

Gender Discriminatory Taxes and Labor Supply

Jochen Hundsdoerfer* and Eva Matthaiei†

Freie Universität Berlin

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Abstract

In this paper, we examine the impact of discriminatory taxation on individual labor supply decisions. Using the controlled environment of an experimental laboratory, we manipulate both outcome fairness as well as procedural fairness of taxation between participants. While mere outcome inequality does not influence labor supply decisions significantly, we find evidence of a strong negative effect of gender-based discrimination on labor supply by both female and male participants. The results further demonstrate a positive effect of fairness perceptions on individual labor supply decisions. However, we find severe differences in fairness perceptions by gender when comparing preferential and disadvantageous outcome inequalities.

Keywords

Tax, labor supply, fairness, discrimination

1 Introduction

The call for equality is as old as human rights themselves. Nevertheless, it took until the past century for gender equality to become one of the major political concerns in western industrialized countries. Over the past decades especially gender issues with respect to the labor market form the heart of this discussion. Hereby European politicians have recently put gender differences in taxation into the spotlight (Gunnarsson et al., 2017). Among other factors a variety of tax policies in practice such as joint taxation for couples, Earned Income Tax Credits or Working Tax Credits are accused to establish inequalities and specially to promote disincentives for labor market participation of second earners and therefore mostly women (e.g. Blundell, 2000; Eissa and Hoynes, 2004; Gunnarsson et al., 2017). To

* Prof. Dr. Jochen Hundsdoerfer, Freie Universität Berlin, School of Business & Economics, Department of Accounting Auditing and Taxation, Thielallee 73, D-14195 Berlin, Germany, jochen.hundsdoerfer@fu-berlin.de.

† Eva Matthaiei, Freie Universität Berlin, School of Business & Economics, Department of Accounting Auditing and Taxation, Thielallee 73, D-14195 Berlin, Germany, eva.matthaiei@fu-berlin.de (corresponding author).

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overcome labor market inequalities a number of gender-based policies such as affirmative action (e.g. in the USA) or quotas (e.g. Spain and Norway) have been discussed and implemented to increase female labor market participation (Alesina et al., 2011). In the course of this discussion, Alesina and Ichino (2007) promoted the idea of gender-based taxation, implementing lower tax rates for women while raising tax rates for men, in the media - an idea that also found its way into tax reform suggestions in Italy (Alesina et al., 2011). Next to the political discussion the empirical research evidence on work incentives for second earners, often based on survey data, is growing (recent studies for Germany are for example Triebe, 2013; Chirvi, 2017). Gender-based taxation on the other hand has been predominantly been addressed theoretically or using microeconomic simulations (see e.g. Alesina et al., 2011; Colombino and Narazani, 2014; Meier and Rainer, 2015; Colonna and Marcassa, 2015). While further socioeconomic factors contributing to gender-based inequalities in taxation, such as the division of unpaid work, still need to fight their way into the political focus (see Gunnarsson et al., 2017), recent experimental studies start to consider these (Schröder and Burow, 2016; Cochard et al., 2018). However, none of these studies address fairness perceptions of inequalities and the resulting fairness effects on labor supply. Given the political relevance and the vast discussion of labor supply responses to tax policies in general (see Killingsworth, 1983, part 6; Keane, 2011), the lack of empirical evidence with respect to the perception and effects of inequality in taxation is astonishing.

On the other hand, evidence from general labor market studies proves that individuals greatly respond to perceived unfairness in the way they have been treated (for a recent overview see Fehr et al., 2009). Nevertheless, only one empirical study addresses the effects of perceived unfairness of taxation on labor supply but without a specific focus on inequalities due to tax policies. Using data from the 2005 wave of the German Socioeconomic Panel (SOEP), Cornelißen et al. (2013) show that the belief that “the rich do not pay their fair share in taxes” is associated with a 20% increase in paid absenteeism from work. While the study proposes a strong link between tax fairness beliefs and individual labor supply, it is exposed to several shortcomings. Equivalent to the afore mentioned survey based studies on disincentive effects for second earners of tax policies, claiming a causal relationship between the two phenomena based on the given data is inherently difficult. Furthermore, despite comprehensive modelling, measurement issues regarding the difference between absenteeism due to actual sickness and deliberate reductions in working time as a response to fairness concerns remain.

As opposed to earlier studies, we directly investigate the link between unfair tax settings across workers and the individual labor supply decision. We address the question whether market participants actually adjust their labor supply if they are aware of being taxed differently than others and if this adjustment is linked to underlying fairness perceptions. To test the proposed causal relations, we

conduct a laboratory experiment. Our analysis differentiates between the distinct domains of tax fairness - outcome and procedure - and captures discrepancies in perceptions and reactions between subjects. Differences in outcome fairness are created by randomly attributing either high or low tax rates between subjects, while the randomization is completely visible to the participants. Gender-based tax rates are levied to introduce a violation of procedural fairness. Hereby our experimental design is set up in order to capture both a situation in which female participants suffer (benefit) from inequality by facing a high (low) tax rate while male participants benefit (suffer) from facing a low (high) tax rate.

Our study contributes to the research on taxes and labor supply by being the first to investigate the impact of unfair differential taxation between subjects on individual labor supply in a laboratory experiment. Hereby we pioneer in the analysis of the effects of random and discriminatory horizontal inequity in taxation. Furthermore, using gender as the basis of discrimination we directly address relevant gender issues of taxation. In addition, we contribute to the literature on comparative net pay among workers, by introducing net pay differences through unequal tax rates. We thus provide further evidence on the effects of comparisons between workers on individual preferences and decisions by investigating the influence of discriminatory (net) wage differences on labor supply in the lab. Finally, by distinctively manipulating the tax rate determination procedure, we contribute to the broader research field on trust in authorities and its effects on individual decision-making.

The remainder of this article is organized as follows. In section 2, a brief review of the related literature and its implications for the current study is presented. In section 3, we derive the hypothesis and describe the experimental design. Results from the empirical analysis are stated and discussed in section 4. Section 5 closes with final remarks.

2 Review of the related literature

The well-established perspective that inequalities and the connected disincentives created by several tax policies actually translate into reductions of female labor supply has recently been challenged. Studying the effects of joint taxation on work division of couples in a laboratory experiment, Schröder and Burow (2016) only find a negative effect of joint taxation on labor effort of men when assigned the secondary earner role. Using a quasi-experimental approach based on data from the SOEP, Chirvi (2017) concludes that childbirth as opposed to mere tax incentives created by entering joint taxation is the key factor driving female labor supply. However, the study only focuses on women entering joint taxation, meaning women getting married, and not married women in general (Chirvi, 2017). In addition, both Schröder and Burow (2016) as well as Cochard et al. (2018) provide evidence that

couples follow a strictly economic optimization when dividing paid and unpaid work without any pre-determined socioeconomic gender role. These challenges to established “truths” stress the need for empirical evidence on labor responses to inequalities of taxation ever more.

Studies regarding the effects of gender-based taxation mainly agree that taxing women at a lower rate than men is effectively in raising women’s overall labor supply and can be optimal (e.g. Alesina et al., 2011; Colombino and Narazani, 2014; Colonna and Marcassa, 2015). However, results by Meier and Rainer (2015) suggest that the optimal allocation of a low tax rate to a gender, male or female, strongly depends on the underlying assumptions. One assumption studying gender specific labor market effects is usually based on women having higher elasticities of labor supply (for a recent overview of labor supply elasticities in Europe and the US see Bargain et al., 2014). Although somewhat contradicting, the aforementioned findings by Schröder and Burow (2016) do support gender differences in labor supply elasticities. In an attempt to study the underlying mechanisms of the gender-wage gap in an experimental labor market, Schwierén (2012) also finds differences in effort levels as well as the wage-effort-correlation between male and female participants. Further gender differences in preferences related to labor market behavior, such as risk taking, have been widely discussed and supported by experimental studies (for a recent overview see Azmat and Petrongolo, 2014). Additionally, Pfeifer and Stephan (2018) provide evidence of gender differences in wage fairness perceptions, where women are more willing to regard their wages as fair and subsequently less likely to demand pay raises. Given this support for gender differences in labor market reactions, we assured that each experimental treatment group consists of approximately the same number of male and female participants. We did so because we aim at studying the overall market impact of inequalities and accordingly fairness violations of taxation. This design enables us to derive conclusions regarding society as a whole while keeping the relevant gender focus.

While existing studies on the effect of taxes on labor supply do not offer evidence regarding comparisons among taxpayers, there is a growing stream of literature concerning the effects of relative pay information on worker behavior. Most studies report findings of (positive and negative) reciprocal behavior in labor effort (e.g. Cohn et al., 2014; Cohn et al., 2015; Fischer and Steiger, 2009; Charness and Kuhn, 2007). However, following Bracha et al. (2015) reciprocity should not determine labor supply decisions as only the employee benefits from accepting, rejecting or renegotiating a given job offer. Using data from a laboratory experiment, they provide evidence of a strong negative effect of relative pay information on the labor supply of comparatively low paid workers (Bracha et al., 2015). Arguably, this result indicates a shift in workers preferences potentially in line with “coherent arbitrariness” (Bracha et al., 2015). In addition to experimental evidence, results by Cornelißen et al.

(2011) indicate a negative impact of perceived unfairness of CEO pay on working morale based on data from the 2005 SOEP wave. Card et al. (2012) provide further evidence in this direction by reporting lower job satisfaction and higher probability of looking for a new job among relatively low paid university staff members with access to co-worker pay information.

Building on Festinger's social comparison theory (Festinger, 1954), three norms of equity have been discussed in the tax compliance literature. Following Wenzel (2003), horizontal equity refers to the equality of tax payments among equal income levels. Vertical equity refers to tax rates for different income levels according to the principle of contribution ability. Exchange equity refers to the received value of tax-funded public goods. Focusing on tax reporting as direct reciprocity towards a tax system with no utility of public good redistribution, prior experimental evidence suggests a negative effect of tax differentials on tax compliance of disadvantageously taxed individuals (see e.g. Spicer and Becker, 1980; Fortin et al, 2007; Bazart and Bonein, 2014; Castro and Rizzo, 2014). Nevertheless, these results seem to be strongly dependent on the manner of the implementation of inequality and are not overall consistent. First, Webley et al. (1991) fail to find any effect of inequality at all. Castro and Rizzo (2014) find evidence of a negative effect of vertical inequity on reported income but not of horizontal inequity, while Fortin et al. (2007) find a negative effect of horizontal inequity on tax compliance. Bazart and Bonein (2014), then again provide evidence of a negative effect of both horizontal and vertical inequity on tax compliance, where the horizontal inequity dominates the vertical. In addition, evidence of positive reciprocity among advantageously treated subjects is even less pronounced. Spicer and Becker (1980) report a corresponding positive effect in tax compliance for subjects that believe to benefit from fiscal inequality, while results by Bazart and Bonein (2014) do confirm this positive effect but remain insignificant.

Concerning the additional role of procedural fairness in individual decision making, empirical evidence stemming from a broad field of research shows a positive impact of procedural fairness on individual compliance with decisions made by authorities (for an overview see Tyler, 2006). Since the introduction of the "slippery slope" framework by Kirchler et al. (2008) there's also a growing stream of literature providing evidence of a negative interaction effect between trust in authorities and procedural fairness in tax compliance decisions, where the latter is of stronger concern in an environment of low trust (see e.g. van Dijk, and Verboon, 2010). However, these studies commonly rely on manipulating beliefs about related fairness concerns such as information provision or the analysis of general fairness beliefs in a given tax system and country, both often additionally mixed with other concerns such as fiscal exchange (see e.g. Kogler et al., 2016; Gobena, and van Dijk, 2016; Richardson, 2006).

Results on the role of intentions in tax settings further support the importance of tax rate determination procedures. Lévy-Garboua et al. (2009) provide evidence that the existence of Laffer curve effects in labor supply is highly dependent on the existence of a tax rate intentionally chosen by a market partner. While randomly applied tax rates rather lead to a linear decline in labor supply, intentionally set tax rates lead to stronger labor supply reductions at the highest possible tax rate in the experiment (79%) and show a non-linear effect on labor supply below that (Lévy-Garboua et al., 2009). The argument underlying these results is that the perception of being treated unfairly and thus reducing labor supply as an emotional response is highly dependent on the manner in which tax rates are chosen (Lévy-Garboua et al., 2009). Evidence from ultimatum games further supports the role of intentions when it comes to human interactions. Falk et al. (2003), for example, show that the probability of rejecting an uneven (unfair) offer, and thus forgoing own income, significantly increases when the offer is made intentionally compared to a randomly decided split. In a labor market context, these results have been confirmed with regard to the effect of wage offers on exerted effort (e.g. Charness, 2004, Offerman, 2002). Therefore, our experimental design isolates procedural fairness by varying the actual tax rate determination process from universal to random to discriminatory.

3 Hypothesis Development, Experimental Protocol and Variable Measurement

Hypothesis Development and Experimental Design

In a psychological interpretation, fairness comprises of four domains: distribution, procedure, information and interpersonal behavior (Wirtz et al., 2017). Building on this specification, Wenzel (2003) introduced a fairness framework for tax compliance consisting of a) distributive justice, b) procedural justice, and c) retributive justice. As retributive justice refers to sanctions of norm violations, which lie outside the scope of this article, in our treatments we focus on pillars a) and b) of this framework.

We examine fairness effects of taxation using a 2×3 between subjects factorial design with the independent variables being the level of the applied tax rate (high or low) and the determination procedure of the individually applied tax rate (universal, random or discriminatory). We decided to manipulate the determination procedure of the individually applicable tax rate to be able to differentiate outcome effects in labor supply towards both general fairness dimensions. An overview of the general sequence of the experiment is shown in Figure 1 (below). Please note that Figure 1 separates treatment groups by the actual treatment information provided during the experiment. Figure 2 below shows the actually resulting six treatment groups used for empirical evaluation.

The first two groups, namely *Control High* and *Control Low*, form the reference groups for the treatment groups *Random* and *Discriminatory*. The groups *Control High* and *Control Low* represent the case of a universally applied tax rate with no direct fairness violation. Participants assigned to these groups do not receive any information about any other group. In the *Control High* (*Control Low*) treatment, subjects are solely informed that the general tax rate equals 40% (20%).

Our first treatment group *Random* is designed to manipulate distributive justice. Distributive justice generally refers to a norm of equality in the achieved outcome across individuals (Wirtz et al., 2017). In her prevalent model of inequity in social exchange, Adams (1965) established this norm as relative equity of personal outcome (e.g. payment) in relation to personal input (e.g. effort) for decisions in the labor context. Building on the equity conditions previously discussed in the tax compliance literature (please refer to section 2), we focus on manipulating horizontal equity among taxpayers by introducing inequity through differing tax rates on the same pre-tax payment for all participants.¹ Furthermore, due to the highly transparent random application of tax rates we do not violate procedural justice at this point. In the *Random* treatment subjects are informed that the individually applied tax rate equals either 40% (*Random High*) or 20% (*Random Low*) dependent on the color of the table tennis ball (white for high and orange for low) drawn before the start of the actual experiment. Accordingly, subjects in both treatments knew that there were other subjects in the room randomly taxed at a different rate.

Following the results by Cornelißen et al. (2013) and Bracha et al. (2015) we expect subjects that are randomly taxed at a high rate (*Random High*) to feel being treated unfairly to their disadvantage regarding their personal outcome (net wage). We therefore expect these subjects to reduce labor supply compared to subjects in the high taxed control group. Hypothesis 1a therefore states:

H 1a: Labor Supply is significantly lower in the *Random High* compared to the *Control High* treatment.

Concerning the effect of randomly applied differences in taxation on those that are randomly taxed at a low rate (*Random Low*), two effects are possible. Following the predictions in Adam's (1964) general model on equality, the perception of an unequal outcome should lead to an adjustment in behavior for both advantageously and disadvantageously treated individuals. Based on this general preference for fairness, we would predict a reduction in labor supply for subjects in the *Random Low* as compared to those in the *Control Low* group. On the other hand, this expectation is weakened by the fact that the actual outcome of the decision process of other group members is unknown to the subject and

¹ Note that we specifically define horizontal equity in terms of tax rates and not in terms of tax payments after (possible) evasion as it is partially done in previous studies (see e.g. Bozart, and Bonein 2014).

interactions are impossible. In addition, prior evidence on neither inequality in taxation nor inequality in pay (see section 2) supports a negative effect for advantageously treated individuals. On the contrary, results by Blount and Bazerman (1996) report a higher willingness to work under better but unequal pay conditions than marginally lower but equal pay. Based on this evidence we would expect subjects that are randomly taxed at a low rate to experience a feeling of “getting lucky” and thus increasing labor supply as compared to the low taxed control group. As both effects are conceivable, we formulate Hypothesis 1b undirected:

H 1b: Labor Supply significantly differs in the *Random Low* as compared to the *Control Low* treatment.

In our other treatment group (*Discriminatory*), we did not only violate distributive but also procedural fairness as compared to the *Random* treatment group. Regarding a broader context, Leventhal (1980) postulated six criteria for evaluating procedural fairness in general, namely: consistency, neutrality, accuracy, representativeness, ethics and the opportunity for revision. Building on his model of procedural fairness, we decided to focus on the criteria consistency and neutrality in combination with ethics for two reasons. With regard to importance, consistency and neutrality of the law as well as common ethical values represent some of the most basic requirements of modern democratic societies. For practical reasons, these criteria are also easily violated in a laboratory experiment. For subjects in the last two treatment groups, *Discriminatory High* and *Discriminatory Low*, the individually applied tax rate was determined based on their gender. In order to gain gender robust treatment results for the last groups the treatment information for *Discriminatory High* and *Discriminatory Low* was further divided. For half of the subjects in the groups the discrimination resulted in a high tax rate for men, while for the other half it resulted in a high tax rate for women; and the participants only knew about the discrimination in their subgroup. As a result, the treatment groups *Discriminatory High* and *Discriminatory Low* consist equally of men and women, whereby both feel either disadvantageously or advantageously discriminated respectively.

Combining the previously presented evidence on a) the role of intentions with b) the effects of violations of procedural justice by authorities (see section 2), we expect labor supply among discriminatorily high taxed workers to be significantly lower than that of randomly high taxed workers and accordingly that of workers in the high taxed control group. Hypothesis 2a therefore states:

H 2a: Labor Supply is significantly lower in the *Discriminatory High* than in the *Random High* and in the *Control High* treatment.

Regarding the difference in individual labor supply between a discriminatorily and a universally applied low tax rate, the same negative and positive effects are possible as for the *Random Low* group.

However, the negative effect of an additional violation of procedural justice, especially through discrimination, might mitigate the positive effect previously expected for subjects in the *Random Low* as compared to the *Control Low* treatment. Nevertheless, as we cannot rule out the possibility that subjects might still experience happiness about being treated to their advantage, we do not expect the positive effect to vanish completely. Accordingly, Hypothesis 2b states:

H 2b: Labor Supply significantly differs in the *Discriminatory Low* as compared to the *Random Low* and the *Control Low* treatment.

Experimental Protocol

In order to identify the effects of discriminatory taxes on labor supply, we conducted a real effort experiment using a contract approach. The contract approach allowed all subjects to decide on the number of tasks they were willing to work on, and accordingly the time they were willing to work for, given the specific contract conditions (Blaufus et al., 2016). By individually determining the duration of the experiment, subjects were given the choice between labor (translating into income available for consumption) and actual leisure time. For the real effort task, we used a modified version of the digit-counting task introduced by Abeler et al. (2011). The task involved counting the number of ones in a 10×10 digit table randomly filled with a 50% chance per cell of containing either a zero or one.² The tables were generated at the beginning of each session and the same for all subjects participating in the session.

The experiment was programmed and conducted with the experiment software z-Tree (Fischbacher, 2007). All experimental treatments were randomly applied in all session, thus possible effects of time and day were not treatment specific. In addition, varying tables on a session level guaranteed that differences in labor supply and working performance were not due to differing tasks by treatments. One female and one male experimenter supervised all sessions. Each session consisted of one overall period that was divided into seven subsequent stages. Figure 1 provides an overview of these stages.

² The counting task has several advantages. First, it does not require any prior knowledge and previous experiments by Abeler et al. (2011) and Bühren and Kundt (2014) do not show significant learning effects throughout the task. Being boring, artificial and purposeless it also introduces costs of effort for the subjects while ruling out experimenter demand effects (Abeler et al. 2011; Bühren and Kundt 2014).

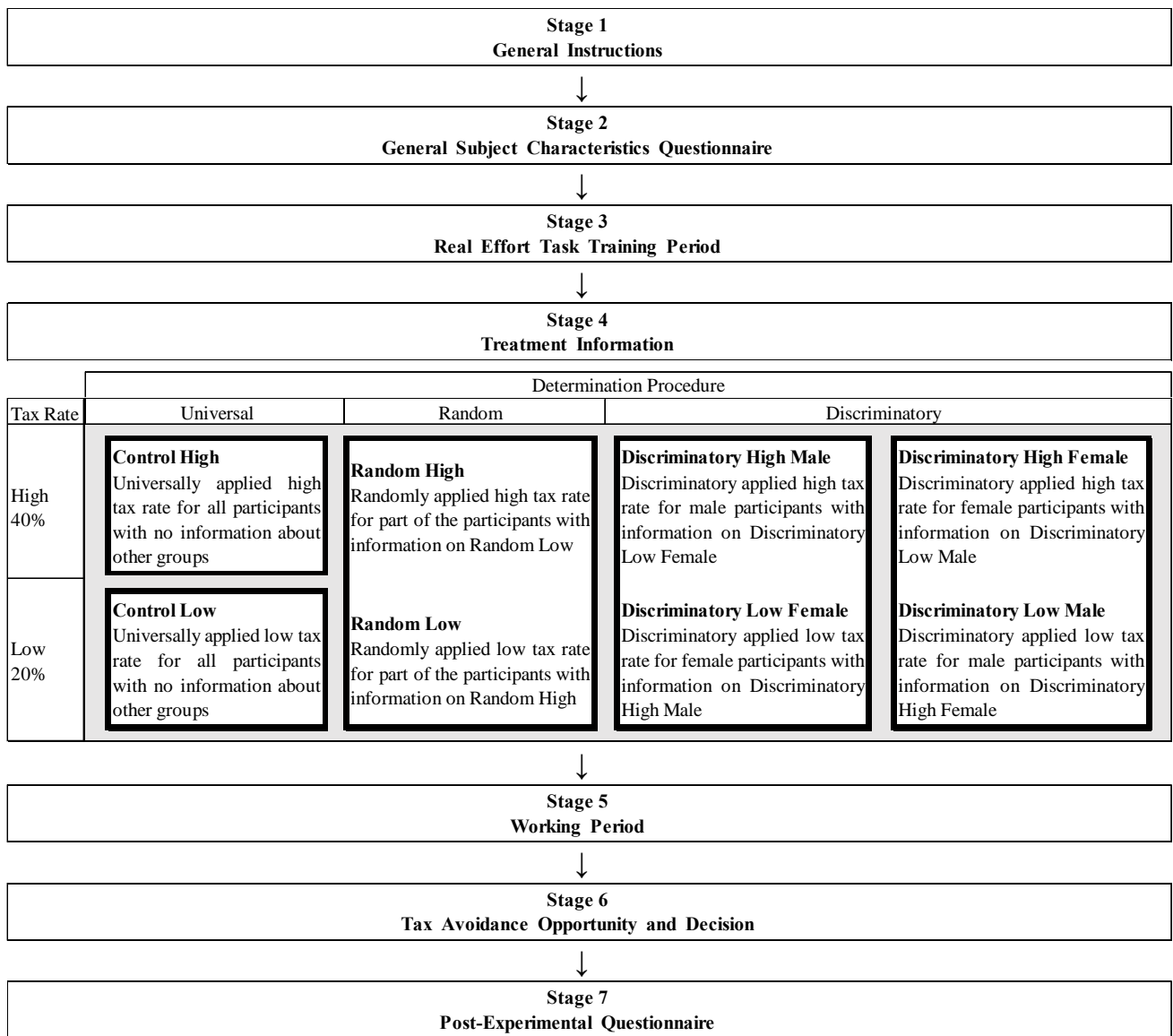


Figure 1. Flowchart of the experimental procedure ³

³ Bold lines display information separation between subjects.

Tax Rate	Determination Procedure				
	Universal	Random	Discriminatory		
High 40%	<p>Control High</p> <p>Universally applied high tax rate for all participants with no information about other groups</p>	<p>Random High</p> <p>Randomly applied high tax rate for part of the participants with information on Random Low</p>	<p>Discriminatory High</p> <table border="1"> <tr> <td> <p>Discriminatory High Male</p> <p>Discriminatory applied high tax rate for male participants with information on Discriminatory Low Female</p> </td> <td> <p>Discriminatory High Female</p> <p>Discriminatory applied high tax rate for female participants with information on Discriminatory Low Male</p> </td> </tr> </table>	<p>Discriminatory High Male</p> <p>Discriminatory applied high tax rate for male participants with information on Discriminatory Low Female</p>	<p>Discriminatory High Female</p> <p>Discriminatory applied high tax rate for female participants with information on Discriminatory Low Male</p>
<p>Discriminatory High Male</p> <p>Discriminatory applied high tax rate for male participants with information on Discriminatory Low Female</p>	<p>Discriminatory High Female</p> <p>Discriminatory applied high tax rate for female participants with information on Discriminatory Low Male</p>				
Low 20%	<p>Control Low</p> <p>Universally applied low tax rate for all participants with no information about other groups</p>	<p>Random Low</p> <p>Randomly applied low tax rate for part of the participants with information on Random High</p>	<p>Discriminatory Low</p> <table border="1"> <tr> <td> <p>Discriminatory Low Female</p> <p>Discriminatory applied low tax rate for female participants with information on Discriminatory High Male</p> </td> <td> <p>Discriminatory Low Male</p> <p>Discriminatory applied low tax rate for male participants with information on Discriminatory High Female</p> </td> </tr> </table>	<p>Discriminatory Low Female</p> <p>Discriminatory applied low tax rate for female participants with information on Discriminatory High Male</p>	<p>Discriminatory Low Male</p> <p>Discriminatory applied low tax rate for male participants with information on Discriminatory High Female</p>
<p>Discriminatory Low Female</p> <p>Discriminatory applied low tax rate for female participants with information on Discriminatory High Male</p>	<p>Discriminatory Low Male</p> <p>Discriminatory applied low tax rate for male participants with information on Discriminatory High Female</p>				

Figure 2. Separation of treatment groups for empirical analysis

After entering the laboratory, all participants were randomly assigned a seat by drawing a table tennis ball from one of the experimenters. This procedure was also used to generate a random treatment assignment of all participants while ensuring an approximately equal distribution of male and female participants per treatment. Overall, the probability of being taxed at a high (low) rate equaled 50% for all participants, while the probability of each treatment assignment equaled 16.67% for all (male and female) participants through all sessions.

Following the random assignment, the experiment started at the same time for all participants in one session. Throughout all stages of the experiment, all instructions were provided electronically and questions could be posted towards the experimenters quietly at all times. At the first stage, all participants were given identical general instructions considering the sequence of the experiment.⁴

During the second stage, all participants had to answer the same general information questionnaire. At this point mainly demographic information was collected. In addition, subjects were asked about their motivation to earn money in the course of the experiment in order to measure the treatment influence on individual working motivation afterwards.

Following the pre-experimental questionnaire, all subjects had the chance to familiarize themselves with the real effort task through a training period. The training period consisted of a maximum of five subsequent tables. This period could be determined prematurely up to the participant's choice after each of the tables and had no influence on the subject's payout. During the training period, subjects

⁴ During the experiment, instructions all were given in German. A translation of the treatment instructions is provided in Appendix 1. The full original instructions as well as translations of the general instructions, task explanations and questionnaires can be requested from the authors.

were shown a countdown per table to enhance individual working time estimates. Furthermore, the training period offers the opportunity to control for possible, however unlikely, differences in individual talent for the task.

At stage four, the actual treatment information was given to the subjects.⁵ Treatment instructions consisted of the information on the treatment dependent tax system as well as the pre-tax piece rate and the general labor contract conditions. The pre-tax piece rate per correctly counted table equaled 15 Euro Cents for all subjects. The general labor contract conditions were also identical for all treatments. In addition, all subjects were informed that all tax payments due were donated by the experimenter to the library of the School of Business & Economics of the Freie Universität Berlin. The donation of tax payments to the school's library was made in order to replicate the purpose of state tax systems to finance public goods while keeping the actual public good at a decent level of abstraction. This helps to increase external validity by accounting for the complex interaction between taxpayer and tax system discussed in section 2. At this point, each subject could enter a labor contract on a self-chosen number of tasks (tables) to work on. The number of tables agreed upon in the contract referred to the total number of tables the individual subject had to count, not the number of correctly counted tables. Therefore, subjects were able to make mistakes during the subsequent working period. This provides the additional possibility to compare not only labor supply across treatments but also working effort.⁶

Having completed the working period, subjects were shown the number of contracted tables, the number of correctly completed tasks, their pre-tax income, their tax payment due and their post-tax income at stage six.⁷

In the post-experimental questionnaire, subjects were asked about their working experience and fairness perceptions during the experiment. Further additional control variables were collected. The post-experimental questionnaire was identical for all subjects, apart from those that had zero pre-

⁵ A translation of the treatment instructions is provided in Appendix 1.

⁶ As the focus of this paper lies on labor supply reactions, we do not include the analyses of working effort in the current version. The respective results will be included in future versions of this paper.

⁷ Having this information in mind, all subjects with a positive tax payment (and income accordingly) were now given the opportunity to legally avoid taxes by purchasing tax advisory services from a tax expert at the Freie Universität Berlin. In order to reach their tax avoidance decision, subjects were provided with the amount of potential tax savings, the related costs and resulting net benefit according to the level of services purchased, all measured in percent of the initial tax payment due. The opportunity to legally distract payments from the public system offers an opportunity to disentangle the individual need to reciprocate the tax treatment free of any risk from other purely labor related effects such as lower working motivation. After the tax advisory decision, subjects were again provided with their resulting wage payments before entering the post-experimental questionnaire.

As the focus of this paper lies on labor supply reactions and the *ex post* tax avoidance opportunity could not have distorted the labor supply, we do not include the analyses of results from the tax avoidance decision in the current version. The respective results may be included in future versions of this paper.

service tax payment due and therefore could not purchase any tax advisory services.⁸ In addition, subjects in the control groups had to answer one question less than the rest of all subjects.

Variable Measurement

Our main dependent factor of interest, labor supply, is captured by two variables. First of all, Labor Supply is defined as the number of tables each subject agreed upon in the labor contract. Every participant could enter a contract in a range between zero and a maximum of 200 tables. The limitation of tables was chosen in order to keep the duration of the experiment at a maximum of four hours while preventing corner solutions at the maximum number of tables. In addition, Labor Time is measured as the total time each subject spent counting tables. We decided to include (and later on focus on) Labor Time in order to rule out guessing behavior by participants.

For further investigation of the treatment influence on labor supply, participants were asked to state their initial work motivation in the General Subject Information Questionnaire, as well as the change in their work motivation due to the treatment dependent contract information in the post-experimental questionnaire. Initial motivation to work (Pre-Treatment Motivation) was measured on 1-to-7-scale, ranging from “very low” to “very high”. The change in motivation (Change in Motivation) was again measured on a 1-to-7-scale now ranging from “strongly reduced” to “strongly increased”.

Regarding important control variables, in the post-experimental questionnaire we measure individual inequity aversion (fairness preferences). Following Bazart and Bonein (2014), we used the payout distribution task, developed by Bartling et al (2009), to capture aheadness and behindness aversion in a situation where the participant him- and herself is subject to the consequences of his/her decision.⁹ Drawing on Tan and Chin-Fatt (2000) we further monitored fairness perception during the experiment a) regarding the general tax system and b) the individual personal tax experience. In addition, we evaluated procedural fairness of the tax system applied during the experiment. Fairness Perceptions were collected via five statements each measured on a Likert-type 1-to-7-scale, ranging from “I do not agree at all” to “I fully agree”.¹⁰

Sample Characteristics

The experiment was conducted in 15 sessions at the computerized experimental laboratory of the Freie Universität Berlin School of Business and Economics during June, November and December 2017.

⁸ These subjects had to answer one question less.

⁹ The task was included as hypothetical questions so neither of tasks led to any payment for the participants.

¹⁰ For a complete overview of all variables and their description, please refer to Appendix 2.

Overall, 190 undergraduate and graduate students from the Freie Universität Berlin participated in the experiment. No student participated in more than one session. All participants were recruited via public announcements using identical invitations. On average seven female and six male students participated in each session. Due to a system breakdown at the university, one session was terminated prematurely. At the time of the breakdown, 26 subjects had not finished the experiment yet. 21 of these subjects were still in the working period, while one participant had almost completed the post-experimental questionnaire. However, 14 of the 21 participants agreed to complete the post-experimental questionnaire on paper following the breakdown. We base our analysis of Labor Supply on the available data for all 190 subjects, resulting in slight differences in the number of observations between models due to the lack of control variables. The analysis of Labor Time however is solely based on those subjects who completed the working period. Subjects earned 10.50 € on average for an average duration of 82 minutes. Table 1 provides an overview of the sample characteristics. We find some significant differences regarding personal characteristics among our treatment groups.¹¹ Because overall more women participated in the experiment, male participants are slightly underrepresented in the *Random High* treatments. This difference is marginally significant compared to the *Discriminatory* groups. We find further differences among treatments regarding age, semester, religiosity, political orientation, tax expertise, optimism and fairness preferences. Accordingly, we decided to control for all of these characteristics in the further analysis. For a discussion of potential influences of these characteristics on our dependent variables, please refer to section 4.

¹¹ An overview of the personal characteristics by treatment is provided in Appendix 3. Differences between treatments are analyzed based on untabulated results from Wilcoxon Rank-Sum Tests. The authors will provide all untabulated results upon request.

Table 1. Participant characteristics¹²

	N	Mean	Sd	Min	Max
Gender	190	0.56	0.50	0	1
Talent	190	-55.08	27.42	-220.7382	0
Age	190	21.74	4.21	17	52
Business & Economics	190	0.49	0.50	0	1
Semester	190	3.67	3.78	1	25
Religiosity	190	3.66	2.59	1	10
Political Orientation	190	4.41	1.63	2	10
Political Interest	190	2.18	0.76	1	4
Pre-Treatment Motivation	190	4.99	1.60	1	7
Job Experience	190	0.52	0.50	0	1
Tax Expertise	179	2.72	1.47	1	7
Optimism 1	179	5.92	1.15	2	7
Optimism 2	179	5.78	1.42	1	7
Aheadness Aversion 1	179	0.80	0.40	0	1
Aheadness Aversion 2	179	0.69	0.46	0	1
Behindness Aversion 1	179	0.78	0.42	0	1
Behindness Aversion 2	179	0.71	0.46	0	1
Disposable Income	179	395.04	259.97	0	1600
Time Pressure	179	0.23	0.42	0	1
Observations	190				

4 Results

Descriptive Statistics

Results for our dependent variables Labor Supply and Labor Time are shown in Figure 2. Differences between treatment groups are based on results from Wilcoxon Rank-Sum Tests comparing two treatment groups at a time.¹³ Based on descriptive analysis we only find evidence supporting Hypothesis 2a. Individual labor supply is lower under discriminatory high taxation compared to universal high taxation. This difference is marginally significant based on the number of contracted tasks and significant based on the time participants were willing to work on the tasks. Nevertheless, results do not support the existence of a difference between a discriminatory and randomly applied high tax rate. Among those groups taxed at a low tax rate, average labor supply is the highest in the *Discriminatory Low* treatment. However, the underlying differences remain insignificant. Although we did not hypothesize any effect of the size of tax rates per se, we further analyzed differences between high taxed and low taxed participants. We do not find any significant differences based on the number of contracted tasks. Labor supply based on the time participants spent working on the other hand is lower in the *Discriminatory High* compared to each the *Discriminatory Low* and the *Random Low* group (marginally significant).

¹² Please note again that differences in the number of observations are due to the before mentioned network break down at the university and the resulting premature end of one session.

¹³ Please note that we do not adjust p-values for multiple hypothesis testing as we cannot find an economic reason why our results would be driven by the existence of more than two treatment groups.

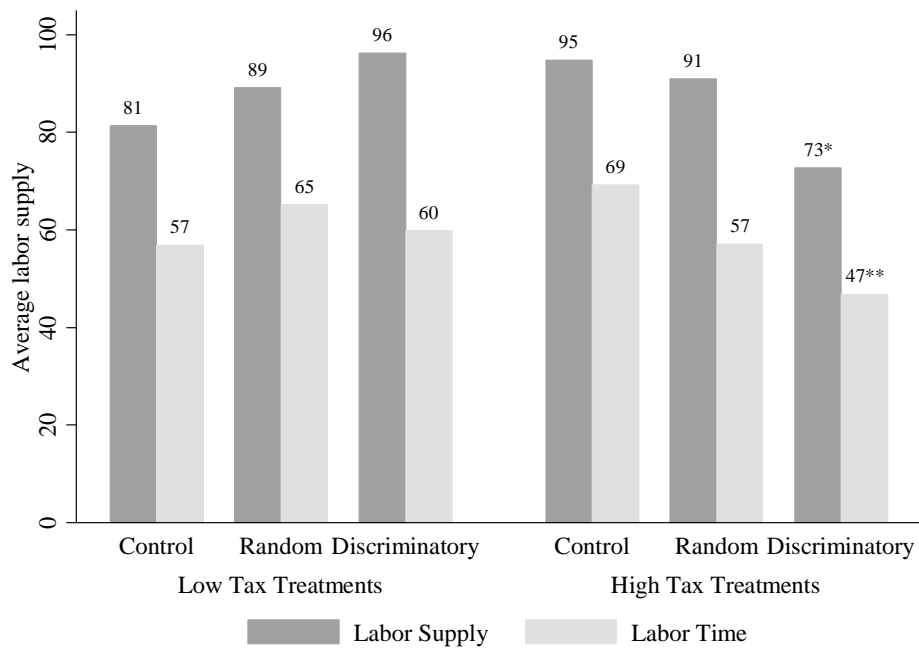


Figure 3. Labor Supply and Labor Time in the six treatment groups

As these overall results are surprising given the hypothesized effects and prior evidence on the importance of tax rates and net wages, we further investigate differences among participants in the six treatment groups. This further investigation reveals that especially male and female participants strongly differ in their reaction towards inequalities in taxation. Average Labor Supply and Labor Time by gender is therefore shown in Figure 3. Several trends can be identified from the graph. When comparing the low tax treatments, male labor supply remains approximately steady despite the different determination procedures of the tax rate. Among the inequality treatments when male participants are taxed to their advantage, male Labor Time only shows a slight decrease in the case of female discrimination. On the other hand comparing the isolated effect of the tax rate on male labor supply (*Control Low* versus *Control High*) a strong increase in male Labor Supply and Labor Time in line with an income effect of taxation is visible. When comparing male reactions to the different inequality scenarios in the high tax treatments we find growing declines in male labor supply. Especially male Labor Time is significantly lower when men face a high tax rate due to their gender (*Discriminatory High*) compared to a universally high tax rate (*Control High*). Taken together with the slight decreases in male labor supply where men face a low tax rate but others face a high one (*Random Low* and *Discriminatory Low*), these results indicate that male participants especially react towards inequality. Labor Supply and Labor Time by female participants on the other hand increases in inequality when comparing the low tax treatments. Facing low tax rates due to random luck (*Random Low*), and even more so due to male discrimination (*Discriminatory High*), appears to motivate female

subjects to work more. This result is in line with the assumption that a gender-based taxation where the male labor force is discriminated would increase female labor supply (see section 2). However, when drawing conclusions about optimal taxation caution is required. The strong reactions to a) changes in universally applied tax rates from low to high and b) inequality in the high tax treatments by male participants in our sample do neither support lower labor supply elasticities of men nor steady labor supply by men when switching from a universal tax system to one where men are discriminated. Finally when comparing female labor supply reactions to the different inequality scenarios where female participants face a high tax rate also provides evidence of a pronounced decrease in both female Labor Supply and Labor Time in case of female discrimination. Overall our results support the existence of negative effects of inequality creating tax policies such as joint taxation on labor supply of the disadvantaged party. Even more important this result holds not only if this party is female but the effect is even stronger if it is male.

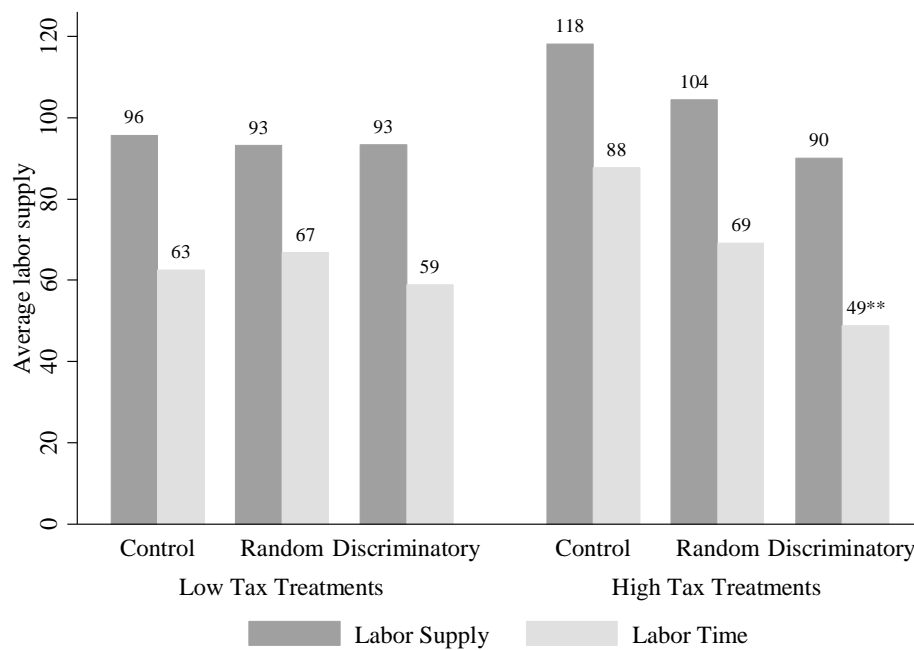


Figure 4. Labor Supply and Labor Time of **male** participants

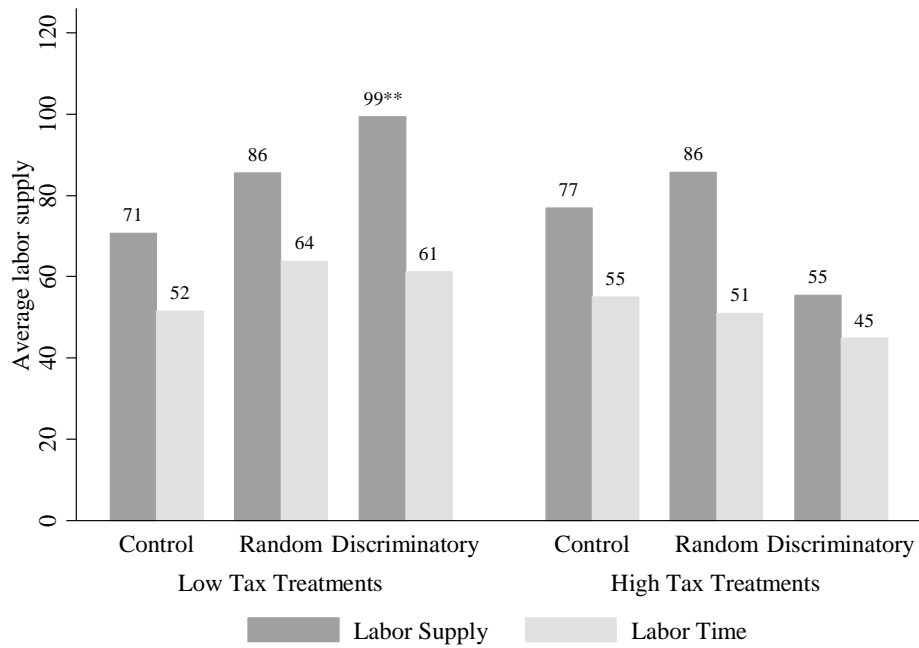


Figure 5. Labor Supply and Labor Time of **female** participants

As especially female labor supply seems to be driven by personal advantage we analyze these trends further. In order to get a clear picture of reactions to both sides of inequality, benefit (low tax rate) and suffering (high tax rate), by male and female participants, we combine the results for treatments *Random High* and *Discrimination High* into *Disadvantageous Tax* and those of *Random Low* and *Discrimination Low* into *Preferential Tax* and compare Labor Supply and Labor Time between those. Results for male and female participants are shown in Figure 4. Evaluations based on the combined treatments support the previously noted trends. Male labor supply is not driven by their own advantage but steady within inequality. Female Labor Time on the other hand significantly increases when female participants benefit from a low tax rate compared to their fellow participants.

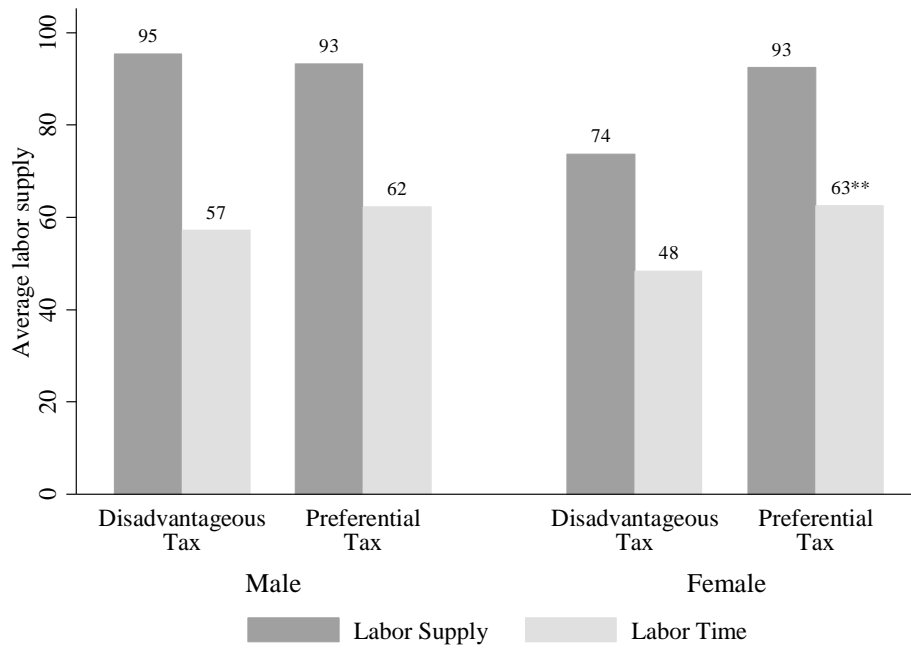


Figure 6. Labor Supply and Labor Time in Disadvantageous Tax and Preferential Tax treatments

A further comparison of the perceived fairness of the applied tax systems shows that the results in labor supply reactions are in line with differences in the fairness ratings by male and female participants. As can be seen in Figure 5, we only find evidence of a marginally significant increase in Personal Fairness ratings by male participants when comparing a preferential to a disadvantageous outcome. Ratings of General and Procedural Fairness by male participants however do not differ based on a preferential outcome. Fairness ratings by female participants however strongly increase in the case of preferential taxation. This effect is largest for the rating of Personal Fairness, considering how they themselves have been treated, but also highly significant in the rating of General Fairness and significant regarding the fairness of the procedure applied to determine the tax rate. These findings based on descriptive statistics indicate the existence of a strong difference in fairness perception between male and female participants with respect to inequalities - a difference that appears to have strong implications for real live decisions such as labor supply. To clarify the suggested relation between fairness perceptions and labor supply, we will analyze this link within the next section (Table 5 and Table 6).

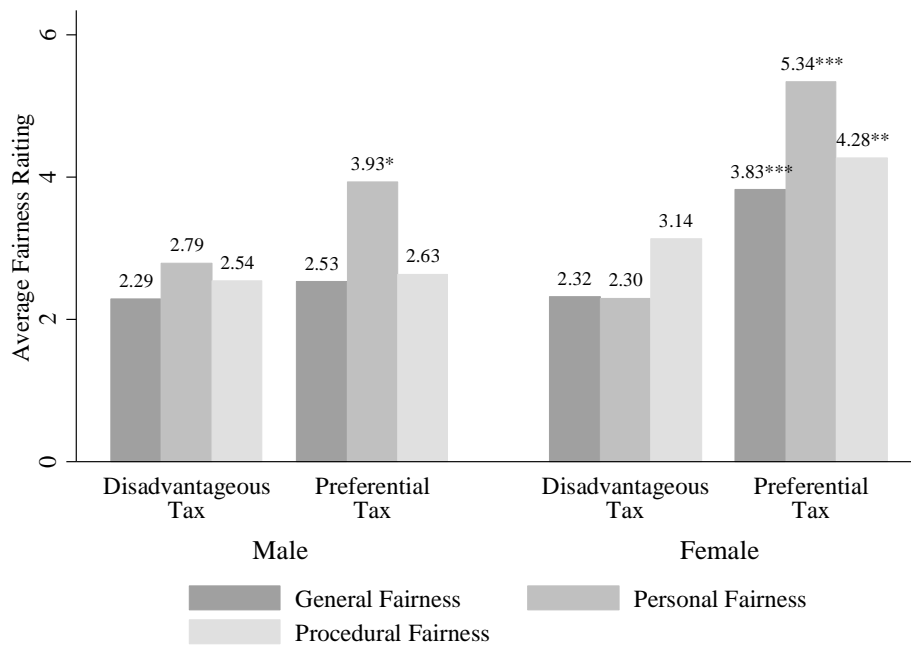


Figure 7. Fairness Perception in Disadvantageous Tax and Preferential Tax treatments

Hypothesis Tests

Since our results are overall equivalent when comparing labor supply based on the number of contracted tasks (Labor Supply) and the time subjects spent working (Labor Time), we will focus the remaining analysis on Labor Time in order to enhance clarity. Multivariate results for Labor Supply are shown in Appendix 4. Multivariate analyses of treatment effects on Labor Time confirm the findings based on descriptive statistics. The underlying results are shown in Table 2. Labor Time by those subjects taxed at a low rate does not significantly differ between treatments. Regarding participants taxed at a high rate, we can again only confirm the second half of Hypothesis 2a. Subjects that suffer from discrimination by the tax system reduce labor supply significantly compared to the *Control High* treatment. This reduction amounts to approximately 34 minutes or 57% of the average Labor Time over all treatments. The negative effect of a randomly applied high tax rate (*Random High*) on the other hand is only marginally significant in one model specification, thus we cannot confirm H1a. Out of all personal characteristics only Pre-Treatment Motivation is positively associated with labor supply in the low tax treatments. This association is insignificant in the high tax treatments with respect to Labor Time. On the other hand, especially Gender has a highly significant strong negative influence on Labor Time in the high tax treatments. In addition, Disposable Income decreases labor supply in the high tax treatments. Our control for Talent with respect to the counting task shows only a weakly significant negative effect in the high tax treatments. None of the other personal or session characteristics influence Labor Time significantly.

Table 2. Treatment effects on Labor Time

	(1) Labor Time	(2) Labor Time	(3) Labor Time	(4) Labor Time	(5) Labor Time	(6) Labor Time
Random Low	8.315 (9.878)	9.605 (9.398)	6.580 (10.263)			
Discriminatory Low	3.054 (9.700)	1.050 (9.348)	-4.801 (10.027)			
Random High				-12.893 (11.744)	-20.490* (11.418)	-14.506 (12.377)
Discriminatory High				-23.264* (11.747)	-31.084*** (11.284)	-34.172*** (12.810)
Gender		-4.158 (7.589)	-4.525 (9.049)		-26.248** (10.046)	-26.923* (13.918)
Disposable Income		-0.008 (0.014)	-0.008 (0.015)		-0.056** (0.022)	-0.058** (0.023)
Talent		0.010 (0.135)	-0.008 (0.139)		-0.327* (0.177)	-0.337* (0.181)
Pre-Treatment Motivation		7.572*** (2.354)	7.592*** (2.624)		1.195 (2.973)	2.059 (3.338)
Age			0.549 (1.205)			2.201 (1.978)
Business & Economics			3.145 (8.358)			1.091 (10.002)
Semester			0.074 (1.295)			-2.285 (1.900)
Job Experience			-14.171 (9.337)			-12.343 (11.388)
Tax Expertise			3.765 (2.956)			0.899 (3.946)
Religiosity			1.418 (1.550)			0.140 (2.254)
Political Orientation			1.620 (2.519)			3.155 (3.715)
Political Interest			0.960 (5.860)			4.449 (7.764)
Time Pressure			7.081 (9.091)			-11.588 (12.049)
Optimism 1			0.201 (3.599)			6.232 (4.992)
Optimism 2			0.781 (3.296)			-0.116 (3.388)
Aheadness Aversion 1			-11.941 (9.735)			5.534 (13.429)
Aheadness Aversion 2			14.032 (9.252)			-9.983 (10.573)
Behindness Aversion 1			-10.960 (13.832)			-5.515 (17.386)
Behindness Aversion 2			-0.099 (11.593)			6.290 (15.180)
Late Session Summer			0.634 (11.796)			-14.597 (15.207)
Early Session Winter			4.871 (10.209)			7.827 (14.699)
Late Session Winter			9.294 (11.494)			0.847 (14.167)
Constant	56.851*** (6.859)	25.975 (17.557)	-6.648 (45.449)	69.205*** (8.069)	88.017*** (23.005)	-6.111 (65.680)
Observations	85	84	84	84	82	82
Prob > chi2	0.6982	0.0625	0.5222	0.1442	0.0093	0.2027
Pseudo R-squared	0.0008	0.0142	0.0271	0.0045	0.0202	0.0350

Note: Reference treatments are *Control Low* for models (1), (2) and (3) and *Control High* for models (3), (4) and (5). Reference category for session controls is Early Session Summer. All estimations are Tobit regression models censored at zero.

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

In order to analyze previously discussed differences between fairness perceptions and resulting labor supply decisions by male and female participants, we further compare the treatment influence on fairness ratings for male and female subjects separately. Tables 3 and 4 contain the respective results. Fairness perceptions by male participants are mainly driven by the determination procedure, random or discriminatory. A discriminatory determined tax rate has a highly significant negative effect on fairness perceptions by male participants with respect to all five fairness dimensions in both model specifications. The negative effects of a randomly applied tax rate on General Fairness and Equality as well as its positive effect on Discrimination are especially pronounced when controlling for personal and session characteristics. In particular, male fairness ratings are not influenced by the height of their own tax rate. Neither the coefficient on Low Tax, the difference between a universal tax rate of either 20% or 40%, nor the respective interaction terms with the determination procedure, Random and Discriminatory, show a significant influence on male fairness perceptions. Only when adding all personal and session control variables to the model the coefficient on the interaction between the height of the tax rate and a discriminatory determination procedure becomes significant. Given all other factors remain stable, this represents an extension of the gap between personal fairness perceptions at a low and a high tax rate by male participants when switching from a universal tax rate to a discriminatory tax rate of approximately 2.7 points. However, considering this extension together with the strong negative effect of discrimination, personal fairness ratings by male participants in the *Discriminatory Low* treatment are still decreased compared to those in the *Control Low* treatment.

Fairness ratings by female participants also show a negative effect of discrimination, and the respective negative and positive effects of randomly determined tax rates on equality and discrimination ratings previously noted for male subjects in our sample. Nevertheless, especially personal fairness ratings by female participants are highly dependent on the height of the applied tax rate. The isolated effect of a low tax rate, when female participants do not know of any other tax rates (*Control Low* versus *Control High*) significantly increases Personal Fairness by about 1.7 points alone. A difference that again significantly increases in both *Random* and *Discriminatory* treatments. The magnitude of this increase being large enough to represent an increase in Personal Fairness ratings in the *Random Low* and *Discriminatory Low* treatments compared to the *Control Low* group. Noticeably, the gap in female fairness ratings between high and low tax rates widens in case of inequality over all fairness dimensions. The respective effects, however, mostly remain insignificant. Overall, the reaction of female participants in our sample appears to be strongly driven by their own advantage of being taxed at a low rate.

Table 3. Treatment effects on fairness perception (male participants)

	(1) General Fairness	(2) Personal Fairness	(3) Procedural Fairness	(4) Equality	(5) Discrimination
<i>No Control Variables</i>					
Low Tax	0.292 (0.984)	0.926 (0.911)	0.692 (1.067)	-0.886 (1.539)	-1.399 (1.941)
Random	-1.283 (1.131)	1.026 (1.044)	-0.448 (1.221)	-5.442*** (1.886)	2.793 (2.105)
Low Tax * Random	0.083 (1.510)	-1.174 (1.391)	-0.909 (1.640)	2.982 (2.440)	1.028 (2.872)
Discriminatory	-3.821*** (1.078)	-3.741*** (1.003)	-2.751** (1.136)	-5.330*** (1.654)	5.545*** (1.944)
Low Tax * Discriminatory	0.201 (1.444)	1.906 (1.317)	-0.518 (1.543)	-0.154 (2.248)	3.440 (2.698)
Constant	4.058*** (0.715)	3.932*** (0.661)	3.422*** (0.772)	5.532*** (1.120)	1.121 (1.407)
Observations	82	82	82	82	82
Prob > chi2	0.0001	0.0000	0.0079	0.0002	0.0000
Pseudo R-squared	0.0821	0.0929	0.0511	0.0861	0.1022
<i>Full Control Variables</i>					
Low Tax	-0.855 (0.948)	-0.232 (0.847)	0.370 (1.089)	-2.166 (1.514)	0.261 (1.906)
Random	-2.123* (1.141)	0.380 (0.994)	0.515 (1.293)	-6.308*** (2.019)	4.399** (2.197)
Low Tax * Random	1.438 (1.421)	0.437 (1.269)	-0.797 (1.646)	4.234* (2.485)	0.689 (2.690)
Discriminatory	-4.757*** (1.117)	-4.193*** (0.997)	-2.900** (1.247)	-7.326*** (1.830)	6.765*** (2.016)
Low Tax * Discriminatory	1.452 (1.359)	2.666** (1.217)	-0.049 (1.562)	1.318 (2.161)	2.744 (2.484)
Personal Controls					
Session Controls					
Constant	3.446 (3.007)	5.324** (2.625)	4.439 (3.533)	2.100 (5.232)	-12.606** (6.023)
Observations	82	82	82	82	82
Prob > chi2	0.0002	0.0000	0.0182	0.0003	0.0001
Pseudo R-squared	0.1893	0.2051	0.1369	0.1972	0.2036

Note: All estimations are Tobit regression models censored at one and seven. Low Tax * Random and Low Tax * Discriminatory denotes factorial interaction between the respective Dummy variables. Personal Controls is a vector of control variables including: Disposable Income, Age, Business & Economics, Semester, Job Experience, Tax Expertise, Religiosity, Political Orientation, Political Interest, Experienced Discrimination, Optimism 1, Optimism 2, Aheadness Aversion 1, Aheadness Aversion 2, Behindness Aversion 1, Behindness Aversion 2 and Time Pressure. Session Controls is a vector of control variables including: Late Session Summer, Early Session Winter and Late Session Winter. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4. Treatment effects on fairness perception (female participants)

	(1) General Fairness	(2) Personal Fairness	(3) Procedural Fairness	(4) Equality	(5) Discrimination
<i>No Control Variables</i>					
Low Tax	1.251 (0.792)	1.719** (0.777)	0.815 (0.931)	-0.512 (1.260)	-0.954 (2.108)
Random	-1.110 (0.748)	-1.200 (0.745)	-1.233 (0.870)	-4.153*** (1.221)	3.028 (1.924)
Low Tax * Random	0.111 (1.095)	2.265** (1.083)	0.741 (1.278)	2.774 (1.753)	3.088 (2.846)
Discriminatory	-1.943** (0.851)	-1.689** (0.841)	-1.916* (0.969)	-5.505*** (1.415)	6.528*** (2.266)
Low Tax * Discriminatory	1.597 (1.179)	2.701** (1.169)	0.983 (1.364)	3.310* (1.919)	-1.106 (3.025)
Constant	3.249*** (0.572)	2.969*** (0.564)	4.273*** (0.665)	5.327*** (0.902)	0.853 (1.511)
Observations	97	97	97	97	97
Prob > chi2	0.0010	0.0000	0.0402	0.0002	0.0021
Pseudo R-squared	0.0540	0.1275	0.0296	0.0660	0.0548
<i>Full Control Variables</i>					
Low Tax	1.447* (0.764)	1.985** (0.774)	0.709 (0.904)	-0.216 (1.256)	-0.961 (2.078)
Random	-0.932 (0.703)	-0.695 (0.723)	-0.898 (0.824)	-3.833*** (1.170)	3.328* (1.788)
Low Tax * Random	0.349 (1.129)	1.750 (1.148)	0.681 (1.328)	3.498* (1.870)	1.416 (2.941)
Discriminatory	-1.324 (0.831)	-1.581* (0.860)	-1.932* (0.971)	-5.043*** (1.444)	5.620** (2.226)
Low Tax * Discriminatory	1.033 (1.172)	2.318* (1.213)	1.192 (1.372)	3.009 (2.005)	-0.181 (3.143)
Personal Controls					
Session Controls					
Constant	2.386 (3.356)	-1.349 (3.430)	-4.305 (3.940)	8.149 (5.644)	-14.665 (8.880)
Observations	97	97	97	97	97
Prob > chi2	0.0138	0.0000	0.1427	0.0100	0.0253
Pseudo R-squared	0.1128	0.1770	0.0827	0.1204	0.1181

Note: All estimations are Tobit regression models censored at one and seven. Low Tax * Random and Low Tax * Discriminatory denotes factorial interaction between the respective Dummy variables. Personal Controls is a vector of control variables including: Disposable Income, Age, Business & Economics, Semester, Job Experience, Tax Expertise, Religiosity, Political Orientation, Political Interest, Experienced Discrimination, Optimism 1, Optimism 2, Aheadness Aversion 1, Aheadness Aversion 2, Behindness Aversion 1, Behindness Aversion 2 and Time Pressure. Session Controls is a vector of control variables including: Late Session Summer, Early Session Winter and Late Session Winter. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Keeping the treatment influence on fairness ratings in mind, we further analyze the degree to which the several fairness dimensions influence labor supply decisions by male and female participants in order to test the indirect treatment effect on labor supply through a change in fairness perceptions. Again, we find great differences in real decisions between male and female participants. Male labor supply is mainly driven by Procedural Fairness and Equality. A one-point increase in either of these ratings increases labor supply by about 7 minutes. In addition, we find evidence of a significant positive influence of the General Fairness perception and a marginally significant negative influence of Discrimination on the time male participants spent working. Based on significant results, labor supply by women is exclusively increased by Personal Fairness ratings. Meanwhile, the magnitude of the increase is a little lower than increases in male labor supply with respect to Procedural Fairness and Equality. Comparably to the results for male labor supply, we find a negative, however insignificant, effect of Discrimination on female Labor Time. For both male and female subjects a one-point increase in Discrimination decreases Labor Time by about 3 minutes.

Regarding the further analysis of treatment effects on the motivation to earn money during the experiment, results are in line with the overall treatment effect on labor supply decisions.¹⁴ We find a negative overall effect of a discriminatory determined high tax rate on the change in the motivation to earn money. With respect to the influence of fairness perceptions on Change in Motivation, we again find that Personal Fairness has the strongest positive impact for female participants while Procedural Fairness and Equality have the strongest impact for male participants. As opposed to labor supply reactions however, all fairness dimensions show a significant positive influence on the change in motivation to earn money for female participants. Nevertheless, this result is in line with the finding that fairness perceptions regarding all fairness dimensions by female participants appear to be driven by their own advantage of facing a low tax rate. Interestingly however Personal Fairness does have a significant influence on the change in motivation to earn money for male participants. Given the significant increase in the gap between Personal Fairness in *Discriminatory Low* and Personal Fairness ratings in *Discriminatory High* compared to the respective ratings in the control treatments by male participants, these findings raise the question of whether labor supply decisions by male participants may not be slightly driven by their own advantage, too.

¹⁴ All results regarding Change in Motivation are presented in Appendix 6.

Table 5. Fairness effects on Labor Time (male participants)

	(1)	(2)	(3)	(4)	(5)
	Labor Time	Labor Time	Labor Time	Labor Time	Labor Time
<i>No Control Variables</i>					
General Fairness	7.249*** (2.408)				
Personal Fairness		3.394 (2.460)			
Procedural Fairness			6.505** (2.513)		
Equality				7.193*** (2.046)	
Discrimination					-2.659 (1.976)
Constant	42.873*** (8.747)	52.250*** (10.451)	45.388*** (8.970)	42.770*** (7.856)	75.748*** (9.467)
Observations	77	77	77	77	77
Prob > chi2	0.0034	0.1699	0.0112	0.0007	0.1806
Pseudo R-squared	0.0108	0.0024	0.0081	0.0145	0.0023
<i>Full Control Variables</i>					
General Fairness	5.733** (2.462)				
Personal Fairness		3.338 (2.495)			
Procedural Fairness			6.982*** (2.555)		
Equality				7.158*** (1.991)	
Discrimination					-3.503* (1.997)
Personal Controls					
Session Controls					
Constant	-19.623 (46.761)	-15.399 (48.892)	-31.532 (46.925)	-19.198 (44.106)	-10.648 (47.064)
Observations	77	77	77	77	77
Prob > chi2	0.1205	0.2461	0.0780	0.0229	0.1930
Pseudo R-squared	0.0317	0.0273	0.0341	0.0401	0.0289

Note: All estimations are Tobit regression models censored at one and seven. Low Tax * Random and Low Tax * Discriminatory denotes factorial interaction between the respective Dummy variables. Personal Controls is a vector of control variables including: Disposable Income, Age, Business & Economics, Semester, Job Experience, Tax Expertise, Religiosity, Political Orientation, Political Interest, Experienced Discrimination, Optimism 1, Optimism 2 and Time Pressure. Session Controls is a vector of control variables including: Late Session Summer, Early Session Winter and Late Session Winter. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 6. Fairness effects on Labor Time (female participants)

	(1)	(2)	(3)	(4)	(5)
	Labor Time	Labor Time	Labor Time	Labor Time	Labor Time
<i>No Control Variables</i>					
General Fairness	2.169 (2.151)				
Personal Fairness		4.455** (1.954)			
Procedural Fairness			1.883 (2.079)		
Equality				1.927 (1.830)	
Discrimination					-2.380 (1.592)
Constant	47.770*** (8.308)	38.051*** (8.455)	47.379*** (9.422)	48.238*** (7.658)	64.434*** (7.427)
Observations	89	89	89	89	89
Prob > chi2	0.3144	0.0244	0.3659	0.2936	0.1378
Pseudo R-squared	0.0011	0.0057	0.0009	0.0012	0.0025
<i>Full Control Variables</i>					
General Fairness	2.878 (1.988)				
Personal Fairness		6.071*** (1.857)			
Procedural Fairness			2.968 (1.997)		
Equality				2.172 (1.698)	
Discrimination					-2.315 (1.626)
Personal Controls					
Session Controls					
Constant	-26.772 (59.375)	-35.419 (56.896)	-20.602 (59.147)	-31.275 (59.916)	-14.901 (59.157)
Observations	89	89	89	89	89
Prob > chi2	0.0855	0.0101	0.0834	0.0951	0.0871
Pseudo R-squared	0.0298	0.0389	0.0300	0.0293	0.0297

Note: All estimations are Tobit regression models censored at one and seven. Low Tax * Random and Low Tax * Discriminatory denotes factorial interaction between the respective Dummy variables. Personal Controls is a vector of control variables including: Disposable Income, Age, Business & Economics, Semester, Job Experience, Tax Expertise, Religiosity, Political Orientation, Political Interest, Experienced Discrimination, Optimism 1, Optimism 2 and Time Pressure. Session Controls is a vector of control variables including: Late Session Summer, Early Session Winter and Late Session Winter. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Robustness and Discussion

To test for effects of the estimation procedure, we reran all censored estimations using a linear regression model.¹⁵ All results remain unchanged. Regarding the premature termination of one experimental session, we tested the persistence of the presented results by both excluding separately a) all participants that did not finish working on their number of contracted tasks, and b) all participants that did not complete all experimental stages. All presented results remain qualitatively unchanged in both specifications.

Regarding the results on differences between male and female fairness perception and labor supply decisions between preferential and disadvantageous taxation, the lower proportion of male participants in the *Random High* group might be a reason for not finding significant differences between randomly and discriminatory applied high tax rates. Male participants do not differ in their fairness perception regarding Personal and Procedural Fairness between universally or randomly applied high tax rates. This and the resulting persistence of an income effect of higher taxation for male participants in the *Random High* treatment, support the assumption that a higher number of male participants in this group would be expected to drive labor supply upwards. This would lead to a larger gap when comparing overall results for male and female participants between *Random High* and *Discriminatory High*. Concerning the other differences in participant characteristics between treatments, we further analyze impacts of the single characteristics on all of our dependent variables separately. Only Political Orientation has a significant impact on both Labor Supply and Labor Time. This association appears to be driven only by the *Control Low* treatment, where we find a strong positive correlation between our measures of Labor Supply and Political Orientation. However, Political Orientation in this group does not differ significantly from any other group. Political Orientation does differ between the groups *Control High* and *Random High*. The stronger tendency to the left (liberal) political side in the *Random High* group potentially distorts labor supply in this group downwards. If so, this would increase the gap to the *Control High* but again decrease the gap to the *Discriminatory High* treatment. This might be a further reason for not finding significant differences in individual labor supply decisions between the treatments *Random High* and *Discriminatory High*. However, it is important to notice that the political tendency in the *Random High* group is not gender specific. With respect to fairness perception, we do not find any personal characteristic to be associated with fairness perceptions except for Time Pressure. Time Pressure shows a marginally significant negative correlation with General Fairness and Personal Fairness and a significant positive correlation with Discrimination. Despite the fact that our measure of Time Pressure does not differ significantly between treatment groups we nevertheless reran

¹⁵ All estimations regarding the robustness of results can be obtained from the authors upon request.

all estimations excluding a) all participants for whom Time Pressure equals 1 and b) all participants that simply stated that they had been under time pressure but did not have an actual follow up appointment. All results, especially with respect to fairness perceptions and resulting labor supply decisions, remain qualitatively unchanged for both adjustments. However, the overall negative effect of discriminatory high tax rates and positive fairness effects for male participants on labor supply based on the number of contracted tasks lack significance in adjustment b).

Considering fairness preferences, we find subjects in treatment *Random Low* to be less aheadness averse (especially Aheadness Aversion 2) than in the *Random High* and both *Discriminatory* treatments. This result might favor a positive fairness rating and higher labor supply by subjects that have been randomly taxed to their advantage. Surprisingly however female participants in our sample show stronger Aheadness Aversion 2, operating against the observed effect of preferential taxation on female fairness perception and labor supply. Regarding behindness aversion, subjects in the *Control High* treatment are less behindness averse. As these subjects are universally taxed and do not know about the existence of a lower tax rate, we do not expect this characteristic to bias the presented results.

In addition to their gender, we find some further differences in personal characteristics of male and female participants. Women in the sample are significantly younger and study in lower semesters than male participants. A higher proportion of the male participants is studying at the School of Business & Economics. Women in the sample also have less job experience, less disposable income and are more interested in politics. They also state to have lower Tax Expertise. Nevertheless, regarding each of these characteristics we do not find a significant influence of any of the characteristics on any of our measures of labor supply or fairness perception. We also fail at finding the same differences in fairness perception and labor supply found by gender to be present when dividing the sample by any other characteristic.

5 Conclusion

We discuss the effect of inequalities in taxation on individual labor supply decisions. By manipulating the fairness of both determination procedure and outcome of taxation in a controlled laboratory experiment, we provide evidence of a strong negative effect of disadvantageous discriminatory taxation on labor supply. This effect is stable for both a task based and a time based measure of labor supply and additionally present in the motivation to earn money. On the other hand, neither randomly determined tax rates nor preferential but discriminatory taxation do affect labor supply decisions significantly. Contradicting previous evidence on the importance of tax rates and net wages for labor

supply, we also do not find significant differences in labor supply when comparing the isolated effect of the height of tax rates.

Nevertheless, we are able to attribute the lack of significant differences between treatment groups to the existence of a strong gender difference in labor supply reactions to taxes, especially with respect to inequalities in taxation. We further provide evidence that differences between male and female labor supply stem from a) different fairness perceptions of male and female participants and b) differences regarding the fairness dimensions that are driving labor supply decisions by both groups respectively. While male participants in our sample appear to be primarily driven by procedural fairness, female participants show strong positive reactions towards their own advantage regardless of the general inequality among all participants that comes along with it. These findings have important implications for both existing inequalities within tax policies as well as potential reforms towards gender-based taxation in order to increase female labor market participation. Accordingly, the current study does not only contribute to the existing literature by being the first to discuss the possible effects of differential taxation on individual labor supply decisions. To the best of our knowledge, we are also the first to identify the existing gender difference with respect to both fairness perception and resulting consequences in real decisions. Being aware of potential shortcomings of the presented results due to the small number of observations, this identification constitutes an important basis for future research.

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Appendix

Appendix 1. Treatment information

Treatment information *Control Low*

Information about the offered employment contract

At this point, you have the possibility to determine the favored amount of work you want to carry out. The employment contract refers to the number of tables you have to work on. You can determine the number of tables in a range from 0 (rejection of the labor contract) to 200 (maximum work effort). The payment depends on the number of correctly counted tables. You receive a gross salary of 15 cents per **correctly** processed table, which corresponds to an expected hourly gross salary of about 13 Euros on average.

The gross salary is subject to a **general** tax rate of **20%**. The obtained tax contributions will be refunded to the community by donating them to the library of the School of Business & Economics.

Note: If you work on less tables than contractually agreed upon, you violate your employment contract, which leads to the total cancellation of your payment. In this case, you will only receive the fixed show up fee of 3 Euros. Accordingly, the tax payment will equal 0 Euros.

Please decide now how many tables you want to process and type the corresponding number in the provided field below. Begin your task by clicking on „Start Working Period“.

Number of tables that you want to process:

Treatment information *Control High*

Information about the offered employment contract

At this point, you have the possibility to determine the favored amount of work you want to carry out. The employment contract refers to the number of tables you have to work on. You can determine the number of tables in a range from 0 (rejection of the labor contract) to 200 (maximum work effort). The payment depends on the number of correctly counted tables. You receive a gross salary of 15 cents per **correctly** processed table, which corresponds to an expected hourly gross salary of about 13 Euros on average.

The gross salary is subject to a **general** tax rate of **40%**. The obtained tax contributions will be refunded to the community by donating them to the library of the School of Business & Economics.

Note: If you work on less tables than contractually agreed upon, you violate your employment contract, which leads to the total cancellation of your payment. In this case, you will only receive the fixed show up fee of 3 Euros. Accordingly, the tax payment will equal 0 Euros.

Please decide now how many tables you want to process and type the corresponding number in the provided field below. Begin your task by clicking on „Start Working Period“.

Number of tables that you want to process:

Treatment information *Random Low* and *Random High*

Information about the offered employment contract

At this point, you have the possibility to determine the favored amount of work you want to carry out. The employment contract refers to the number of tables you have to work on. You can determine the number of tables in a range from 0 (rejection of the labor contract) to 200 (maximum work effort). The payment depends on the number of correctly counted tables. You receive a gross salary of 15 cents per **correctly** processed table, which corresponds to an expected hourly gross salary of about 13 Euros on average.

The gross salary is liable for taxation. The applicable tax rate depends on the color of the table tennis ball which you drew at the beginning of the experiment. The applicable tax rate is **20% for participants with an orange ball** and **40% for participants with a white ball**. The obtained tax contributions will be refunded to the community by donating them to the library of the School of Business & Economics.

Note: If you work on less tables than contractually agreed upon, you violate your employment contract, which leads to the total cancellation of your payment. In this case, you will only receive the fixed show up fee of 3 Euros. Accordingly, the tax payment will equal 0 Euros.

Please decide now how many tables you want to process and type the corresponding number in the provided field below. Begin your task by clicking on „Start Working Period“.

Number of tables that you want to process:

Treatment information *Discriminatory Low and Discriminatory High* (female discrimination)

Information about the offered employment contract

At this point, you have the possibility to determine the favored amount of work you want to carry out. The employment contract refers to the number of tables you have to work on. You can determine the number of tables in a range from 0 (rejection of the labor contract) to 200 (maximum work effort). The payment depends on the number of correctly counted tables. You receive a gross salary of 15 cents per **correctly** processed table, which corresponds to an expected hourly gross salary of about 13 Euros on average.

The gross salary is liable for taxation. The applicable tax rate depends on your gender. The applicable tax rate is **20% for male** and **40% for female participants**. The obtained tax contributions will be refunded to the community by donating them to the library of the School of Business & Economics.

Note: If you work on less tables than contractually agreed upon, you violate your employment contract, which leads to the total cancellation of your payment. In this case, you will only receive the fixed show up fee of 3 Euros. Accordingly, the tax payment will equal 0 Euros.

Please decide now how many tables you want to process and type the corresponding number in the provided field below. Begin your task by clicking on „Start Working Period“.

Number of tables that you want to process:

Treatment information *Discriminatory Low and Discriminatory High* (male discrimination)

Information about the offered employment contract

At this point, you have the possibility to determine the favored amount of work you want to carry out. The employment contract refers to the number of tables you have to work on. You can determine the number of tables in a range from 0 (rejection of the labor contract) to 200 (maximum work effort). The payment depends on the number of correctly counted tables. You receive a gross salary of 15 cents per **correctly** processed table, which corresponds to an expected hourly gross salary of about 13 Euros on average.

The gross salary is liable for taxation. The applicable tax rate depends on your gender. The applicable tax rate is **20% for female** and **40% for male participants**. The obtained tax contributions will be refunded to the community by donating them to the library of the School of Business & Economics.

Note: If you work on less tables than contractually agreed upon, you violate your employment contract, which leads to the total cancellation of your payment. In this case, you will only receive the fixed show up fee of 3 Euros. Accordingly, the tax payment will equal 0 Euros.

Please decide now how many tables you want to process and type the corresponding number in the provided field below. Begin your task by clicking on „Start Working Period“.

Number of tables that you want to process:

Appendix 2. Variable description

Variable	Description
Labor Supply	Number of tasks entered in the labor contract
Labor Time	Time spent working on the tasks in minutes
Low Tax	Dummy variable equal to 1 if subject is taxed at the low rate (20%)
Random	Dummy variable equal to 1 if subject is in either <i>Random Low</i> or <i>Random High</i> treatment
Discriminatory	Dummy variable equal to 1 if subject is in either <i>Discriminatory Low</i> or <i>Discriminatory High</i> treatment
General Fairness	Fairness rating on a scale from 1 to 7 concerning the statement “The tax system applied in the experiment was fair in general”
Personal Fairness	Fairness rating on a scale from 1 to 7 concerning the statement “The tax system applied in the experiment was fair for me personal”
Procedural Fairness	Fairness rating on a scale from 1 to 7 concerning the statement “The rules applied to determine the applied tax rate in the experiment were fair”
Equality	Fairness rating on a scale from 1 to 7 concerning the statement “All taxpayers were treated equally by the experimental tax authorities”
Discrimination	Fairness rating on a scale from 1 to 7 concerning the statement “Individual participants were explicitly discriminated during the experiment”
Generally Fair	Dummy variable equal to 1 if General Fairness is rated 4 or higher
Personally Fair	Dummy variable equal to 1 if Personal Fairness is rated 4 or higher
Fair Procedure	Dummy variable equal to 1 if Procedural Fairness is rated 4 or higher
Equal	Dummy variable equal to 1 if Equality is rated 4 or higher
Discriminative	Dummy variable equal to 1 if Discrimination is rated 4 or higher
Gender	Dummy variable equal to 1 if participant is female
Talent	Mean time per table in the training period multiplied by minus one
Age	Age in years
Business & Economics	Dummy variable equal to 1 if participant studies at the School of Business & Economics
Semester	Number of terms the participant is currently studying in
Religiosity	Rating on a scale from 1 to 10 ranging from “not religious at all” to “very religious”
Political Orientation	Rating on a scale from 1 to 10 ranging from “left” to “right”

Political Interest	Rating on a scale from 1 to 4 ranging from “strongly interested” to “not interested at all”
Pre-Treatment Motivation	Motivation to earn money during the experiment: Rating on a scale from 1 to 7 ranging from “hardly motivated” to “highly motivated” in the pre-experimental questionnaire
Change in Motivation	Change in the motivation to earn money during the experiment due to the labor contract conditions: Rating on a scale from 1 to 7 ranging from “strongly decreased” to “strongly increased” in the post-experimental questionnaire
Post-Treatment Motivation	Level of Motivation to earn money during the experiment calculated as Pre-Treatment Motivation +/- Change in Motivation
Job Experience	Dummy variable equal to one if participant has experience working in a real job
Tax Expertise	Rating on scale from 1 to 7 ranging from “very bad (no tax knowledge at all)” to “very good (tax expert)”
Disposable Income	Monthly disposable income after rent and fix expenditures in Euro
Time Pressure	Dummy variable equal to 1 if participant stated that he/she has been under time pressure and had a following appointment
Optimism 1	Rating on a scale from 1 to 7 concerning the statement “I always try to make the best of the situation”
Optimism 2	Rating on a scale from 1 to 7 ranging from “half empty” to “half full” concerning the statement “A glass filled to 50% capacity with water is”
Aheadness Aversion 1	Dummy variable equal to 1 if participant chose equal payment distribution (10:10 versus 10:6)
Aheadness Aversion 2	Dummy variable equal to 1 if participant chose equal payment distribution (10:10 versus 16:4)
Behindness Aversion 1	Dummy variable equal to 1 if participant chose equal payment distribution (10:10 versus 10:18)
Behindness Aversion 2	Dummy variable equal to 1 if participant chose equal payment distribution (10:10 versus 11:19)
Experienced Discrimination	Dummy variable equal to one if participant has been discriminated in his private and/or professional live any time prior to the experiment
Early Session Summer	Dummy variable equal to 1 if session took place at 10.30 am in June
Late Session Summer	Dummy variable equal to 1 if session took place at 2.30 pm in June
Early Session Winter	Dummy variable equal to 1 if session took place at 10.30 am in November or 11 am in December
Late Session Winter	Dummy variable equal to 1 if session took place at 2.30 pm in November or 4 pm in December

Appendix 3. Participant characteristics by treatment

Control Low

	N	Mean	Sd	Min	Max
Gender	35	0.57	0.50	0	1
Talent	35	-53.05	24.91	-151.01	-26.78
Age	35	22.29	6.20	17	52
Business & Economics	35	0.43	0.50	0	1
Semester	35	3.66	4.54	1	25
Religiosity	35	3.71	2.61	1	9
Political Orientation	35	4.29	1.67	2	10
Political Interest	35	2.11	0.80	1	3
Pre-Treatment Motivation	35	4.89	1.41	1	7
Job Experience	35	0.49	0.51	0	1
Tax Expertise	31	2.23	1.15	1	4
Optimism 1	31	6.10	0.91	4	7
Optimism 2	31	6.10	1.19	3	7
Aheadness Aversion 1	31	0.74	0.44	0	1
Aheadness Aversion 2	31	0.68	0.48	0	1
Behindness Aversion 1	31	0.84	0.37	0	1
Behindness Aversion 2	31	0.81	0.40	0	1
Disposable Income	31	365.87	224.79	1	850
Time Pressure	31	0.13	0.34	0	1
Observations	35				

Control High

	N	Mean	Sd	Min	Max
Gender	30	0.57	0.50	0	1
Talent	30	-52.43	23.35	-129.17	-19.05
Age	30	22.10	3.83	17	33
Business & Economics	30	0.50	0.51	0	1
Semester	30	4.00	4.19	1	15
Religiosity	30	3.43	2.31	1	8
Political Orientation	30	4.80	1.73	2	8
Political Interest	30	2.10	0.76	1	3
Pre-Treatment Motivation	30	5.03	1.43	2	7
Job Experience	30	0.60	0.50	0	1
Tax Expertise	28	2.93	1.56	1	6
Optimism 1	28	5.61	1.17	3	7
Optimism 2	28	5.46	1.26	3	7
Aheadness Aversion 1	28	0.86	0.36	0	1
Aheadness Aversion 2	28	0.64	0.49	0	1
Behindness Aversion 1	28	0.57	0.50	0	1
Behindness Aversion 2	28	0.57	0.50	0	1
Disposable Income	28	450.11	273.10	1	1000
Time Pressure	28	0.18	0.39	0	1
Observations	30				

Random Low

	N	Mean	Sd	Min	Max
Gender	30	0.53	0.51	0	1
Talent	30	-60.05	35.18	-183.77	0
Age	30	22.80	4.21	17	35
Business & Economics	30	0.53	0.51	0	1
Semester	30	4.43	4.38	1	18
Religiosity	30	3.73	2.66	1	9
Political Orientation	30	4.47	1.53	2	8
Political Interest	30	2.30	0.79	1	3
Pre-Treatment Motivation	30	4.67	1.95	1	7
Job Experience	30	0.40	0.50	0	1
Tax Expertise	28	2.96	1.62	1	7
Optimism 1	28	5.57	1.57	2	7
Optimism 2	28	5.50	1.48	2	7
Aheadness Aversion 1	28	0.68	0.48	0	1
Aheadness Aversion 2	28	0.50	0.51	0	1
Behindness Aversion 1	28	0.82	0.39	0	1
Behindness Aversion 2	28	0.64	0.49	0	1
Disposable Income	28	409.89	241.84	1	1100
Time Pressure	28	0.29	0.46	0	1
Observations	30				

Random High

	N	Mean	Sd	Min	Max
Gender	32	0.72	0.46	0	1
Talent	32	-59.78	37.45	-220.74	-35.61
Age	32	21.19	3.31	17	30
Business & Economics	32	0.41	0.50	0	1
Semester	32	3.09	3.07	1	12
Religiosity	32	3.16	2.36	1	8
Political Orientation	32	3.97	1.43	2	6
Political Interest	32	2.25	0.76	1	4
Pre-Treatment Motivation	32	5.00	1.72	1	7
Job Experience	32	0.53	0.51	0	1
Tax Expertise	31	2.39	1.26	1	6
Optimism 1	31	5.74	1.06	2	7
Optimism 2	31	5.81	1.68	1	7
Aheadness Aversion 1	31	0.81	0.40	0	1
Aheadness Aversion 2	31	0.77	0.43	0	1
Behindness Aversion 1	31	0.77	0.43	0	1
Behindness Aversion 2	31	0.74	0.44	0	1
Disposable Income	31	328.52	190.25	0	750
Time Pressure	31	0.23	0.43	0	1
Observations	32				

Discriminatory Low

	N	Mean	Sd	Min	Max
Gender	33	0.48	0.51	0	1
Talent	33	-51.66	20.42	-91.32	-9.07
Age	33	21.39	3.21	17	34
Business & Economics	33	0.58	0.50	0	1
Semester	33	3.82	3.33	1	12
Religiosity	33	4.36	2.96	1	10
Political Orientation	33	4.55	1.72	2	7
Political Interest	33	2.09	0.72	1	3
Pre-Treatment Motivation	33	5.15	1.42	2	7
Job Experience	33	0.55	0.51	0	1
Tax Expertise	31	3.26	1.59	1	7
Optimism 1	31	6.16	1.04	3	7
Optimism 2	31	6.00	1.29	3	7
Aheadness Aversion 1	31	0.81	0.40	0	1
Aheadness Aversion 2	31	0.74	0.44	0	1
Behindness Aversion 1	31	0.77	0.43	0	1
Behindness Aversion 2	31	0.74	0.44	0	1
Disposable Income	31	473.35	356.60	1	1600
Time Pressure	31	0.29	0.46	0	1
Observations	33				

Discriminatory High

	N	Mean	Sd	Min	Max
Gender	30	0.50	0.51	0	1
Talent	30	-53.87	18.79	-108.44	-34.47
Age	30	20.67	3.41	17	33
Business & Economics	30	0.53	0.51	0	1
Semester	30	3.03	2.91	1	13
Religiosity	30	3.50	2.61	1	8
Political Orientation	30	4.40	1.67	2	8
Political Interest	30	2.23	0.73	1	3
Pre-Treatment Motivation	30	5.23	1.70	1	7
Job Experience	30	0.53	0.51	0	1
Tax Expertise	30	2.60	1.48	1	7
Optimism 1	30	6.30	0.95	4	7
Optimism 2	30	5.77	1.55	1	7
Aheadness Aversion 1	30	0.90	0.31	0	1
Aheadness Aversion 2	30	0.77	0.43	0	1
Behindness Aversion 1	30	0.87	0.35	0	1
Behindness Aversion 2	30	0.73	0.45	0	1
Disposable Income	30	347.77	228.07	1	800
Time Pressure	30	0.30	0.47	0	1
Observations	30				

Appendix 4. Analysis of Labor Supply (number of contracted tables)

	Treatment effects on Labor Supply					
	(1)	(2)	(3)	(4)	(5)	(6)
	Labor Supply	Labor Supply	Labor Supply	Labor Supply	Labor Supply	Labor Supply
Random Low	9.148	10.254	9.783			
	(16.448)	(16.003)	(16.717)			
Discriminatory Low	16.958	-0.498	-3.238			
	(16.057)	(15.762)	(16.148)			
Random High				-6.343	-13.848	-11.369
				(18.191)	(18.157)	(19.056)
Discriminatory High				-25.775	-40.760**	-44.618**
				(18.463)	(18.133)	(20.769)
Gender		-12.962	-15.890		-52.272***	-54.564**
		(12.878)	(14.834)		(15.986)	(20.845)
Disposable Income		0.009	0.008		-0.074**	-0.070*
		(0.024)	(0.027)		(0.034)	(0.037)
Talent		0.302	0.244		-0.284	-0.251
		(0.235)	(0.240)		(0.258)	(0.269)
Pre-Treatment Motivation		11.608***	10.958**		5.712	7.970
		(4.122)	(4.441)		(4.518)	(4.892)
Age			1.492			1.586
			(2.046)			(3.204)
Business & Economics			4.559			-8.799
			(14.141)			(16.030)
Semester			-2.453			-2.499
			(2.241)			(3.053)
Job Experience			-12.583			-9.665
			(15.247)			(17.257)
Tax Expertise			2.863			4.671
			(4.802)			(6.413)
Religiosity			3.274			0.394
			(2.559)			(3.443)
Political Orientation			0.909			0.368
			(4.286)			(5.488)
Political Interest			-3.874			10.339
			(9.436)			(12.466)
Time Pressure			13.434			2.987
			(15.730)			(18.874)
Optimism 1			2.451			9.636
			(6.114)			(8.013)
Optimism 2			2.958			-3.739
			(5.404)			(4.990)
Aheadness Aversion 1			-21.494			13.047
			(16.019)			(22.063)
Aheadness Aversion 2			21.716			-27.798
			(15.673)			(17.483)
Behindness Aversion 1			-0.735			-14.156
			(23.200)			(28.605)
Behindness Aversion 2			-16.757			11.336
			(20.389)			(25.206)
Late Session Summer			18.473			25.180
			(20.477)			(24.812)
Early Session Winter			11.426			21.906
			(17.863)			(23.620)
Late Session Winter			23.514			27.233
			(18.808)			(22.938)
Constant	83.653***	49.738	-17.462	100.123***	121.996***	14.369
	(11.154)	(30.094)	(77.574)	(13.092)	(36.029)	(107.449)
Observations	98	90	90	92	89	89
Prob > chi2	0.5727	0.1012	0.6031	0.3490	0.0119	0.3374
Pseudo R-squared	0.0011	0.0115	0.0235	0.0023	0.0184	0.0296

Note: Reference treatments are *Control Low* for models (1), (2) and (3) and *Control High* for models (3), (4) and (5). Reference category for session controls is *Early Session Summer*. All estimations are Tobit regression models censored at zero and 200. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Fairness effects on Labor Supply (male participants)

	(1)	(2)	(3)	(4)	(5)
	Labor Supply	Labor Supply	Labor Supply	Labor Supply	Labor Supply
<i>No Control Variables</i>					
General Fairness	10.013** (4.316)				
Personal Fairness		2.994 (4.247)			
Procedural Fairness			9.832** (4.373)		
Equality				9.352** (3.737)	
Discrimination					0.769 (3.499)
Constant	73.348*** (15.460)	92.715*** (18.047)	73.980*** (15.587)	75.466*** (13.951)	100.809*** (16.580)
Observations	82	82	82	82	82
Prob > chi2	0.0215	0.4816	0.0259	0.0134	0.8259
Pseudo R-squared	0.0066	0.0006	0.0062	0.0077	0.0001

Full Control Variables

General Fairness	7.994* (4.342)				
Personal Fairness		4.080 (4.268)			
Procedural Fairness			8.652* (4.419)		
Equality				9.856*** (3.639)	
Discrimination					-1.064 (3.513)
Personal Controls					
Session Controls					
Constant	-58.412 (85.289)	-48.053 (87.819)	-70.808 (86.460)	-57.944 (82.265)	-29.212 (85.769)
Observations	82	82	82	82	82
Prob > chi2	0.1224	0.2043	0.1112	0.0500	0.2394
Pseudo R-squared	0.0314	0.0284	0.0320	0.0362	0.0273

Note: All estimations are Tobit regression models censored at one and seven. Low Tax * Random and Low Tax * Discriminatory denotes factorial interaction between the respective Dummy variables. Personal Controls is a vector of control variables including: Disposable Income, Age, Business & Economics, Semester, Job Experience, Tax Expertise, Religiosity, Political Orientation, Political Interest, Experienced Discrimination, Optimism 1, Optimism 2 and Time Pressure. Session Controls is a vector of control variables including: Late Session Summer, Early Session Winter and Late Session Winter. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Fairness effects on Labor Supply (female participants)

	(1)	(2)	(3)	(4)	(5)
	Labor Supply	Labor Supply	Labor Supply	Labor Supply	Labor Supply
<i>No Control Variables</i>					
General Fairness	2.682 (3.284)				
Personal Fairness		5.381* (2.953)			
Procedural Fairness			1.274 (3.053)		
Equality				0.429 (2.718)	
Discrimination					-0.321 (2.420)
Constant	70.540*** (12.405)	59.250*** (12.545)	74.391*** (13.430)	77.932*** (11.074)	80.657*** (11.268)
Observations	97	97	97	97	97
Prob > chi2	0.4145	0.0701	0.6764	0.8745	0.8943
Pseudo R-squared	0.0007	0.0033	0.0002	0.0000	0.0000
<i>Full Control Variables</i>					
General Fairness	4.271 (3.114)				
Personal Fairness		8.698*** (2.908)			
Procedural Fairness			3.462 (3.028)		
Equality				1.043 (2.557)	
Discrimination					-0.837 (2.479)
Personal Controls					
Session Controls					
Constant	-69.099 (90.310)	-81.463 (87.365)	-55.373 (90.290)	-62.428 (91.213)	-58.189 (90.668)
Observations	97	97	97	97	97
Prob > chi2	0.1500	0.0292	0.1690	0.2126	0.2148
Pseudo R-squared	0.0241	0.0309	0.0235	0.0224	0.0224

Note: All estimations are Tobit regression models censored at one and seven. Low Tax * Random and Low Tax * Discriminatory denotes factorial interaction between the respective Dummy variables. Personal Controls is a vector of control variables including: Disposable Income, Age, Business & Economics, Semester, Job Experience, Tax Expertise, Religiosity, Political Orientation, Political Interest, Experienced Discrimination, Optimism 1, Optimism 2 and Time Pressure. Session Controls is a vector of control variables including: Late Session Summer, Early Session Winter and Late Session Winter. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Appendix 5. Fairness perception & Gender in Preferential Tax treatments

Gender effect on fairness perception in Preferential Tax treatments

	(1) Generally Fair	(2) Personally Fair	(3) Fair Procedure	(4) Equal	(5) Discriminative
Gender	2.632 (1.649)	3.592** (2.039)	2.319 (1.329)	2.925 (1.961)	0.950 (0.523)
Constant	0.200*** (0.0980)	0.875 (0.320)	0.304*** (0.131)	0.154*** (0.083)	2.000* (0.775)
Observations	59	59	59	59	59
Prob > chi2	0.1136	0.0202	0.1364	0.0978	0.9257
Pseudo R-squared	0.0374	0.0684	0.0299	0.0441	0.0001

Note: All estimations are Logit regression models. Coefficients represent odds ratios. Standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Appendix 6. Analyses of Change in Motivation

	Treatment effects on Change in Motivation					
	(1)	(2)	(3)	(4)	(5)	(6)
	Change in Motivation	Change in Motivation	Change in Motivation	Change in Motivation	Change in Motivation	Change in Motivation
Random Low	0.332 (0.356)	0.356 (0.357)	0.312 (0.346)			
Discriminatory Low	0.354 (0.347)	0.382 (0.353)	0.229 (0.335)			
Random High				-0.344 (0.542)	-0.351 (0.515)	-0.134 (0.512)
Discriminatory High				-0.945* (0.546)	-1.046** (0.515)	-1.258** (0.566)
Gender		-0.013 (0.287)	-0.399 (0.305)		-0.514 (0.450)	-1.005* (0.559)
Disposable Income		-0.000 (0.001)	-0.000 (0.001)		-0.002* (0.001)	-0.002* (0.001)
Talent		0.000 (0.005)	-0.001 (0.005)		0.023*** (0.009)	0.027*** (0.008)
Pre-Treatment Motivation		0.031 (0.092)	0.055 (0.092)		-0.251* (0.128)	-0.249* (0.134)
Age			0.067 (0.043)			0.069 (0.085)
Business & Economics			0.153 (0.293)			-0.107 (0.429)
Semester			-0.068 (0.047)			-0.034 (0.080)
Job Experience			-0.443 (0.315)			-0.833* (0.460)
Tax Expertise			0.062 (0.099)			0.000 (0.178)
Religiosity			0.084 (0.053)			0.183* (0.094)
Political Orientation			0.016 (0.088)			0.066 (0.152)
Political Interest			0.496** (0.195)			0.353 (0.342)
Time Pressure			0.346 (0.324)			0.206 (0.517)
Optimism 1			0.066 (0.126)			0.266 (0.223)
Optimism 2			-0.036 (0.112)			0.221 (0.140)
Aheadness Aversion 1			-0.238 (0.328)			0.499 (0.600)
Aheadness Aversion 2			0.755** (0.322)			0.202 (0.468)
Behindness Aversion 1			-0.450 (0.478)			-0.729 (0.785)
Behindness Aversion 2			0.264 (0.417)			0.616 (0.698)
Late Session Summer			0.270 (0.422)			-0.011 (0.671)
Early Session Winter			-0.012 (0.370)			0.344 (0.636)
Late Session Winter			0.392 (0.389)			-0.206 (0.630)
Constant	3.937*** (0.245)	3.928*** (0.673)	0.626 (1.604)	3.574*** (0.389)	7.069*** (1.034)	1.667 (2.885)
Observations	90	90	90	89	89	89
Prob > chi2	0.5254	0.9237	0.2715	0.2189	0.0081	0.0401
Pseudo R-squared	0.0042	0.0063	0.0897	0.0089	0.0507	0.1093

Note: Reference treatments are *Control Low* for models (1), (2) and (3) and *Control High* for models (3), (4) and (5). Reference category for session controls is Early Session Summer. All estimations are Tobit regression models censored at one and 7. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Fairness effects on Change in Motivation (male participants)

	(1)	(2)	(3)	(4)	(5)
	Change in Motivation	Change in Motivation	Change in Motivation	Change in Motivation	Change in Motivation
<i>No Control Variables</i>					
General Fairness	0.131 (0.093)				
Personal Fairness		0.192** (0.089)			
Procedural Fairness			0.206** (0.093)		
Equality				0.145* (0.081)	
Discrimination					-0.094 (0.074)
Constant	3.400*** (0.338)	3.084*** (0.378)	3.175*** (0.335)	3.360*** (0.305)	4.182*** (0.351)
Observations	82	82	82	82	82
Prob > chi2	0.1614	0.0328	0.0284	0.0756	0.2050
Pseudo R-squared	0.0064	0.0149	0.0157	0.0103	0.0053
<i>Full Control Variables</i>					
General Fairness	0.141 (0.092)				
Personal Fairness		0.193** (0.089)			
Procedural Fairness			0.293*** (0.089)		
Equality				0.192** (0.077)	
Discrimination					-0.163** (0.072)
Personal Controls					
Session Controls					
Constant	0.846 (1.800)	0.351 (1.809)	-0.005 (1.727)	0.837 (1.727)	0.781 (1.746)
Observations	82	82	82	82	82
Prob > chi2	0.1356	0.0815	0.0191	0.0579	0.0758
Pseudo R-squared	0.0806	0.0879	0.1064	0.0926	0.0889

Note: All estimations are Tobit regression models censored at one and seven. Low Tax * Random and Low Tax * Discriminatory denotes factorial interaction between the respective Dummy variables. Personal Controls is a vector of control variables including: Disposable Income, Age, Business & Economics, Semester, Job Experience, Tax Expertise, Religiosity, Political Orientation, Political Interest, Experienced Discrimination, Optimism 1, Optimism 2 and Time Pressure. Session Controls is a vector of control variables including: Late Session Summer, Early Session Winter and Late Session Winter. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Fairness effects on Change in Motivation (female participants)

	(1)	(2)	(3)	(4)	(5)
	Change in Motivation	Change in Motivation	Change in Motivation	Change in Motivation	Change in Motivation
<i>No Control Variables</i>					
General Fairness	0.308*** (0.098)				
Personal Fairness		0.401*** (0.086)			
Procedural Fairness			0.330*** (0.090)		
Equality				0.281*** (0.080)	
Discrimination					-0.076 (0.076)
Constant	2.554*** (0.375)	2.067*** (0.368)	2.276*** (0.398)	2.614*** (0.330)	3.871*** (0.353)
Observations	97	97	97	97	97
Prob > chi2	0.0021	0.0000	0.0004	0.0006	0.3204
Pseudo R-squared	0.0255	0.0547	0.0343	0.0315	0.0027
<i>Full Control Variables</i>					
General Fairness	0.321*** (0.089)				
Personal Fairness		0.403*** (0.082)			
Procedural Fairness			0.322*** (0.086)		
Equality				0.317*** (0.071)	
Discrimination					-0.134* (0.075)
Personal Controls					
Session Controls					
Constant	1.364 (2.584)	0.954 (2.460)	2.542 (2.558)	1.096 (2.502)	2.250 (2.711)
Observations	97	97	97	97	97
Prob > chi2	0.0052	0.0002	0.0040	0.0008	0.0630
Pseudo R-squared	0.0999	0.1257	0.1023	0.1163	0.0754

Note: All estimations are Tobit regression models censored at one and seven. Low Tax * Random and Low Tax * Discriminatory denotes factorial interaction between the respective Dummy variables. Personal Controls is a vector of control variables including: Disposable Income, Age, Business & Economics, Semester, Job Experience, Tax Expertise, Religiosity, Political Orientation, Political Interest, Experienced Discrimination, Optimism 1, Optimism 2 and Time Pressure. Session Controls is a vector of control variables including: Late Session Summer, Early Session Winter and Late Session Winter. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1