2000).[12]

The model is based on the assumption that individuals choose the alternative that maximizes their utility. The utility function consists of a systematic and stochastic part. Specifically, utility individual i derives from alternative j in choice situation t is described by:

$$U_{ijt} = \beta_i' x_{jt} + \gamma' x_{jt} * z_i + \varepsilon_{ijt} \ ,$$

where β_i and γ are coefficient vectors, x_{jt} is a vector with job attributes, z_i is a vector with individual characteristics, and ε_{ijt} is an error term. The error term ε_{ijt} is independent and identically (iid) extreme-value distributed. The defining characteristic of the mixed rank-ordered logit model is that the coefficients, i.e. preferences, vary over individuals with density $f(\beta_i | \theta)$. Coefficients are assumed to be normally distributed with parameters of the distribution (mean and variance) described by θ. This is the main difference between the mixed rank-ordered logit and the standard rank-ordered logit model, which assumes that β_i is the same for all individuals, i.e. $\beta_i = \beta$.

Since individuals' preferences for job attributes are likely to be correlated, we allow the individual-specific parameters to be correlated.[13] We are also interested in the parameter vector γ, which captures the interaction between job attributes and individual characteristics such as gender, grade, and social preferences. The interaction terms allow

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[12] While the less complicated rank-ordered logit model can deal with the discrete and ordinal nature of rank-ordered choice data, it ignores the correlation between choice observations of the same individual, hence assuming independence of irrelevant alternatives (IIA).

[13] For instance, consider an individual who greatly cares about making a difference in the life of others. It is likely that this individual cares more than average about both focus of the company and job autonomy, so that he or she can also decide on the exact way to help others. See Hess and Train (2017) for further examples. Failure to take this correlation into account could lead to over- or underestimation of the marginal rates of substitution.

the valuation of job attributes to differ systematically between individuals with different observable characteristics, and are therefore not individual-specific.

Individuals choose the alternative j from choice set t that gives them highest utility. The probability that individual i with preferences β_i prefers alternative j over all alternatives k in choice set t is therefore described by:

$$P_{ijt}(\beta_i) = Pr\big(U_{ijt} - U_{ikt} > 0\big), \qquad \forall k \neq j$$

As utility depends on the iid extreme-value distributed error term ε_{ijt}, the probability that individual i chooses alternative j in a given choice set is described by:

$$P_{ijt}(\beta_i) = \frac{e^{\beta_i' x_{jt} + \gamma' x_{jt} * z_i}}{\sum_j e^{\beta_i' x_{jt} + \gamma' x_{jt} * z_i}}$$

The probability of observing individual i's choices in all T choice sets is

$$S_i(\beta_i) = \prod_{t=1}^{T} \frac{e^{\beta_i' x_{jt} + \gamma' x_{jt} * z_i}}{\sum_j e^{\beta_i' x_{jt} + \gamma' x_{jt} * z_i}}$$

which is the joint probability of the choices made in the different choice sets. As β_i is unobserved and we aim to estimate the parameters θ of the preference distribution, we average over β_i to obtain the probability as a function of the parameter θ:

$$S_i(\theta) = \int S_i(\beta_i) f(\beta_i | \theta) d\beta_i$$

Since this expression has no closed-form solution, we approximate this probability using simulated maximum likelihood (Revelt & Train, 1998). In particular, we approximate $S_i(\theta)$ by estimating $S_i(\beta_i)$ for different values of β_i. Each value of β_i is drawn from the distribution $f(\beta_i | \theta)$ and the corresponding probability $S_i(\beta_i)$ is calculated. This process is repeated for many draws, which gives us a simulated estimate of $S_i(\theta)$:

$$S_i^{sim}(\hat{\theta}) = \frac{1}{R} \sum_{r=1}^{R} S_i(\beta_i^{r|\hat{\theta}})$$

where R is the number of draws, $\hat{\theta}$ is the estimated value of θ, and $\beta_i^{r|\hat{\theta}}$ is the r-th draw

from $f(\beta_i|\hat{\theta})$. To obtain the parameter estimates $\hat{\theta}$ that best describe choices of all

individuals, we need to sum $S_i^{sim}(\hat{\theta})$ over all individuals to maximize the likelihood

function $LL(\hat{\theta}) = \sum_i S_i(\hat{\theta})$ with respect to $\hat{\theta}$. In all our reported estimations we use 200

draws generated by a Halton sequence, see Lancsar et al. (2017) for a discussion of the

trade-offs involved in choosing the number of draws.

We do not allow all coefficients to differ between individuals for two reasons.

First, models with all parameters varying can be unstable (Revelt and Train, 1998).

Second, it is convenient to keep wage coefficients fixed, because we use the wage as a

common metric to compute the implied monetary value of job attributes. Also, we control

for order effects to obtain more precise estimates: we include dummy variables that

indicate whether a job is presented on the left of the screen, in the center, or on the right.[14]

The rank ordered logit is also referred to as exploded logit, because it exploits

information on the preference relations that are revealed by the ranking. Assuming that

the ranking process is sequential, respondents first choose the most attractive alternative

from the choice set, and then choose the most attractive option out of the remaining

alternatives.[15] The data is 'exploded' to represent this choice process, which means in our

case that the dataset is transformed to record the preferred option among the three

alternatives as well as between the two remaining alternatives. This implies that we have

five observations per choice set: three observations (taking values 0 or 1) to indicate the

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[14] Dummies indicate whether a job was presented as job A, B, or C (see Figure 1). We do not allow these order effects to differ over individuals. Jobs presented in the middle column (job B) are chosen more frequently, while jobs presented on the right of the screen are least preferred. Those order effects are small in magnitude. Correcting for order effects increases the precision of the estimates.
[15] A limitation is that, under the assumption of transitivity, we ignore the information implicit in evaluations of the same job in different choice sets. However, this situation occurs only 36 times in our data.

most preferred option, and two to indicate the second-ranked option. As each individual is confronted with five choice sets, the total number of observations in the estimations is equal to 25 times the number of respondents. The mixed rank-ordered logit model is estimated as mixed logit on the 'exploded' data.

5. Results

5.1. Average preferences for job attributes

The analysis proceeds in two steps. First, we estimate a mixed rank-ordered logit model to establish the average value of each job attribute. In terms of the econometric model explained above, we estimate the preference parameters β_i assuming $\gamma = 0$. Next, in Section 5.2, we interact job attributes with individual characteristics to examine how job preferences differ by individual characteristics.

Table 4 presents the estimation results. The first column reports the mean estimated coefficients, the second column the estimated standard deviation of the individual coefficients. Note that the dependent variable (rank 1-3) is inverted, so that positive coefficients indicate higher levels of attractiveness.[16] Coefficients can be interpreted as log odds, or after exponentiating, odds ratios.

Concerning the mission of the company, we find that respondents have a clear preference for working in a commercial organization with a focus on innovation or on CSR & sustainability. Respondents find working for a non-profit organization less desirable, although they still prefer non-profit organizations over organizations that focus exclusively on making profit. These differences are statistically significant at the one

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[16] This rank-order reversion is implicit in the 'exploded' data structure.

percent level. The odds that a job in a company with a focus on innovation is chosen is 1.5 times the odds that a job in a company focused on profit is chosen.

All other job attributes are also significantly related to job rank, with the exception of pay-for-performance.[17] Respondents positively value autonomy and teamwork, in particular work in multidisciplinary teams. Those findings are consistent with the idea that individuals care about job meaning in the sense of Cassar and Meier (2018), who define job meaning as a function of mission, autonomy, feelings of competence and relatedness. Maestas et al. (2018) likewise find that workers positively value autonomy in deciding how to do their work. They also investigate preferences for teamwork, and find that workers prefer to work on their own rather than in teams. Since they also find that younger workers (25-34) have a relative preference for teamwork compared to older workers, we can reconcile their findings with ours as our sample is on average 25 years old.

Moreover, respondents care about salary, workload, and (reasonable perspective on) a permanent contract. Moving from a low salary to a high salary and from no autonomy to full autonomy has the largest impact on the odds that a job is preferred. It is important to take into account that the effect sizes are evaluated relative to the reference category: €400 additional monthly salary is a substantial difference. Likewise, university graduates are unlikely to be offered a job with no autonomy at all.

The estimated individual coefficients are generally highly statistically significant. This shows that there is substantial individual heterogeneity in the data, which justifies

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[17] Note that the performance-based wage component in our experiment is 10% of the wage, which corresponds with the experimental variation in salary levels. It is therefore hard to argue that the performance-based wage variation is too small. Perhaps individuals are generally confident that they will meet performance targets, or they do not mind wage fluctuations because they expect to be capable of income smoothing.

estimating a mixed rank-ordered logit model over the standard rank-ordered logit model.

However, we cannot interpret those coefficients as accurate measures of preference

heterogeneity, for several reasons. The values are estimated to fit the assumed normal

distribution and are based on only five choice situations per individual. Moreover,

individual coefficients also reflect other sources of individual heterogeneity than

preference heterogeneity.[18]

The value of job attributes can be expressed in monetary terms by comparing the

estimated coefficients with the estimated effects of a €200 wage increase. The third

column in Table 4 provides an overview of the implied monetary value of each job

attribute, while Figure 2 provides a graphical illustration. Since the effect of salary on job

attractiveness is non-linear (the coefficient of a raise from €1,800 to €2,200 is less than

twice as large as the coefficient of a raise from €1,800 to €2,000), we compare the

coefficients of all attributes to the *average* effect of a €200 wage increase rather than the

marginal effect at the baseline of €1800.[19] The estimated value of a mission on innovation

or CSR is roughly worth the equivalent of a €170 and €220 monthly net salary raise,

respectively. Work in multidisciplinary teams (rather than individual work) and full job

autonomy and are even worth the equivalent of €300 and €400 monthly net salary raise,

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[18] Mixed logit models with full correlation between individual preference parameters pick up all sources of heterogeneity that are present in the data. They do not only reflect individual heterogeneity in preferences; they also pick up scale heterogeneity, which is defined as "variation across individual decision-makers in the impact of factors that are not included in the model, relative to the impact of factors that are included." (Hess and Train, 2017). This makes it difficult to interpret them. For instance, individual preference parameters have larger variance for individuals who display more random choice behavior.

[19] We divide the estimated coefficient of each job attribute by the average value of a €200 wage increase and then multiply by €200. More specifically, we divide all coefficients by $1/2 \left(\beta_{€2000} + 1/2\, \beta_{€2200} \right)$, where $\beta_{€2200}$ is the increase in attractiveness of a job that pays €2,200 relative to a job that pays €1800. This explains why the value of €2,000 net per month instead of €1,800 is not equal to €200, since we relate all attributes to the average value of a €200 wage increase and respondents exhibit decreasing marginal returns to salary.

respectively. Individuals also demand more than €300 compensation for regularly working overtime.

We should, however, be careful interpreting these numbers. First, in case there is heterogeneity in preferences, observed wage differentials will be much smaller due to self-selection. For example, organizations will not compensate workers with €300 higher salary for working overtime frequently as long as there are sufficient workers who do not mind working overtime so much and are therefore satisfied with a lower compensation. Second, since in practice not all job characteristics are easily observable for potential applicants, observable characteristics may signal the presence of unobservable characteristics. The valuation of company mission is therefore not clear when it is also perceived to signal high workload or high job autonomy. Third, applicants may view organizations' prosocial mission statements with skepticism when they are not backed up by their products and policies. Similar credibility issues may arise in communications regarding work load and job autonomy. With these caveats in mind, we can conclude that, *ceteris paribus,* workers are on average willing to accept a €170 to €220 lower wage when the organization has a prosocial mission.

We also conducted a short follow-up survey among respondents from Eindhoven University of Technology three years after the initial survey (N=108). This gives us an impression whether the job characteristics included in our hypothetical choice experiment relate to job satisfaction. We describe the survey and analysis in the appendix. We should be careful not to overinterpret the findings given that the evidence is correlational and based on a small number of observations, but the overall pattern is consistent with the findings from the hypothetical choice experiment. Workers who report that their organization emphasizes innovation report higher job satisfaction. Likewise, we find that

job autonomy, job security and monodisciplinary teamwork are positively related to job satisfaction.

5.2. Heterogeneity in preferences by personality traits and economic preferences

The next step in the analysis is to examine heterogeneity in job preferences by personality. We therefore extend the mixed rank-ordered logit model with interactions between the job attributes and personality characteristics. In terms of our econometric framework, γ is no longer restricted to be zero. As before, coefficients of all job attributes except for wage are allowed to vary over individuals. We also include interaction terms to control for university (Eindhoven or Delft) and nationality.[20] Table 5 reports the estimation results. Columns 1 and 2 show the mean estimated coefficients and their standard deviations for the reference category, which is a male Dutch student from the Delft University of Technology. Columns 3-9 report the interaction effects of the job attributes with the personality traits. We will discuss the interaction effects in what follows.

A. Mission of the company

We find that women have a stronger preference for working in a non-profit or a for-profit with a prosocial mission than men. These effects are statistically significant at the one percent level after controlling for personality characteristics. Gender differences in mission preferences therefore do not seem to be driven by gender differences in

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[20] For ease of presentation we do not report the coefficients of the other variables included in the model, i.e. order effects and job attributes interacted with university and nationality.

competitiveness or altruism.[21] The effect is sizeable. For instance, men have 1.74 times higher odds to prefer a for-profit with a focus on innovation over a profit oriented company, whereas women have 2.34 times higher odds. Organizations with a prosocial mission are also more likely to attract individuals with prosocial attitudes: individuals who are less competitive and individuals who are more altruistic. One standard deviation increase in competitiveness reduces the odds that a for-profit with a focus on innovation is preferred over a profit-oriented company from 1.74 to 1.54. The effect of competitiveness on preferences for mission on CSR is in the same order of magnitude. We do not observe differences in mission preferences by indicators of ability, i.e. grades and self-efficacy.

B. *Job design*

Various job attributes that fall into the category job design also induce self-selection of job applicants. Teamwork is particularly valued by individuals who have high trust in others. This is consistent with the economic intuition that individuals who have high trust in others are less concerned about free-rider behavior of team members. We do not find a relation with ability or self-efficacy, suggesting that highly able individuals are not concerned about team members free-riding on their talent. Also, one might expect that competitive attitudes come at the cost of cooperation, but we do not find that competitive individuals shy away from teamwork.

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[21] We cannot rule out that gender differences in competitiveness or altruism drive gender differences in mission preferences. Both attitudes are hard to measure precisely, while gender is measured without error. However, such an interpretation is unlikely. Gender differences in competitiveness and altruism are modest in this sample (see correlations in Table 3), potentially due to sorting into science and engineering studies based on preferences and attitudes. Rather, gender differences in preferences for company mission might be driven by gender differences in values, ethical principles, beliefs on gender role attitudes and behaviors, and other preferences.

Selection effects of autonomy are less clear. We do not find a relation with self-efficacy, and only a weak relation with academic achievement. Specifically, we find a significant interaction between individuals' grade point average and the intermediate level of autonomy, but not the highest level of autonomy. The desire for job autonomy therefore seems independent of perceived ability.[22] Job autonomy seems to be particularly valued by women. This might be related to the finding that women care more about the 'meaning' of their job to society at large, so it is natural that they also want to contribute significantly to reaching that objective.

High workload induces a selection effect that is hard to interpret. Risk tolerant individuals seem to have less problems with working overtime, and this effect is statistically significant at the 1% level. Together with the finding that risk tolerant individuals also have a higher valuation of salary, a possible interpretation is that risk tolerant individuals have a higher reference point in mind, i.e. they are striving to obtain a certain income level or social status. To reach this reference point, they are relatively willing to exert effort, more sensitive to salary, and more inclined to take risks (see Dohmen et al., 2021, for experimental evidence on such a mechanism). However, in the absence of information on individuals' reference point or ambition we should be careful not to overinterpret this finding.

C. Contractible aspects

A straightforward way to increase the attractiveness of a job is to offer a competitive salary. Our results confirm this standard economic prediction. However, higher salaries

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[22] This is not because grades and self-efficacy are highly correlated: we obtain the same results when we estimate models that include one of the two characteristics.

may also change the composition of the pool of applicants. The results reported in Table 5 suggest that competitive and selfish individuals particularly value high salaries, which is consistent with previous findings of Reuben et al. (2015, 2017) and Kamas and Preston (2018). These effects are statistically significant at the one percent level. We also find that paying high salaries is not an efficient way to attract high-achieving students. If anything, high-achieving students have a lower valuation of salary than low-performing students. Finally, as discussed above risk tolerant individuals seem to have a higher valuation of salary.

As discussed above and shown in Table 4, pay for performance does not seem to affect average job attractiveness. It is therefore interesting to examine whether individuals with high perceived ability or risk tolerance have a higher valuation of pay for performance than individuals with low perceived ability or risk tolerance. We do not find evidence for this: the valuation of pay for performance does not differ by grades, self-efficacy, or risk attitude. We also find no relation with competitiveness. The estimation results suggest a gender difference: women appear to shy away from individual pay for performance, but not from team-based pay for performance.

Finally, offering job security affects the composition of the pool of applicants. In line with economic theory, risk tolerant individuals care less about obtaining a permanent contract.

6. Concluding Remarks

This paper provides evidence that high-tech companies with a mission focusing on innovation or CSR have a competitive advantage on the labor market for entry-level

jobs. Keeping all other job attributes constant, we estimate that workers at the start of their career are on average willing to give up between €170 and €220 net per month. The magnitude of this wage effect is large but in line with findings of Kesternich et al. (2020) on jobs with high versus low meaning, Burbano (2016) on the information workers receive on social activities of a firm, Montgomery and Ramus (2011) on socially responsible companies, and Maestas et al. (2018) on the opportunities jobs create to make a positive impact on the community or society.

We also observe systematic heterogeneity in the valuation of attributes that may induce important selection effects in labor markets: companies that focus on innovation or CSR and sustainability are considered particularly more attractive by women and individuals who are relatively altruistic and less competitive. This insight is important for organizations for two reasons. First, since gender diversity is a common concern in the male-dominated field of engineering, it is important to know that a prosocial focus of the company can contribute to gender diversity in the workplace. Second, companies may benefit from attracting altruistic and less-competitive workers, since workers with those attitudes arguably cooperate more effectively, and in particular when they feel motivated by the mission of the company.

Besides mission of the company, we identify a number of other job attributes that workers at the start of their career care about. Those attributes include traditional economic aspects such as salary, workload, and job security as well as important elements of job design such as autonomy and teamwork.

We also find a number of other interesting sorting patterns. Job autonomy is particularly valued by women. Teamwork is highly valued by individuals who have high trust in others. Salary is considered especially important by competitive and selfish

individuals. Finally, the job security of a permanent contract attracts risk averse individuals.

It should be noted that graduates might interpret the firm and job attributes included in our study as cues for a larger set of related characteristics, and that these cues might be related to respondents' personality. However, also in practice recruiters decide what aspects to emphasize in their recruiting efforts to signal these broader cues. Recruiters may for example emphasize the company's focus on innovation not because potential applicants value this attribute per se, but also because graduates associate this mission with several other desirable job aspects related to the corporate culture that enable a company to be innovative.

Organizations can also attract the types that they believe best fit their organization by strategically combining job attributes. For example, an organization with a strong focus on CSR and sustainability that is looking for a workforce with a competitive attitude can pay high salaries to attract those types. Clearly, not all job attributes can easily be changed (e.g. occupation, absence of profit motive), but many aspects can be changed or emphasized in job advertisements and recruitment procedures more broadly. Also, organizations can often improve on the marketing of CSR initiatives to their employees (Bhattacharya et al., 2008).

We consider our research as a first step to learn about the valuation and sorting effects of immaterial job attributes, and mission in particular. Future research could investigate in more detail why workers, particularly women and altruistic individuals, value a prosocial focus of the company. For instance, they may care about the contribution of their work to society, but they may also believe that organizations with a prosocial mission have better chances to survive in the long run. Alternatively, they may perceive

an organization's prosocial mission as a signal that the organization also cares for its employees, or, in line with the findings of our study, that the work atmosphere is better because the workforce is more prosocial. Furthermore, our discrete choice experiment is specifically designed for engineers at the start of their career, and therefore particularly relevant for firms in the high-tech sector. Future research could explore whether our findings generalize to other sectors, to workers at other career stages, or workers with lower levels of education. For instance, it is conceivable that older workers attach a higher value to a permanent contract than graduates in science and engineering at the start of their career, who typically do not have family obligations yet and have very good labor market prospects. Experienced workers may also express weaker preferences for teamwork to the extent that teamwork is valued for informal learning opportunities (De Grip et al., 2016). Another interesting question is to what extent organizations are aware of the sorting mechanisms described in this paper. Do they attract the people they would like to attract? It would also be interesting to learn how attracting different worker types translates into profitability. Those questions are left for further research.

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Figures and Tables

Figure 1. Screenshot of decision screen in the discrete choice experiment

	Job A	Job B	Job C
Salary	1800 euro net per month	2000 euro net per month	1800 euro net per month
Work environment	Work is conducted in teams where people have the same expertise	Work is conducted on one's own	Work is conducted in teams where people have the same expertise
Workload	Workload can usually be accomplished in regular working time	Workload can usually be accomplished in regular working time	High workload requires frequently working unpaid overtime
Control over work	You have no influence on what you do and how you do it	You have no influence on what you do and how you do it	You decide on what you do and how you do it
Composition salary	Fixed Salary	10% higher or lower wage per month depending on individual performance	Fixed Salary
Focus of company	For profit organization with a strong focus on innovation	Non-profit organization	Non-profit organization
Occupation	Research and development	Research and development	Management
Job security	Permanent contract	Permanent contract	2 year temporary contract with 80% chance on permanent contract

Please indicate your ranking by inserting the numbers 1 to 3 in the respective boxes at the bottom of each screen, where 1 means most preferred and 3 means least preferred.

Job A ☐   Job B ☐   Job C ☐

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Figure 2. Estimated implied monetary value of job attributes
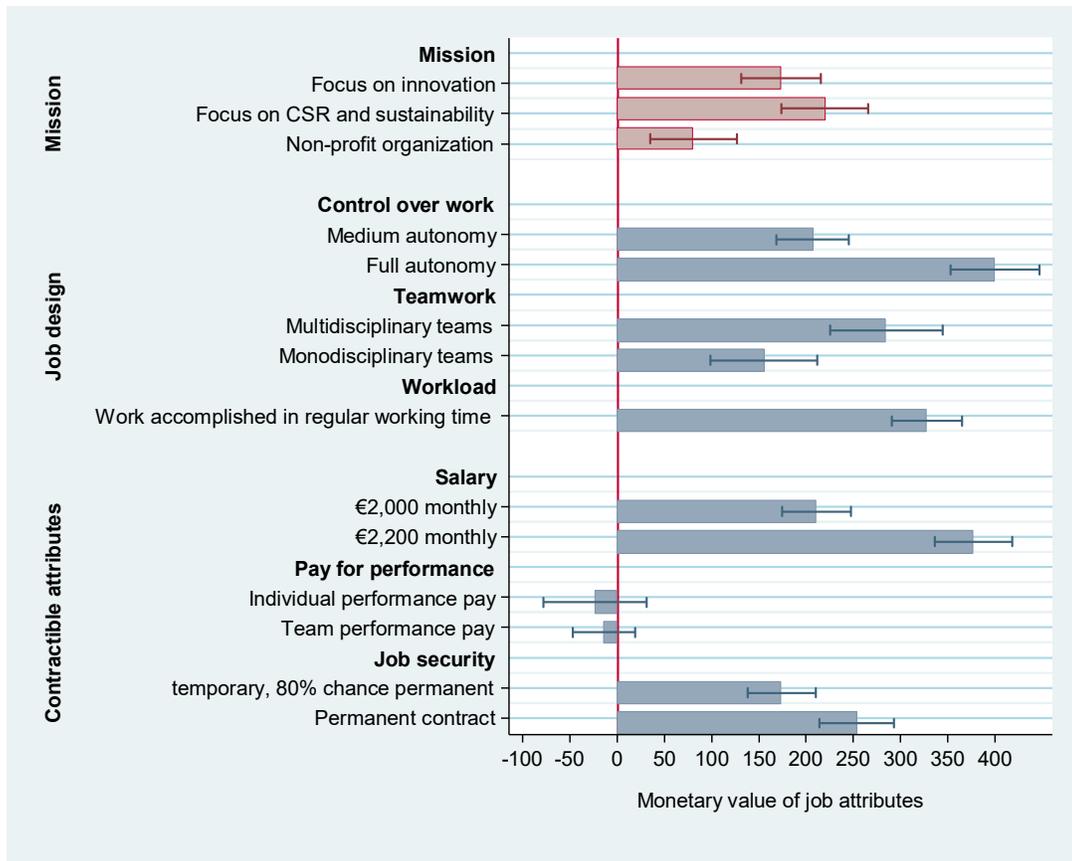
Table 1. Overview of job attributes and their values in the discrete choice experiment

Attributes	Values
Mission	
Focus of the company	• For profit organization that is strongly profit orientated • For profit organization with a strong focus on innovation • For profit organization with a strong focus on corporate social responsibility and sustainability • Non-profit organization
Job design	
Autonomy: control over own work	• You have no influence on what you do and how you do it. • You have no influence on what you do, but you decide on how you do it. • You decide on what you do and how you do it.
Teamwork	• Work is conducted on one's own, • Work is conducted in multidisciplinary teams, • Work is conducted in teams where people have the same expertise.
Workload	• High workload requires frequently working unpaid overtime. • Workload can usually be accomplished in regular working time.
Contractible attributes	
Salary	• €1800 netto per month • €2000 netto per month • €2200 netto per month
Pay for performance	• Fixed salary • 10% higher or lower wage per month depending on individual performance • 10% higher of lower wage per month depending on team performance.
Job security	• 2 year temporary contract with 20% chance on permanent contract • 2 year temporary contract with 80% chance on permanent contract • Permanent contract
Occupation	• Research and development, • Management, • Sales

Table 2. Descriptive statistics by university

	Eindhoven	Delft	Total	P-value
Age	25.42***	24.99	25.16	0.01
Second-year MSc (%)	63%	71%***	68%	0.002
Gender (% woman)	27%	36%***	67%	0.000
Nationality: Dutch	64%	61%	62%	0.22
Grade (1-10)	7.47	7.57**	7.53	0.019
Self-Efficacy	3.91	3.95	3.94	0.14
Risk tolerance	6.36	6.30	6.32	0.56
Competitiveness	3.16	3.11	3.13	0.34
Trust	3.28	3.28	3.28	1.00
Altruism	-0.13	0.08***	-0.01	0.00
N	595	903	1498	

Stars indicate significance of differences between Delft and Eindhoven: ** p<0.05, ***P<0.01. P-values are based on two-sided tests with unequal variances.

Table 3. Correlations between personal characteristics, personality traits and preferences

	Age	MSc year	Univers.	National.	Gender	Grade	Self Eff.	Risk tol.	Comp.	Trust	Altruism
Age	1.00										
MSc year (2nd)	0.17	1.00									
University (Delft)	-0.07	0.08	1.00								
Nationality (Dutch)	-0.12	0.15	-0.03	1.00							
Gender (woman)	-0.07	-0.03	0.09	-0.01	1.00						
Grade	-0.06	0.07	0.06	0.00	-0.01	1.00					
Self Efficacy	0.00	0.05	0.04	-0.03	-0.05	0.18	1.00				
Risk tolerance	0.12	-0.04	-0.02	-0.15	-0.02	0.06	0.26	1.00			
Competitiveness	-0.08	0.03	-0.02	0.07	-0.13	0.10	0.28	0.22	1.00		
Trust	-0.03	0.06	0.00	0.31	0.06	-0.01	0.01	0.02	-0.04	1.00	
Altruism	0.07	-0.07	0.09	-0.28	0.06	-0.03	0.00	0.18	-0.13	0.04	1.00

The interpretation of the highest value of binary variables is indicated between ().

Table 4. Effect of job attributes on job attractiveness: estimation results

Method: Mixed rank-ordered logit

Dependent variable: job rank	Mean coefficients (1)	SD random coefficients (2)	Monetary value (3)
Mission			
For-profit, profit oriented		Reference category	
For-profit focus on innovation	0.408***	0.576***	€ 173.34
	(0.051)	(0.103)	
For-profit focus on CSR	0.518***	0.943***	€ 220.07
	(0.055)	(0.099)	
Non-profit	0.191***	0.950***	€ 81.15
	(0.055)	(0.092)	
Job design			
Control over work			
No autonomy		Reference category	
Decide how to do, not what to do	0.487***	0.744***	€ 206.90
	(0.046)	(0.091)	
Decide how to do and what to do	0.941***	1.095***	€ 399.79
	(0.056)	(0.079)	
Teamwork			
Work conducted on one's own		Reference category	
Multidisciplinary teams	0.671***	1.22***	€ 285.08
	(0.072)	(0.113)	
Monodisciplinary teams	0.366***	0.960***	€ 155.50
	(0.068)	(0.127)	
Workload			
High workload requires frequent working overtime		Reference category	
No regular overtime required	0.772***	0.847***	€ 327.99
	(0.045)	(0.053)	
Contractible attributes			
Salary			
1800 net per month		Reference category	
2000 net per month	0.497***		€ 211.15
	(0.044)		
2200 net per month	0.889***		€ 377.70
	(0.049)		
Pay for performance			
Fixed pay		Reference category	
Individual pay for performance	-0.055	0.895***	-€ 23.37
	(0.065)	(0.160)	
Team pay for performance	-0.033	0.093	-€ 14.02
	(0.039)	(0.134)	
Job security			
20% chance on permanent contract		Reference category	
80% chance on permanent contract	0.410***	0.511***	€ 174.19
	(0.043)	(0.096)	
permanent contract	0.597***	0.813***	€ 253.64
	(0.048)	(0.085)	
Observations		37450	
Individuals		1498	
Log-Likelihood		-11781.18	

Mixed rank-ordered logit model of job rank as a function of job attributes. Order effects and occupation are included, but not reported. Job rank is inverted so that higher values indicate a more attractive job. Stars indicate significance: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Standard errors are clustered at the individual level and reported in parentheses. Column 1 reports the estimated mean coefficients and column 2 the standard deviation of the individual random coefficients. Column 3 reports implied estimates of willingness to pay.

Table 5. Effect of job attributes and their interaction with individual characteristics on job attractiveness: estimation results

Method: mixed rank-ordered logit Dependent variable: job rank	Average effects (1)	SD (2)	#Gender (female) (3)	#Grade (4)	#Self-Efficacy (5)	#Risk Tolerance (6)	#Competi-tiveness (7)	#Trust (8)	#Altruism (9)
Mission									
For-profit, profit oriented					Reference category				
For-profit focus on innovation	0.555***	0.697***	0.296***	0.036	0.021	0.068	-0.125**	-0.068	0.152***
	(0.089)	(0.107)	(0.115)	(0.056)	(0.054)	(0.054)	(0.056)	(0.053)	(0.053)
For-profit focus on CSR	0.569***	0.907***	0.447***	0.041	0.061	-0.016	-0.135**	-0.022	0.195***
	(0.096)	(0.127)	(0.124)	(0.060)	(0.060)	(0.060)	(0.059)	(0.055)	(0.057)
Non-profit	0.295***	1.002***	0.364***	0.073	-0.016	-0.001	-0.259***	-0.048	0.140**
	(0.097)	(0.129)	(0.120)	(0.059)	(0.059)	(0.060)	(0.062)	(0.064)	(0.061)
Job design									
Control over work									
No autonomy					Reference category				
Decide how to do, not what to do	0.650***	0.640***	0.178*	0.112***	0.035	0.023	0.059	0.017	0.008
	(0.076)	(0.089)	(0.105)	(0.042)	(0.050)	(0.049)	(0.047)	(0.049)	(0.043)
Decide how to do and what to do	1.133***	0.986***	0.386***	0.071	0.078	0.030	0.107**	0.082	0.012
	(0.090)	(0.084)	(0.118)	(0.049)	(0.056)	(0.059)	(0.051)	(0.058)	(0.053)
Teamwork									
Work conducted on one's own					Reference category				
Multidisciplinary teams	1.161***	1.042***	-0.149	-0.013	0.061	0.099	0.047	0.152**	-0.032
	(0.119)	(0.115)	(0.140)	(0.073)	(0.073)	(0.075)	(0.070)	(0.071)	(0.081)
Monodisciplinary teams	0.789***	0.828***	-0.251*	0.027	-0.060	0.048	-0.050	0.126*	-0.059
	(0.116)	(0.101)	(0.140)	(0.066)	(0.067)	(0.070)	(0.065)	(0.071)	(0.078)
Workload									
Frequent overtime required					Reference category				
No regular overtime required	0.958***	0.778***	0.132	-0.003	-0.065	-0.136***	-0.041	0.019	0.001
	(0.072)	(0.063)	(0.083)	(0.037)	(0.044)	(0.043)	(0.043)	(0.040)	(0.040)
Contractible attributes									
Salary									
1800 net per month					Reference category				
2000 net per month	0.713***		-0.011	-0.047	0.017	0.011	0.078*	-0.034	-0.068
	(0.077)		(0.095)	(0.044)	(0.043)	(0.048)	(0.045)	(0.047)	(0.045)
2200 net per month	1.253***		-0.001	-0.082*	0.071	0.108**	0.140***	-0.031	-0.163***
	(0.085)		(0.101)	(0.049)	(0.050)	(0.050)	(0.051)	(0.052)	(0.051)

Table 5. *Continued*

Pay for performance

Fixed pay					Reference category				
Individual pay for performance	0.089	0.616***	-0.361**	0.026	0.029	0.086	0.059	-0.004	0.041
	(0.114)	(0.207)	(0.141)	(0.069)	(0.071)	(0.072)	(0.072)	(0.069)	(0.075)
Team pay for performance	-0.040	0.242	-0.116	-0.047	0.046	0.042	0.011	-0.040	0.021
	(0.070)	(0.153)	(0.088)	(0.037)	(0.044)	(0.044)	(0.043)	(0.041)	(0.044)

Job security

20% chance on permanent contract					Reference category				
80% chance on permanent contract	0.555***	0.383***	0.053	-0.045	-0.077*	-0.078	0.043	0.036	0.020
	(0.075)	(0.136)	(0.097)	(0.056)	(0.043)	(0.049)	(0.045)	(0.046)	(0.051)
permanent contract	0.693***	0.766***	0.085	0.010	0.017	-0.178***	0.062	-0.005	0.002
	(0.080)	(0.087)	(0.103)	(0.046)	(0.048)	(0.051)	(0.048)	(0.051)	(0.051)

Observations	35725
Individuals	1429

Mixed rank-ordered logit model of job rank on job attributes, interacted with all individual characteristics reported in columns (3)-(9) as well as university and nationality (not reported). Occupation and order effects are included, but not reported. Individual characteristics are standardized. Rank is inverted so that higher values indicate a more attractive job. Columns (1) and (2) report average effects of the job attributes and standard deviation of individual coefficients, respectively. Columns (3)-(9) report the interactions between job attributes and the respective individual characteristics. Stars indicate significance: ***p<0.01, **p<0.05, *p<0.1. Standard errors are clustered at the individual level and reported in parentheses.

Appendix: Follow-up questionnaire

To test whether the preferences of the respondents in our stated-choice experiment are reflected in their job satisfaction when they are employed, we have sent a short follow-up questionnaire to the graduates of the Eindhoven University of Technology who gave us permission to do so. We conducted this survey in October 2018, i.e., more than three years after the initial survey. Of the 374 individuals contacted, 118 completed the survey (32% response rate). Of these graduates, 7 were not employed and 3 did not complete all survey questions, leaving us with 108 complete responses. Apart from gender and nationality, we do not observe statistically significant differences in personal characteristics between individuals who participated in the initial sample, but did not participate in the follow-up survey. The respondents to the follow-up survey seem more representative for the whole student population of Eindhoven University of Technology than our initial survey sample. In our follow-up survey, 19% of respondents is female, compared to 20% in the student population and 27% of initial survey participants. Our follow-up survey consists of 71% Dutch nationals, which is more than in the initial survey (64%) but still an underrepresentation compared to the student population (82% Dutch).

We asked respondents to describe their current job with regard to the same job attributes we included in the hypothetical choice experiment. Table A1 provides an overview of the questions we asked to describe the current job, as well as the response frequencies. Most questions force respondents to make a choice between two or three answer categories. An exception is mission of the company. Respondents rate the importance of profit, innovation, and CSR on a 11-point Likert scale, respectively. To give an impression of the distribution, we reclassify their answers into three different

categories: Not important (0-5), Important (6-8), Very Important (9-10). A focus on innovation is rated highest. With regard to the other questions, we observe quite some variation in the answers. This confirms that the range of values in the discrete choice experiment is generally relevant for graduates' job choice.

We regress these characteristics on job satisfaction as measured on a 11-point Likert-scale (average score 7.58, standard deviation 1.55). We transform the ratings of the importance of profit, innovation and CSR mission of the company as follows. We calculate the importance ratings of innovation and CSR relative to the importance rating of profit, then take the log of this ratio and standardize. The estimation results are reported in Table A2. In the first column, we control for gender and nationality. In the second column, we add potentially endogenous controls such as tenure, whether the workplace is located in the Netherlands, and occupation. Interestingly, we find that respondents who report working in an organization with a strong emphasis on innovation relative to profit are more satisfied with their job. This finding is in line with the findings from our discrete choice experiment. However, we do not find that those who work in organizations emphasizing CSR are more satisfied with their job.

Consistent with our hypothetical choice experiment, graduates who report having more autonomy also report significantly higher job satisfaction. As expected, teamwork is also associated with higher job satisfaction, although this effect is only statistically significant when teams are monodisciplinary. Workload is negatively associated with job satisfaction, but this effect is not statistically significant. Finally, a permanent contract is reflected in higher job satisfaction, while performance pay has no statistically significant effect.

It would be interesting to analyze whether there is a relation between individuals' preferences expressed in the experiment and attributes of their current job. Unfortunately, the sample size (N=108) is too limited for such an analysis. Moreover, since job characteristics are self-reported, individuals with stronger preferences are likely to be more critical in their evaluation, biasing results towards zero. Given the small number of observations and lack of exogenous variation, we should be careful not to overinterpret the findings above. Nevertheless, they provide some evidence that workers care about the job attributes that show up as important in the hypothetical discrete choice experiment.

Table A1. Follow-up survey: descriptive statistics on respondents' current job

How would you describe your organization: profit or non-profit?	N	Percent
Non-Profit	35	32%
Profit	73	68%
How important is profit in the culture of your company?		
Not important	43	40%
Important	37	34%
Very important	28	26%
How important is innovation in the culture of your company?		
Not important	15	14%
Important	46	43%
Very important	47	44%
How important is CSR in the culture of your company?		
Not important	28	26%
Important	58	54%
Very important	22	20%
How much autonomy do you have in your job?		
No influence at all	2	2%
No influence on what you do, only on how to do it	40	37%
Influence on what you do and how you do it	66	61%
How is work typically conducted?		
Conducted on your own	35	32%
Teams where people have the same expertise	23	21%
Work is conducted in multidisciplinary teams	50	46%
How would you describe your workload?		
Moderate workload	74	69%
High workload, requires frequent overtime	34	31%
Does your salary include performance-related components?		
No	77	71%
Yes	31	29%
What describes your employment prospects best?		
No prospect on permanent contract	22	20%
Good prospect on permanent contract	21	19%
Permanent contract	65	60%

Table A2. Follow-up survey: current job characteristics and job satisfaction

Method: OLS	Job satisfaction (1)	Job satisfaction (2)
Mission		
Mission: importance innovation relative to profit	1.002***	0.861**
	(0.323)	(0.343)
Mission: importance CSR relative to profit	-0.125	-0.123
	(0.287)	(0.296)
Autonomy		
No or little autonomy	Reference category	
Full autonomy	0.599**	0.577*
	(0.301)	(0.307)
Teamwork		
Mostly individual	Reference category	
Teamwork: monodisciplinary	0.973***	0.964***
	(0.364)	(0.352)
Teamwork: multidisciplinary	0.492	0.496
	(0.299)	(0.305)
Workload		
Moderate workload	Reference category	
High workload, frequent overtime	-0.470	-0.453
	(0.316)	(0.335)
Performance-related pay		
no	Reference category	
yes	0.361	0.231
	(0.253)	(0.263)
Job security		
No prospect on permanent contract	Reference category	
good prospect on permanent contract	1.010**	1.061**
	(0.480)	(0.433)
Permanent contract	1.494***	1.609***
	(0.478)	(0.459)
Gender		
Male	Reference category	
Female	-0.090	-0.169
	(0.420)	(0.468)
Nationality		
Non-Dutch	Reference category	
Dutch	0.275	0.296
	(0.297)	(0.368)
Controls: tenure, workplace in Netherlands, occupation	No	Yes
Observations	108	108
R-squared	0.37	0.41

Stars indicate significance: ***p<0.01, **p<0.05, *p<0.1. Robust standard errors in parentheses. The importance of innovation relative to profit is defined as the log of the ratio of the importance of innovation over the importance of profit, both rated on a 11-point Likert scale. The importance of CSR relative to profit is defined similarly. These two variables are standardized for ease of interpretation.