Green jobs, intertemporal preferences, and social pressure: an experiment for a green transition of the labour market

Green Jobs, Intertemporal Preferences, and Social Pressure: An Experiment for a Green Transition of the Labour Market*

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Abstract

While the industry is witnessing a progressive ecological transition, it is still unclear how greener sectors can expand in the market without an adequate labour supply. We carry out an experiment (*n*=500) to investigate what incentives are most effective in encouraging people to apply for green jobs. To do so, we elicit ranked preferences towards green and brown jobs with different intertemporal payoffs. In the treatment group, subjects experience a mild level of social pressure in favour of a green transition. Findings from a probabilistic model show that, when treated, subjects are 24.4 percentage points more likely to favour green job opportunities, especially those granting increasing wage profiles. Differences in treatment are particularly evident for women, individuals with large circles of friends, introverts, and questioners of the green economy. As the job market transitions toward greener opportunities, our work contributes to understanding how peer pressure strategies can encourage applications for green jobs.

Keywords: Experimental Economics, Green Economy, Green Jobs, Intertemporal Preferences, Social Expectations.

JEL: C9, J22, Q50.

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1 Introduction

As illustrated by Loiseau et al. (2016), the definition of green economy is vast and inclusive of many concepts and objectives. These range between 'cleaner production, waste hierarchy, bio-economy, industrial ecology, circular economy, nature-based solutions, and dematerialization through product-servicing, and tools like life cycle assessment, and cost-benefit analysis'. Most scholars agree that to fully succeed in the green transition, government intervention is essential, especially to include a change in societal lifestyles (Droste et al., 2016).

According to recent statistics, gross value added and employment from market production in the EU environmental economy, respectively, grew by 4.2% and 3.9% in 2018. In parallel, in the US, about 32% of corporations are observed to have made investments to address climate change. While regulation and financial incentives are still uncertain in the green sector domain, more and more firms are committing to sustainable solutions. In the current era, the industry is in the process of transitioning towards greener sectors via restructuring, innovation, and investment in skills (Steen and Njos, 2018; Pavlova, 2018; Ansah and Sorooshian, 2019; Capasso et al., 2019).

To produce and thrive in the market (Stilvel and Primrose, 2010), firms need a sufficient level of labour supply and committed workers. The slow or absent supply of green jobs is justified by the delay that exists between the adoption of new techno-economic paradigms in the economy and the corresponding change in lifestyles (Perez, 2020)—including choosing a specific job. While the setups for a digital and green economy are mostly present, applying for a green job is difficult per se. First, the societal and cultural framework has not yet normalized applications for green jobs. Second, they often require higher levels of formal education in green and sustainability positions or, when they do not, their screening mechanisms appear to favour those with a background in 'green' competencies. Third, human resources are not yet trained to review 'green' applications. An agreed definition of green jobs is still lacking in the literature, as well as little is known about the effects of investments or green growth and jobs on labor market outcomes (Deschenes, 2013). As illustrated by Vona et al. (2018), green employment may consider 'an ample spectrum of actions devoted to environmental sustainability', which require both engineering skills for designing and producing technology and managerial skills for implementing and monitoring environmental organizational practices. In the

current stage, the new techno-economic 'green' paradigm is being progressively absorbed and the transformation is not complete – the global value of the green economy opportunity should be around 10.3 trillion dollars, but by 2050 (Oxford Economics, 2023). This means that applying for a green job, or offering one, is not yet the norm.

Compared to the European Union —which, among others, recently introduced the European Green Deal, a Circular Economy Action Plan, a Zero Pollution Action Plan, and the Farm to Fork Strategy— government policies in favor of a green transition are not significantly developed in the US. A series of Federal policies, however, address the need to create incentives for a green economy and, consequently, a green workforce. An investment tax credit measure is present for solar energy adoption, indirectly supporting job creation in the solar industry. A per-kilowatt-hour tax credit for electricity derived from wind energy is also active, meaning jobs could progressively grow for wind energy production and maintenance. The Clean Energy Manufacturing Initiative (CEMI), on theother hand, supports the creation of clean energy manufacturing through various grants. Finally,the Weatherization Assistance Program (WAP) carries out improvements for energy efficiency in low-income households, giving origin to jobs to decarbonize buildings.

Though institutions are in the process of creating the right conditions for an expansion of green jobs that also benefits workers in addition to firms (Grolleau et al., 2012), moral hypocrisy still affects green choices (Gamma et al., 2020). Moral hypocrisy means subjects may appear or want to appear moral but are not actually moral. In our case, most of the population cares deeply aboutthe environment and the green economy in theory. However, this does not necessarily correspond to actions useful to achieve a social paradigm of green growth. Individuals may be aware of the economic, societal, monetary, and environmental benefits of green jobs but fail to take action in this direction by applying for them. In our experiment, we gather ranked preferences for jobs in the green and brown economy, defined as firms employed respectively in low-carbon and carbon-intensive sectors. In addition, each job opportunity offers distinct intertemporal benefits among decreasing, increasing, and constant wage profiles. The resulting scenario displays six distinct job opportunities which individuals must rank.

Intertemporal incentives matter significantly for employment preferences. In the simplest trade-off scenario, workers express preferences for higher salaries in the far future (Loewenstein and

Nachum Sicherman, 1991). Changes in taxation also affect intertemporal labour supply for both women (Haan, 2010) and men (Haan and Uhlendorff, 2013). Intertemporal decisions also emerge due to marriage (Mazzocco et al., 2014), weather and flexibility of work (Krueger and Neugart, 2018), retirement preferences (Rogerson and Wallenius, 2016), human capital accumulation (Walle- nius, 2011), and consumption insurance (Wu and Krueger, 2021). In other words, when making a decision, rational individuals are likely to value the consequences occurring in different time periods. Regarding the role of ecological transition, the future wage for polluting and green are projected to have opposite patterns, especially regarding low-skilled jobs (Chateau et al., 2018).

Our design does not focus exclusively on the interaction between greenness and intertemporal wage profiles but also accounts for the potential effect of social pressure in shaping choices on greenjobs. This is why, within the treatment group, participants encounter a subtle degree of social influence advocating for a shift towards green initiatives. Indeed, a large number of studies argue that social incentives are often stronger than monetary ones in shaping behaviour. According to Sanfey et al. (2014), individuals' motivations to make a certain decision are always belief-dependenton others' expectations. This has also been proven by Cloutier et al. (2011), who illustrated how regions of our brain respond when we violate social expectations. With respect to occupational change, the analyses by Patuelli et al. (2020) and Falck et al. (2012) highlight how family and peer pressure shape entrepreneurial identity. Job pressure is also significantly shaped by the work- family interface (Narisada, 2020). Similarly, negative expectations from peers influence unemployed subjects' decision to partake or not in a training programme to increase job opportunities (Focacci and Lam, 2020). In general, non-standard institutions, such as social ones, may affect individual behaviour (Heckman, 2000), especially when social isolation is at stake (Cacioppo and Hawkley, 2009).

While the extant literature is rich in studies that tackle the nature and incentive-based mechanisms that lead firms to restructure for greener sectors, research is scarce with respect to behavioural investigations related to the labour force that could make such transformation possible. We aim to fill this gap by understanding what incentives drive people to opt for greener jobs. Particularly,we investigate whether, when applying for a job, potential job candidates are motivated to a larger extent by social pressure and expectations, or rather by intertemporal preferences, where incentives

vary short and long term. Our findings are relevant for both policy makers interested in nudging efficient occupational behaviour and firms interested in attracting a committed type of labour force. To do this we use experimental methods on a large segment of the population treated with different information. The chosen approach is the most cost-effective for gathering preliminary evidence in a complex context like the job market, where many overlapping factors exist. This setup is designed to ensure high internal validity by utilizing a survey experiment, while also reaching a relevant sample through well-established preference ranking elicitation methods.

In Section 2, we illustrate the experimental design and the data used for our analysis. Section 3 discusses the findings obtained from the experiment, while Section 4 concludes with some implications.

2 Empirical Strategy & Data

2.1 Experimental Design

To identify what incentives are most effective in nudging people into greener jobs, we carried out an online experiment on Qualtrics using 500 participants residing in the US, aged between 18 and 40. The age range is justified by the design of the experiment, which investigates lifelong job applications (40-years time horizon). Participants were hired through the Prolific platform and paid $8.85 per hour. The sample is well-balanced across treatments according to demographic characteristics (see Table A.2 in Appendix). Individuals are randomly assigned to a treatment. The questionnaire is presented to subjects at the end of the experiment, and several control checks are present.

All participants are initially provided with some relevant information regarding job openings and their features in line with the idea that they have to make a decision relevant to their career. For this purpose, we ask them to carefully look at all career prospects.

Table 1 below features the sector of the company, distinguishing between carbon-intensive and low carbon[2], and the future yearly wage level associated with each decade the subject would work at the company in question. These career wage prospects are shown to participants and presented

[2]The distinction aims to present two contrasting cases: one where the sector consistently contributes to climate change through carbon emissions, and another where the sector maintains overall low emissions. No example is provided to participants to avoid priming on specific sectors over others.

in the table below for convenience. For simplicity, the retirement benefits are the same after forty years of work. Options A, B and C are jobs in a carbon-intensive sector in companies that cause pollution and climate change. Options D, E and F are jobs in a low-carbon sector in companies that drive the ecological transition of the economy. The wage level is different across all options. Options A and D show a decreasing wage over the years. Options B and E show a constant wage over the years. Options C and F show an increasing wage over the years. Subjects are indirectly required to consider a potential trade-off between job type and income.

After answering some comprehension questions relative to the career prospects, participants in the treatment group are exposed to a message conveying social pressure. Particularly, they are exposed to the following text: "In your community, some of the people would not apply for a job in a carbon-intensive company because it damages their health and the planet. Applying for a job in the low-carbon sector helps to promote the green economy, as well as safeguard the planet. In other words, part of your community agrees that opting for a green job is the best solution for society." Subjects in the control group are not treated with any specific information.

All participants are asked to decide what job they would like to apply for. They are asked to rank the above-mentioned job options following the order of job applications they would send out,with 1 and 6, respectively, indicating their favourite and least favourite job options.

The survey ends with a short questionnaire. We ask questions relative to their age, gender, level of education, risk preferences, whether they consider themselves extroverts or introverts, and whether they have a small or large circle of friends. Participants are then asked about their employment status, the sector of employment, and the extent to which the company they currently work atis to be considered environmentally friendly. We also investigate their level of concern for the environmental situation in their community, for large-scale environmental damages, and for climate change in general. About this, we propose a last question where we ask what they think of the economy's green transition. In particular, we ask them whether it can potentially affect the labour market in terms of the creation or destruction of job opportunities.

Option	Sector	1-10	11-20	21-30	31-40	Total
A	Carbon intensive	$22	$20	$18.5	$17	$775
B	Carbon intensive	$19.5	$19.5	$19.5	$19.5	$780
C	Carbon intensive	$17	$18.5	$20	$22	$775
D	Low-carbon	$20	$19	$18.5	$18	$755
E	Low-carbon	$19	$19	$19	$19	$770
F	Low-carbon	$17	$18	$20	$22	$770

Table 1: Career Wage Prospects in thousands $

2.2 Variables & Model

For each respondent, we obtain a ranking of the options from Option A to Option F. This implies that for each respondent we will have 6 scores from 1 to 6 associated with the options from A to F. For instance, respondent 1 will have six choices linked to each one of the options available. Each match from the values 1-6 is uniquely linked with one of the options.

From this variable, we create a dummy variable called 'green preference', which is equal to 1 when one of the green options (D, E and F) is ranked first; and 0 otherwise. We also create a categorical variable 'category', distinguishing individuals into three groups based on their first three employment options. 'All brown" is the category of individuals who put carbon-intensive options in the first three ranks. In 'all green" individuals strictly prefer green options. 'Mixers" are those who put both brown and green options within the first three ranks.

To examine the treatment effect, we employ two models. In the first probabilistic model P, the outcome of interest Y is 'green preference'. In the second multinomial logistic model ML, the outcome of interest Y is 'category'. The models are specified in the following way:

$$E(Y|X) = P(Y = 1|X) = \Phi(\beta_0 + \beta_1 TREAT + \delta^T D + \gamma^T K)$$

In our models, X is a vector of regressors which are: $TREAT$ a dummy indicating whether social pressure is applied or not, D is a series of demographics including age, gender, level of education and employment status; K includes a series of controls, including demographic characteristics, risk preferences, and personality. In particular, we distinguish between people who are risk averse and risk lovers, as well as introverts or extroverts, also considering whether they have a large or small

circle of friends. We also account for attitudes towards the environment and the green economy, as there might be a moderating factor for choices that are significantly greener.

The main hypotheses are pre-registered on the AEA RCT Social Science Registry[3].

Hypothesis 1: Main treatment effect We hypothesize that subjects in the treatment group(i.e. subjects who have displayed the social pressure text) will opt more for green job openings than subjects in the control group.

Hypothesis 2: Treatment effect on choice variability Subjects in the treatment group are predicted to show smaller variability across choices than subjects in the control.

In addition to the multivariate analysis and following the approach of Finch (2022), the hypotheses are discussed under the lenses of a Plackett-Luce Model (PLM) to assess the distance between rankings and more generally the effectiveness of the treatment against the control group.

No other main hypotheses on the treatment effect were pre-registered as the rest of the investi- gation remained an exploratory analysis.

Finally, building on Loewnstein and Sicherman (1991), we investigate how the carbon intensity of each sector and social pressure can affect job choices that are different from a temporal perspective. In particular, we are interested in the following outcome; namely, whether the individual is more or less likely to opt for a job that favours constant over increasing over decreasing salaries.

2.3 Data

Among the 500 individuals who took part in our experiment, 21 were not able to answer correctly the initial understanding questions. In particular, they made more than two mistakes. Our final sample is therefore based on 479 individuals and characterized as follows (Table A.2 in the Ap- pendix). Concerning gender, 55% identify as men, 43.6% as women, and 1.4% did not disclose this information. Participants are 34.4 years old on average. As regards education, the majority has a Bachelor's degree (45.2%), followed by a high-school degree or equivalent (36.4%), and a Master's

[3]Dini, Giorgio and Chiara Natalie Focacci. 2022. "Green jobs and motivations." AEA RCT Registry. August 03. https://www.socialscienceregistry.org/trials/9824

degree (12.6%). When it comes to social circles, 83% describe themselves as introverts and most of the participants declare to have a small circle of friends (86.6%). The most popular sectors are information technology (15.97%), retail (12.04%), healthcare (8.38%), accountancy, banking and finance (6.81%), and business, consultancy and management (5.76%). 32.98% think their current company is somewhat environmentally friendly.

Concerning risk preferences, the majority of participants chose 2 (17.2%), 3, 4, and 6 (12%) on a scale from 1 to 10, where 10 represents the highest appreciation for risk. 29.4% and 18.4% chose 6 on a scale from 1 to 10 for, respectively, being concerned about the environment in their community and large-scale environmental damages. 26.6% of the participants picked 10 when asked to what extent they are concerned about climate change. When asked how they think a green transition of the economy can potentially affect the job market, 53.6% and 11.4% think it, respectively, creates and destroys job opportunities.

3 Results & Discussion

At first, we investigated the role of treatment effect on rankings for both carbon-intensive and low-carbon options. The graph 1 displays both control and treatment density plots with dashed and solid lines. Treatment raises option D to F density towards the first ranks and, symmetrically, lowers ranks of options A to C towards the last ranks.

This graphical intuition is corroborated by the probabilistic regression model showing that job candidates who are treated with social pressure are 24.4 percentage points more likely to opt for green jobs when looking for employment (Table 7). Results remain economically and statistically significant when controls are included. On this subject, we find that individuals who claim to be concerned about the environment, in general, are 35.9 percentage points more likely, significant at 1% level, to put options of green jobs in higher ranks of preference. A positive and significanteffect equal to 41.6 percentage points is also found for individuals who see green jobs as a proactive opportunity to create employment.

When investigating interactions through the multinomial logistic model, we find significant differences between treated and untreated individuals across defined categories. As coefficients cannot be

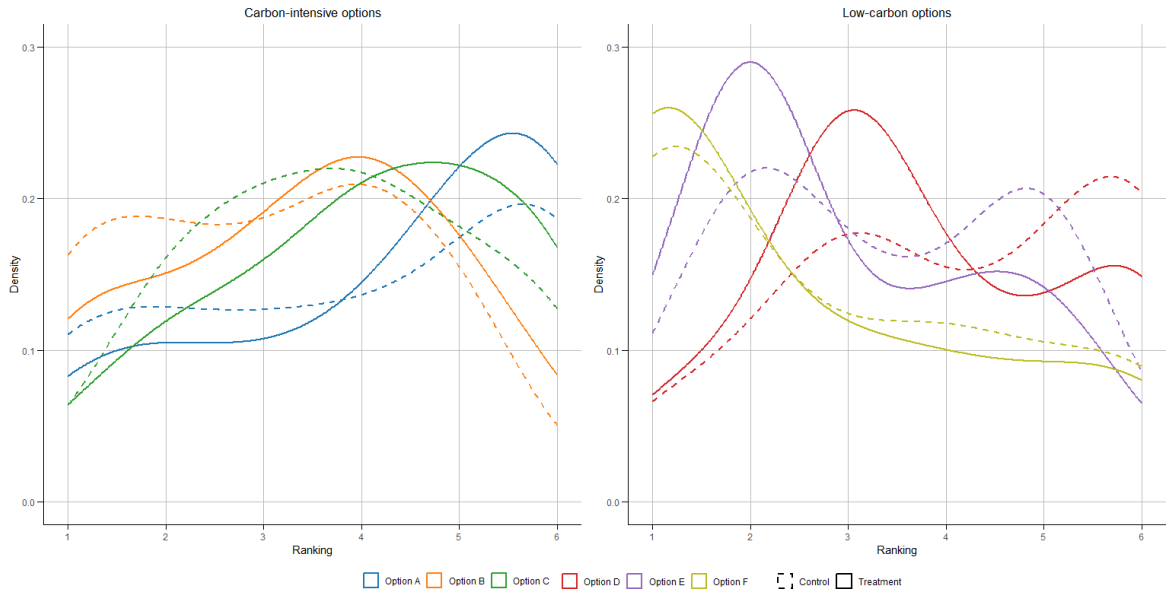

Figure 1: To the left, options A to C representing the carbon-intensive options show the movement towards the lowest rankings of the grid. To the right, options D to F, low-carbon options are to a large extent heightened towards the first ranks.

interpreted directly, we estimate predicted probabilities with the stata mlincom command for non-linear effects (Mize, 2019). The attitude of men and women towards opting for green jobs, brown jobs, and a mix of the two for their first three preferences is quite divergent (Figure 2). While, originally, men choose brown options to a larger extent than women, their likelihood of opting for them as first preferences drops significantly after treatment. Similarly, while women tend to choose green options more often when untreated compared to men, social pressure increases their likeli- hood of opting for green jobs. This may be justified by the stronger perceptiveness and sensitivityto peer pressure experienced by men in society, currently empirically tested for drinking (Morriset al., 2020), smoking (Newman, 1984), and sexual activity (Duckworth & Trautner, 2019). This gender-based characteristic turns out to be useful as regards the green transition, as men treated with environmental pressure by their community tend to readjust their occupational behaviour in favour of green options.

We also investigate whether differences emerge with respect to individuals having more larger or smaller circles of friends in line with Focacci & Lam (2020). Particularly, we find that, when

treated, subjects with large circles of friends favour brown jobs less often, compared to small-circle members (Figure 3). An explanation of this can be found in the exposure of large-circle members to a larger number of opinions. The larger the group, the higher the probability of being friends with individuals who opt for green choices in the first place. This, in turn, causes individuals in large circles of friends to conform to similar ideas or to not oppose them. Already in adolescence, individuals learn 'a great deal' about the world through their wider circle of friends (Giordano, 1995).

No particular effect is observed for the employment status category (Figure 4). It appears that being employed or not does not significantly impact whether individuals favour greener choices in their ideal job ranking or not. A slight effect is found post-treatment in unemployed subjects. Fol- lowing social pressure, they are less likely to pick brown choices as their first three job preferences.In general, however, the likelihood of opting for green or brown jobs seems independent from employ-ment status. Similarly, no significant effect is observed as regards the comparison between graduated and not graduated individuals (Figure 6), or between older and younger respondents (Figure 7). The latter may be explained by the fact that the range between the oldest and the youngest subjectsin our sample is not extremely large as the oldest subject is 40. Their attitudes towards green and brown jobs may not be that dissimilar.

When we compare introverted and extroverted subjects, we find a significant difference in their likelihood to favour green or brown jobs (Figure 5). Introverts are generally more inward-focused, which may lead them to ask themselves questions, analyse their behaviour, and develop awareness (Beukeboom et al., 2013). This is why pressure from society affects them to a large extent, pushing their green choices up compared to when not treated. On the other hand, extroverts tend to favour brown options more often after being treated with pressure. This could be explained by their difficulty in complying to rules: pushing them to behave according to a certain normative expectation leads to the exact opposite effect. Extroverts' ego tends to be generally higher (Taft, 1970; Brashears et al., 2020; Lee et al., 2022). Thus, a normative expectation may cause rebellion against the norm itself; in this case, choosing green jobs because society wants you to. No significant effect is observed for risk-averse individuals and risk lovers (Figure 8).

When analysing results for those who are and are not concerned with the environment, we

observe that the treatment effect is the same (Figure 7). The main difference lies in the higher baseline for green job preferences for those who are concerned with the environment. An interestingresult is observed between subjects who believe the green transition will destroy jobs and subjects who believe it will create jobs (Figure 9). Following our social pressure treatment in favour ofthe green transition, we observe a change in the attitude of treated subjects according to whicha green transition generates more job opportunities (p-value=0.037). For pessimist subjects, the likelihood of choosing brown jobs as their first three favourite options significantly decreases after treatment. On the other hand, the likelihood of choosing green jobs as their first three favourite options significantly increases after treatment. The effect for subjects who are optimistic about the green transition is significantly smaller, as they might be already convinced by the superiority of green jobs. This indicates that targeting the first group –namely, those who believe the green transition will destroy jobs– is extremely relevant. Their baseline for choosing brown jobs, when not treated, is significantly higher, while the effect of social pressure is successful in changing their preferences.

Regarding our second hypothesis, we reject the null hypothesis of treatment inducing a smaller variance. Table 16 displays the variance of each option across treatments and the Bartlett test of homogeneity of variances allows to test the difference given non-normality conditions. The test impedes the rejection of the null hypothesis suggesting that variance is not different after the intervention.

Finally, results from Table 13 suggest that individuals prefer increasing and constant wage prospects to decreasing ones. However, interestingly the greenness of the job option alters the conventional increasing-constant relationship. In the control group, which excludes any confounding effect of peer pressure, option F is the most preferred (mean rank = 2.77), while option B, being carbon-intensive and constant wages is the second most opted prospect (mean rank = 3.05) followed by option E (low-carbon and constant) (mean rank = 3.38). Surprisingly, option C is ranked fourth on average (mean rank = 3.76). We exclude that the total difference of 5 thousand dollars between options C and B can explain this reversal to predictions. Not surprisingly, options D and A, with decreasing wage prospects, are the least preferred.

4 Conclusions

In this article, we carried out an experiment and treated individuals with different information to see to what extent social pressure and intertemporal preferences can nudge them into applying for a job that is more environmentally friendly.

Estimates from a probabilistic regression model applied to 473 individuals show that individuals are significantly more likely to opt for a green job when they are treated with social pressure in favour of sustainable employment. Comparatively to non-treated individuals, they are 24.4 percentage points more likely to place green jobs in higher ranks of preference when applying for a job. Our findings contribute to the sparking debate on the future of greener sector from the behavioural perspective of the labour force. This is justified by the necessity for labour supply to exist and expand in greener sectors if such greener sectors want to expand and gain market power.

Results show that this is particularly true for individuals who value long-term benefits and are risk averse in terms of job stability but risk lovers for immediate monetary payoffs. On this subject, implications for firms that are committed to greener solutions are advised to frame job offers focused on the incentives that exist and increase in the future. Considering the progressive restructuring of firms into sectors that are more environmentally friendly, future projections are likely to be significantly positive for individuals who work in such sectors. Carbon-intensive firms may also be careful with regards to the framing of their job offers, which inherently attract individuals with short-term goals. Finally, we find a significant difference in the likelihood of individuals to favour green or brown jobs based on whether they are introverts or extroverts. Because introverts are generally more used to analyse and question themselves (Beukeboom et al., 2013), pressure from society can affect them to a large extent. On the other hand, when treated with pressure, extroverts,who tend to dislike complying to norms (Taft, 1970; Brashears et al., 2020; Lee et al., 2022), tendto favour brown options more often. This suggests firms should account for individual personalities depending on the target of their job offers.

Our study accounts for some limitations which must be considered. First, the study accounts for a relatively small sample size (473 observations following comprehension questions) which still allows us to draw statistically robust conclusions within the experimental setting. However, the

prolific sample, despite being commonly adopted in experimental studies, still lacks strong potential generalizability to broader populations. Second, the online setting is a starting point to approach research in this field, exploring incentives and factors commonly present in real-world applications. Since our evidence suggests a consistent effect of peer pressure on individuals' choices, the next natural step would be to use observational data and field experiments on job search behaviour. Lastly, ranked options demonstrate a great potential to observe shifts in behaviour; however, the action space is restricted while participants could have ranked multiple options equally.

While forms of green activism are implemented to protect the environment and support the green economy via sensitive consumer choices, the potential benefit of social initiatives would be exploited to enhance the supply of green jobs as well, encouraging people to make a difference by working a green job and keeping skilled workers motivated[4]. Additionally, understanding the roleof inter-temporal monetary incentives (Loewenstein and Sicherman, 1991) is crucial, too, for labour market institutions, including trade unions, to ensure competitive salaries in green jobs and stable careers. Our findings would also help firms in framing their job vacancies for green jobs in a more effective way.

Nonetheless, for the green economy to truly flourish, systemic policies must be put in place to support both businesses and workers. These policies are not only critical for motivating individuals to enter the green workforce but also for ensuring businesses have the necessary tools to facilitate a smooth transition to sustainable practices. A series of policy implications could contribute toa successful green transition. In general, financial positive incentives such as tax deductions or subsidies for renewable energy projects or green technologies could help businesses to start or develop their green transition. In parallel to this, regulations could be put in place to set specific targets for reducing carbon emissions, as well as create more sustainable companies and buildings in line with energy efficiency standards. On this subject, governments could invest in the green restructuring of companies, as well as in infrastructure, including public transportation.

As regards our study more specifically, we believe that, when hiring, governments, public bodies, and private companies should account for the peer effects that surround the green transition. This means being up to date with the community's commitment to environmental issues -without falling

[4]https://www.oecd.org/environment/Employment-Implications-of-Green-Growth-OECD-Report-G7-Environment-Ministers.pdf

into the trap of green washing-, as well as investing or offering attractive training programs to job candidates or extant employees interested in developing a profile in renewable energy, energy efficiency, solar installation, wind turbine maintenance, and sustainable construction, and other green industries. Similarly, human capital investment could play a significant role in encouraging individuals to apply for green jobs, especially if this is done at the early stages of education, when individuals are even more influenced by their peers. Sustainability and environmental education should be included in the new school curricula, as well as scholarships could be offered for pursuing degrees, and later careers, in related green fields.

The green economy is the future. While firms invest in transforming themselves, the framing of job offers is crucial to guarantee a type of labour supply that exceeds not just in quantity but alsoin quality. Corporations that are likely to succeed in the future, saving both the economy and the environment, are those who work with motivated people. While monetary payoffs are not a sufficient condition to do so, accounting for social expectations and intertemporal preferences is necessary to achieve this goal.

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Appendix

A.1 Experimental instructions

CONSENT FORM

Dear respondent, you are invited to participate in a study conducted by researchers of the Erasmus University Rotterdam and University of Bologna.

You are invited to this survey online because you are residing in the US and you are 18 years old or older.

The objective of the study is to understand job applicants' behaviour. You are invited to fill out a survey on strategies in job market context that will take about four minutes. Once the survey is completed, you will earn £0.5 (£8.85/hour), transferred to your account in local $ currency.

Participation in the survey is voluntary and anonymous. The answers you provide to us by completing the survey will remain confidential and will only be used for research purposes. In any case, we will not be able to trace the answers back to participants.

Codes, not names, will be used in our analysis of the data. Anonymous data may be published in scientific journals, articles, and other public contexts and stored in a secure location for a minimum of 10 years. Data processed before the withdrawal of your consent and anonymized is lawfully collected and can be used for the research. You do not have to justify your decision to withdraw.

If you have questions related to the study, please send an email to: focacci@law.eur.nl or giorgio.dini2@unibo.it.

By signing this Form, you consent to participate in this research, confirm that you are at least 18 years old, understand that participating in this research is completely voluntary; and understand that your data will be anonymized for further research and publication.

You can now agree to the conditions explained above to participate in the study or withdraw.

I AGREE

I DO NOT AGREE

PLEASE READ THE TEXT BELOW CAREFULLY

Imagine you have to make a decision that is relevant to your career.

You can see a list of job openings and their features. Now you can look at these career prospects.

Each line represents an option for a job opening highlighting the **company sector** and the future **yearly wage level** in every decade you will be employed in that company for that job.

If you are using a smartphone scroll left to see all the table

Option	Company sector	1-10 years	11-20 years	21-30 years	31-40 years	Total
Option A	Carbon intensive	22,000$	20,000$	18,500$	17,000$	775,000$
Option B	Carbon intensive	19,500$	19,500$	19,500$	19,500$	780,000$
Option C	Carbon intensive	17,000$	18,500$	20,000$	22,000$	775,000$
Option D	Low-carbon	20,000$	19,000$	18,500$	18,000$	755,000$
Option E	Low-carbon	19,000$	19,000$	19,000$	19,000$	760,000$
Option F	Low-carbon	17,000$	18,000$	20,000$	22,000$	770,000$

Have you read everything?

Yes

No

In brief, regarding the **company sector**:

- Options A, B and C indicate jobs in a **carbon-intensive sector** in companies that cause pollution and climate change.
- Options D, E and F indicate jobs in a **low-carbon sector** in companies that drive the ecological transition of the economy.

The **yearly wage level over the years is different** across all options. But, as you can see:

- Options A and D show a **decreasing yearly wage.**
- Options B and E show a **constant yearly wage.**
- Options C and F show an **increasing yearly wage.**

If you are using a smartphone scroll left to see all the table

Option	Company sector	1-10 years	11-20 years	21-30 years	31-40 years	Total
Option A	Carbon intensive	22,000$	20,000$	18,500$	17,000$	775,000$
Option B	Carbon intensive	19,500$	19,500$	19,500$	19,500$	780,000$
Option C	Carbon intensive	17,000$	18,500$	20,000$	22,000$	775,000$
Option D	Low-carbon	20,000$	19,000$	18,500$	18,000$	755,000$
Option E	Low-carbon	19,000$	19,000$	19,000$	19,000$	760,000$
Option F	Low-carbon	17,000$	18,000$	20,000$	22,000$	770,000$

Now, only a few questions about these prospects.

Which option has increasing yearly wage and carbon intensive business?

- Option A
- Option B
- Option C

Which option allows you to earn **less** than 18,000$ in 35 years from now?

- Option A
- Option C
- Option F

Which is the option that allows you to earn **the most** considering the first 30 years?

- Option A
- Option B
- Option D

In your community some of the people would not apply for a job in a polluting company because it damages their health and the planet. Applying for a job in the low-carbon sector helps to promote the green economy, as well as safeguard the planet. In other words, part of your community agrees that opting for a green job is the best solution for society.

You now have to take a decision with respect to what job you would like to apply for.

Please rank the job options below (Options A to F) following the order of job applications you would send out.

1 indicates your favorite job option, 6 your least favorite job option.

	1	2	3	4	5	6
Option A	○	○	○	○	○	○
Option B	○	○	○	○	○	○
Option C	○	○	○	○	○	○
Option D	○	○	○	○	○	○
Option E	○	○	○	○	○	○
Option F	○	○	○	○	○	○

A reminder of the career wage prospects:

If you are using a smartphone scroll left to see all the table

Option	Company sector	1-10 years	11-20 years	21-30 years	31-40 years	Total
Option A	Carbon intensive	22,000$	20,000$	18,500$	17,000$	775,000$
Option B	Carbon intensive	19,500$	19,500$	19,500$	19,500$	780,000$
Option C	Carbon intensive	17,000$	18,500$	20,000$	22,000$	775,000$
Option D	Low-carbon	20,000$	19,000$	18,500$	18,000$	755,000$
Option E	Low-carbon	19,000$	19,000$	19,000$	19,000$	760,000$
Option F	Low-carbon	17,000$	18,000$	20,000$	22,000$	770,000$

Are you employed at the moment?

- Yes
- No

In which sector are you employed?

Engineering and manufacturing

To what extent would you define the sector in which you currently work as 'environmentally-friendly'?

- Extremely environmentally-friendly
- Somewhat environmentally-friendly
- Neither cases
- Somewhat not environmentally-friendly
- Extremely not environmentally-friendly

Do you have a small or large circle of friends?

Small

Large

Do you consider yourself more of an introvert or extrovert?

Introvert

Extrovert

With which gender do you identify most with?

Male

Female

Prefer not to say

Please type in your age below:

What is the highest level of education you have completed?

- Less than high school degree
- High school degree (or equivalent including GED)
- Professional degree (JD, MD)
- Bachelor's degree
- Master's degree
- Doctorate

From a scale of 1 to 10, to what extent do you agree with the sentence: 'I like risk'.

I totally disagree — I totally agree

1 2 3 4 5 6 7 8 9 10

I like risk

How much are you concerned about:

Never — Little — Somewhat — Much — A Great Deal

1 2 3 4 5 6 6 7 8 9 10

The environment situation in your community

Large-scale environmental damages

Climate change

Do you think a green transition of the economy can potentially affect the job market? How?

It destroys job opportunities

Neither destroy nor create job opportunities

It creates job opportunities

A.2 Tables

Table 2: Descriptive statistics: Total population before exclusion of participants with two or more mistakes in the comprehension questions

	Mean (%)	St. Dev.	Min	Max
Gender				
Male	55.0	50.0	0	1
Female	43.6	49.6	0	1
Other	1.4	11.8	0	1
Age (years)	34.4	87.6	18	40
Education				
Less than high school degree	8.0	8.9	0	1
High school degree (or equivalent)	36.4	48.2	0	1
Professional degree (JD, MD)	4.0	19.6	0	1
Bachelor's degree	45.2	49.8	0	1
Master's degree	12.6	33.2	0	1
Doctorate	1.0	9.9	0	1
Employment status				
Employed	76.4	42.5	0	1
Not employed	23.6	42.5	0	1
Sector				
Accountancy, banking, and finance	6.8	25.2	0	1
Business, consultancy, and management	5.8	23.3	0	1
Charity and voluntary work	0.5	7.2	0	1
Creative arts and design	5.2	22.3	0	1
Energy and utilities	1.3	11.4	0	1
Engineering and manufacturing	6.8	25.2	0	1
Environment and agriculture	0.8	8.8	0	1
Healthcare	8.4	27.7	0	1
Hospitality and events management	3.1	17.5	0	1
IT	16.0	36.7	0	1
Law	1.0	10.2	0	1
Law enforcement and security	0.5	7.2	0	1
Leisure, sport, and tourism	0.5	7.2	0	1
Marketing, advertising, and PR	2.1	14.3	0	1
Media and internet	2.6	16.0	0	1
Property and construction	2.1	14.3	0	1
Public services and admin.	4.5	20.6	0	1
Recruitment and HR	1.0	10.2	0	1
Research and higher education	2.9	16.7	0	1
Retail	12.0	32.6	0	1
Sales	4.5	20.6	0	1
Science and pharmaceuticals	0.8	8.8	0	1
Social care	26.2	16.0	0	1
Teacher training and education	52.3	22.3	0	1
Transport and logistics	28.8	16.7	0	1
Environmentally-friendly				
Extremely environmentally-friendly	10.7	31.0	0	1
Extremely not environmentally-friendly	3.9	19.4	0	1
Neither cases environmentally-friendly	36.4	48.2	0	1
Somewhat environmentally-friendly	33.0	47.1	0	1
Somewhat not environmentally-friendly	16.0	36.7	0	1

Table 3: Descriptive statistics: total population

	Mean (%)	Mean (%)		
Circle of friends				
Large	13.4	34.1	0	1
Small	86.6	34.1	0	1
Personality				
Extrovert	17.0	37.6	0	1
Introvert	83.0	37.6	0	1
Risk attitude (from 1 to 10)				
1	10.0	30.0	0	1
2	17.2	37.7	0	1
3	16.8	37.4	0	1
4	14.8	35.5	0	1
5	10.8	31.1	0	1
6	12.0	32.6	0	1
7	9.8	29.7	0	1
8	5.6	23.0	0	1
9	1.8	13.3	0	1
10	1.2	10.9	0	1
Concern for local environment (from 1 to 10)				
1	3.2	17.6	0	1
2	5.4	22.6	0	1
3	7.0	25.5	0	1
4	6.4	24.5	0	1
5	6.0	23.8	0	1
6	29.4	45.6	0	1
7	12.2	32.8	0	1
8	14.8	35.5	0	1
9	4.4	20.5	0	1
10	11.2	31.6	0	1
Concern for climate change (from 1 to 10)				
1	4.4	20.5	0	1
2	4.6	21.0	0	1
3	2.0	14.0	0	1
4	3.0	17.1	0	1
5	3.6	18.6	0	1
6	14.8	35.5	0	1
7	11.6	32.1	0	1
8	15.6	36.3	0	1
9	13.8	34.5	0	1
10	26.6	44.2	0	1
Green transition				
It creates job opportunities	53.6	49.9	0	1
Neither destroy nor create job opportunities	35.0	47.7	0	1
It destroys job opportunities	11.4	31.8	0	1

Table 4: Descriptive statistics by group: control & treatment

	Mean (%)	Mean (%)
Gender		
Male	53.60	56.40
Female	45.20	42.00
Other	1.20	1.60
Age	38.1	30.8
Education		
Less than high school degree	0.8	0.8
High school degree (or equivalent)	35.2	37.6
Professional degree (JD, MD)	3.6	4.4
Bachelor's degree	46.0	44.4
Master's degree	13.6	11.6
Doctorate	0.8	1.2
Employment status		
Employed	75.2	77.6
Not employed	24.8	22.4
Sector		
Accountancy, banking, and finance	6.38	7.22
Business, consultancy, and management	6.91	4.64
Charity and voluntary work	6.91	1.03
Creative arts and design	0.53	3.61
Energy and utilities	0.53	2.06
Engineering and manufacturing	5.32	8.25
Environment and agriculture	1.06	0.52
Healthcare	12.23	4.64
Hospitality and events management	1.60	4.64
IT	13.83	18.04
Law	1.06	1.03
Law enforcement and security	1.06	0
Leisure, sport, and tourism	0	1.03
Marketing, advertising, and PR	2.66	1.55
Media and internet	4.26	1.03
Property and construction	2.13	2.06
Public services and admin.	2.13	4.12
Recruitment and HR	1.06	1.03
Research and higher education	2.13	3.61
Retail	11.7	12.37
Sales	4.79	4.12
Science and pharmaceuticals	1.06	0.52
Social care	3.72	1.55
Teacher training and education	2.66	7.73
Transport and logistics	2.13	3.61
Environmentally-friendly		
Extremely environmentally-friendly	9.57	11.86
Extremely not environmentally-friendly	5.32	2.58
Neither cases environmentally-friendly	37.32	35.57
Somewhat environmentally-friendly	32.98	32.99
Somewhat not environmentally-friendly	14.89	17.01

Table 5: Descriptive statistics by group: control & treatment

	Mean (%)	Mean (%)
Circle of friends		
Large	12	14.8
Small	88	85.2
Personality		
Extrovert	15.6	18.4
Introvert	84.4	81.6
Risk attitude (from 1 to 10)		
1	11.2	8.8
2	18.4	16
3	14	19.6
4	14.4	15.2
5	11.6	10
6	11.6	12.4
7	11.2	8.4
8	5.2	6
9	1.2	2.4
10	1.2	1.2
Concern for local environment (from 1 to 10)		
1	4	2.4
2	5.6	5.2
3	5.6	8.4
4	7.2	5.6
5	6.8	5.2
6	30	28.8
7	12.4	12
8	12.4	17.2
9	2.8	6
10	13.2	9.2
Concern for climate change (from 1 to 10)		
1	4	4.8
2	4	5.2
3	0.4	3.6
4	2.4	3.6
5	3.2	4
6	16	13.6
7	11.6	11.6
8	14.8	16.4
9	15.2	12.4
10	28.4	24.8
Green transition		
It creates job opportunities	56.4	50.8
Neither destroy nor create job opportunities	33.6	36.4
It destroys job opportunities	10	12.8

Table 6: Pearson's Chi-squared test with Yates' continuity correction

	Control		Treatment		
Variable	N	Percent	N	Percent	Test
Gender	239		240		$\chi^2 = 2.116$
Male	137	57%	125	52%	
Female	101	42%	112	47%	
Prefer not to say	1	0%	3	1%	
Under30	239		240		$\chi^2 = 0.497$
Under	145	61%	137	57%	
Over	94	39%	103	43%	
Friends	239		240		$\chi^2 = 0.196$
Small circle	209	87%	214	89%	
Large circle	30	13%	26	11%	
Social attitude	239		240		$\chi^2 = 0.072$
Introvert	199	83%	203	85%	
Extrovert	40	17%	37	15%	
Environmentalism	239		240		$\chi^2 = 0.1$
Less concerned	103	43%	99	41%	
Concerned 1	136	57%	141	59%	
Education	239		240		$\chi^2 = 0.625$
Not graduate	94	39%	85	35%	
Graduate	145	61%	155	65%	
Employment	239		240		$\chi^2 = 0.089$
No	54	23%	58	24%	
Yes	185	77%	182	76%	
Green job	239		240		$\chi^2 = 0.051$
No or unclear	158	66%	162	68%	
Yes	81	34%	78	32%	

Statistical significance markers: * $p<0.1$; ** $p<0.05$; *** $p<0.01$.
'Green job' is a dummy for whether the subject has a green job somewhat to (extremely green) or not.

Table 7: Results of the Probit Models regressions

	Dependent variable:		
	greenpref		
	(1)	(2)	(3)
Treatment	0.244**	0.248**	0.218*
	(0.118)	(0.119)	(0.123)
Female		0.018	−0.009
		(0.120)	(0.127)
Older		0.116	0.097
		(0.119)	(0.124)
Graduate		0.155	0.137
		(0.128)	(0.136)
Employed		−0.067	− 0.061
		(0.148)	(0.157)
Friends: Large			−0.146
			(0.205)
Extrovert			−0.182
			(0.185)
Green transition: null			0.205
			(0.210)
Green transition: positive			0.419**
			(0.210)
Risk tolerance			0.023
			(0.142)
Concerned for environment			0.359***
			(0.132)
Constant	0.191**	0.077	− 0.334
	(0.082)	(0.163)	(0.241)
Observations	473	473	473
Log Likelihood	−311.585	− 310.340	− 299.603
Akaike Inf. Crit.	627.169	632.680	623.206
Note:			*p<0.1; **p<0.05; ***p<0.01

Table 8: Average Marginal Effects of Probit Regression

Factor	AME	SE	z	p	Lower	Upper
Treatment	0.0770*	0.0428	1.7990	0.0720	-0.0069	0.1608
Female	-0.0018	0.0451	-0.0408	0.9674	-0.0902	0.0866
Older	0.0321	0.0438	0.7327	0.4637	-0.0538	0.1181
Graduate	0.0639	0.0489	1.3060	0.1915	-0.0320	0.1598
Employed	-0.0255	0.0541	-0.4720	0.6370	-0.1315	0.0805
Friends: Large	-0.0562	0.0765	-0.7348	0.4625	-0.2061	0.0937
Extrovert	-0.0678***	0.0677	-1.0015	0.3166	-0.2006	0.0649
Green transition: null	0.0641	0.0787	0.8137	0.4158	-0.0902	0.2183
Green transition: positive	0.1471*	0.0782	1.8796	0.0602	-0.0063	0.3004
Risk tolerance	0.0074	0.0498	0.1486	0.8819	-0.0902	0.1050
Concerned for environment	0.1342***	0.0485	2.7657	0.0057	0.0391	0.2293

AME: Average Marginal Effect; SE: Standard Error; z: z-value; p: p-value; Lower: Lower Confidence Interval; Upper: Upper Confidence Interval; Significance codes: *** 0.001 ** 0.01 * 0.05.

Table 9: Estimated average discrete probability effects of multinomial logistic regressions with standard errors clustered at the individual level. SE in parentheses.

	(1) All brown	(2) Mixers	(3) All green
Treatment	-0.030	-0.070	0.100**
	(0.357)	(0.119)	(0.015)
Female	-0.016	0.026	-0.010
	(0.647)	(0.582)	(0.822)
Older	0.026	-0.049	0.023
	(0.449)	(0.290)	(0.581)
Friends: Large	0.049	-0.190**	0.141*
	(0.392)	(0.011)	(0.052)
Employed	0.015	-0.012	-0.003
	(0.719)	(0.829)	(0.961)
Green transition: null	-0.083	0.096	-0.012
	(0.228)	(0.249)	(0.880)
Green transition: positive	-0.176**	0.089	0.086
	(0.010)	(0.270)	(0.291)
Graduate or higher	-0.019	-0.063	0.082*
	(0.615)	(0.223)	(0.077)
Extrovert	0.032	0.014	-0.046
	(0.543)	(0.836)	(0.454)
Concerned for environment	-0.039	-0.151***	0.190***
	(0.322)	(0.002)	(0.000)
Risk tolerance	0.013	0.025	-0.038
	(0.728)	(0.606)	(0.390)
N	475	475	475
Note:			*p<0.1; **p<0.05; ***p<0.01

Table 10: Plackett-Luce model parameter estimates for options from A to F data with mean as the reference considering only the control participants

Option	Estimate	Std. Error	z value
Option A	-0.50152***	0.05385	-9.314
Option B	0.19369***	0.04913	3.942***
Option C	-0.19929***	0.05005	-3.982***
Option D	-0.27846***	0.05190	-5.365***
Option E	0.29315***	0.04910	5.971***
Option F	0.49242***	0.05273	9.338***

Table 11: Plackett-Luce Model Parameter Estimates for Options A to F considering only the treated participants

Option	Estimate	Std. Error	z value
Option A	-0.60838***	0.07670	-7.932
Option B	0.04930	0.07025	0.702
Option C	-0.33844***	0.07231	-4.681
Option D	-0.12799	0.07254	-1.764
Option E	0.43503***	0.07050	6.171
Option F	0.59047***	0.07564	7.806

Table 12: Plackett-Luce model parameter estimates for options from A to F data with mean as the reference

Option	Estimate	Std. Error	z value
Option A	-0.50152***	0.05385	-9.314
Option B	0.19369***	0.04913	3.942***
Option C	-0.19929***	0.05005	-3.982***
Option D	-0.27846***	0.05190	-5.365***
Option E	0.29315***	0.04910	5.971***
Option F	0.49242***	0.05273	9.338***

Table 13: Mean Rank Table

Sample	A	B	C	D	E	F
All	4.08	3.23	3.90	3.93	3.19	2.67
Control	3.91	3.05	3.76	4.12	3.38	2.77
Treatment	4.25	3.40	4.04	3.74	3.00	2.57

Table 14: Pairwise ranking matrix for the six options from A to F

	A	B	C	D	E	F
A	0	135	214	219	185	156
B	338	0	322	243	224	185
C	259	151	0	234	185	163
D	254	230	239	0	131	125
E	288	249	288	342	0	162
F	317	288	310	348	311	0

Table 15: Marginal ranking matrix for the six options from A to F

	A	B	C	D	E	F
A	66	54	52	60	87	154
B	87	76	85	117	84	24
C	26	73	86	108	96	84
D	38	46	140	60	65	124
E	49	164	62	68	106	24
F	207	60	48	60	35	63

Table 16: Estimated variance for each option. The difference between control and treatment is tested through the Bartlett test of homogeneity of variances with null hypothesis: variance is the same for both groups. We fail to reject the null for all options.

Variable	**Control**	**Treatment**	**Bartlett test p-value**
Option A	3.53	3.04	0.252
Option B	2.18	2.29	0.706
Option C	2.09	2.29	0.481
Option D	2.73	2.39	0.308
Option E	2.22	2.17	0.866
Option F	3.44	3.35	0.833

A.3 Figures

Figure 2: Treatment effect interaction with gender.

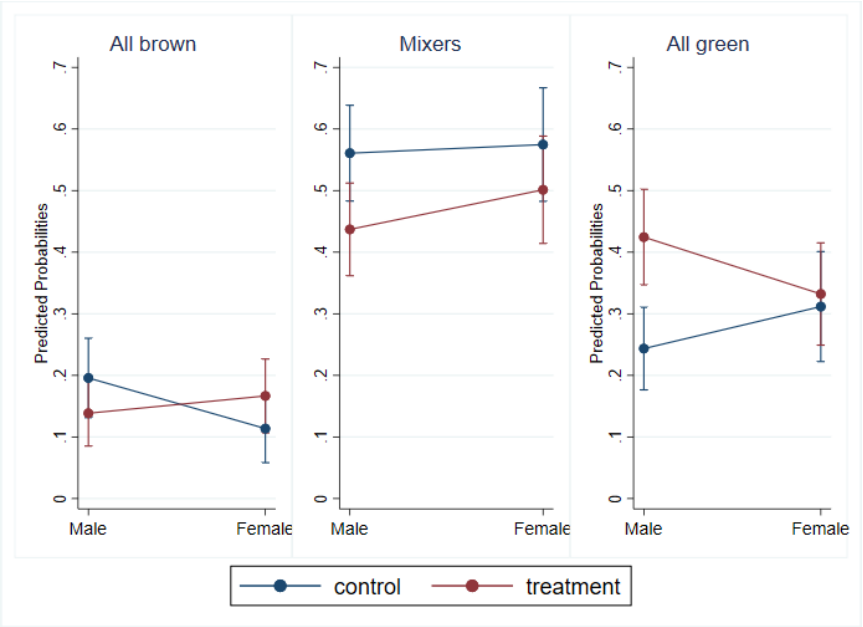

Figure 3: Treatment effect interaction with cohort of friends.

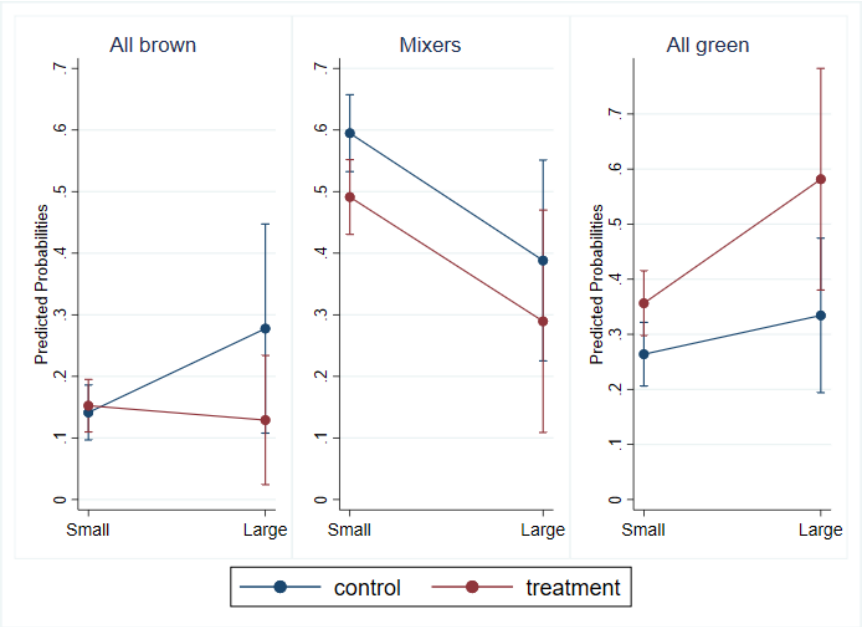

Figure 4: Treatment effect interaction with employment status.

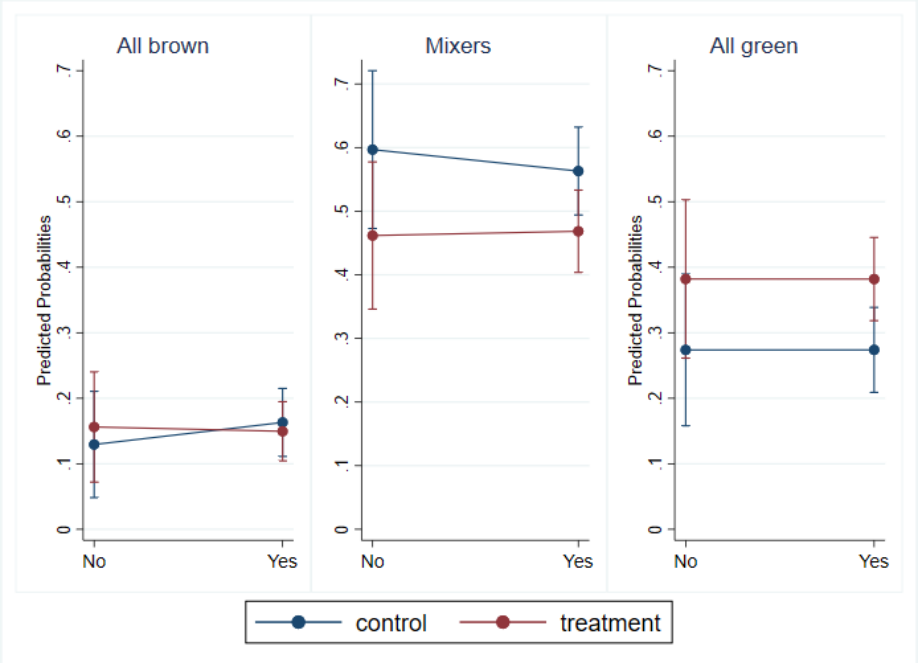

Figure 5: Treatment effect interaction with individual social behaviour.

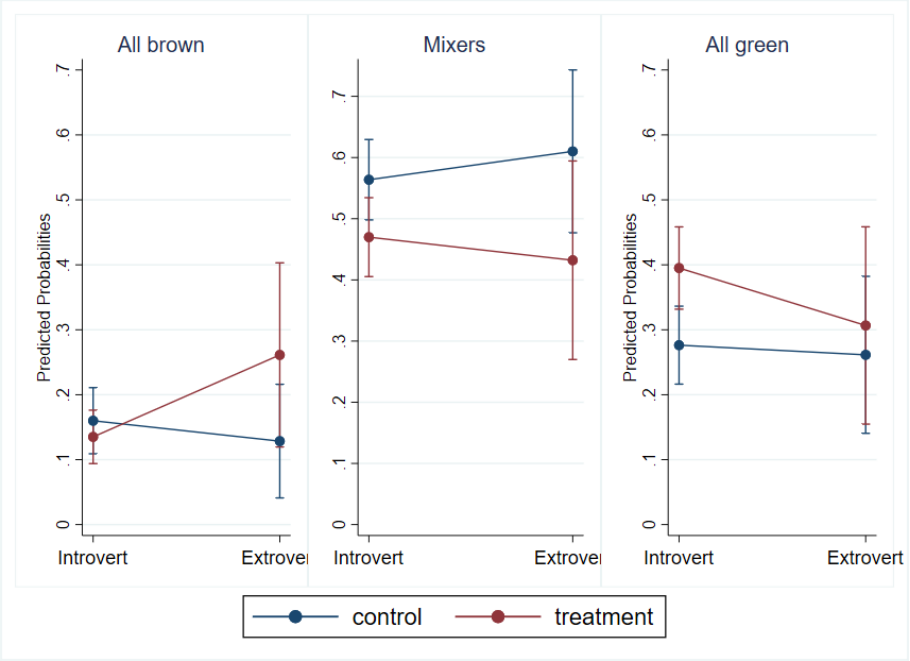

Figure 6: Treatment effect interaction with level of education.

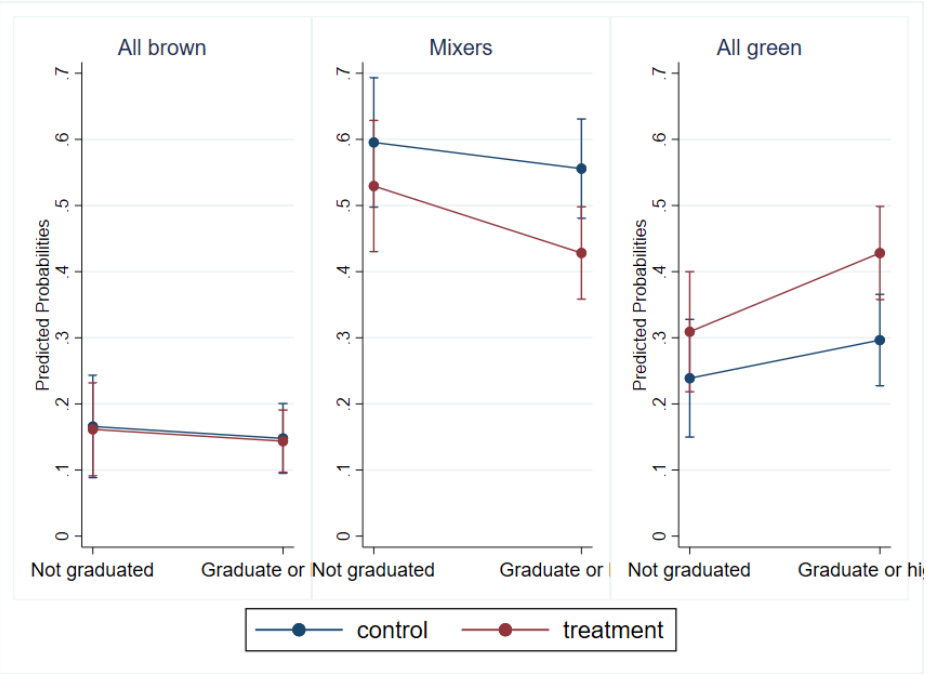

Figure 7: Treatment effect interaction with age (above vs below mean age).

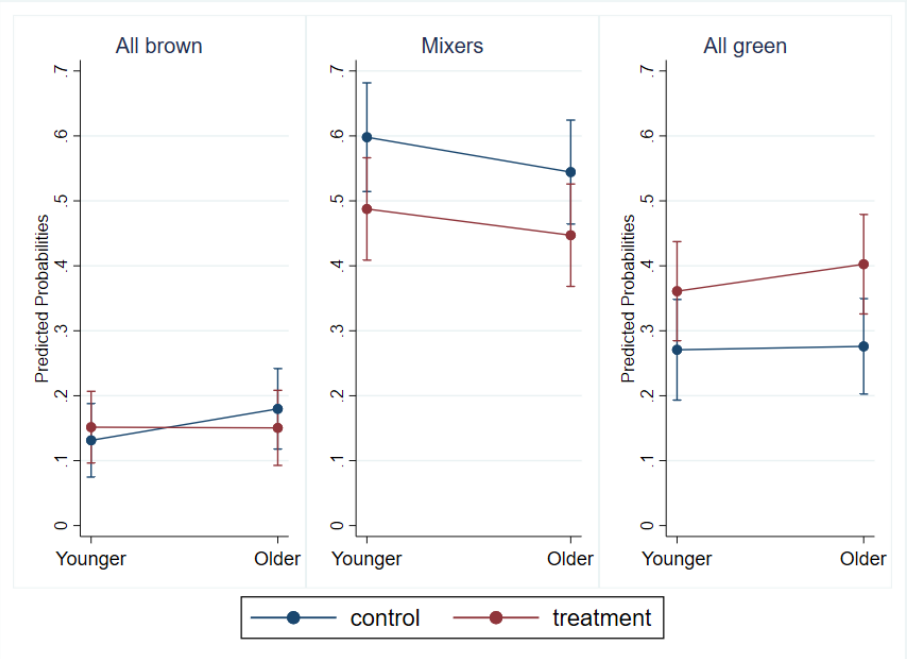

Figure 8: Treatment effect interaction with concern for the environment (above vs below mean concern).

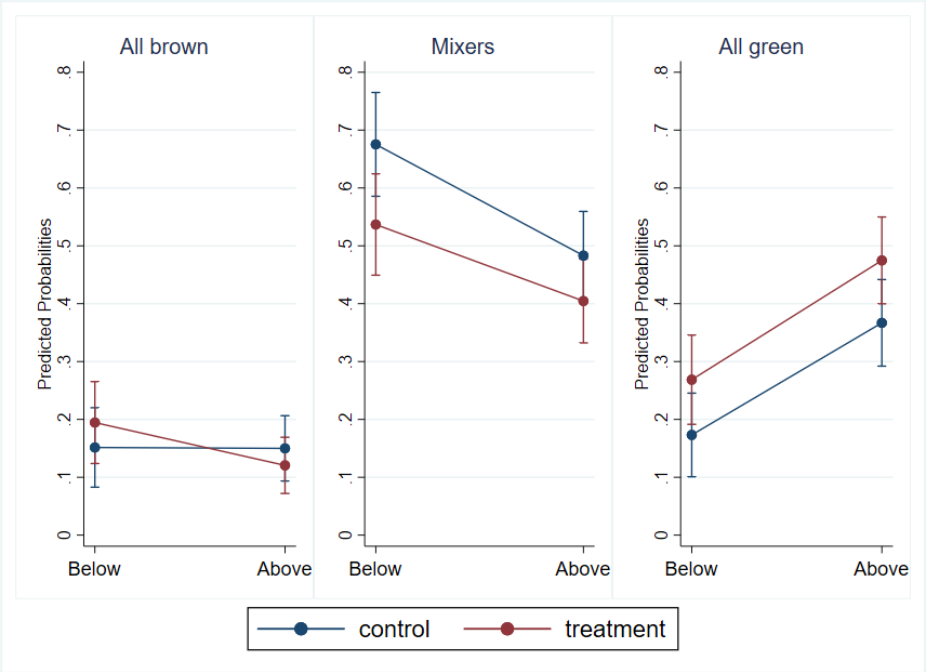

Figure 9: Treatment effect interaction with attitude towards risk (above vs below 6 in self-reported risk tolerance question.)

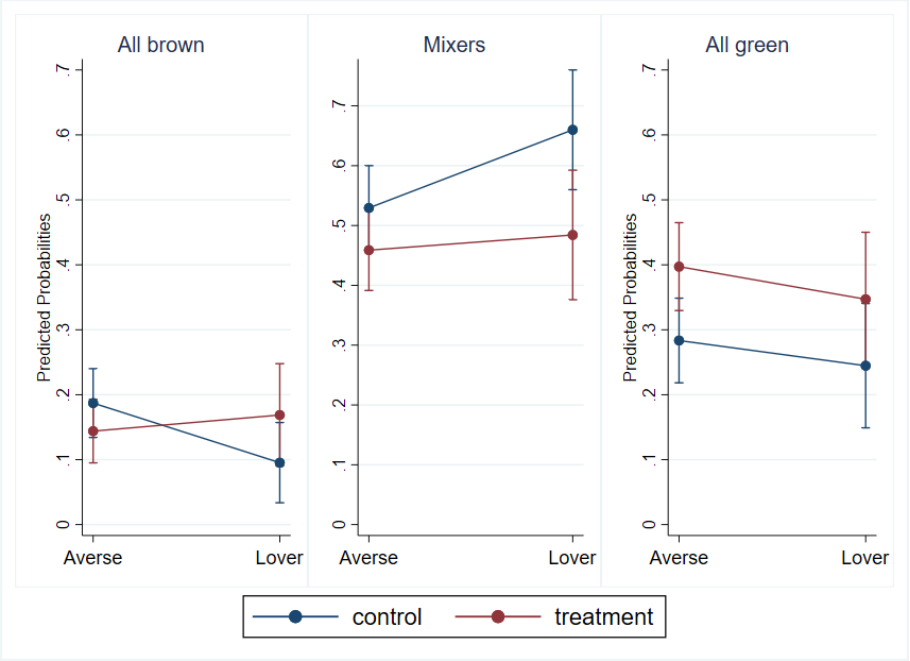

Figure 10: Treatment effect interaction with attitude towards green transition. *Destroy* : “It destroys job opportunities”; *Neutral* : “Neither destroy nor create job opportunities”; *Create*“It creates job opportunities”.