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Working Paper

January 2018 - WP 2018-01

UNIVERSITÉ CAEN NORMANDIE

UNIVERSITÉ DE RENNES 1

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Abstract

We examine both the private benefits and spillover costs of labor market favoritism in a unique laboratory experiment design. Group identities are first created and the data show that both employment preference rankings and wage offers favor in-group members. Workers positively reciprocate towards in-group employers by choosing higher effort in a gift exchange game. Thus, favoritism can be privately rational for employers. However, unemployed subjects are allowed to burn resources (at a cost to themselves), and we document significantly increased resource destruction when unemployment can be attributed to favoritism towards others. This highlights a significant spillover cost of favoritism that is often ignored, and it points to one possible micro-foundation of some anti-social behavior.

Keywords: Discrimination, Experimental Economics, Social identity, Conflicts
JEL Codes: C90, C92, J15, J16

Acknowledgements

The authors thank seminar participants at Appalachian State University for helpful comments on this paper. Funding is gratefully acknowledged from the French National Association of Research (ANR 12-INEG-0002).

1. INTRODUCTION

Since the publication of Gary Becker's *The Economics of Discrimination* in 1957, the subject of discrimination has been of particular interest to labor economists. The literature on labor market discrimination is large, and has benefitted from the complementary efforts of empirical econometric, field experimental, and controlled laboratory studies. In this paper we aim to contribute to the existing literature by investigating a potential motive for taste-based discrimination in a unique experimental design that can help shed light on both the private incentives and spillover impacts of discriminatory practices. In other words, there may be instances where favoring one group of workers over another privately benefits the firm, yet generates spillover costs to society.

According to Becker, taste-based discrimination leads to suboptimal recruiting decisions. Thus, competitive markets should help eliminate this type of discrimination as prejudiced employers face higher production costs. In contrast, other models have considered that taste-based discrimination is driven by efficiency considerations such as reduced costs of communication (Lang, 1986; Athey et al, 2000; Efferson et al, 2008; Feng et al, 2012). Yet another alternative is that employers may benefit from in-group favoritism in terms of reciprocal effort. Specifically, in-group workers may provide high effort both in response to in-group employment favoritism as well as in-group wage favoritism. In either case, this implies that not all taste-based discrimination is detrimental from the perspective of the firm's private cost/benefit analysis, and in-group favoritism may therefore be a potential source of taste-based discrimination. One of the main contributions of this paper is to show that in-group favoritism affects hiring, wage, and effort choices. As has been noted recently, in-group favoritism need not imply out-group hostility, and so we exploit this difference between "exophobia" (out-group discrimination) versus "endophilia" or in-group favoritism (Feld et al, 2016).[1] Thus, while outcomes may be similar, the motivation for differential treatment could differ from what one typically considers discrimination. For expositional purposes, we use the terms discrimination and favoritism somewhat interchangeably.

In addition to providing evidence of favoritism and reciprocity between in-group employers and workers, another contribution of our paper is the generation of unique data on spillover effects of discrimination/favoritism. Specifically, our experimental design provides an avenue for spillover effects to manifest by allowing unemployed workers (who may or may not be able

[1] The Feld et al., (2016) study notes the lack of attention given to this distinction in the economics literature outside of a couple of older papers (Goldberg, 1982, and a survey article by Cain, 1986).

to attribute their unemployment status to in-group favoritism) to destroy others' resources (i.e., burn money). Thus, our data permit us to measure one type of discrimination spillover cost on society. While there are limitations to how much laboratory money-burning choices can teach us about true societal costs like fragmentation and increased conflict, our data may be seen as providing at least some evidence of one micro-foundation of societal tension, riots, or less extreme but still costly forms of antisocial behavior. We view this as an important contribution to the literature on discrimination because such costs of discrimination on society are typically ignored in existing research. A third contribution of our study is to provide a theoretical framework that can explain several of our findings as the result of preferences that incorporate moral motivations, fairness, and discrimination concerns. A final contribution of this study is the strategy method elicitation of decisions from subjects, which allows us to identify the impact of favoritism by examining each subject's full contingency choice set.

The potential for disgruntled societal groups to engage in costly anti-social behavior is real. For example, significant costs to society were incurred in France in 2006 when proposed labor laws upset young workers who viewed the new laws as unfair or discriminatory towards new workers. In Paris alone, more than 500,000 protestors gathered, and the media coverage showed evidence of explicit societal costs as store fronts were vandalized and cars torched by a few dozen rioters.[2] Even recent civil unrest in the U.S. that is not specifically connected to labor market outcomes (e.g., the Baltimore riots of 2015) show the potential societal costs of tension between identity groups (e.g., racial groups) and real or perceived in-group favoritism. Other examples of how discrimination may impact societal resources and wealth transfer might include the pursuit of ant-discrimination lawsuits, which are costly to society but not an antisocial use of resources.[3] Our design allows us to separate targeted resource destruction from indiscriminate resource destruction in a way that can be informative regarding our understanding of discrimination spillover costs.

To preview our main results, we document evidence of the private benefits to employers of discriminating against out-group (or favoring in-group) workers. However, there is also significant increases in money burning by unemployed workers in our experimental setting,

[2] For instance, significant costs to society were incurred in France in October and November 2005, when a series of riots occurred in the French suburbs, involving the burning of cars and several public buildings. The riots resulted in three deaths of non-rioters many police injuries and nearly 3000 arrests. A state of emergency was declared on November 8, later extended for three weeks, and the government announced a crackdown on immigration. This event was an expression of frustration and real or perceived discrimination on the labor market from immigrant communities with Arab or Muslim background.

[3] We wish to thank an anonymous reviewer for suggesting the example of an anti-discrimination lawsuit as a type of resource cost due to discrimination that is not necessarily anti-social.

most notably when there is evidence of discriminatory employers. This highlights that society as a whole has an interest in addressing systematic favoritism.

2. BACKGROUND

Labor market discrimination may exist for a variety of reasons. In Becker's model, discrimination in hiring or wages is caused by a 'taste for discrimination', which leads the employer to hire or pay higher wages to members of her/his own group (henceforth, "in-group"). Other models predict workplace segregation but consider that in-group biases are driven by efficiency considerations, such as reduced costs of communication (Lang, 1986; Athey et al., 2000). Communication costs, in general, are lower among individuals with a common group identity of some sort. This may be a contributing factor in understanding how in-group favoritism evolves (Efferson et al, 2008; Feng et al., 2012), which can then help explain segregation of informal networks (Marsden, 1987). In-group networks have been found to impact hiring decisions (Granovetter 1995; Holzer, 1996; Bayer et al., 2008; Hensvik and Nordström Skans, 2016; Gee et al, forthcoming). For example, researchers have reported that workplaces with black supervisors or owners are significantly more likely to employ black workers (Bates, 1994; Carrington and Troske, 1998; Stoll et al., 2004; Giuliano et al., 2009). This suggests that in-group favoritism may be a key component of the discriminatory outcome.

An alternative to taste-based discrimination is statistical discrimination (Phelps, 1972; Arrow, 1972). According to this approach, employers have incomplete information about the worker's potential performance. Imperfect information arises either because minority groups emit noisier signals (Phelps, 1972; Aigner and Cain, 1977; Cornell, and Welch, 1996; Pinkston, 2003) or because negative prior beliefs about members of a particular group may become self-fulfilling in equilibrium (Lundberg and Startz, 1983). Due to the complexity of factors that may contribute to discrimination, we view this topic area as one where laboratory methods offer a particularly attractive approach for generating primary data that are relatively free from many of the confounds typically present in studies based on field data.

An exhaustive account of the different types of discrimination is beyond the scope of this paper, but it is worth noting what laboratory methods have contributed in this area. Examples of laboratory studies aimed at studying the determinants of discrimination include: Holm, 2000; Anderson and Haupert, 1999; Fershtman and Gneezy, 2001; Fryer *et al.*, 2005; Dickinson and Oaxaca, 2009, 2014; Slonim and Guillen, 2010; Castillo and Petrie, 2010; Rödin and Özcan, 2011; Falk and Zehnder, 2013; see also Anderson *et al.* 2006 and Lane, 2016, for surveys). As

noted above, laboratory methods are a methodological alternative intended to facilitate identification of the determinants of discrimination (Giuliano et al., 2009, is an exception) by isolating the key variables of interest, thus facilitating causal inference. Laboratory research has shown that statistical discrimination may result from risk aversion, mistaken stereotypes, incomplete information, or assessment bias (Anderson and Haupert, 1999; Davis, 1987; Fershtman and Gneezy, 2001; Dickinson and Oaxaca, 2009; Castillo and Petrie, 2010), and a another laboratory study found that discrimination may lead to hiring as well as wage-based discrimination (Dickinson and Oaxaca, 2014). Finally, a recent paper by Grosch and Rau (2017) focuses on discriminatory pay and its impact on antisocial behavior in a laboratory experiment study. Relative to Grosch and Rau (2017) we implement a stronger group identity manipulation, we use a decision task focused on reciprocity as a key mechanism behind in-group favoritism, and our money burning game is able to separate targeted from indiscriminate resource destruction among the unemployed.

As noted above, our focus in the present paper is on taste-based discrimination because our design leaves little room for statistical discrimination. This is the case because our experimental employers receive precise information regarding each worker's productivity (i.e., a cost function). Nevertheless, we acknowledge that employers may form beliefs that anticipate in-group reciprocity, and this may constitute a weak form of statistical discrimination. In our laboratory environment, group identity carries no relevant information content or cost advantage, thus removing common explanations from consideration in explaining our results. Taste-based preference for in-group members or the expectation of worker reciprocity would be the only identifiable reasons to show favoritism by group identity in such instances. Nevertheless, these two reasons highlight how both a preference and statistically-based component may potentially contribute to in-group favoritism. One may simply prefer making favorable choices towards in-group members, or one may do so due to a belief that in-group reciprocity is stronger than out-group reciprocity—the line is somewhat blurred between taste-based and what is akin to statistical discrimination. We cannot and do not attempt to disentangle taste-based from this form of belief-based statistical discrimination, assuming it may exist, in our data.

Another relevant stream of literature is the laboratory research on group identity formation and its effects on behavior. Research has found that the more salient the in-group membership status, the larger the impact on behavior (Charness et al, 2007). Notably, a recent meta-analysis (Lane, 2016) focused on discrimination experiments with a group identity component and highlighted that both preference- and statistically-based discrimination have been found across

laboratory studies using identify groups. One conclusion reached was that artificially-induced group identities seem to generate relatively strong evidence of discrimination in laboratory studies.

Eckel and Grossman (2005) reported that group identification increased cooperation in a public goods game, while Chen and Li (2009) found that in-group members were more forgiving and more interested in maximizing welfare of their particular group.[4] Other recent research also reports significant in-group favoritism (e.g. Chen and Chen, 2011; Chen et al, 2014; Currarini and Mengel, 2016; see Hewstone et al, 2002 for a survey). Of particular relevance to our work is the Chen and Chen (2011) result that effort coordination increased to high levels when group identity was more salient. Due to our belief that reciprocity concerns may be at the heart of in-group favoritism, we use of a gift-exchange environment in our design. The Chen and Chen (2011) results suggest that positive reciprocity by in-group workers is likely in gift-exchange effort environments, which would imply that employers may rationally choose to favor in-group workers (i.e., discriminate against out-group workers).

Group identity is not without its drawbacks, as has recently been noted in the literature. Hostility towards out-group members may not always manifest (Goette et al, 2006), but there is an apparent dark side to group identity that may at times lead to vindictive or antisocial actions if certain triggers are present (e.g., intergroup competition, see Goette et al., 2012). Surprisingly, in-group favoritism may also increase norm violations by in-group members (Bernhard et al, 2006). Our environment will allow us to examine and test distinct facets of the in-group favoritism hypothesis.

A key way in which our study contributes to this discussion of the dark side of group identity is by examining spillover effects of favoritism via a money burning game. Recent behavioural findings suggest that anti-social tendencies do exist in such games (see Zizzo and Oswald, 2001; Zizzo, 2004; Abbink and Sadrieh, 2009; Abbink and Herrmann, 2011). These studies have provided strong evidence that people may be willing to harm others even in the absence of immediate or future expected monetary return. These papers have also shown that the desire to burn money is mainly rooted in inequality aversion and fairness concerns. In a seminal paper, Zizzo and Oswald (2001) designed a game where subjects could reduce (burn) other subject's

[4] Others have shown that trust may increase within groups, which points to another potential benefit of showing preferences towards one's own group (Glaeser at al, 2000; Eckel and Wilson, 2004; Bernhard et al, 2006; Goette et al., 2006; Falk and Zehnder, 2007; Buchan et al., 2008; Fiedler et al., 2011). This highlights that another rationale for discrimination may be to increase social capital within a group.

payoffs at a personal cost.[5] Despite the personal cost, the majority of subjects chose to destroy some portion of others' payoffs. Consistent with models of inequality aversion, the authors found that subjects burn money mainly to reduce inequalities: Higher payoff subjects experienced more money burned compared to lower payoff subjects. Such results suggest that those perceived to be in a favored position may have more money burned by others.

3. EXPERIMENT DESIGN

3.1 *Preliminary Phase—Social Preference Elicitation and Group Identity Induction*

Before the main hiring and effort choice experiment, subjects participated in a 2-part preliminary phase. First, we used an existing procedure to generate common measures of social preferences (Blanco et al, 2011). Specifically, a measure of disadvantageous inequality aversion (i.e., "envy") is derived from ultimatum game responder choices, and a modified dictator game is used to generate a measure of advantageous inequality aversion (called "guilt" by Blanco et al, 2011, but can be considered a proxy for altruism. See instructions in Appendix A for further details).[6] Decisions in the social preference elicitation tasks were incentivized,[7] but participants were not informed of the preliminary task outcome until the end of the experiment in order to avoid wealth effects.[8] Furthermore, the lack of context in these preliminary tasks helped avoid the potential for behavioral spillovers into the main experiment.

During a second part of this preliminary phase, we induce group identities. These group identities are a relevant variable of interest in our design. Each experimental "society" consists

[5] There is a substantial literature on altruistic peer punishment building on Ostrom et al., (1992) and Fehr and Gächter (2000). The money burning component of our design differs from this literature in several important aspects. Altruistic peer punishment is usually the result of social norm violation, typically within a public goods social dilemma. Norms in the money burning game are not comparable to contributions in a public goods environment, and the target of the money burning is not one's unemployed peers. Rather, the target of one's punishment in our experiment are either other workers and/or the employer, which represents punishment upstream in the relationship hierarchy.

[6] Inequality aversion stipulates that individuals care about the distribution of monetary payoffs in addition to their own payoff. Specifically, an inequality averse individual prefers equal monetary payoffs for all players, though some may have a differential aversion to inequality depending on whether it benefits (advantageous inequality) or harms oneself (disadvantageous inequality). Models of inequality aversion were first proposed by Bolton (1991) and refined by Fehr and Schmidt (1999) and Bolton and Ockenfels (2000). Using the Blanco et al (2011) tasks, we calculate the α and β parameters for each subject described in Fehr and Schmidt (1999) as measures of disadvantageous and advantageous inequality, respectively.

[7] More specifically, one row of the payoff matrix is randomly selected from each game for payoff.

[8] To avoid possible contamination of the main results due to this initial elicitation, we also note that wording of the social preference elicitation task was more neutral relative to the labor-context of the main experiment, and participants were not made aware of their payoffs regarding the social preference elicitation until the end of the experiment. It is also the case that what is really of interest to us is the main results comparison across treatments (and all subjects received the same elicitation task initially).

of 8 subjects divided into two groups of 4 subjects each. Groups are formed based on similarity of choices in a movie preference task. More specifically, participants are presented with a set of choices between two movies – drama and comedy. Following those questions, we matched together the four participants who chose comedies (respectively, dramas) the most often. Participants were informed that their identity group members were similar in terms of movie preference, but were not given any more specific information regarding the algorithm underlying the matching procedure. Then we increased the saliency of group identity by asking matched participants to choose a group name from among a predefined list of sea/ocean name options to represent the group's "identity" (e.g., group "Atlantic", group "Baltic").[9] Our choice to induce otherwise meaningless group identities rather than use subjects' natural identities (e.g. gender, ethnicity or social background) was intended to increase control over the group assignments and limit selection concerns in the data.[10] Thus, throughout the experiment subjects are assigned to a *society* that includes two different *identity-groups*.[11]

3.2 *Main Experiment Phase*

Our experiment consists of four treatments that differ on two dimensions: worker employment assignments (random or based on rankings), and the effort cost of the workers (homogeneous or heterogeneous). The specific roles within each 8-subject experimental "society" are: 2 employers, 4 workers, and 2 unemployed. The baseline treatment, called *Homogeneous Ranking*, consists of three stages that involve distinct decisions. In Stage 1, each subject makes decisions in the role of an employer who must hire two workers who will each make an effort choice affecting the employer's monetary payoff (e.g. Sutter and Weck-Hannemann, 2003). As a potential employer, subjects rank the other 7 members of his/her society from most (rank=1) to least (rank=7) preferred. Information on the group identity of each subject is common knowledge when making ranking decisions, and these rankings are then used to form firms

[9]Group name choice was accomplished using a 3-minute chat feature in the computer interface such that participants could only interact with other members of their identity group. It was forbidden to reveal one's true identity. At the end of the 3-minute chat, group name was selected by majority rule. If no agreement was reached, a random name was assigned to the group. However, agreement was reached by all groups without exception.

[10] One may expect that using movie preferences to match participants could lead to gender segregated groups. We do not observe unbalanced gender distribution among identity groups (i.e., movies tastes did not differ by gender).

[11] Identity-groups are not to be confused with a subject's individual randomly assigned ID number used to label a specific subject in the anonymous interaction environment. These ID numbers are randomly re-assigned in each stage of the experiment (i.e., it is not possible to track a specific subject across experiment stages).

within the society for some treatments.[12] Subjects were fully aware that these rankings would be binding if randomly assigned as an employer in the following stage of the experiment.

Once all employers submit their rankings, firms composed of an employer and two employees are formed using a two-step mechanism similar to the one suggested by Bogomolnaia and Jackson (2002) (see also Castillo and Petrie, 2010). In step one, the first employer (called A1) is randomly chosen by the computer and is matched with her/his two preferred employees based on her/his ranking. Thus, a first firm is formed with this employer and her/his two best ranked workers (called worker B1 and B2). In a second step, the second randomly chosen employer (called A2) is matched with her/his two most preferred employees (called B3 and B4) from among the remaining four participants who have not yet been assigned to the first employer in step one. The two participants not assigned to a firm are assigned the role of unemployed workers (unemployed worker C1 and unemployed worker C2 respectively). The two unemployed workers in each group do not take part in Stage 2 of the game and receive a fixed payment of 5 EMU (Experimental Monetary Units), which is analogous to unemployment insurance.

The second experimental stage (Stage 2) consists of a gift-exchange game between employers and their respective workers. Employers assign (potentially unequal) wages to the workers of their respective firm. Wage options are $w = 16$ or $w = 32$, for the employer. We use the strategy method to elicit employers' decision for each potential identity-group composition of the firm. Workers then choose an integer level effort $e \in [1, 4]$ for each potential wage distribution within the firm and for both of the possible employer identity-groups.[13] Employed workers face the same marginal cost of 5 EMU for each effort unit chosen, with the cost of effort function given by:

(1) $C(e)=5e-5$

Employer profits are a function of the two employee effort levels e_1 , e_2 and the wages paid to each employee, w_1, w_2 according to the following function:

[12] Specifically, subjects are told that those assigned a preferred rank are more likely to be recruited as a worker for that subject, should he/she be randomly assigned as an employer.

[13] Our choice to use strategy method elicitation (i.e., contingent choices) represents a trade-off between the amount of data generated versus the emotional arousal potential of the decision. Brandts and Charness (2011) report in a recent survey that treatment effects found with contingent choices were always found also when using direct response elicitation. Because direct response elicitation likely involves a more hot emotional state than strategy method elicitation, our results may represent conservative estimates of the treatment effects if one believes that a more unconscious or emotional response partly generates in-group favoritism.

(2) $\Pi_{employer}(e_1,e_2,w_1,w_2) = 32\ (e_1 + e_2) - w_1 - w_2.$

Each worker *i*'s payoff is given by:

(3) $\Pi_{\text{worker}}(e_i,w_i,) = w_i - C(e_i)$

Note that unemployed workers do not participate in Stage 2 and instead receive a fixed amount of 5 ECU, which can be viewed as unemployment insurance.

In Stage 3, unemployed workers take part in a money burning game. At the time subjects made ranking, wage, and/or effort choices, no one was aware that there would be a third stage of the experiment. Here, unemployed workers can either target specific individuals in the society (at a relatively high cost — 1 EMU paid burns 5 EMU of a specific target individual) or burn money of both employers and workers without distinction (for a relatively low cost — 1 EMU paid burns 2 EMUs of other employers' and workers' payoff).[14] This Stage 3 money burning game allows unemployed workers to express their negative emotions, such as anger, for not having been hired in a way that is costly to the society. We consider this to be important in evaluating the overall impact of discrimination or favoritism in the labor market.

A second treatment, *Homogeneous Random*, is similar to *Homogeneous Ranking* (described above) with the exception of Stage 1, which is replaced in *Homogeneous Random* by a simple random assignment of workers as either employed by a firm or unemployed. Specifically in *Homogeneous Random*, two participants are first selected at random by the computer to be employers, then among the 6 remaining members of the experimental society, four subjects are randomly assigned as workers to employers A and B (two workers each). Thus, the remaining two workers are unemployed due to random selection.[15] It is apparent that in *Homogeneous Ranking* and unemployed worker may attribute this condition to the preference of employers, which allows as examination of how favoritism in hiring may impact decisions relative to the *Homogenous Random* treatment.

Finally, the other two treatments, *Ranking Heterogeneous* and *Random Heterogeneous* replicate the first two treatments described with the exception of heterogeneity in the cost of effort functions (i.e., the productivity) of the workers. Specifically, in the *Heterogeneous* treatments, each society of 8 subjects is divided into 4 high productivity (low effort cost, $C(e)=3e-3$) and 4 low productivity (high effort cost, $C(e)=5e-5$) individuals. Once the employers are randomly selected from within the society, this effort cost information is not

[14] A subject choosing the "burn with no distinction" option was not allowed to individually target subjects for additional money burning.

[15] Note that identity groups are irrelevant for the matching algorithm in the *Random* assignment treatments.

applicable to the employer subjects and the remaining 6 members of society always included 3 high and 3 low productivity workers.

By comparing decisions in *Homogeneous* and *Heterogeneous* treatments, we investigate whether high productivity may alter the likelihood of employer in-group favoritism and/or whether unemployed workers consider the heterogeneity in worker productivity when making money burning choices. Recall that unemployed workers earn a fixed payoff of 5 EMU, while the range of possible payoffs to employed workers is [1,32] EMU for high cost of effort workers, and [7,32] EMU for low cost of effort workers. The range of possible payoffs for the employers are [0,224] EMU.

3.3 *Procedures and Parameters*

The experiment consists of 8 sessions conducted at the CREM-CNRS (LABEX-EM) institute of the department of Economics of the University of Rennes 1 in France. Summary information about the 8 sessions is shown in Table 1.

Table 1. Experimental Sessions

Sessions	Treatment	# Participants
1 ; 2	Homogeneous Ranking	48
3 ; 4	Homogeneous Random	48
5 ; 6	Heterogeneous Ranking	48
7 ; 8	Heterogeneous Random	48
	Total number of participants:	192

A total of 192 undergraduate students in management, economics, law, medicine, arts and sciences were recruited via the ORSEE software (Greiner, 2004). Participants earned on average 15.52€, including a show-up fee of 5€. During the experiment, all payments were expressed in experimental currency units (EMU), and are converted to Euros at a predetermined conversion rate of 5 EMU = 1€. Some of the participants may have participated in experiments before but, to our knowledge, none had experience in any experiment similar to ours. No individual participated in more than one session of this study.[16] On average, sessions lasted

[16] The ORSEE recruitment software allows us to clearly identify students who have already participated to a similar game. However, we acknowledge that we cannot totally rule out the fact that they might have played a similar game in another university/institution, though we consider this very unlikely.

about 75 minutes including instructions and payment of participants. The experiment was computerized using the Z-tree software package (Fischbacher, 2007).

3.4 *Theoretical Framework*

Our identification of testable hypotheses will be facilitated by introduction of a simple theoretical framework. Absent the introduction of behavioral considerations, our game is one in which workers would choose minimal effort (since effort is costly), employers anticipate this and make minimal wage offers, and unemployed workers do not burn money because it is costly to do so. However, here we present a framework that incorporates moral motivations (see Figuieres et al, 2013 for details on such models), reciprocity (see Rabin, 1993, for a formal model incorporating fairness into a utility function), and taste-based discrimination (introduced in Becker, 1957). Such considerations capture relevant features that may impact choices of workers and employers, as well as the unemployed, in our experimental environment. Our framework will consider the importance of group identity as well.

We present hypotheses in the next section in the chronology of the experiment sequence, but in order to understand some theoretical underpinnings of importance let us first consider the gift exchange game and proceed backwards through the game. As needed, we will index one's in-group as group *A*, and so group index *B* will refer to the out-group.

The extended model attempts to combine considerations for intrinsic moral obligation, fairness concerns, and taste-based discrimination. We first consider the *modified gift exchange game*, separately from the money burning game (considered afterwards). The game consists of a firm and 2 workers. Let *A* (*B*) denote the majority (minority) group identity. We assume that the firm belongs to the majority group (A) and that there is a worker of each group identity. The game consists of 3 stages. In stage 1, the employer hires employees; in stage 2 the employer chooses wages and in stage 3 each hired worker *i* chooses her normalized effort $e_i \in [0,1]$.

We proceed to solve the game predictions by backwards induction. In stage 3, In the final stage, worker *i* chooses effort level e_i to maximize:

(A1) $U_i(e_i, w_{ij}) = w_{ij} - c(e_i) - v_i(e_i - \widehat{e_i})$, with $\widehat{e_i} = \widehat{e_i}(\widetilde{e_i}, w_{ij})$ and $i, j \in [A, B]$

where, w_{ij} is the wage employer j offers worker i, $c(e_i)$ is worker i's cost of effort function (where $c'_e > 0$ and $c''_{ee} > 0$) and $v_i(e_i - \widehat{e_i})$ is one's "moral obligation" function that generates disuility when effort differs from one's personal moral ideal, $\widehat{e_i}$ (e.g., Nyborg, 2000 ; Brekke

et al, 2003 ; Figueres et al, 2013). By assumption, $v_i(0) = 0$ and $v_i(e_i - \widehat{e_i}) > 0$ iff $e_i \neq \widehat{e_i}$. We also assume $v'_e = \frac{\partial v}{\partial e_i} \gtreqless 0 \leftrightarrow (e_i - \widehat{e_i}) \gtreqless 0$. So, (moral) disutility is reduced as one moves effort e_i closer to one's moral ideal, $\widehat{e_i}$. We also assume marginal disutility increases at an increasing rate as effort gets further from the moral ideal, $v''_{ee} > 0$.

Following Figueres et al (2013), $\widehat{e_i}(\widetilde{e_i}, w_{ij})$ is the moral obligation function that combines an autonomous component grounded on a Kantian categorical imperative (Lafont, 1975) denoted $\widetilde{e_i}$, and a component related to fairness considerations, which depends on the employer's wage decisions w_{ij}. The second component of the moral obligation function can be interpreted as the worker *i*'s belief regarding employer *j*'s fairness, in the spirit of Rabin (1993), where a high wage (perhaps anchored around the perceived equitable wage) is perceived as a kind action.[17]

The moral obligation function satisfies the following intuitive properties:

Assumption 1: $\frac{\partial \widehat{e_i}}{\partial \widetilde{e_i}} = \hat{e}'_{\tilde{e}} \geq 0$ (one's moral obligation increases in the effort imperative)

Assumption 2: : $\frac{\partial \widehat{e_i}}{\partial w} = \hat{e}'_w \geq 0$ (one's moral obligation increases in w_{ij})

Essentially, Assumption 2 states that if the worker observes a (low) high wage, she perceives this as a (un)kind action, which will (decrease) increase her moral imperative. This framework implies the worker will desire to reciprocate a kind wage offer with higher effort to reduce the disutility of choosing effort below her revised higher moral obligation level in equation A1.

The first order conditions for each worker type are:

(A2) $\frac{\partial U}{\partial e_i}: -c'_e(e_i) - v'_e\left(e_i - \hat{e}\left(\widetilde{e_i}, w_{ij}\right)\right) = 0$ with group $i \in [a, b]$

In A2, the first term is negative and the sign of the second term depends, by assumption, on whether one's effort is above or below her moral obligation. Starting from a situation where worker *i* exerts an effort lower than her moral obligation, a marginal increase in effort reduces her loss of utility. These first-order conditions can be solved to obtain Nash equilibrium effort level $e_i^* = e(w_i)$ such that the following identity holds when substituting optimal effort and the moral obligation function back into A2:

(A3) $-c'_e\left(e^*(w_{ij})\right) - v'_e\left(e^*(w_{ij}) - \hat{e}(\widetilde{e_i}, w_{ij})\right) \equiv 0.$

[17] While Rabin (1993) considers one's "belief" of how kind someone is, beliefs may be replaced with an actual signal of kindness (see Dickinson, 2000) in the case of our workers who make effort choices with full knowledge of the wage offer.

From equation (A3) we can then get the following comparative static result :

(A4) $$\frac{\partial e_i^*}{\partial w_{ij}} = \frac{v''_{e\hat{e}}\left(\frac{\partial \hat{e}}{\partial w}\right)}{-c''_{ee}-v''_{ee}}$$

Since both *c*(.) and *v*(.) are convex functions, the denominator is unambiguously negative. By assumption, $\frac{\partial \hat{e}}{\partial w} > 0$. Therefore, this implies that the necessary condition for the existence of $\frac{\partial e_i^*}{\partial w_{ij}} > 0$ (i.e., positive wage effort reciprocity) is that $v''_{e\hat{e}} < 0$, which is a reasonable condition. The interpretation of this condition is that a marginal increase in the moral obligation (resulting from increased wage by employer) raises the marginal reduction of moral disutility when changing effort towards that moral obligation. Our first predictions are with respect to effort.

Prediction a: Strong intrinsic moral motivations embodied by $v_i(e_i - \widehat{e_i})$ and a high moral target will generate non-minimal effort predictions.

Prediction b: There is a positive relationship between wage and effort.

In stage 2 of the game, firms choose wages by maximizing utility that depend on output, *Q*, wages paid, effort levels (recognizing these are a function of wages), the size of labor force *L*. Indexing by $I \in [A, B]$ indicates effort, wages, labor force, etc, for the employer's in-group, *A*, versus out-group, *B*. As with worker effort, we introduce moral considerations in terms of the wage offered compared to a moral ideal for the employer. The moral ideal, $\widehat{w_I}$ for the wage offered to worker of identity group *I* is exogenous since the employer is the first-mover in the game. We also introduce Becker's (1957) coefficient of discrimination that will apply an extra discrimination cost, *d*, to each worker hired from the out-group. All of this is subject to the workers' optimal effort first-order condition constraint. The employer maximizes the following :

(A5) Maximize $_{wa,wb}$ $U_a(w_a, w_b, e_a, e_b, L_a, L_b) =$

$$Q(e_a(w_a)L_a, e_b(w_b)L_b) - w_aL_a - w_bL_b - v_a(w_a - \widehat{w_a}) - v_b(w_b - \widehat{w_b}) - dL_b$$

Where *e.L* is the efficiency labor force (Yellen, 1984). We note in (A5) that intrinsic moral motivations are now separated and indexed separately by in-group/out-group, and we assume an in-group favoritism such that $\widehat{w_a} > \widehat{w_b}$ (one's moral standard is a higher wage for in-group wage offers). The first-order conditions can be written as:

(A6) $$\frac{\partial U}{\partial w_a}:\ Q'\big(e(w_a)\big) - L_a - v_a'(w_a - \widehat{w_a}) = 0$$

$$\frac{\partial U}{\partial w_b}:\ Q'\big(e(w_b)\big) - L_b - v_b'(w_b - \widehat{w_b}) = 0$$

which implies : $Q'\big(e(w_a)\big) - L_a - v_a'(w_a - \widehat{w_a}) = \ Q'\big(e(w_b)\big) - L_b - v_b'(w_b - \widehat{w_b})$

The terms in each first-order condition account for the marginal product of increased effort, the marginal cost of a higher wage per worker, and the marginal change in disutility associated with the change in wage. From these first-order conditions we can obtain optimal wages that depend on the differential moral standards (which depend on group identity), such that $w_a^* = w(\widehat{w_a}) > w_b^* = w(\widehat{w_b})$

This leads to our stage 2 predictions:

Prediction a: Concern for moral obligation towards workers will lead to above minimal wage levels

Prediction b: If moral obligation is stronger for in-group members (i.e., in-group favoritism), then in-group workers are offered higher wages that out-group workers

We next consider the first stage of the modified gift exchange game. In stage 1 of the game, the firm chooses the optimal number of workers to hire from each group identity (*A*, *B*), taking into account wages are a function of moral standards perceived for each group, and workers have chosen optimal effort as a function of those wages. The firm maximization problem is :

(A7) $$max_{L_a,L_b}\ U = Q(e_a(w_a(\widehat{w_a}))L_a, e_b(w_b(\widehat{w_b}))L_b) - w_a(\widehat{w_a})L_a - w_b(\widehat{w_b})L_b - v_a(w_a(\widehat{w_a}) - \widehat{w_a}) - \delta_i(w_b(\widehat{w_b}) - \widehat{w_b}) - dL_b$$

From this we get the following first order conditions :

(A8) $$\frac{\partial U}{\partial L_a}: Q'_{L_a}(e(w_a(\widehat{w_a}))L_a, e_b(w_b(\widehat{w_b}))L_b) = w_a(\widehat{w_a})$$

$$\frac{\partial U}{\partial L_b}: Q'_{L_b}(e(w_b(\widehat{w_b}))L_a, e_b(w_b(\widehat{w_b}))L_b) = w_b(\widehat{w_b}) + d$$

which can also be expressed as : $\frac{Q'_{La}}{w_a(\widehat{w_a})} = \frac{Q'_{L_b}}{w_b(\widehat{w_b})+d}$

These conditions involve hiring up to the point where marginal contributions to production equals the wage rate. However, given that the discrimination coefficient, *d*, increases the

marginal cost of an out-group hire, the Nash equilibrium hiring levels will generally involve $L_a^*(e_a^*) > L_b^*(e_b^*, d)$.[18] This is our stage 3 prediction:

> *Prediction*: Assuming identical marginal productivity (MP) of worker effort across identity groups, employers will only hire in-group workers for a sufficiently high discrimination coefficient, *d* (higher MP of out-group workers can mitigate this).

Let's now consider the money burning game. We can consider this game in isolation given players in our experimental environment were unaware of its existence until after the gift exchange game.[19] For simplicity we assume here that burning decisions target only the employers. The unemployed worker has utility defined by unemployment benefits, moral obligations to burn money and reciprocal kindness considerations such that utility for unemployed worker *i* is (using capital *A*, *B* to index group identities now, to avoid confusion with burning choice, *b*):

$$\text{(A9)} \quad U_i^{unemployed} = z - c(b_{AA}) - c(b_{AB}) - v\left(b_{AA} - \widehat{b_{AA}}\right) - \gamma\left(b_{AB} - \widehat{b_{AB}}\right)$$

$$\text{with } \widehat{b_{\iota J}} = \widehat{b_{\iota J}}\left(\widetilde{b_\iota}, h_i\right) \text{ for } i, j \in [A, B]$$

Where *z* is the unemployment insurance, and $c\left(b_{ij}\right)$ is the cost for individual *i* burning the money of an employer *j* who may be an in-group or out-group individual. The last two terms represent moral loss of utility due to deviating from one's moral idea in terms of money burning, $\widehat{b_{\iota J}}$. As with effort functions in the gift exchange game, we assume $\widehat{b_{\iota J}}$ is a moral obligation function that is a combination of an autonomous Kantian categorical imperative component, $\widetilde{b_{\iota J}}$, and a component related to fairness considerations that depend on the employer's <u>non-</u>hiring decision h_i that implicitly induces a loss of income w_{ij}. For simplicity let's assume that the autonomous moral ideal is not to burn such that $\widetilde{b_{\iota J}}$=0.[20] Therefore, the moral ideal is captured solely by the employer's <u>non-</u>hiring decision *h*. We also assume that $v > \gamma$, which

[18]Alternatively, out-group workers may compensate for the increased cost to employers with higher effort, but this implies the out-group worker would incur additional costs of effort that would not be optimal in light of the inferior out-group wage level.

[19]This assumption would be similar to the assumption that employers make hiring and wage decisions without consideration of spillover costs that may stem from unemployed workers.

[20] Interestingly, our model allows us to account for pure nastiness in money burning games, which would mean that nasty individuals have a positive $\widetilde{b_{\iota J}}$ components (e.g., Abbink and Sadrieh, 2009).

implies there is higher disutility to burning money of an in-group member compared to an out-group member (see, e.g., Bernhard et al, 2006; Goette et al, 2006).

Each unemployed worker chooses her optimal money burning level by maximizing (A9) with respect to the burn choice, *b*, which yields the following first order conditions:

(A10a) $\frac{\partial U_A}{\partial b_{AA}}$: $-c_b'(b_{AA}) - v_b'\left(b_{AA} - \widehat{b_{AA}}\right) = 0$

(A10b) $\frac{\partial U_A}{\partial b_{AB}}$: $-c_b'(b_{AB}) - \gamma_b'\left(b_{AB} - \widehat{b_{AB}}\right) = 0$

The first term of each first-order condition is negative and corresponds to the marginal cost of burning money, while the second term corresponds to the disutility from deviation from one's moral ideal in terms of burning. The optimal money burning level is $b_{ij}^* = b^*(\widehat{b_{ij}})$ such that (by replacing $\widehat{b_{ij}}$ by its value $\widehat{b_{ij}}(h_i)$) we get the following identities :

(A11a) $-c_b'\left(b^*(\widehat{b_{AA}}(h_A))\right) - v_b'\left(b^*(\widehat{b_{AA}}(h_A)) - \widehat{b_{AA}}(h_A)\right) \equiv 0$

(A11b) $-c_b'\left(b^*(\widehat{b_{AB}}(h_B))\right) - \gamma_b'\left(b^*(\widehat{b_{AB}}(h_B)) - \widehat{b_{AB}}(h_B)\right) \equiv 0$

From equation (A11a) and (A11b) we can then get the following comparative static result:

(A12a) $\frac{\partial b_{AA}^*}{\partial h_A} = \frac{v_{b\hat{b}}''\left(\frac{\partial \hat{b}}{\partial h_A}\right)}{-c_{bb}''-v_{bb}''}$ and (A12a) $\frac{\partial b_{AB}^*}{\partial h_B} = \frac{\gamma_{b\hat{b}}''\left(\frac{\partial \hat{b}}{\partial h_B}\right)}{-c_{bb}''-\gamma_{bb}''}$

By assumption, *c*(.), *v*(.) and γ(.) are convex functions such that the denominators of (A12a) and (A1b) are negative. Since $\frac{\partial \hat{b}}{\partial h} > 0$, the condition for a positive relationship between a non-hiring decision (perceived. as an unkind act) and a burning decision is that $v_{b\hat{b}}'' < 0$ and $\gamma_{b\hat{b}}'' < 0$. In other words, a necessary condition is that increasing the moral ideal level of burning reduces the marginal impact of burning choices on moral disutility. Our predictions with respect to burning decisions are summarized as follow:

Prediction a: If the unemployed worker views the non-hiring choice as an act of malice from the employer, then she will burn more money than her initial moral target level (set to zero).

Prediction b: Since hiring is not intentional in the *Random* treatment, money burning in *Random* treatments will be lower than in *Ranking* treatments, and it would only reflect nasty preferences.

Prediction c: Unemployed are more likely to burn out-group members' money compared to in-group members' money.

Our predictions proceeded through the backwards induction process as we solved the modified gift exchange game and then presented analysis of the money burning game.

3.6 *Hypotheses*

Here, we establish hypotheses regarding outcomes in each stage of our gift exchange game, as well as for money burning. We appeal both to predictions from our theoretical framework as well as from established empirical results in the literature, and we connect each hypothesis in this section to the specific "prediction" identified in the model presented above. Note that due to the 2x2 design we employ, each hypothesis below is conditioned on holding the other factor constant.

Consider first the hiring decisions in the *Ranking* treatments. If participants do not have discriminatory or favoritism based preferences, they should view group identities as irrelevant when assigning ranks — they should assign ranks randomly. However, one may conjecture that employers may have distaste for hiring people not belonging to their own group (Becker, 1957; Lang, 1986; Athey et al., 2000), or a preference for hiring in-group members as research has documented (Bouckaert and Dhaene, 2004).[21] Our first prediction states that employers may only hire in-group workers given a sufficiently high discrimination coefficient, *d*. In addition, one may also reasonably expect that individuals may be more likely to hire in-group individuals if they anticipate reciprocal higher effort in the gift exchange game (i.e., higher effort than out-group workers). However, in-group favoritism may be offset in the *Heterogeneous Ranking* treatment if employers care more about high productivity (i.e., low effort cost) than group identity. Our conjecture is summarized below in H1:

H1a: In *Ranking* treatments, preferred ranks will be assigned to in-group subjects.
H1b: In-group favoritism in rankings will be lower in *Ranking Heterogeneous* compared to *Ranking Homogeneous* due to worker productivity differences.

[21]In-group favoritism and out-group discrimination have been very robust findings in the social psychology literature (Tajfel *et al.* 1971; Billig and Tajfel, 1973; Turner and Brown, 1978; Vaughan *et al.* 1981; Diehl, 1988; Pratto and Shih, 2000).

Our second set of hypotheses describe the expected impact of in-group favoritism (or out-group discrimination) on wage choices. These hypotheses are derived in our model and result from a stronger moral obligation to in-group workers. We also conjecture that there may be a trade-off between hiring and wage discrimination, which may imply increased wage favoritism in *Random* treatments where employers cannot engage in hiring discrimination. This trade-off between hiring and wage discrimination is quite intuitive and was found in Dickinson and Oaxaca (2014), and Prediction 2b identifies higher in-group wages as a result of stronger moral obligations to in-group workers.

H2a: Wages offered to in-group subjects will be higher than wages offered to out-group subjects (i.e., in-group wage favoritism).
H2b: In-group wage favoritism will be higher in *Random* treatments where there is not an additional opportunity to show favoritism in hiring.

These first two sets of hypotheses focus on in-group favoritism impact on the dimensions of subject rankings and wage offerings. The remaining two sets of hypotheses focus on reciprocity effects of the workers (hired and unemployed). A large body of research documents positive reciprocity in numerous settings (including gift exchange experiments, see Fehr et al, 1997). Recent research also finds that individuals display more positive reciprocity towards in-group members (Chen and Li, 2009). Our theoretical framework predicts a positive wage-effort relationship that results from moral obligations and wages being interpreted as acts of kindness that increase one's moral ideal level of effort (Prediction 3a). This leads to hypotheses H3:

H3a: In-group workers will choose higher effort levels than out-group workers.
H3b: The will be positive wage-effort reciprocity, and this relationship will be stronger between in-group employer-workers.

Finally, our last hypothesis concerns money-burning decisions. Because burning money is costly, selfish and rational players should never burn money. However, individuals may have distributional concerns that influence their decisions in the money burning stage. Specifically, being unemployed may create dissatisfaction, which would be heightened when unemployment results from the intentional ranking choices. Thus, the unemployed may be more willing to sacrifice a part of their payoffs in order to burn employers' money in *Ranking* treatments, even when there are no monetary gains from doing so (Rabin, 1993; Falk and Fischbacher, 2006). The theoretical framework predicts differential money burning in the *Random* treatments (Predictions 4b and 4c). We also conjecture that, in both *Random and Ranking* treatments,

income comparisons may affect the decision to burn money. If the unemployed suffer from disadvantageous inequality aversion then they may be willing to burn money in order to reduce income differences (Fehr and Schmidt, 1999). The intentionality behind rankings that lead to unemployment, however, would still imply a disproportionate burning of employers' money, relative to other workers' money, in *Ranking* treatments. We also conjecture that money burning may be higher in societies with heterogeneous productivity across workers. In this case, employed workers who are low productivity (i.e., high cost of effort) may be a particular target for money burning given that employers would not reasonably hire a low productivity worker unless favoring one's group identity more strongly than one's productivity (and profit) potential. These conjectures are summarized as follows:

H4a: Money burning will be higher in *Ranking* compared to *Random* treatments.
H4b: Money burning in *Ranking* treatments will more often target employers than individuals in general.
H4c: Money burning will be higher in *Heterogeneous* treatments and will more often target low productivity (employed) workers, rather than high productivity workers.

4. RESULTS

We first investigate whether participants show favoritism towards in-group members (i.e., discriminate) in hiring, wage and effort decisions. These outcome measures inform our understanding of the private incentives firms may have to show favoritism. After analysis of the employer and worker decisions, we then investigate the social costs of favoritism in the form of unemployed worker money-burning choices.

4.1 *Discrimination and its Rationale*

4.1.1. In-group favoritism in hiring

Our data show that participants tend to rank in-group members more favorably (i.e., lower ranks). In the *Homogeneous Ranking* treatment, in-group members are assigned an average rank of 2.35 whereas out-group members are assigned an average rank of 5.24 (Wilcoxon signed-rank, $p<0.01$).[22] The additional information on worker costs of effort in the *Heterogeneous Ranking* treatment lowers this gap—the average in-group ranking is 2.98 compared to 4.77 for out-group members, which is a significantly reduced gap compared to *Homogeneous Ranking*

[22] All non-parametric tests are run on independent observations or they take into account the matched pairs nature of the data, depending on the comparison examined. We report two-sided p-values throughout.

gap (Wilcoxon Mann-Whitney, $p<0.01$). However, preferential ranking of in-group members remains significant (Wilcoxon signed-rank, $p<0.01$).

Table 2 reports the results of rank-ordered logit models (Beggs et al., 1981) on the determinants of the employer's ranking decision. The dependent variable $Rank_{ij}$ corresponds to the rank employer *i* assigns to each potential worker *j*. The independent variables include the candidate's identity group, as well as a control for candidate's productivity in the heterogeneous ranking treatment (column 3).[23] Coefficients reported indicate the marginal change in the log-odds of moving one rank higher, holding all other variables constant, but our focus is on the direction of the estimated effects. All models indicate that in-group members are ranked significantly better than out-group members (i.e., *lower* rank values). Model (2) and (3) of Table 2 report estimates in the *Homogeneous* and *Heterogeneous* treatments respectively. The significant negative coefficient on *Player j In-Group* ($p<.01$) confirms the existence of in-group favoritism at the hiring stage. Although in-group members are ranked better than out-group members in both treatments (models (2) and (3), $p<.01$ in both instances), favoritism is lower in the presence of heterogeneous productivities as indicated by the positive and significant ($p<.05$) coefficient estimate on *Player j High Effort Cost* in model (4).[24] This supports both Hypotheses 1a and 1b. Model (4) indicates that low productivity (i.e., high effort-cost) workers are ranked worse than high productivity workers, holding group identity constant ($p<.05$). If one includes an interaction term between high effort cost and in-group status of player *j* in model (3), results are unchanged and the interaction term is statistically insignificant ($p>.10$, estimates available on request).

[23] Each subject had to assign the same set of ranks (1-7) to the other subjects, and so subject-fixed variables (e.g., gender, altruism, etc) are omitted from these regressions.

[24] Also supporting this statement is the fact that the coefficient associated with "*Player j In-Group*" in Table 2 is significantly higher (i.e., less negative, which indicates less favoritism) in the Heterogeneous treatment (model 2) compared to the Homogeneous treatment in model (3) ($z = -4.95$, $p < 0.01$).

Table 2. Ranking Decisions

Rank attributed by player *i* to player *j* – Rank-Ordered Logit estimates				
	(1) Pooled regression	(2) Homogeneous Treatment	(3) Heterogeneous Treatment	(4) Heterogeneous Treatment
Player *j* In-Group	-1.725***	-2.604***	-1.180***	-1.210***
	(0.126)	(0.244)	(0.152)	(0.153)
Player *j* High Effort Cost	---	---	---	0.394**
				(0.154)
Total Observations	672	336	336	336
Number of Subjects	96	48	48	48

Notes: Standard errors are displayed in parentheses. **Lower ranks are preferred ranks.**
*** $p<0.01$, ** $p<0.05$, * $p<0.1$ (2-tailed)

Our interpretation of these first results is that employers anchor on group identity, with a preference for in-group status, when no other information is available. Additional information, such as productivity differences, give employers other characteristics of the worker on which to base a ranking (i.e., an employment preference). These findings support both hypotheses H1a and H1b.

Result 1a. In *Ranking* treatments, in-group members are ranked significantly better, on average, than out-group members.

Result 1b. The extent of in-group favoritism is lower—but still significant—in the *Heterogeneous* treatments. This is consistent with the premise of Hypothesis H1b, which stated that high productivity of an out-group worker would mitigate some of the in-group favoritism.

4.1.2. In-group favoritism in wage-setting

Figure 1 reports the proportion of high wages offered to in-group versus out-group members for both *Random* and *Ranking* treatments. Consistent with hypothesis H2a, we observe that in-group workers receive high wages significantly more often than out-group workers (X^2 test, $p<0.01$). This wage gap is significantly positive in the *Random* treatments (X^2 test, $p<0.01$), but not in *Ranking* treatments (X^2 test, $p=0.509$), which supports hypothesis H2b.

Figure 1. Wage discrimination

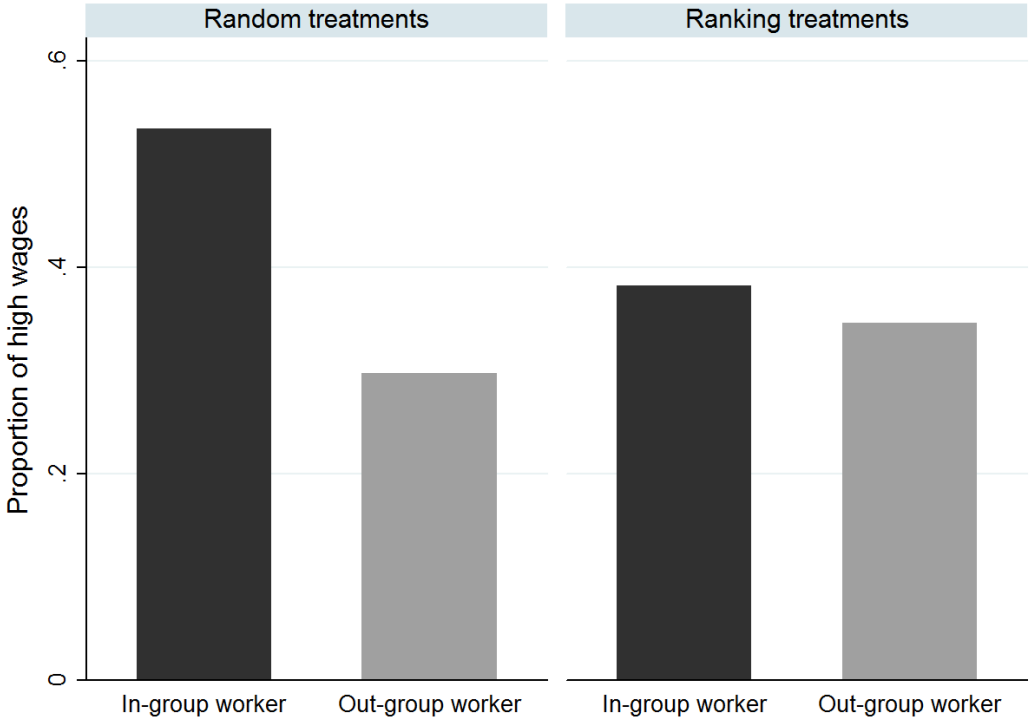


Table 3 reports random-effect logit estimates on the probability of offering a high wage.[25] In all treatments, we observe in-group favoritism in wage offerings (H2a). In-group workers have a significantly increased probability of receiving a high wage offer compared to an out-group worker (Table 3, Model (1), $p<.01$). Models (2) and (3) display separated estimates of the impact of *Player j In-Group* in the *Homogeneous* and *Heterogeneous* productivity treatments, which are statistically significant at the $p<.05$ (*Homogeneous*) and $p<.01$ (*Heterogeneous*) levels. The coefficient on the interaction variable *In-Group×Ranking Treatment* in model (2) suggests that preferential in-group wages are marginally less likely in *Homogeneous Ranking* compared to *Homogeneous Random* ($p<.10$; marginal support for hypothesis H2b). This is intuitive given the *Ranking* treatments allow for favoritism or discrimination in rankings, and therefore employment likelihood, prior to a wage decision. Together with previous evidence from Fig. 1, these findings may point to a trade-off between hiring discrimination and wage discrimination in the absence of productivity information on workers. Dickinson and Oaxaca (2014) also find evidence of a trade-off between hiring and wage discrimination in a laboratory setting designed to examine statistical discrimination.

[25]Employers always earn more in our design, and so we do not include the *envy* parameter that is used in some of the other regression analysis.

Results in Table 3 also show that more advantageous-inequality averse subjects, based on the Blanco et al. (2010) measure they call "altruism", offer higher wages (see footnote 6).

Table 3. Wage-setting decision

Probability that *i* offers a high wage to *j* – Random-effects Logit estimates			
	(1) Pooled	(2) Homogeneous Treatment	(3) Heterogeneous Treatment
Player *j* In-Group	2.074***	10.6347**	1.178***
	(0.389)	(4.628)	(0.405)
Ranking Treatment	-0.486	1.758	1.104
	(1.326)	(4.229)	(1.272)
In-Group × Ranking Treatment	-1.042*	-8.546*	-0.236
	(0.533)	(4.548)	(0.574)
Player *j* High Effort Cost	---	---	0.062
			(0.1331)
Heterogeneous Treatment	-1.692	---	---
	(1.237)		
Heterogeneous × Ranking Treatment	2.041	---	---
	(1.818)		
Altruism	4.763***	11.787**	4.536**
	(1.747)	(4.333)	(2.200)
Constant	-2.302**	-8.125*	-3.416***
	(1.018)	(4.437)	(1.173)
Total Observations	624	144	480
Number of Subjects	48	24	24

Notes: Standard errors are displayed in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$ (2-tailed).
The higher number of observation for a set number of subjects in *Heterogeneous* treatments is due to the increase in decision options using the strategy method when introducing another differentiating factor (i.e., cost of effort combinations possible among an employer's two workers when making wage choices)

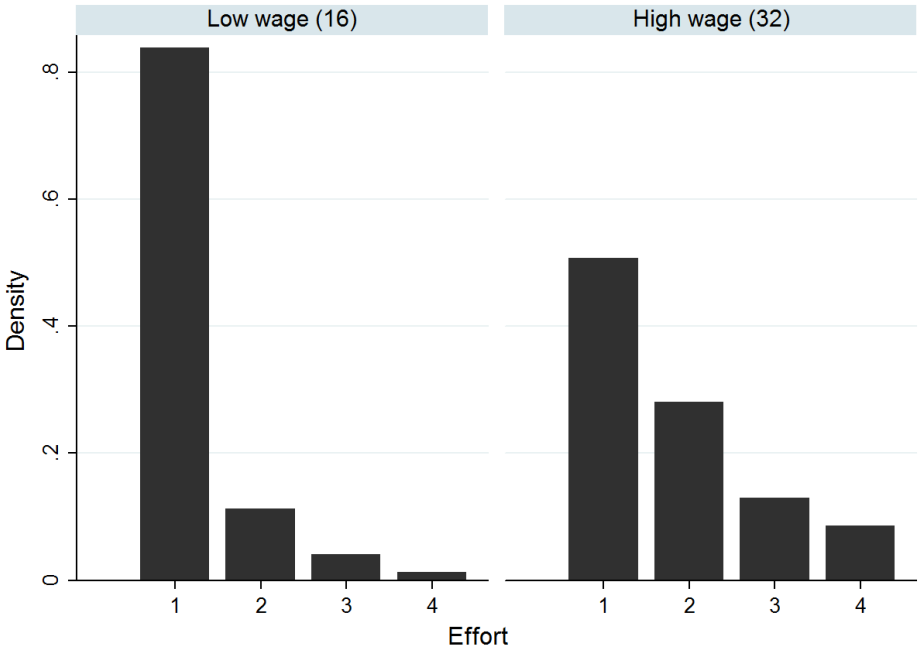
Our key findings in evaluating Hypotheses 2 are summarized in results 2a and 2b.

Result 2a. In-group members receive higher wage offers than out-group members.
Result 2b. In-group wage favoritism is marginally greater with random employment assignment and homogeneous worker productivity (*Homogeneous Random*).

4.1.3. In-group worker reciprocity effects

We first observe that higher wages are reciprocated with higher effort levels, as is common in the literature (Fehr et al, 1997). Workers offered a low wage of 16 ECU provide average effort of 1.22, whereas workers offered a high wage of 32 ECU provide average effort of 1.79. This difference is statistically significant (Wilcoxon signed-rank test, $p<0.01$) and holds in all treatments. Figure 2 reports the distribution of effort chosen at both wage levels.

Figure 2. Reciprocity by wage level



The data in Fig. 2 show evidence that workers choose higher effort levels at the higher wage rate, which support hypothesis H3b. The highest effort choices, independent of wages, are made by in-group workers, which supports hypothesis H3a. In *Ranking* treatments, the average effort exerted by in-group workers is 1.67, whereas it is 1.54 for out-group workers (Wilcoxon Mann-Whitney, $p=0.026$).

One could expect that discrimination would be particularly costly for a prejudiced employer who hires a low productivity in-group member, rather than a high productivity out-group

worker. Our initial nonparametric analysis of the data show, however, that there is no difference in effort choices in that comparison (Wilcoxon Mann-Whitney, p=0.726). We also fail to find any evidence that an out-group worker who is offered a lower wage than an in-group worker chooses lower effort. Indeed, an out-group member offered a wage of 16 while the in-group coworker receives 32 does not choose lower effort compared to if both weree paid 16 (Wilcoxon signed-rank, p=0.9847).[26]

Table 4 reports multivariate analysis of the determinants of effort choices. We estimate random effects Tobit models to explore the influence of wage comparisons and group identity on effort. The use of Tobit models is justified by the high number of left-censored observations in the sample. Figure 2 and Table 4 indicate a significant positive relationship between wage and effort (p<.01 in all models). This positive reciprocity finding is typical in the gift-exchange game (Fehr et al. 1997) and indicates social motivations driving reciprocity. Table 4 also identifies a marginal positive reciprocity effect of being employed in the *Ranking* treatment (*Ranking* coefficient in models (1)-(3) of Table 4, p<.10 in each case). This is consistent with positive reciprocity because only in *Ranking* treatments the employer ranking choices are responsible for a worker not being unemployed, but the effect is not very precisely measured and disappears when additional controls are added in model (4).

[26] Recall that the strategy-method implies each subject make choices for all contingencies, which includes choosing effort for each possible group identity and wage offer to the other worker hired by the same employer.

Table 4. Worker Effort Choices

Dependent Variable = Effort choice of worker – Random-effect Tobit estimates				
	(1)	(2)	(3)	(4)
Wage	0.105***	0.103***	0.101***	0.101***
	(0.005)	(0.007)	(0.008)	(0.008)
In-Group employer	0.355***	0.355***	0.325***	0.324***
	(0.071)	(0.071)	(0.119)	(0.119)
In-Group coworker	0.308***	0.308***	0.308***	0.308***
	(0.071)	(0.071)	(0.071)	(0.071)
Ranking Treatment	0.796*	0.792*	0.796*	0.391
	(0.4419)	(0.446)	(0.447)	(0.364)
Wage > coworker wage	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Wage = coworker wage	---	-0.017	-0.017	-0.017
		(0.088)	(0.088)	(0.088)
Wage < coworker wage	---	-0.100	-0.100	-0.101
		(0.148)	(0.148)	(0.148)
Low cost of effort (high productivity)	---	0.033	0.006	0.165
		(0.513)	(0.515)	(0.666)
In-Group employer×Wage	---	---	0.048	0.048
			(0.148)	(0.148)
Altruism	---	---	---	4.190***
				(0.666)
Envy	---	---	---	0.224
				(0.159)
Constant	-3.453***	-3.352***	-3.309***	-4.561***
	(0.373)	(0.423)	(0.556)	(0.561)
Total Observations	1,536	1,536	1,536	1,536
Number of Subjects	96	96	96	96

Notes: Standard errors are displayed in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$ (2-tailed)

The estimation results indicate that effort choice is not influenced by coworker wage in any of our models. However, effort choice is significantly positively related to both the employer and coworker in-group status ($p<.01$ in all instances). All models in Table 4 point to group identity as an important determinant of effort choice in our experimental setting, which supports hypothesis H3a, although our theoretical framework does not predict that in-group co-workers will influence effort choices similar to having an in-group employer. Model (3) and (4) of Table 4 include an interaction variable *In-Group Employer×Wage* aimed at capturing any differential

response from in-group workers to higher wages. We do not observe a significance difference in the positive reciprocity effect between in-group and out-group members. Our estimation results therefore only partially support hypothesis H3b. One might interpret this result to say that workers are always open to positively reciprocating higher wages, but the presence of more in-group individuals in one's work group (employers and other workers) is sufficient to stimulate another component of altruism not captured in the standard measure (which also is shown to significantly increase effort choices in Table 4, model 4). Our findings regarding worker effort choices are summarized in results 3.

Result 3a. In-group workers choose significantly higher effort levels compared to out-group workers.

Result 3b. There is a significant positive wage-effort effect, but the effect is not moderated by group identity matches—we have only partial support for H3b.

At this point, our results show evidence of in-group favoritism by employers, even when group identity carries no practical information content or cost savings to employers. And, while the gift exchange reciprocity effect estimated is unconditional (ie., not stronger among in-group employers and workers), we also estimate a general tendency for workers to choose higher effort levels for in-group employers. Additionally, the data indicate higher effort choices when the anonymous co-worker is also an in-group member, and the higher effort levels in the *Ranking* treatments indicate that workers reciprocate the intentional rankings that led to their being employed. Put together, these results point to a rational reason for employers to show favoritism towards in-group applicants and workers. However, our last set of results looks at the important spillover effects of such favoritism in our experimental society.

4.1.4. The social costs of discrimination

Our last set of findings concern money burning decisions of the unemployed subjects in each experimental society (a total of n=48 unemployed subjects in our data set). Recall that this component of our design attempts to explore a micro foundation of resource destruction that may help our understanding of how societal tensions can result from labor market favoritism.[27] Table 5 shows descriptive statistics that highlight key treatment differences. Specifically,

[27] We noted in the Introduction that not all responses to discrimination are anti-social, but our specific experimental environment explores actual resource destruction as opposed to wealth transfers. As such, our lab money burning stage is more akin to antisocial vandalism or rioting, as opposed to potentially prosocial acts intended to transfer wealth (e.g., an anti-discrimination lawsuit).

money burning is always higher in *Ranking* treatments compared to the analogous *Random* treatment. In the *Random* treatments combined, only 8.33% of unemployed participants decide to indiscriminately burn money from employers and workers (i.e., no specific target subject). This proportion is marginally higher in the combined *Ranking* treatments, where 29.17% of unemployed participants engaged in "burn all" decisions (X^2, p=0.064). This suggests that employment that results from intentional ranking choices is more likely to lead to money burning. An interesting difference seen in Table 5, however, is that the additional money burning in *Ranking Heterogeneous* compared to *Random Heterogeneous* seems due to an increase in nonspecific "burn all" decisions. In the *Homogeneous* treatments, the additional money burning due to employment by rankings seems more focused on burning money of targeted subjects. We explore these observations econometrically in Table 6.

Table 5. Money burning – descriptive statistics

	Total money burnt (EMUs)	% of participants who burn	% of participants who "**target burn"**	% of participants who "**burn all"**
Random Homogeneous	17	16.66%	8.33%	8.33%
Ranking Homogeneous	37	33.33%	25%	8.33%
Random Heterogeneous	87	58.33%	50%	8.33%
Ranking Heterogeneous	112	75%	25%	50%

Notes: participants who "target burn" designate participants in the role of unemployed that decided to target at least one individual, i.e. to spend 1 EMU to burn 5 EMU from a chosen participant. Recall that participants who decide to do so do not have the opportunity to "burn all", i.e. to destroy 2 EMU to all workers and employers at the cost of 1 EMU.

Table 6 shows results from estimations aimed at identifying the factors that influence the probability that an unemployed subjects *i* burns money of a subject *j* (who could be an employed worker or an employer).[28] In Table 6, the dichotomous dependent variable in model (1) equals one if subject *j*'s payoff decreases due to *i*'s money burning decision. In this case, *j*'s money may have been burnt due to either a targeted money burning choice or as part of a general "burn all" decision by the unemployed subject *i*. In model (2), we focus only on whether *j*'s payoff was reduced due to a targeted money burning decision (i.e., we ignore "burn all" decisions in model (2)). Other regressors control for envy (i.e., disadvantageous inequality aversion), earnings of the target, role (employer or worker) of the target, and treatment variables.

[28]The standard errors presented in table 6 are clustered at the independent observation level, which in this case is at the level of the *experimental society*. We apply this restriction in the analysis of the unemployed actions only, because unlike employers of workers, unemployed participants receive information on outcomes within the experimental society when making their money-burning decision.

Table 6. Determinants of money burning

Probability that unemployed i harms participant j - Random-Effects Logit estimates		
	(1) Direct + indirect target	(2) Direct target only
Random Treatment	*Ref.*	*Ref.*
Ranking Treatment	1.711*	2.657*
	(1.012)	(1.565)
Heterogeneous Treatment	3.368*	2.153
	(1.780)	(1.548)
Heterogeneous × Ranking Treatment	3.298*	-4.182**
	(1.971)	(1.957)
j is an Employer	2.156**	2.333*
	(0.918)	(1.233)
Earnings of *j*	-0.010	0.006
	(0.052)	(0.048)
Het. Treat. × Worker *j* High Cost	2.032*	2.353*
	(1.083)	(1.218)
Het. Treat. × *i* has High Cost	0.476	2.372
	(2.106)	(1.469)
Het. Treat. × *i* has Low Cost & Worker *j* High Cost	-0.036	-0.028
	(1.050)	(1.332)
i and *j* are NOT from same group	0.441	0.394
	(0.280)	(0.545)
i's Envy	-0.038	-0.862
	(0.714)	(0.635)
Constant	-8.083***	-6.552***
	(1.571)	(1.716)
Total Observations	288	288
Number of Subjects	48	48

Notes: Standard errors clustered at the *experimental society* level in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$ (2-tailed)

Our results in Table 6 indicate that employers ("*j is an employer*" variable) are marginally more likely than workers to be targeted for money burning ($p<.10$).[29] This finding is consistent with hypothesis H4b. Money burning is marginally more frequent in *Heterogeneous*

[29] As we will see, the results in Table 6 are all marginal at the $p<.10$ level (for the 2-tailed test), but it should be noted that the analysis of money burning decisions presents us with the smallest number of observations for our analysis.

treatments, and more so when the target, *j*, has a high cost of effort, compared to money burning in the *Homogeneous* treatment. For this comparison, we test the combined coefficients on *Heterogeneous* + (*Heterogeneous* X *Worker j High Cost*) and find the difference significant in model 1 (X^2=6.34, p<.042) and marginal in model 2 (X^2=5.74, p=.057).

This may indicate that unemployed workers view low productivity workers who were employed as illegitimate. Money burning is also marginally more frequent in *Ranking* treatments, where participants were assigned the role of unemployed following employers' intentional hiring decisions (p<.10). The regressions also underline particular behaviors in the *Heterogeneous Ranking* treatment. When including targeted money burning and decisions to burn money indiscriminately in model (1) we find that this sort of money burning is marginally stronger in *Heterogeneous Ranking* compared to *Heterogeneous Random* (p<.10). However, when focusing only on targeted money burning in model (2), the unemployed burn marginally more in *Heterogeneous Random* compared to *Heterogeneous Ranking* (p<.10).[30]

To further address the determinants of money burning even absent hiring discrimination, we report additional estimations of the determinants of money burning in Table 7 on the separate subsamples of *Random* treatments and the *Ranking* treatments. Only in *Ranking* treatments are the employers marginally more targeted than workers (p <.10). In contrast, in the *Random* treatments when effort costs are *Heterogeneous*, there is a marginal increase in the probability of money burning, in general, and of being targeted if one is a high effort cost worker (p<.10).[31] It may be the case that heterogeneity in productivity represents an inequality that is viewed as unfair and therefore promotes antisocial behaviors even when unemployment does not result from employer preferences. Together, these results are consistent with the hypothesis that the unemployed spread out their resource destruction across employers and other workers when intentionality led to one's unemployed status. Nevertheless, while the results in Table 6 are somewhat supportive of hypotheses H4a-H4c, our design choice that allows for two types of money burning (targeted versus general) inherently complicates the analysis and interpretation of these money burning results.

[30] Because unemployed are constrained in our experiment to either "burn all" or burn specific targets' money, it is somewhat intuitive that there is more indiscriminate burning in *Heterogeneous Ranking.* This is because the unemployed may feel anger towards *both* employers (due to ranking choices that led to being unemployed) as well as other employees who were favored in hiring, and "burn all" offers the most amount burned per dollar spent in our experimental design (see again Section 3.2).

[31] Testing the linear combination of the coefficients of *Heterogeneous Treatment* and *Het. Treat.* × *Worker j High Cost* in Table 6, we find that high cost workers in the *Heterogeneous* treatment are significantly more targeted than workers in *Homogeneous* treatments for both *Random* (p <.01) and *Ranking* (p < .01) treatments.

Table 7. Determinants of money burning (estimates run on separate subsamples)

Probability that unemployed i harms participant j - random-effect logit estimates		
	(1)	(2)
	Random treatments	**Ranking treatments**
	Direct + indirect target	Direct + indirect target
Heterogeneous treatment	2.903*	13.081***
	(1.653)	(4.180)
j is an employer	1.146	3.596*
	(0.979)	(2.102)
Het. Treat. × worker *j* with high cost	2.230*	2.453
	(1.319)	(1.927)
Het. Treat. × *i* has high cost	0.988	-1.513
	(1.697)	(4.821)
Het. Treat. × *i* has low cost & worker *j* with high cost	-0.946	-0.485
	(1.261)	(1.067)
i and *j* are not from same group	0.445	0.418
	(0.530)	(0.680)
i's envy parameter	-1.303	0.471
	(2.470)	(1.378)
Constant	-5.647***	-10.501***
	(1.721)	(4.131)
Total Observations	144	144
Number of Subjects	24	24

Notes: Standard errors clustered at the *experimental society* level in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$ (2-tailed)

In addition to examining the determinants of individual money burning decisions, we also examine the monetary cost to society of the money burning that occurs. Indeed, because our main goal with respect to the money-burning stage was to identify the extent of any behavioral spillovers, a more direct approach to answering this question is an econometric evaluation of the costs to society, which we present in Table 8. For this, we measure the cost incurred from money burning upon each of the 144 participants in the role of employer or employed worker.

The outcome measure we use is the difference between earnings before and after unemployed participants decided to burn (or not) money within the experimental society. In the following, we refer to this measure as the *cost incurred from money burning*.

Table 8. The cost for society of money burning

Monetary loss incurred from money burning – OLS estimates				
	(1) Pooled	(2) *Random*	(3) *Ranking*	(4) *Ranking*
Ranking Treatment	0.556* (0.344)	---	---	---
Heterogeneous Treatment	1.944** (0.716)	1.944*** (0.465)	2.083*** (0.509)	2.696*** (0.494)
Heterogeneous × Ranking Treatment	0.139 (1.037)	---	---	---
Worker	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Employer	0.677* (0.425)	0.208 (0.494)	1.146** (0.540)	1.146** (0.494)
Level of hiring discrimination	---	---	---	1.225*** (0.325)
Constant	0.247 (0.361)	0.403 (0.277)	0.646 (0.402)	-0.988* (0.569)
Total Observations (Subjects)	144	144	144	144
R^2	0.2264	0.2035	0.2357	0.3677

Notes: Standard errors clustered at the *experimental society* level in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$ (2-tailed)
"Level of hiring discrimination" (0, 1, or 2) reports the number of employers in the experimental society who discriminate by ranking only in-group workers at the three top positions during the hiring stage.

The costs incurred from money burning are marginally higher in the *Ranking* treatments (Table 8, model (1), *Ranking treatment* dummy, $p<.10$), but significantly higher when accounting for the degree of hiring favoritism observed in the group (Table 7, model (4), *Level of hiring discrimination* variable, $p<.01$). The degree of hiring favoritism/discrimination is calculated within a society as the number of employers (zero, one or two) who rank only in-group workers at the three top positions during the hiring stage—we could refer to these as prejudiced employers. On average, the per-subject cost incurred from money burning is 0.886 EMU in absence of discrimination. The cost increases to an average of 2.72 EMU when the society is composed of one prejudiced employer and 2.62 EMU when there are two prejudiced employers.

Our findings confirm that the monetary loss to the experimental society from money burning is marginally higher in the *Ranking* treatments (H4a). They also suggest that the presence of initial inequality in productivity (i.e., *Heterogeneous* treatments) significantly increases these money-burning spillover costs (H4c) as evidenced by the positive an significant coefficient on the *Heterogeneous* treatment dummy in all models of Table 8 ($p<.01$ in each case). Interestingly, employers are harmed significantly more than workers in the *Ranking* treatments in models (3) and (4) of Table 8 ($p<.05$), where unemployment is the result of the intentional ranking choices of employers. This is consistent with unemployed subjects using targeted money burning as an explicit punishment mechanism in addition to the general money burning that can be exercised at lower marginal cost per EMU burned. It is likely the case that targeted money burning is favored when only the employers are the object of one's discontent. However, when productivity differences among workers are also present, unemployed workers may be frustrated or angry with both employers and other workers, and it is more cost effective to burn additional resources with an indiscriminate "burn all" decision in our design. Model (4) in Table 8 also estimates that money burning costs are a direct and increasing function of the level of favoritism identified in the experimental society.

Overall, we find support for hypotheses H4a-H4c and, importantly, these results highlight how labor market discrimination or favoritism may lead to undesirable spillover effects).[32] The evaluation of Hypotheses 4a-4c are summarized as follows:

Result 4a. In *Ranking* treatments, money burning is marginally higher. Indiscriminate money burning occurs more frequently in *Heterogeneous Ranking* than *Homogeneous Ranking*.

Result 4b. Employers are targeted marginally more than workers for money burning in general, and experience significantly higher money burning losses in the *Ranking* treatments.

Result 4c. Money burning losses are significantly higher in *Heterogeneous* productivity treatments.

5. DISCUSSION

We present a new experimental design that permits us to investigate not only the private incentives to show favoritism (or discriminate), but it also allows us to evaluate a type of spillover costs on society. Consistent with previous findings, we find that the conditions for the occurrence of discrimination are rather weak (Holm, 2000). Our lab design generates

[32] We acknowledge that there are multiple reasons why individuals may riot. It is because we find evidence that the *Ranking* treatment leads to more employer-targeted money burning that we can claim that our results identify a spillover effect directly linked to favoritism (as opposed to the general discontent money burning that may result from labor productivity inequality we induce in *Heterogeneous* treatments).

discriminatory treatment of individuals not associated with one's group under conditions of a contrived laboratory-induced group identity. An alternative perspective is to view this differential treatment as favoritism towards in-group members. Either way, a key objective of this paper is to highlight that favoritism based purely on group identity (i.e., no impact on costs or information from showing such favoritism) can be privately beneficial to an employer, and yet produce spillover costs to society from discontent among excluded workers. Importantly, this discontent will express itself in one way or another (as it always does), and we focus on one particular channel for expressing discontent that yields insights into issues relevant to society. Our extension of an existing theoretical framework (Figuieres et al, 2013) generates testable hypotheses that are generally supported in our data and were derived from the assumption that preferences incorporate concerns for moral ideals, fairness, as well as taste-based discrimination.

We opted for primary data generation with controlled laboratory experiments to more cleanly identify favoritism based purely on group identity preferences, as well as to channel any discontent into a limited set of consequential options. In field data, hiring based on social networks likely allows for reduced communication costs or provides employers with valuable information on a candidate, both of which present a confound in assessing favoritism for the pure reason of group identity preference. Unemployed worker discontent in naturally occurring settings can also be expressed in numerous ways, which are often not quantifiable and not always even identifiable. As such, for our particular research question the laboratory offers an advantage over field data, and makes possible the identification of causal favoritism effects that are difficult to identify in naturally occurring field data.

Our three key findings are: First, we find evidence that even a weakly constructed common group identity becomes a source of favoritism or "endophilia" (Feld et al, 2016) both at the hiring stage and in wage offers. This is consistent with previous findings of in-group favoritism, such as in Chen and Chen (2011). While this documents multiple dimensions on which discrimination may operate, even in a laboratory environment (see Dickinson and Oaxaca, 2014), the potential for positive reciprocity towards employers by those hired and/or offered high wages implies that such in-group favoritism may be in the monetary payoff interest of the employer. Secondly, we find that subjects generally reciprocate high wage offers with higher effort choices (consistent with Fehr et al, 1997), although the effect is not magnified by in-group interactions as we hypothesized. Rather, our evidence in support of stronger reciprocity among in-group members (Chen and Li, 2009) is with respect to effort and hiring. Our data

confirm that workers make higher effort choices for in-group employers, and choose marginally higher effort when hiring is due to intentional rankings. This finding suggests that employers should rationally prefer in-group workers over out-group workers, all else equal. Finally, while there may be some evidence that in-group favoritism benefits employers, we considered the spillover costs on society of unemployed workers burning resources. We find evidence of significant money burning when productivity inequality exists in society (consistent with Zizzo and Oswald, 2001), as well as when employment discrimination is more present. Thus, labor market favoritism that plausibly produces discontent is likely an important micro-foundation of more significant societal costs such as fraud or social services abuse, or more severe forms of anti-social behavior such as rioting, vandalism, or looting.

To be fair, such discrimination may also lead to presumably less anti-social forms of resource use, such as would be the case with increased antidiscrimination lawsuits. However, our design is not able to speak directly to these types of unemployed worker actions since our environment does not allow the unemployed to recapture additional resources as a result of the money burning choices we examine. Doing so would also require a formal and centralized institution as opposed to the informal and decentralized nature of the money burning choices we examine. These design options would possible future extensions of this study. One clear example of a policy intervention that may help reduce the more wasteful forms of antisocial resource destruction would be laws aimed at equal opportunity protections, such as the Equal Opportunity Act in the U.S, or Article 13 of the Treaty of Amsterdam in the European Union. While the actual enforcement of such laws is another matter, our results highlight that not all anti-social money burning activities may even have a clear avenue of mitigation. Recall that our additional estimations in table 7 report marginal increases in money burning even when hiring discrimination is *not* possible (i.e., *Random* treatments) as long as it is known that not all individuals are endowed with the same cost of effort (perhaps a proxy of endowed abilities one may offer to the labor market).

This study is not without a few other limitations, which may offer additional avenues to extend this research. For example, our use the strategy method was a design choice intended to maximize the data generation from a fixed set of subjects. One might argue that data from contingency decisions may differ from choice data elicited from a single decision scenario. A recent survey by Brandts and Charness (2011) indicated that most studies comparing the strategy method with direct response elicitation showed replicated results across methods. And importantly, treatment effects found using the strategy method were always observed using direct response elicitation as well. One view of the strategy method of elicitation is that is

places subjects in a more "cold" emotional state compared to direct elicitation, and so behaviors like money burning may be less prevalent than if making the same decision in a "hot" emotional state, such as with direct elicitation. At the very least one can argue, given results from this recent survey (Brandts and Charness, 2011) that we could expect similar results if using direct elicitation methods.

Finally, we highlight the limited number of observations on money burning decisions due to the somewhat limited (n=48) set of unemployed subjects in our design. A study more focused on the money burning costs may choose an experimental design with a larger set of unemployed relative to employed subjects, as well as the introduction of multiple periods to perhaps introduce endogenous interventions and allow for learning. The sensitivity of our results to elements such as these are ultimately empirical questions that can be explored in future research. Nevertheless, we feel that our evidence for favoritism spillover costs, even in a stylized laboratory environment, highlights their importance in understanding the full impact of differential treatment in labor markets. It also highlights an important argument for why discrimination or favoritism are undesirable for society as a whole.

References

Abbink, K., & Herrmann, B. (2011). The moral costs of nastiness. *Economic Inquiry*, *49*(2), 631-633

Abbink, K., & Sadrieh, A. (2009). The pleasure of being nasty. *Economics Letters*, *105*(3), 306-308.

Aigner, D. J., & Cain, G. G. (1977). Statistical theories of discrimination in labor markets. *Industrial and Labor Relations Review*, *30*(2), 175-187.

Anderson, D. M., & Haupert, M. J. (1999). Employment and statistical discrimination: A hands-on experiment. *The Journal of Economics*, *25*(1), 85-102.

Anderson, L., Fryer, R., & Holt, C. (2006). Discrimination: experimental evidence from psychology and economics. *Handbook on the Economics of Discrimination*, 97-118.

Arrow, Kenneth J. (1972). Models of job discrimination. In Racial discrimination in economic life, edited by A.H. Pascal. Lexington, MA: D.C. Heath, 83-102.

Athey, S., Avery, C., & Zemsky, P. (2000). Mentoring and Diversity. *American Economic Review*, *90*(4), 765-786.

Bates, T. (1994). Utilization of minority employees in small business: A comparison of nonminority and black-owned urban enterprises. *The Review of Black Political Economy*, *23*(1), 113-121.

Bayer, P., Ross, S. L., & Topa, G. (2008). Place of work and place of residence: Informal hiring networks and labor market outcomes. *Journal of Political Economy*, *116*(6), 1150-1196.

Becker Gary, S. (1957). The economics of discrimination. Chicago, University of Chicago Press.

Beggs, S., Cardell, S., & Hausman, J. (1981). Assessing the potential demand for electric cars. *Journal of Econometrics*, *17*(1), 1-19.

Bernhard, H., Fischbacher, U. & Fehr, E. (2006). Parochial altruism in humans. *Nature, 442*(7105), 912-915.

Bernhard, H., Fehr, E., & Fischbacher, U. (2006). Group affiliation and altruistic norm enforcement. *The American Economic Review*, *96*(2), 217-221.

Billig, M., & Tajfel, H. (1973). Social categorization and similarity in intergroup behaviour. *European Journal of Social Psychology*, *3*(1), 27-52.

Blanco, M., Engelmann, D., & Normann, H. T. (2011). A within-subject analysis of other-regarding preferences. *Games and Economic Behavior*, *72*(2), 321-338.

Bogomolnaia, A., & Jackson, M. O. (2002). The stability of hedonic coalition structures. *Games and Economic Behavior*, *38*(2), 201-230.

Bolton, G. E. (1991). A comparative model of bargaining: Theory and evidence. *The American Economic Review*, *81*(5): 1096-1136.

Bolton, G. E., & Ockenfels, A. (2000). ERC: A theory of equity, reciprocity, and competition. *The American Economic Review*, 90(1), 166-193.

Bouckaert, J., & Dhaene, G. (2004). Inter-ethnic trust and reciprocity: results of an experiment with small businessmen. *European Journal of Political Economy*, *20*(4), 869-886.

Brandts, J., & Charness, G. (2011). The strategy versus the direct-response method: a first survey of experimental comparisons. *Experimental Economics*, *14*(3), 375-398.

Buchan, N. R., Croson, R. T., & Solnick, S. (2008). Trust and gender: An examination of behavior and beliefs in the Investment Game. *Journal of Economic Behavior & Organization*, *68*(3), 466-476.

Cain, G. (1986). 'The economic analysis of labor market discrimination: a survey', in (O. Ashenfelter and R. Layard, eds.), Handbook of Labor Economics, Vol. 2, pp. 693–785, Amsterdam: North-Holland.

Carrington, W. J., & Troske, K. R. (1998). Interfirm segregation and the black/white wage gap. *Journal of Labor Economics*, *16*(2), 231-260.

Castillo, M., & Petrie, R. (2010). Discrimination in the lab: Does information trump appearance?. *Games and Economic Behavior*, *68*(1), 50-59.

Charness, G., Rigotti, L., & Rustichini, A. (2007). Individual behavior and group membership. *The American Economic Review*, *97*(4), 1340-1352.

Chen, R., & Chen, Y. (2011). The potential of social identity for equilibrium selection. *The American Economic Review*, *101*(6), 2562-2589.

Chen, Y., & Li, S. X. (2009). Group identity and social preferences. *The American Economic Review*, *99*(1), 431-457.

Chen, Y., Li, S. X., Liu, T. X., & Shih, M. (2014). Which hat to wear? Impact of natural identities on coordination and cooperation. *Games and Economic Behavior*, *84*, 58-86.

Cornell, B., & Welch, I. (1996). Culture, information, and screening discrimination. *Journal of Political Economy*, *104*(3), 542-571.

Currarini, S., & Mengel, F. (2016). Identity, homophily and in-group bias. *European Economic Review*, *90*, 40-55.

Davis, D. D. (1987). Maximal quality selection and discrimination in employment. *Journal of Economic Behavior & Organization*, *8*(1), 97-112.

Dickinson, D. L., & Oaxaca, R. L. (2009). Statistical discrimination in labor markets: An experimental analysis. *Southern Economic Journal*, *76*(1), 16-31.

Dickinson, D. L., & Oaxaca, R. L. (2014). Wages, employment, and statistical discrimination: Evidence from the laboratory. *Economic Inquiry*, *52*(4), 1380-1391.

Diehl, M. (1988). Social identity and minimal groups: The effects of interpersonal and intergroup attitudinal similarity on intergroup discrimination. *British Journal of Social Psychology*, *27*(4), 289-300.

Eckel, C. C., & Grossman, P. J. (2005). Managing diversity by creating team identity. *Journal of Economic Behavior & Organization*, *58*(3), 371-392.

Eckel, C. C., & Wilson, R. K. (2004). Is trust a risky decision? *Journal of Economic Behavior & Organization*, *55*(4), 447-465.

Efferson, C., Lalive, R., & Fehr, E. (2008). The coevolution of cultural groups and ingroup favoritism. *Science*, *321*(5897), 1844-1849.

Falk, A. and Fischbacher, U. (2006), "A Theory of Reciprocity", *Games and Economic Behavior*, 54 (2), 293-315.

Falk, A., & Zehnder, C. (2013). A city-wide experiment on trust discrimination. *Journal of Public Economics*, *100*, 15-27.

Feld, J., Salamanca, N., & D.S. Hamermesh (2016). Endophilia or exophobia: Beyond discrimination. *The Economic Journal*, *126*(August), 1503-1527.

Fehr, E., & Schmidt, K. M. (1999). A theory of fairness, competition, and cooperation. *The Quarterly Journal of Economics*, *114*(3), 817-868.

Fu, F., Tarnita, C. E., Christakis, N. A., Wang, L., Rand, D. G., & Nowak, M. A. (2012). Evolution of in-group favoritism. *Scientific Reports*, *2*, 460.

Fehr, E., & Gächter, S. (2002). Altruistic punishment in humans. *Nature*, *415*(6868), 137-140.

Fehr, E., Gächter, S., & Kirchsteiger, G. (1997). Reciprocity as a contract enforcement device: Experimental evidence. *Econometrica*, 833-860.

Fershtman, C., & Gneezy, U. (2001). Discrimination in a segmented society: An experimental approach. *The Quarterly Journal of Economics*, *116*(1), 351-377.

Figueres, C., D. Masclet, and M. Willinger (2013) Weak moral motivation leads to the decline of voluntary contributions. *Journal of Public Economic Theory*, 15(5), 745-772.

Fischbacher, U. (2007). z-Tree: Zurich toolbox for ready-made economic experiments. *Experimental Economics*, *10*(2), 171-178.

Fiedler, M., Haruvy, E., & Li, S. X. (2011). Social distance in a virtual world experiment. *Games and Economic Behavior*, *72*(2), 400-426.

Fryer, R. G., Goeree, J. K., & Holt, C. A. (2005). Experience-based discrimination: Classroom games. *The Journal of Economic Education*, *36*(2), 160-170.

Gee, L. K., Jones, J. J., & Burke, M. (Forthcoming). Networks and Labor Markets: How Strong Ties Relate to the Labor Market Using Facebook's Social Network. *Journal of Labor Economics*.

Giuliano, L., Levine, D. I., & Leonard, J. (2009). Manager race and the race of new hires. *Journal of Labor Economics*, *27*(4), 589-631.

Glaeser, E. L., Laibson, D. I., Scheinkman, J. A., & Soutter, C. L. (2000). Measuring trust. *The Quarterly Journal of Economics*, *115*(3), 811-846.

Goette, L., Huffman, D., & Meier, S. (2006). The impact of group membership on cooperation and norm enforcement: Evidence using Random assignment to real social groups. *The American Economic Review*, *96*(2), 212-216.

Goette, L., Huffman, D., Meier, S. & Sutter, M. (2012). Competition between organizational groups: Its impact on altruistic and antisocial motivations. *Management science*, *58*(5), 948-960.

Goldberg, M. (1982). Discrimination, nepotism and long-run wage differentials. *The Quarterly Journal of Economics*, *97*(2): 307–19.

Granovetter, Mark. (1995). Getting a job: A study of contacts and careers. 2nd ed. Chicago: University of Chicago Press.

Greiner, B. (2004). *An Online Recruitment System for Economic Experiments*. University Library of Munich, Germany.

Grosch, K., & Rau, H.A. (2017). Do Discriminatory Pay Regimes Unleash Antisocial Behavior? CEGE Discussion Paper No. 315. Available at SSRN: https://ssrn.com/abstract=2994877

Hensvik, L., & Skans, O. N. (2016). Social networks, employee selection, and labor market outcomes. *Journal of Labor Economics*, *34*(4), 825-867.

Hewstone, M., Rubin, M. & Willis, H. (2002). Intergroup bias. *Annual Review of Psychology*, 53, 575 – 604.

Holm, H. J. (2000). Gender-based focal points. *Games and Economic Behavior*, *32*(2), 292-314.

Holzer, Harry J. (1996). What employers want: Job prospects for less educated workers. New York: Russell Sage Foundation.

Lane, T. (2016). Discrimination in the laboratory: A meta-analysis of economics experiments. *European Economic Review*, *90*(November), 375-402.

Lang, K. (1986). A language theory of discrimination. *The Quarterly Journal of Economics*, *101*(2), 363-382.

Lundberg, S.J., & Startz, R. (1983). Private discrimination and social intervention in competitive labor market. *The American Economic Review*, *73*(3), 340-347.

Marsden, P. V. (1987). Core discussion networks of Americans. *American Sociological Review, Feb 1,* 122-131.

Ostrom, E., Walker, J., & Gardner, R. (1992). Covenants with and without a sword: Self-governance is possible. *American Political Science Review*, *86*(2), 404-417.

Phelps, E. S. (1972). The statistical theory of racism and sexism. *The American Economic Review*, *62*(4), 659-661.

Pinkston, J. C. (2003). Screening discrimination and the determinants of wages. *Labour Economics*, *10*(6), 643-658.

Pratto, F., & Shih, M. (2000). Social dominance orientation and group context in implicit group prejudice. *Psychological Science*, *11*(6), 515-518.

Rabin, M., (1993). "Incorporating Fairness into Game Theory and Economics." *American Economic Review*, *83*, 1281-1302.

Rödin, M., & Özcan, G. (2011). *Is It How You Look or Speak That Matters?-An Experimental Study Exploring the Mechanisms of Ethnic Discrimination* (No. 2011: 3). Stockholm University Linnaeus Center for Integration Studies-SULCIS.

Slonim, R., & Guillen, P. (2010). Gender selection discrimination: Evidence from a trust game. *Journal of Economic Behavior & Organization*, *76*(2), 385-405.

Stoll, M. A., Raphael, S., & Holzer, H. J. (2004). Black Job Applicants and the Hiring Officer's Race. *Industrial and Labor Relations Review*, *57*(2), 267-287.

Sutter, M., & Weck-Hannemann, H. (2003). Taxation and the Veil of Ignorance–A real effort experiment on the Laffer curve. *Public Choice*, *115*(1-2), 217-240.

Tajfel, H., Billig, M. G., Bundy, R. P., & Flament, C. (1971). Social categorization and intergroup behaviour. *European Journal of Social Psychology*, *1*(2), 149-178.

Turner, J., and R. Brown. (1978). Social status, cognitive alternatives and intergroup relations. *Differentiation between social groups: Studies in the social psychology of intergroup relations*, 201-234.

Vaughan, G. M., Tajfel, H., & Williams, J. (1981). Bias in reward allocation in an intergroup and an interpersonal context. *Social Psychology Quarterly*, *March 1*, 37-42.

Zizzo, D. J., & Oswald, A. J. (2001). Are people willing to pay to reduce others' incomes? *Annales d'Economie et de Statistique*, *63/64*, 39–65.

Zizzo, D. J. (2003). Money burning and rank egalitarianism with random dictators. *Economics Letters*, *81*, 263–266.

Appendix A: Instructions

Instructions are translated from French. The instruction set presented here corresponds to the Heterogeneous Ranking treatment, which is the most complete treatment of our experiment. Sets of instructions for other treatments are available upon request.

General instructions

You are now taking part in an economic experiment. You will take several decisions which are described in this instruction sheet. The instructions are simple. Following them carefully will allow you to earn a considerable amount of money.

Your earnings depend on your own decisions and in some case on the decisions of other participants. It is very important that you read these instructions carefully. Your final earnings will be the sum of what you earn in each game. During the experiment your entire earnings will be calculated in ECU (Experimental Currency Units). At the end of the experiment the total amount of ECU you have earned will be converted to euro at the following rate: 5 ECU = €1. Note that you receive a show-up fee of €5 for your participation to the experiment. We guarantee anonymity for every decision you make.

Game 1

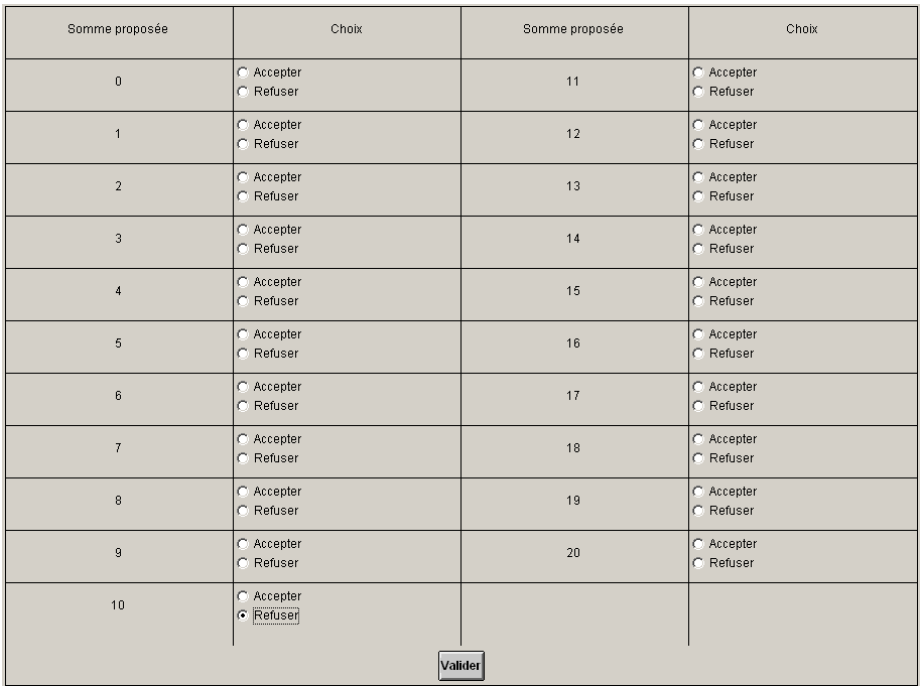
Game 1 includes two steps.

Step 1.

You are randomly matched with another participant in the room. You will receive an endowment of 20 ECU. You must choose how to distribute this endowment between yourself and the other participant. More specifically, you can decide an amount (integer number) to offer to the participant you are matched with.
Please note that in the second step, the participant you are matched with will choose whether to accept or to reject the amount you offer. If the other participant accepts your offer, you will both receive the selected earnings. If the other participant declines your offer, you will both earn nothing in game 1.

Step 2.

A new random draw will match you with a participant in the room. Just like you, this participant made a decision in the first step. He received an endowment of 20 ECU and chose an amount to offer you. You are not informed of this decision. In step 2, you have to declare, for each amount that could have been offered to you, whether to accept or reject the offer. The decision screen will be presented as follows:



Somme proposée	Choix	Somme proposée	Choix
0	○ Accepter ○ Refuser	11	○ Accepter ○ Refuser
1	○ Accepter ○ Refuser	12	○ Accepter ○ Refuser
2	○ Accepter ○ Refuser	13	○ Accepter ○ Refuser
3	○ Accepter ○ Refuser	14	○ Accepter ○ Refuser
4	○ Accepter ○ Refuser	15	○ Accepter ○ Refuser
5	○ Accepter ○ Refuser	16	○ Accepter ○ Refuser
6	○ Accepter ○ Refuser	17	○ Accepter ○ Refuser
7	○ Accepter ○ Refuser	18	○ Accepter ○ Refuser
8	○ Accepter ○ Refuser	19	○ Accepter ○ Refuser
9	○ Accepter ○ Refuser	20	○ Accepter ○ Refuser
10	○ Accepter ● Refuser		

Valider

- If you accept the offer, you will both receive the selected earnings.
- If you decline the offer, you will both earn nothing in game 1.

Your earnings in game 1 are the sum of the amount you kept in the first step (if your offer was accepted) and the amount you were offered in the second step (if you accepted the offer).

Game 2

In game 2, you are randomly matched with a participant in the room. You must select a payoff distribution that will apply to this participant and yourself. At the same time, another participant selects a payoff distribution that will apply to you and him/her.
You must make a decision for each line of the following table. All lines represent a different choice between a payoff distribution A and a payoff distribution B. You must indicate for each line which payoff distribution you would like to see implemented. The decision screen will appear as follows:

Distribution A	Distribution B	Choix	Distribution A	Distribution B	Choix
(0;0)	(20;0)	○ Distribution A ○ Distribution B	(11;11)	(20;0)	○ Distribution A ○ Distribution B
(1;1)	(20;0)	○ Distribution A ○ Distribution B	(12;12)	(20;0)	○ Distribution A ○ Distribution B
(2;2)	(20;0)	○ Distribution A ○ Distribution B	(13;13)	(20;0)	○ Distribution A ○ Distribution B
(3;3)	(20;0)	○ Distribution A ○ Distribution B	(14;14)	(20;0)	○ Distribution A ○ Distribution B
(4;4)	(20;0)	○ Distribution A ○ Distribution B	(15;15)	(20;0)	○ Distribution A ○ Distribution B
(5;5)	(20;0)	○ Distribution A ○ Distribution B	(16;16)	(20;0)	○ Distribution A ○ Distribution B
(6;6)	(20;0)	○ Distribution A ○ Distribution B	(17;17)	(20;0)	○ Distribution A ○ Distribution B
(7;7)	(20;0)	○ Distribution A ○ Distribution B	(18;18)	(20;0)	○ Distribution A ○ Distribution B
(8;8)	(20;0)	○ Distribution A ○ Distribution B	(19;19)	(20;0)	○ Distribution A ○ Distribution B
(9;9)	(20;0)	○ Distribution A ○ Distribution B	(20;20)	(20;0)	○ Distribution A ○ Distribution B
(10;10)	(20;0)	○ Distribution A ○ Distribution B			

Valider

The payoff distribution is represented in brackets. The first figure corresponds to your own payoff, as a decision maker. The second figure corresponds to the payoff of the player with whom you are matched. For instance, the distribution (20 ; 0) means “you earn 20 ECU and the other participant earns 0 ECU”. The distribution (6 ; 6) means “you earn 6 ECU and the other participant earns 6 ECU”.
Once your decision is made, the computer will randomly select a line. It is your decision on that specific line that will be used to compute your earnings.
Your earnings in game 2 are the sum of the amount you decided to attribute to yourself, and the amount you received from another participant who played game 2 at the same time and was matched with you. You will receive information of your payoff at the end of the experiment only.

Game 3

A questionnaire will appear on your screen. You have to honestly answer to the questions. Your answers to those questions will not affect your earnings, nor will they affect the actions you will undertake in the following games of the experiment. Furthermore, please recall that your answers are anonymous and will not be associated with your name. Once the questionnaire is over; we will hand you new instructions.

Game 4

The answers you provided to the previous questionnaire have been used to match you with three other participants in the room. Together you form a group of four participants. Over the course of the experiment, you will stay in this four-persons group. The three participants you have been matched with are the ones whose answers to the questionnaire are the most similar to yours. In other words, you are matched in the group of four participants that corresponds to you the most, based on the questions that have been asked to you previously. Over the course of the experiment, you will interact with the participants of your own group, but also with the participants of another group that has been created according to the same process. Therefore, all interactions you will undertake during the rest of the experiment will always be with the same seven participants (three from your own group and four from the other group).

In game 4, you collectively choose a name for your group. This name will be used until the end of the experiment to designate your group. The choice of this name does not affect your future earnings nor the choices you will make in the future. The name of your group will be chosen via majority voting, from among a predefined list of five names which will be displayed on your screen. The discussion process will be as follows:

In a first step, you will receive information on the five group names you can choose from. Then, you will have 180 seconds in a chat room discussion to reach an agreement on the name to choose. It is strictly forbidden to reveal or give any clue on your real identity in the chat room. If you do not respect this restriction, you will be excluded from the experiment and its payments. Following this discussion, each member of the group votes individually. If the majority of participants voted for the same name, this name will be assigned to your group for the rest of the experiment. If no majority is reached, members of your group will vote a second time. If no majority is reached from this second vote, a random name will be assigned to your group.

Game 5

Game 5 includes two steps.

Step 1

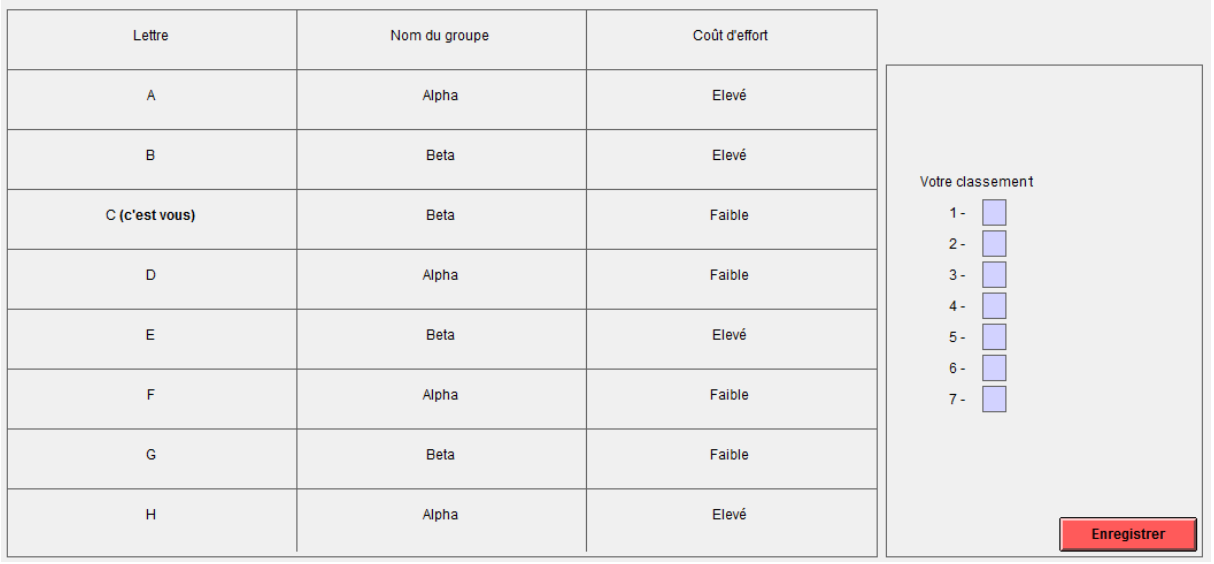
In the first step, you rank by order of preference the seven other participants with whom you interact. This ranking can later be used to form teams. At the end of the first step, a role will randomly be assigned to you. You can be either employer, worker, or unemployed.
In game 5, all participant will randomly be assigned a characteristic: high cost of effort or low cost of effort. This characteristic will affect the participants in the role of worker in step 2 of the game.
Your first decision in game 5 will be taken as a potential employer. You will rank the seven other participants by order of preferences. This ranking will be used to define which workers you would want to recruit in the following of the game. Your chance to hire the participant is the highest for the participant you rank at the first position and the lowest for the participant you rank at the seventh position.
A screenshot of your decision screen is provided in the next page of these instructions.

Information regarding participant's group and participant's cost of effort will be displayed on the decision screen. Participants can be members of your own group, or members of the other group. To attribute a rank, you have to type the letter corresponding to the participant on the right panel of the screen. You cannot enter the same letter twice. The ranking must be complete. If you make any mistake in the ranking, you will be alerted and you will have to enter the ranking anew.

Once every participant has declared his/her preference ranking, the computer will assign roles according to the following rule:

- A first participant is randomly selected and is assigned the role of employer.
- The two participants at the top of the ranking of this employer will join his/her team, and be assigned the role of worker.
- A new participant, among the remaining ones, will be randomly selected and assigned the role of employer.
- The two participants at the top of the ranking of this employer (among remaining participants) will join his/her team, and assigned the role of worker.
- The two participants who have not been assigned the role of employer or worker will be unemployed for the rest of the experiment.

Important: If you are assigned the role of employer, your ranking will be used to match two workers in your team. You should therefore pay attention when declaring this ranking.



Lettre	Nom du groupe	Coût d'effort
A	Alpha	Elevé
B	Beta	Elevé
C (c'est vous)	Beta	Faible
D	Alpha	Faible
E	Beta	Elevé
F	Alpha	Faible
G	Beta	Faible
H	Alpha	Elevé

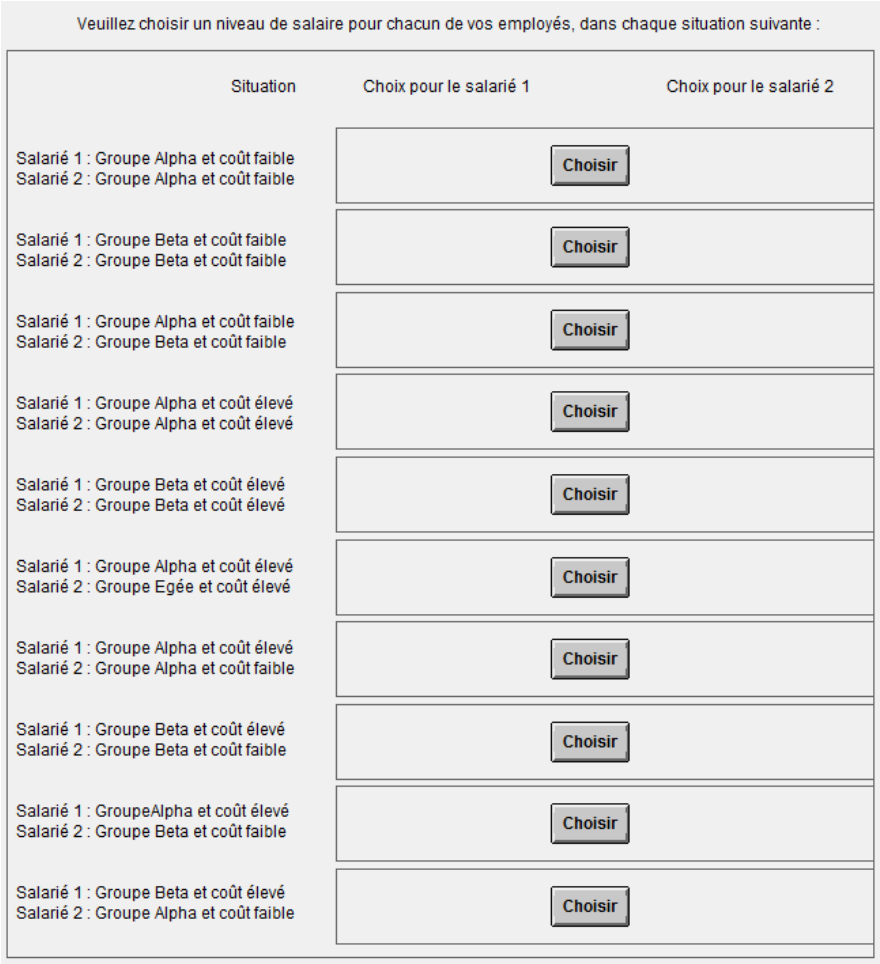
Step 2

Step 2 begins when roles have been assigned to every participant in the room. Your role (employer, worker or unemployed) will determine the actions you can undertake in step 2. Here is a summary of the actions that will be undertaken (further detail are given in the following of the instructions).

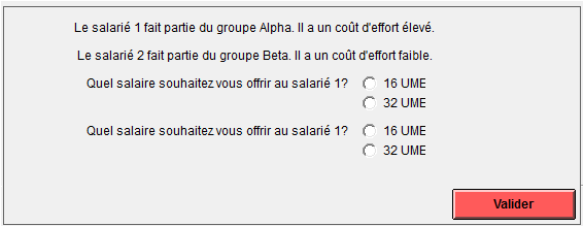
- Employers will decide a wage (16 ECU or 32 ECU) to offer each worker with whom he/she is matched.
- Workers will decide on a level of effort (1, 2, 3 or 4). This level of effort affects both workers' and employer's earnings.
- Participants in the role of unemployed do not make any decision in this game.

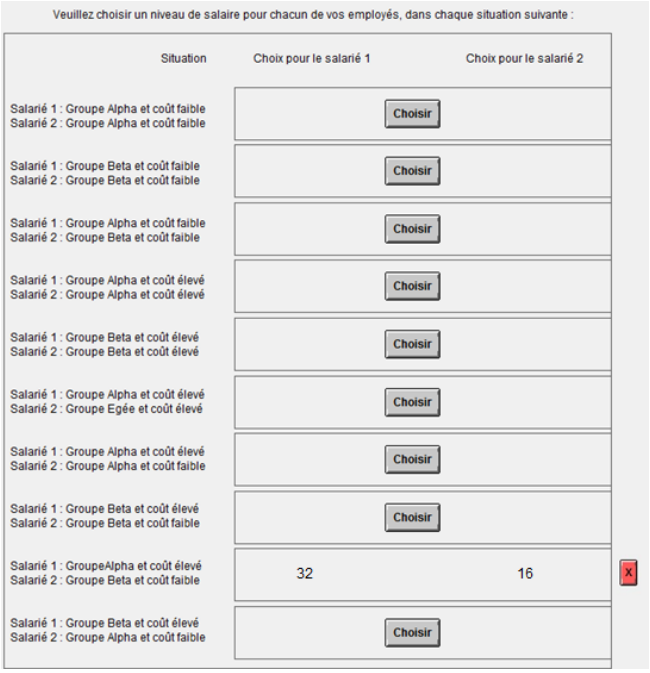
If you are an employer

You have been matched with two workers. You have to decide a wage to offer each of these workers. This wage can be 16 ECU or 32 ECU. The sum of the wages you assign will be withdrawn from your final profits.
When making this decision, you will not be informed of the exact identity of the workers you have been matched with. For that reason, you must assign wages for every possible situation. Your decisions will be made in a simple table. All lines correspond to a different situation, described in the first column. At every line, you must make two decisions: what wage to pay worker 1, and what wage to pay worker 2.
First, you must click on the button "choose", available at every line of the table (see screenshot below).



A new screen will then pop up, describing in detail the situation considered (group and effort cost of both workers 1 and 2). On this screen, you will assign a wage for each of these workers. By clicking on OK, you will validate your choice and then be returned to the previous screen, which will now display the wage choices you have made for each situation. Please note that you can come back to your choice whenever you want.





You must make a decision for every single line of the table. By clicking on the red button next to a line, you can modify your decision. Once all decisions are made, you can permanently validate your choices by clicking on the "end" button.

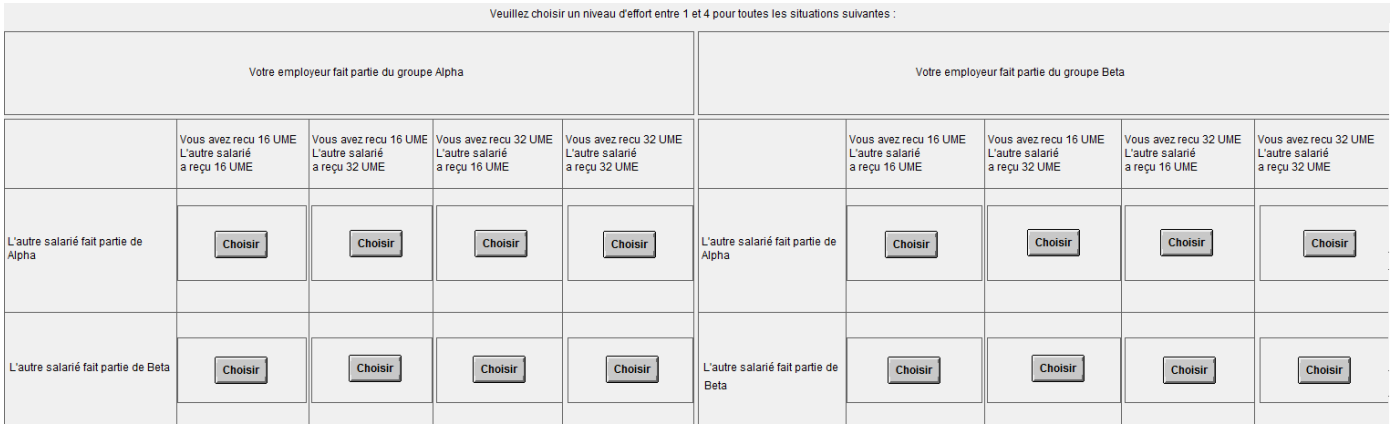
Following your decisions, both of your workers will decide on a level of effort to provide. You will earn 32 ECU for each unit of effort provided by you workers.

Your payoff for game 5 as an employer is defined as:

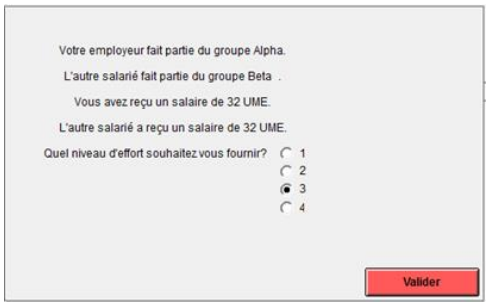
$$earnings\ in\ game\ 5 = 32 \times (effort\ from\ 1st\ worker) + 32 \times (effort\ from\ 2nd\ worker) - (wage\ assigned\ to\ worker\ 1) - (wage\ assigned\ to\ worker\ 2)$$

If you are a worker

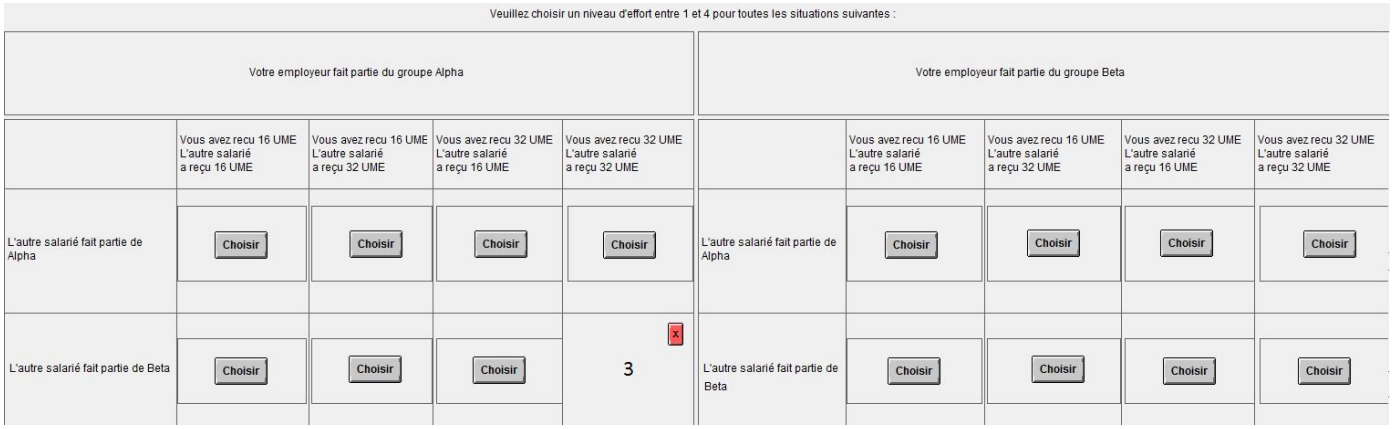
The employer you have been matched with has decided on a wage to offer you and the other worker in your team. As a worker, you will choose a level of effort (1, 2, 3 or 4) to provide. When making this decision, you are not yet informed of the specific wage offered by the employer. You are also not informed of the group to which your employer and your coworker belong. Therefore, you must make an effort decision for every possible situation.
In total, you will have 16 decisions to make. The screen you face will be divided into two panels. The left panel describes all different situations in the event that your employer is from your own group. The right panel describes the exact same situation in the event your employer belongs to the other group. Each panel includes two lines. The first line corresponds to situations where your coworker belongs to one group. The second line corresponds to situations where your coworker belongs to another group. Finally, within each line, you have to make four decisions. These decisions correspond to the different payoff distributions that your employer could have chosen. This screen is displayed in the following screenshot.



To declare the effort that you want to provide in a particular situation, please click on the corresponding button "choose". A pop-up screen will appear. This new screen will describe the situation in details, and will allow you to select a level of effort.



You can confirm your choice by clicking on "validate". Note that you will be able to modify your choice, as long as you have not yet made decisions for every situation.



Each level of effort is associated with a cost. This cost will be withdrawn from your final earning in game 5. The cost of an effort choice depends on your characteristic: high cost of effort or low cost of effort.

If you have a **high cost of effort**, the cost you incur for each level of effort will be as follows :

Level of effort	1	2	3	4
Associated cost	0	5	10	15

If you have a **low cost of effort**, the cost you incur for each level of effort will be as follows :

Level of effort	1	2	3	4
Associated cost	0	3	6	9

Your payoff for game 5 as a worker is defined as:

$$earnings\ in\ game\ 5 = (wage\ received\ from\ employer) - (cost\ of\ the\ selected\ level\ of\ effort)$$

<u>If you are unemployed</u>

You are unemployed, because you have not been selected by an employer in the first step of game 5. You earn a fixed amount of 5 ECU in this game.

Game 6

Only the participants in the role of unemployed will take part in game 6. As an unemployed participant, you can decide whether you want to spend a part of the fixed remuneration of 5 ECU you have received in game 5 to reduce the earning of other participants. To make that decision, you will observe the earnings, the group, and the role (employer or worker) of all other participants who were not unemployed.
Five actions that you may choose from will be displayed on your decision screen. You may reduce the earnings of one participant that you target by 5 ECU. This action will cost you 1 ECU. You can also choose to reduce the earnings by 2 ECU of all participants who have the role of employer or workers. This action would cost you 1 ECU.
Please note that if you decide to reduce the earnings of all participants, you cannot additionally target a particular participant. However, if you decide not to reduce the amount of all other participants, you can choose several participants to target individually. Each action would cost you 1 ECU. The decision screen will appear as follows:

Joueur	Groupe	Type	Coût d'effort	Gain	Decision
A	Alpha	Employeur		96	☐ Réduire le gain de 5 UME (coût 1 UME)
B	Beta	Employeur		128	☐ Réduire le gain de 5 UME (coût 1 UME)
C	Alpha	Salarié	élevé	22	☐ Réduire le gain de 5 UME (coût 1 UME)
D	Beta	Salarié	faible	16	☐ Réduire le gain de 5 UME (coût 1 UME)
E	Alpha	Salarié	faible	27	☐ Réduire le gain de 5 UME (coût 1 UME)
F	Alpha	Salarié	élevé	27	☐ Réduire le gain de 5 UME (coût 1 UME)

☐ Réduire le gain de tous les employeurs et les employés de 2 UME (coût: 1 UME)

Valider

Please recall that all the actions you undertake are anonymous, and are your decisions only. You may choose to not reduce the earnings of any other participant if that is your choice.

The participants who have been in the role of employer or of worker in game 5 do not have any action to undertake in game 6.