Title: How Unequal Wages, Unfair Procedures and Discrimination Affect Labor Supply: Experimental Evidence

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Abstract

We investigate the causal effect of wage inequality, unfair procedures, and (gender) discrimination on labor supply decisions of workers. We conduct an experiment in the laboratory and on an online platform, where workers individually engage in the same task and are individually paid a piece-rate wage. Workers receive information about their own wage and the wage of another worker as well as on the procedure leading to these wages. A worker's labor supply decision only affects him- or herself. That is, providing less labor reduces the worker's earnings but leaves unaffected the other workers' earnings and the employer's earnings.

Design Summary

In the physical lab as well as online experiment, participants will work individually on a repetitive task under different payment schemes. Each participant will decide on how much he or she works during, respectively, forty minutes in the laboratory and up to around one hour online. The task is to copy given lines consisting of random letters and numbers by typing them on their computer. Each participant individually receives a piece-rate wage per line correctly entered. A participant knows that the lines entered do not affect other participants' earnings and are of no further use to the researchers. Supplying more labor, i.e., entering more lines, only increases a participant's own earnings.

Before starting to work, participants receive information about their own piece-rate wage, the piece-rate wage of another worker, and the procedure leading to these piece-rate wages. Participants only go through one payment scheme. The payment schemes, which are our treatments, differ in whether the two workers receive the same wage or different wages, the chances with which one worker receives a high wage and the other receives a low wage when wages differ, and whether gender discrimination determined these chances: (1) EQUAL-low: low equal wages for both workers (no chances), (2) EQUAL-high: high equal wages for both workers (no chances), (3) FAIR: one worker receives a high wage and the other receives a low wage, with fair chances (50% of receiving the high wage for both workers), (4) UNFAIR: one worker receives a high wage and the other receives a low wage, with unfair chances (75% of receiving the high wage for one worker and 25% for the other worker), (5) DISCR: one worker receives a high wage and the other receives a low wage, with unfair chances (75% of receiving the high wage for one worker and 25% for the other worker) and the unfair chances are based on gender. We compare participants' labor supply — how many lines they enter — at a given piece-rate wage across payment schemes between subjects.

We will first conduct the online experiment and then the laboratory experiment. We target 1320 participants online (130 in EQUAL-low, 130 in EQUAL-high, 260 in FAIR, 400 in UNFAIR, and 400 in DISCR). Each treatment will contain about 50% men and 50% women. Our online experiment will guide us in determining the number of participants we will target in the laboratory. We will upload this number before the laboratory experiment.

Hypotheses

Our first three labor supply hypotheses are based on a model of preference for both equal wages and a fair procedure generating these wages. In the model, at a given piece-rate wage, workers' utility decreases with increasing unequal wage between workers and with increasing unfair chances to receive a higher or lower wage. Workers also dislike disadvantageous unequal wages and unfair chances more than advantageous unequal wages and unfair chances. Moreover, based on literature showing that discrimination is associated with serious negative consequences on well-being, we posit that workers dislike unfair chances more when they are discriminatory.

Our fourth hypothesis is based on the intuition that discrimination against women might affect labor supply differently than discrimination against men. The rationale behind this intuition is that, in society, discrimination is generally experienced by women rather than men. However, it is unclear how this would affect labor supply. On the one hand, for example, participants' reaction to discrimination favoring women over men might be shaped by the fact that this compensates women. On the other hand, men might be habituated to higher chances and be especially unhappy with receiving lower chances. The hypotheses are the same for the laboratory and online experiments, which will be analyzed separately.

Hypothesis 1 (Low-wage workers): Among low-wage workers with no, equal, or low chances, labor supply ranks across payment schemes as follows: EQUAL-low > FAIR > UNFAIR > DISCR.

Specifically, for a low-wage worker *i* and another worker *j*, we have

$$L_i(i{:}\ w_L\ ;\ j{:}\ w_L) \ > \ L_i(i{:}\ w_L,\ p_F\ ;\ j{:}\ w_H,\ p_F) \ > \ L_i(i{:}\ w_L,\ p_L;\ j{:}\ w_H,\ p_H) \ > \ L_i(i{:}\ w_L,\ p_L \text{ based on gender};\ j{:}\ w_H,\ p_H \text{ based on gender}),$$

where L_i denotes *i*'s labor supply (number of lines entered), w_L (w_H) indicates a low (high) wage, p_F indicates a fair chance of obtaining a high wage per line, and p_L (p_H) indicates a low (high) chance of obtaining a high wage per line.

Hypothesis 2 (High-wage workers): Among high-wage workers with no, equal, or high chances, labor supply ranks across payment schemes as follows: EQUAL-high > FAIR > UNFAIR > DISCR.

Specifically, for a high-wage worker *i* and another worker *j*, we have

$$L_i(i{:}\ w_H\ ;\ j{:}\ w_H) \ > \ L_i(i{:}\ w_H,\ p_F\ ;\ j{:}\ w_L,\ p_F) \ > \ L_i(i{:}\ w_H,\ p_H;\ j{:}\ w_L,\ p_L) \ > \ L_i(i{:}\ w_H,\ p_H \text{ based on gender};\ j{:}\ w_L,\ p_L \text{ based on gender}).$$

Hypothesis 3 (Greater dislike of disadvantage): Unequal wages, unfair chances, and discrimination decrease labor supply more among low-wage workers than among high-wage workers.

For a worker *i* and another worker *j*, we have

$$L_i(i{:}\ w_L,\ j{:}\ w_L) \ - \ L_i(i{:}\ w_L,\ p_F;\ j{:}\ w_H,\ p_F) \ > \ L_j(j{:}\ w_H;\ i{:}\ w_H) \ - \ L_j(j{:}\ w_H,\ p_F;\ i{:}\ w_L,\ p_F),$$

$$L_i(i{:}\ w_L,\ p_F;\ j{:}\ w_H,\ p_F) \ - \ L_i(i{:}\ w_L,\ p_L;\ j{:}\ w_H,\ p_H) \ > \ L_j(j{:}\ w_H,\ p_F;\ i{:}\ w_L,\ p_F) \ - \ L_j(j{:}\ w_H,\ p_H;\ i{:}\ w_L,\ p_L)$$

and

$$L_i(i{:}\ w_L,\ p_L;\ j{:}\ w_H,\ p_H) \ - \ L_i(i{:}\ w_L,\ p_L \text{ based on gender};\ j{:}\ w_H,\ p_H \text{ based on gender}) \ > \ L_j(j{:}\ w_H,\ p_H;\ i{:}\ w_L,\ p_L) \ - \ L_j(j{:}\ w_H,\ p_H \text{ based on gender};\ i{:}\ w_L,\ p_L \text{ based on gender}).$$

Hypothesis 4 (Discriminating against men or women): In treatment DISCR, discrimination against men decreases the labor supply of low-wage male workers as much as discrimination against women decreases low-wage female workers' labor supply.

For a worker *i* and another worker *j*, we have

$$L_i(i(man)\text{: } w_L, p_L; j\text{: } w_H, p_H) \;-\; L_i(i(man)\text{: } w_L, p_L \text{ for men; } j(woman)\text{: } w_H, p_H \text{ for women}) =$$
$$L_j(j(woman)\text{: } w_H, p_H; i\text{: } w_L, p_L) \;-\; L_j(j(woman)\text{: } w_H, p_H \text{ for women; } j(man)\text{: } w_L, p_L \text{ for men}).$$

Exploratory Section: We will also analyze the labor supply effect of unfair chances on workers who beat the odds. That is, low-wage workers who had high chances to receive a high wage and high-wage workers who had low chances to receive a high piece-rate wage, respectively. We will include this analysis in an exploratory section because (1) the model does not make unambiguous predictions for these cases, and (2) we will obtain a limited number of observations in these situations by design. We will first test whether low or high chances to receive a high wage affect the labor supply of workers who actually receive a high or low wage, compared, respectively, to high-wage and low-wage workers who had equal chances. Second, we will test whether low or high chances based on gender change the labor supply of workers who receive a high or low wage, compared to high-wage or low-wage workers who received low or high chances not based on gender.

Analysis Plan

Hypothesis 1: We use an OLS or Tobit regression (depending on censoring). We will first jointly test the equality of labor supply in the four conditions (payment schemes) involving low-wage workers. Then, if joint equality is rejected, we will test individually the six pairwise equalities of the conditions correcting for multiple comparisons. We also will perform robustness checks with a similar non-parametric analysis: we first jointly test the equality of labor supply in all conditions using a Kruskal-Wallis test, and, if the equality is rejected, we test pairwise equality of the conditions using Dunn's test correcting for multiple comparisons.

Hypothesis 2: Same approach as for hypothesis 1, for high-wage workers.

Hypothesis 3: We use an OLS or Tobit regression (depending on censoring). We first jointly test whether equality holds in the three equations. Then, if joint equality is rejected, we will test individually whether equality holds in each of the three equations, correcting for multiple comparisons.

Hypothesis 4: We use an OLS or Tobit regression (depending on censoring), and test whether the hypothesized equality holds.

Exploratory Section: We use an OLS or Tobit regression (depending on censoring), and implement separately each of the four tests. For robustness, we also use four individual Mann-Whitney tests.