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Don't shoot yourself in the foot! A (real-effort task) experiment on income redistribution and voting

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ABSTRACT

This paper reports results from a laboratory experiment that investigates the Meltzer–Richard model of equilibrium tax rates in which individuals are either low or high skilled workers and face a real-effort task that includes leisure at the work place. We find that a large proportion of low-skilled workers vote for the lowest tax rate (the one that gives them the lowest payoff), especially when the alternative tax rate is very high. However, this proportion is significantly reduced in treatments in which the subjects are given extra information about how the tax operates in redistributing income. This result suggests that the lack of information about the role of taxes in income redistribution may be an important factor in explaining the counter-intuitive voting behavior of low-income voters over income redistribution. We also find some support that the prospect of upward mobility and the belief in the negative effect of taxes on productivity make low-income voters support low tax rates, especially when the alternative tax rate is very high.

> "If American families knew what was good for them, then most of them—all but a small, affluent minority—would cheerfully give up their tax cuts in return for a guarantee that health care would be there when needed."
>
> Paul Krugman 2003. "Roads not taken". *New York Times,* April 25.

1. Introduction

According to the World Inequality Database 2020 (Wid.World),[1] income inequality has increased in almost all countries in recent decades. The speed of this increase has been different across countries, suggesting that the role of institutions and policy is important in shaping income inequality.[2] A comparative example between English-speaking countries such as the US with Continental Europe or

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[2] See Piketty and Saez (2003), Goldin and Katz (2008), Deaton (2013) and Piketty (2014) for a deeper analysis of the increase in income inequality across different countries.

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Japan seems illustrative. Top tax rates on upper-income earners have declined more sharply in English-speaking countries than in the rest of OECD countries. As a consequence, income concentration has been more pronounced in these countries than in continental Europe or Japan, where it has been much more moderate (see Piketty (2014), Atkinson, et al. (2011) and Alvaredo et al. (2011)).

Studies based on the median voter theorem, e.g. Romer (1975), Roberts (1977) and Meltzer and Richard (1981), state that income inequality should be self-correcting in democracies since an increase in income inequality leads the median voter to demand a higher tax rate and thus, a higher level of income redistribution. Looking at the patterns of top income-tax rates and income inequality from the 1970s to today, this theory is not well supported by empirical evidence, particularly in the US (see, e.g., Roemer (1998) and citations therein). Far from expropriating the rich, the poor seem to back less redistributive policies such as tax cuts.[3] An illustrative example was the increased support of low-income voters in swing states such as Wisconsin, Michigan or Pennsylvania for Donald Trump (in favor of slashing taxes on the rich), which was crucial for the Republicans in winning the 2016 US presidential elections.[4]

In real life, it is not possible to distinguish the reason why individuals vote for a certain political party, since political programs present a variety of proposals apart from the fiscal policy. Even if the voters' main concern were the fiscal policy, it would be difficult to know to what extend income redistribution is important in their voting decisions or they focus on other issues such as the use of taxes in public investment. For these reasons, in order to understand citizens' preferences over redistributive policies, it would be useful to abstract from all confounding factors to have a scenario in which individuals only vote for the fiscal policy, and the taxes collected are exclusively used to transfer wealth from the rich to the poor. This is what we do in this paper with a lab experiment to shed some light on individuals' voting behavior over income redistribution. In particular, we focus our attention on the low-income voters' behavior.

With this aim, we design a controlled labor market experiment where workers have to make a real effort task to earn their salary, with the possibility of "real" leisure at the workplace (browse the internet as in Corgnet et al. (2015)) as an alternative to work, to capture the potential disincentive of working if taxes are too high. Before that, they have to vote for a preferred tax rate (between two exogenous ones) that implies more or less redistribution of tax revenues. The tax rate implemented is the one that gets more votes. The tax collection is equally distributed between all members of the society. We test a Meltzer-Richard framework-based model through this lab experiment. According to individuals' performance in a tournament at the beginning of the experiment, we classify them into high-skilled and low-skilled workers (associated with high and low income, respectively). We consider two scenarios regarding the level of polarization of policy platforms: one more moderated in which the two proposed tax rates are close to each other and the other in which polarization is higher. In both cases the lower tax rate is the same and we vary the high one.

There is an extensive empirical and experimental literature on preferences over redistributive policies, but with some differences from this work. Some studies (see for instance Tyran and Sausgruber (2006)), Ackert et al. (2007) and Tepe et al. (2021)) analyze voting decisions assuming exogenous pre-tax income, in the sense that there is no labor market where workers earn their wages. In other studies where income is endogenous, they do not consider a voting process, as in Krawczyk (2011), Durante et al. (2014), Charité et al. (2015), Almås et al. (2020), or Chugunova et al. (2021). In others (see e.g. Charité et al. (2015) and Cappelen et al., 2018), the subjects who vote or make decisions about redistribution are not part of the group in which the redistribution will be applied. There are others as Cabrales et al. (2012) and Agranov and Palfrey (2015), with a closer design to ours, which have a voting process over income redistribution, but they do not consider a real effort task (effort levels are stated), neither leisure time at the work place. As far as our knowledge, Sausgruber et al. (2021) is the only experimental paper using real-effort labor to investigate the aggregate choice of the level of income redistribution. They analyze the differences between the disincentive effect of taxing work and redistributing tax revenues when redistribution is imposed and when it is chosen by voting. This work is the closest to ours in the experimental design, since they also include the option of leisure time. However, they pay for the leisure and their goals are different from ours.

From the data obtained in the initial treatments of our experiment, in contrast to the theoretical predictions, we find that a large proportion of low-skilled workers vote for the lowest tax rate even though this is the rate that minimizes their payoffs, particularly when the alternative tax rate is very high. This is consistent with what we observe in the real world, where tax rates have overall decreased despite the increase in world income inequality. As far as we know, we are the first experimental work observing that low-income workers vote for lower tax rates (and hence for a lower redistribution) than those theoretically predicted.

Why would the poor vote for tax cuts? A wide range of explanations has been offered in the literature for this voting behavior. One that has been recently studied is related to voters' misperceptions about income redistribution and the instruments used to reduce income inequality such as the tax policy. According to Bartels (2005), voters may fail to connect income redistribution with the actual public policy measures such as the tax rate. In an empirical study, Kuziemko et al. (2015) prove that public support for income redistribution increases if they emphasize the connection between taxation and public expenditure and the benefit of these for the lower income members of the society. However, as the tax collected is equally redistributed between individuals in our setting, public expenditure from taxation is maximized. Also in a lab experiment, Lorenz et al. (2017) find that low transparency about redistributive consequences of subjects' decisions decreases redistribution if they vote over a tax rate. Nevertheless, if they vote over a minimal

[3] Kenworthy and McCall (2008) show how an increase in income inequality does not produce an increase in the demand for income redistribution in a variety of OECD countries.

[4] See the press article for a detailed explanation: https://www.weeklystandard.com/john-mccormack/the-election-came-down-to-77-744-votes-in-pennsylvania-wisconsin-and-michigan-updated.

income, redistribution increases, in a context of equivalence framing. Later, Paetzel et al. (2018) show that increasing transparency reduces the framing effects and increases the redistribution when subjects vote for a tax rate, while it reduces the redistribution when they vote in the minimal income framing.[5] We address this transparency result in our experimental design by including an additional treatment in which we better inform subjects about how taxation translates into public benefits for the lower income workers. In particular, we provide own and other group members' payoffs after tax redistribution with the non-implemented tax rate in the feedback after each round. We find that with this additional information the lower tax rate is considerably less voted by low-income voters than in the baseline treatments in all scenarios. Therefore, this result suggests that the lack of information about the role of taxes in income redistribution may be an important factor in explaining the counter-intuitive voting behavior of low-income voters over income redistribution. However, we still find that a non-negligible proportion (13%–26%) of low-income subjects vote for the low tax rate.[6]

A second group of explanations relies on the effect of voters' beliefs over their position in the income ranking or their future productivity or their preferences concerning income redistribution. Gimpelson and Treisman (2018) show that the median US voter perceives herself richer than she actually is. That implies that many who would benefit from redistribution, wrongly think that they would lose, so they end up demanding low levels of income redistribution. Similarly, there are some studies such as Lawrence and Sides (2014), Kuziemko et al. (2014), Kim (2019) and Stantcheva (2020) that support the idea that low-income voters overstimate their income ranking ("Lake Wobegon effect") or their productivity ("Dunning-Kruger" effect).[7] Moreover, Bénabou and Ok (2001) suggest that the prospect of upward mobility induces low-income voters to vote for low levels of income redistribution. To test this result, Agranov and Palfrey (2020) report an experimental study of a dynamic version of the Meltzer-Richard model on the effects of stochastic income mobility and tax persistence. They theoretically obtain a negative relationship between these two effects and the equilibrium tax rates. Overall, their experimental results support their model. To test all these effects, we include an additional treatment in the experiment in which we elicit subjects' beliefs about their relative expected performance in the task before voting for the tax rate. In line with Bénabou and Ok (2001), we find that those low-skilled workers who think that they are more productive than the other low-skilled workers in their society vote more frequently for the low tax rate.

Another driver for low-income workers to vote for low tax rates has to do with the beliefs about the potential distortion of taxes on labor supply that produces the equity-efficiency trade-off presented in the models of Romer (1975), Roberts (1977) and Meltzer and Richard (1981). According to the experiment in Cappelen et al. (2018), individuals tend to overestimate the negative effect of taxes on production. If this effect were strong enough and persistent over time, low-income voters would vote for tax cuts, because they would believe that it would raise productivity and then increase tax revenues.[8] This is the main reason why we have included leisure time in the workplace in order to make this feature more similar to a real work environment. To test this hypothesis, in the former treatment of belief elicitation, we elicit low-skilled workers' beliefs about high-skilled workers' expected performance in the task under the high and the low tax schemes (before voting for the tax rate). We find that those low-skilled workers who overestimate the efficiency cost of taxes are more likely to vote for the low tax rate but only when the alternative tax rate is high enough.

The rest of the paper is organized as follows. Section 2 presents the model and the main theoretical predictions. The design of the experiment to test these predictions is presented in Section 3. Section 4 reports the main results of the experiment and discusses the validity of the theoretical predictions. Section 5 proposes further hypotheses and additional treatments to test the validity of the initial theoretical predictions. Section 6 presents some results including the additional treatments and Section 7 concludes.

2. The model

In this section, we first present a general model and analyze the equilibrium under the assumption of rational and self-interested agents. After that, we illustrate the equilibrium with a particular example with some parameters values we will use in our experimental design.

In our model, the economy is populated by $n > 1$ agents, who participate in a perfectly competitive labor market and care about consumption and leisure. We assume that agents play a sequential game. First, they vote their preferred income tax rate through a

[5] They also consider a version of the Meltzer-Richard model, but apart from their goals, their design is also different from ours. They assign pre-tax income to subjects of each group randomly, while in our design pre-tax income is endogenously obtained through a tournament. Additionally, they introduce a communication stage where subjects can send numerical proposals to the members of their group. In our case, there is no interaction between subjects.

[6] A possible explanation may rely on other theoretical models based on the idiosyncratic beliefs concerning the key factors that determine economic success (e.g. Piketty (1998), Fong (2001) and Alesina and Angeletos (2005)). Although, Jiménez-Jiménez et al. (2020), with the same design as ours, show that meritocracy has a reduced effect on low-income voters' behavior. In particular, they find that in one scenario the tournament has no significant effect on low-income voters' behavior, while in the other scenario the effect is small (around 18%). Thus, this feature of the design is not key to explain our findings on low-skilled voters' behavior. In addition, this same feature is also related to the possibility of having an endogenous selection into roles, which it does not seem to play a relevant role either on explaining our results using the same conclusions in Jiménez-Jiménez et al. (2020).

[7] Other articles such as Galasso (2003) show that, assuming the existence of unselfish voters may help to understand the puzzle between theory and data on the relationship between income inequality and income redistribution. In this line, Yamamura (2012) finds a positive relationship between social capital and preferences over income redistribution.

[8] This is the idea behind the Laffer curve. According to this reasoning, the median voter would vote for a tax cut if they believe the tax rate to be so high that it is in the downwards sloping part of the curve.

democratic political process, which affects their labor decisions. Second, they decide how much to work. We compute the equilibrium of this game by backward induction as follows: We first study agents' decisions on labor supply with a fixed tax rate. Then, we obtain their induced preferences on the tax rate and characterize the equilibrium tax rate chosen by majority rule.

Agent i is either a skilled or unskilled worker, endowed with a productivity w_s or w_u, respectively, such that $w_s > w_u$. Workers' productivity level is public information. There are $n_s > 0$ skilled and $n_u > 0$ unskilled workers, with $n_s + n_u = n$ and $n_s < n_u$. Each worker, endowed with one unit of time, decides how to allocate this unit between labor (x_i) and leisure ($1 - x_i$). A worker with productivity w_i that chooses to work a fraction x_i of their time earns a pre-tax income of $w_i x_i$. Workers suffer a cost effort of $\frac{1}{2}x_i^2$ and enjoy a benefit from leisure of $\beta(1 - x_i)$, with $\beta > 0$ standing for the marginal benefit of leisure.[9] Moreover, each worker pays a proportion $t \in [0, 1]$ of her pre-tax income in taxes. We assume that tax revenues are equally distributed among all workers through a public transfer $b(t, Y) = t\frac{Y}{n}$, where $Y = n_s w_s x_s + n_u w_u x_u$ is the total income of the society and workers' after-tax income is fully consumed. Therefore, worker i's utility function is given by the following expression:[10]

$$u_i(x_i, t) = w_i x_i(1 - t) - \frac{1}{2}x_i^2 + \beta(1 - x_i) + b(t, Y) \tag{1}$$

For a given tax rate t, a worker i chooses to work a proportion of time x_i, such that (1) is maximized. Since the utility is strictly concave on x_i, the unique optimal labor supply for worker i is:

$$\mathrm{x_i^*(t) = w_i\left(1 - t\frac{n - n_i}{n}\right) - \beta} \tag{2}$$

Intuitively, both the tax rate and the workers' valuation of leisure reduce labor supply. However, we impose that this valuation β is low enough to have a positive optimal proportion of time devoted to work for any tax rate, i.e. $x_i^*(t) > 0$. Taxes affect labor supply more intensively to skilled workers than to unskilled ones. This is because skilled workers are worse off after tax payments to support income redistribution towards unskilled workers. Moreover, skilled workers choose to work more time than unskilled workers do if either the skill premium (ratio between skilled and unskilled wages) or the proportion of skilled to unskilled workers is high enough. Skill premium has a straightforward positive incentive effect on skilled workers' labor supply. Both the aforementioned variables reduce the possibility of social mobility. We assume that these variables are such that there is no social mobility, that is, unskilled workers have always a lower income than skilled workers.

By introducing (2) into (1) we characterize workers' preferences for the tax rate, given that they choose their labor supply optimally. In Proposition 1, we state the optimal tax rates for both skilled and unskilled workers.[11]

Proposition 1. If the marginal benefit of leisure β is such that $x_i^* \in (0, 1)$, and if $n_s < n_u$, the optimal tax rates for skilled and unskilled workers are:

$$t_s^* = 0; t_u^* = \frac{n[(w_s - w_u)(w_s + w_u - \beta)]}{2n_u w_s^2 - n_s w_u^2} \tag{3}$$

Otherwise, $t_s^* = 0$ and $t_u^* = 1$.

Proof: See Appendix A.

From Proposition 1, skilled workers prefer no taxation and unskilled workers prefer a positive tax rate that allows them to enjoy certain income redistribution. For the case of skilled workers, this is because the utility function is linear in consumption and tax revenues are rebated back to all workers in equal shares. However, for unskilled workers, while a positive tax rate may benefit them with a certain income redistribution, a high enough tax rate may hurt them. This high tax rate may make both skilled and unskilled workers choose to work less time, decreasing tax revenue, which is consistent with the results related to the Laffer curve.

We next study the effect of both the workers' valuation of leisure and the skill premium on the optimal tax rate for unskilled workers. A higher valuation of leisure relative to consumption reduces the importance of income redistribution for unskilled workers and consequently reduces the intensity of preferences for a high tax rate. In addition, an increase in the skill premium ceteris paribus makes skilled workers raise their labor supply and, therefore, the tax revenue. Because of this, unskilled workers prefer a higher tax rate to increase income redistribution. We state these results in the following proposition.

Proposition 2. Unskilled workers' optimal tax rate decreases in the valuation of leisure time and increases in the skill premium.

Proof: See Appendix A.

In the political competition arena, since unskilled are more numerous than skilled workers, the optimal policy for unskilled workers is implemented by majority voting. This is the case when candidates are purely opportunistic in their policy proposals. To illustrate this result, let us consider a two-candidate political competition model in which the policy proposal is the tax rate. If candidates are purely

[9] This representation of the trade-off between labor and leisure is borrowed from Corgnet et al. (2015) and based on Holmstrom (1982).

[10] We use this specific utility function for the sake of simplicity. A more general utility function could be considered without changing the main results of the model. This more general analysis can be provided upon request.

[11] As we have mentioned before, we calculate both types of workers' optimal tax rates for the case in which all workers choose to work a positive proportion of their time, that is when $\beta < w_i\left(1 - t\frac{n - n_i}{n}\right)$ for all n_i. For the particular case in which both skilled and unskilled workers prefer to work their whole time (i.e. $\beta < w_i\left(1 - t\frac{n - n_i}{n}\right) - 1$) we obtain that the optimal tax rates are $t_s^* = 0$ and $t_u^* = 1$.

opportunistic, they will propose the same policy in equilibrium, which coincides with the optimal tax rate for unskilled workers. Thus, both candidates obtain a tie in elections in equilibrium. Otherwise, if a candidate proposes a different tax rate, she will lose the election for sure.

Consider now a different scenario in which candidates are committed to a certain policy proposal, t^h and t^l, one for each candidate, with $t^h > t^l \geq 0$, which are exogenously given by their ideological positions.[12] In this case, only one candidate can win in equilibrium, who is the one with an ideological position closer to the optimal one for unskilled workers. More precisely, the candidate supporting a low (high) tax rate will win the election if the optimal tax rate for unskilled workers is low (high) enough. We state the previous results in the following proposition.

Proposition 3. If candidates are purely opportunistic, the tax rate chosen by majority voting is t_u^*. However, if policy proposals $\{t^h, t^l\}$ with $t^h > t^l \geq 0$ are exogenously given, t^l is chosen by majority voting if and only if $t_u^* \leq \frac{t^h+t^l}{2}$.

Proof: See Appendix A.

This result implies that if the proposal of the highest tax rate is very high, unskilled workers will vote for the lowest tax rate because the alternative tax rate reduces labor supply so much that it lowers their after-tax income (compensating for the redistributing effect of taxes). Straightforwardly from Proposition 2 and 3, we can state the following corollary:

Corollary 1. If policy proposals $\{t^h, t^l\}$ with $t^h > t^l \geq 0$ are exogenously given, t^l is chosen by majority voting if and only if t^h is high enough.

2.1. An example

We next present a version of the model in which we now incorporate the values of the parameters we consider in our experimental design in the next section ($n = 3, n_s = 1, n_u = 2, w_u = 75, w_s = 188, t^l = 0.2, t^h = 0,4$) to calculate the tax rate selected by majority voting. Since we do not have data about the marginal benefit of leisure, β, we calculate a grid of values for this parameter consistent with the assumptions of the model. Those values are such that both skilled and unskilled prefer to work a positive amount of time and the optimal tax rate for unskilled workers is implemented in equilibrium. By (2) we find that $\beta \in (0, 62.5)$ guarantees those requirements.

By Proposition 1, we obtain the predicted optimal tax rate for both skilled and unskilled workers for the parameters of the experiment. While the optimal tax rate for skilled workers is equal to zero, the optimal tax rate for unskilled workers is between 0.5 and 0.66, as depicted in Fig. 1. [13]

Therefore, according to Proposition 3, we find that the high tax rate (0.4), and any other higher than that, should be selected by simple majority, since the alternative low tax rate 0.2 is always at a larger distance to the optimal tax rate, for any $\beta \in (0, 62.5)$. Thus, assuming perfect information and rational workers, we state the following hypothesis to test with our experimental design:

Hypothesis 1. (H1): Unskilled workers always vote for the high tax rate and as a consequence, the tax rate selected in equilibrium by majority voting is always the high tax rate.

3. Experimental design

Based on the political competition model with ideological positions over the tax rate, we design an experiment in which agents with different skills have to choose between two exogenous tax rates. We consider initially two treatments in which we vary the exogenous high tax rate. After observing that experimental results do not match what our model predicts and, in an attempt to explain those results, we relax some assumptions of the model and state some new hypotheses. To test these new hypotheses, we design four additional treatments. In the first two, we provide participants with extra information about how the tax redistribution works (for the two different high tax rates). In the other two, we elicit beliefs on the effect of tax rates in productivity. Thus, eventually we have a total of six treatments but to be faithful to our design process, we will focus first on the two initial treatments and their results (Sections 3 and 4), and afterwards we will analyze all six treatments (Sections 5 and 6).

The Baseline treatments of our experiment were conducted at the University of Valencia by the LINEEX experimental laboratory in two sessions (one per treatment) with 174 subjects, who were recruited online with software developed by LINEEX. All sessions were run in the lab, using z-Tree software (Fischbacher, 2007). No one was allowed to participate in more than one session.

In our experiment, subjects had to perform a real-effort task in order to earn some income before voting for the preferred tax rate. This task was taken from Corgnet et al. (2015) and consisted of performing several summations. In particular, subjects had to add 16

[12] This scenario might be represented by most of the consolidated democracies using majoritarian electoral systems such as UK or the US. In these types of electoral systems, only two big parties compete to win the elections: the conservative party supporting less government intervention and lower taxes than the liberal party.

[13] The range of values of the optimal tax rate for unskilled workers are calculated from expression (3) in Proposition 1 for $\beta \in (0,62.5)$ such that both skilled and unskilled workers prefer to work a positive amount of time and the optimal tax rate for unskilled workers is implemented in equilibrium. Note also that by Proposition 2 unskilled workers' optimal tax rate depends on both the valuation of leisure time, β, and the skill premium. Assuming no valuation of leisure, unskilled workers' optimal tax rate would be higher than 0.66 if the skill premium assumed was higher.

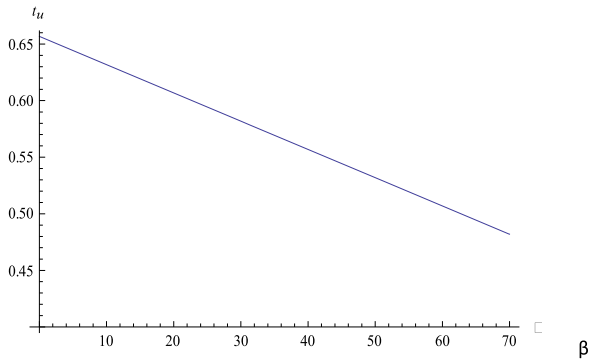


Fig. 1. Optimal tax rates for unskilled workers.
Note: beta refers to the marginal benefit of leisure and t_u represents the optimal tax rate for unskilled workers.

	Columna1	Columna2	Columna3	Columna4	Suma Filas
Fila1	5	8	3	5	
Fila2	2	3	9	6	
Fila3	6	2	1	3	
Fila4	9	8	9	2	
Suma Columnas					

Fig. 2. The work task.

one-digit numbers in 4 × 4 tables (see Fig. 2). They had to add up the sum of all columns and rows in a table before writing the final solution (see the shaded cell on the lower right corner of Fig. 2). They were not allowed to use a calculator or any other electronic devices. Following the design of Corgnet et al. (2015), leisure time consisted of surfing the web in the Chrome browser. This stage was the only source of real payoffs for subjects. This was common information (see instructions in Appendix B). The purpose of the task was that it required considerable mental concentration and was quite monotonous, so as to resemble a real workplace environment in which workers may browse the internet or chat with their friends through social network websites such as *Facebook* or *Twitter*. In addition, the longer the time doing the task, the harder the effort to stay focused on it.[14]

The two treatments we initially consider only differ in the exogenous high tax rate that was 0.4 in **Basel_0.4** and 0.6 in **Basel_0.6**. The experiment was composed of two phases:

Phase 1: Tournament. This phase consisted of a tournament in which each subject performed the aforementioned real-effort task for 4 min. Surfing the web was not allowed in this phase. The best third of the subjects in this phase were assigned to Group A (high-skilled workers) and the rest to Group B (low-skilled workers). In the event of ties, subjects competed again in an additional round for 3 min. After this round, if there were additional ties, subjects were assigned randomly to Group A or B. In this first stage, subjects knew that in the second phase Group A members will earn 188 ECUS per correct table, whereas those in Group B will earn 75 ECUS. This tournament was only played once at the beginning of the session.

Phase 2: Voting. In the second phase, subjects were assigned to three-person groups, each formed by one person from Group A and two from Group B. These groups were fixed throughout the rest of the session. This phase lasted 9 periods, but subjects were not informed about its length. At the beginning of each period, each member of a group had to vote for one of the two tax rates proposed to them to be implemented in their group: a low tax rate and a high tax rate The low tax rate was always 0.2, whereas the high rate was 0.4

[14] We are aware that subjects could access online calculators while surfing the web. However, we think that this happened very infrequently. We provide an argument to support this statement in Appendix E.

in Basel_0.4 and 0.6 in Basel_0.6. In each group, the tax rate was selected by simple majority and it was announced for all group members. Subsequently, subjects had to decide how to divide the 8 min of the period between the real-effort task and leisure time to earn their pre-tax income.[15]

The material payoffs in ECUS for subject i ($i = 1,2,3$) in group j ($j = A, B$) in each period was given by the function:[16]

$$\pi_{ij} = (1-t)\cdot w_j h_{ij} + t\frac{w_A h_{1A} + w_B h_{2B} + w_B h_{3B}}{3},$$

where t is the tax rate selected by simple majority within a group ($t \in \{0.2, 0.4\}$); w_j is the payment per correct table for a subject in group j (75 ECUS for subjects in Group B and 188 ECUS for subjects in Group A) and h_{ij} is the number of correct tables solved by subject i in group j. Note that tax revenues are equally distributed between all members of the group.

At the end of each period, subjects were informed about the number of correct tables of all members of the group and the payoff obtained by all members of the group before and after the tax redistribution.

We paid out one randomly selected period from the 9 periods of the experiment. Every ECU subjects earned was converted to Euros at an exchange rate of 1 euro = 88 ECUS. On average, each person received about 25€ (including a 2€ show-up fee) for a 150-min session. All previous information was known by all subjects.[17]

The following Fig. 3 presents a timeline of the phases and decisions of the experiment:

4. Initial results

In this section, we will test H1 using the data collected from the lab experiment. To do so, we will use nonparametric statistics at an individual level to ensure independence, computing the average of all observations in the nine periods. They will reflect Mann-Whitney one-tailed tests unless stated otherwise.

Before reporting the descriptive statistics, we should check whether the differences in individual behavior between treatments might be due to differences in ability in the real task. We therefore consider the average number of correct tables provided by subjects in the two practice rounds (see the *Training* stage in footnote 15).[18] We find that the difference between skill distributions for the two tax rates is not statistically significant (minimum $p = 0.210$, two-tailed test).[19]

Once we have checked that the skill distribution is similar between treatments, we can analyze individual behavior in a more transparent way. Fig. 4 reports the mean of the percentage of votes for the low tax rate ($t = 0.2$) for different groups in each treatment. We also plot the confidence interval at a 95% for those means. From now on, we will label high-skilled workers as "Rich" and low-skilled workers as "Poor".[20]

Note: *Rich[Poor]* refers to those subjects receiving the high [low] wage. The interval signs at the top of the bars represent confident intervals of the mean at a 95% level.

As expected, high-skilled (Rich) agents vote mostly for the low tax rate in both treatments (84% and 83% for 0.4 and 0.6 high tax rate, respectively). Surprisingly, low-skilled (Poor) workers vote much more frequently for the low tax rate (36% and 56% for 0.4 and 0.6 high tax rate, respectively) than predicted (0% for both), especially when the high tax rate is severe (high tax rate equals to 0.6, $p = 0.002$).[21] This is in line with Corollary 1, that is, a high polarization of policy proposals increases the chance that the low-skilled workers vote for the low tax rate. Unfortunately, this result is not predicted by the model with the parameter values of the experiment. Then, H1 is not supported.

Result 1. Unskilled workers vote more frequently for the low tax rate than predicted by the model. As a consequence, the tax rate selected in equilibrium by majority voting is not always the high tax rate.

We may also explore the data with another perspective: at a worker level instead of at a vote level. The most strightforward measure is the percentage of low-skilled workers who mostly vote (more than 4 periods out of 9) according to the model, that is, they vote for the high tax rate. This amounts to 66% and 40% for the 0.4 and 0.6 high tax rate, respectively. Not surprisingly, these percentages

[15] Before this phase, we included a two-period *Training* phase in which, first, a 0.2 tax rate was announced and in the second period, the announced tax rate was 0.4. Agents knew that the total tax revenue collected within each group would be equally distributed between group members. After the tax rate announcement, subjects had to decide how to divide the 8 min of the period between the real-effort task and leisure time. This stage was irrelevant for payoffs, that is, it was hypothetical, but the idea was to help subjects to compare their payoffs for different tax rates.

[16] Payoffs for the *Training* phase were the same except that t represents the exogenous tax rate implemented by the experimenter instead of that obtained through the voting procedure by the members of each group.

[17] See the instructions and sample screens in Appendix B.

[18] The reason we select the practice rounds and not the first round (without tax-rate scheme) is that the pressure of being assigned to the high-wage group depending on the outcome of this round may bias the real skill distribution of subjects.

[19] The percentage of women was 58% and 56% in the Basel_0.4 and in the Basel_0.6, respectively. Regarding the skill distribution, although men have a slightly higher ability in the task, the differences are not statistically significant ($p = 0.341$ and $p = 0.652$, two-tailed test for Basel_0.4 and Basel_0.6, respectively).

[20] For exact figures on voting decisions for the low tax rate see Table D1 in Appendix D.

[21] Note that the theoretical predictions (in subsection 2.1) are based on the assumption that the leisure time has a sufficient low value for agents. This is supported by our experimental results since average time spent on web surfing by rich from a total of 480 s was 4.7 and 2.3 for the 0.4 and 0.6 high tax rate, respectively; and for the poor it was 3.7 and 3.3 for the 0.4 and 0.6 high tax rate, respectively.

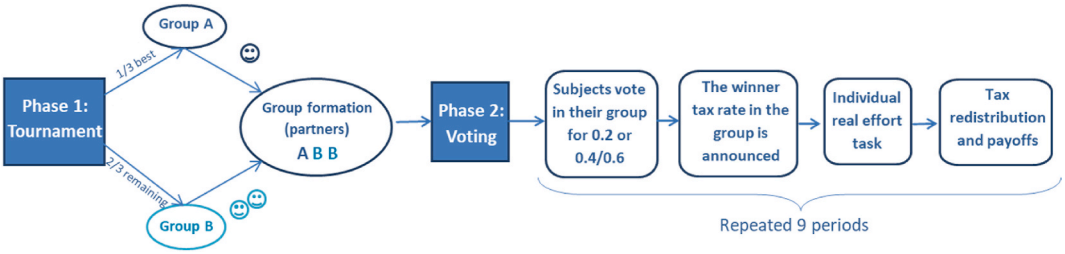
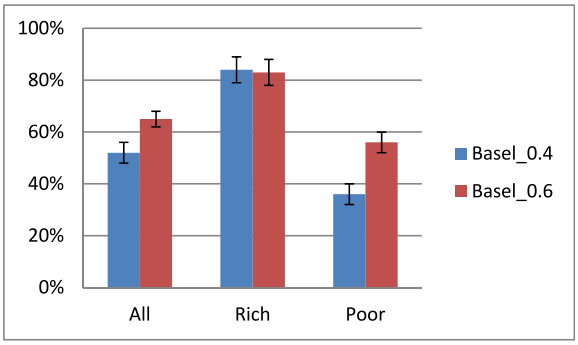


Fig. 3. Timeline baseline.



Note: *Rich[Poor]* refers to those subjects receiving the high[low] wage. The interval signs at the top of the bars represent confident intervals of the mean at a 95% level.

Fig. 4. Mean percentage of votes for the low tax rate.

decrease to 36% and 12%, respectively, when we consider the percentage of low-skilled workers who vote for the high tax rate in all nine periods. Again, those results deviate considerably from the theoretial predictions.

Regarding the implemented tax rate, the hypothesis of the median voter theorem states that the high tax rate should always be the winner in both treatments. Nevertheless, this only happens 52% and 28% of the time in the 0.4 and 0.6 treatments, respectively. These results contrast sharply with those in Agranov and Palfrey (2015). They found that the implemented tax rate in their two treatments was not significantly different from the median of the votes in each group. This contrast may be due to the differences in the experimental design. They consider groups of 5 people, while we consider 3. They have a continous tax rate to vote for, while we have just two exogenous tax rates. Finally, we consider a real task and leisure time in the workplace, while their effort level is stated with no feasible leisure.

The introduction of the real task in our design may involve some issues that may explain the previous results. It could be the case that there are some "very productive" low-skilled workers who will earn more by voting for the low tax rate, that is, given other group members' productivity, their earnings post-tax redistribution will be higher for the low tax rate than for the high one. However, this only happens in 8% and 4% of the cases in Basel_0.4 and Basel_0.6, respectively.[22] Thus, this does not seem to be a relevant explanation.

Another important issue regarding our experimental design is that there might exist an unobserved characteristic of the subject that simultaneously determines her ability in the effort task as well as her voting choice. A growing literature in political science links cognitive ability with political orientations (see Oskarsson et al. 2015 and the references there in). To account for that, we perform a robustness check consisting in comparing our results in the two Baseline treatments with two additional baseline treatments in which the role of the subjects (skilled or unskilled) is assigned randomly. We present the results in Appendix C. We confirm that the endogenous selection problem does not play an important role in the results.

In order to explore other potential explanations for these puzzling results, we relax some assumptions of the model and state new hypotheses in the next section. To test these new hypothesis we desing four additional treatments including more information and subjects' beliefs about their own and others' productivity.

[22] Moreover, in those cases low-skilled workers voted for the low tax rate only 77% and 66% of the time, for Basel_0.4 and Basel_0.6, respectively.

5. New hypotheses and additional treatments

5.1. New hypotheses

In our model we assume that all workers know perfectly how tax revenues are collected and redistributed among them. However, after analyzing the experimental data of the baseline treatments, we may assume that there is a misperception of the role of taxes on income redistribution and so of their benefits towards the poor. Low-skilled workers may not be aware that a high tax rate benefits them more than a low tax rate, since they do not connect taxation with redistribution of income from the high-skilled to the low-skilled workers (see Bartels (2005) and Kuziemko et al.(2015)). More specifically, this would imply in our model that the public transfer $b(t, Y)$ may be perceived as a different function of the real one. In particular, low skilled voters may perceive that the individual public transfer is a function $\widehat{b}(t, Y)$ such that $\frac{\partial \widehat{b}(t,Y)}{\partial t} < \frac{\partial b(t,Y)}{\partial t}$ for any total income produced Y. Assuming this, low skilled workers' optimal tax rate would be lower than that in the case with perfect information about the relationship between taxation and income redistribution. Bearing this is mind, we can state a new hyothesis:

Hypothesis 2. **(H2):** Low-skilled workers vote for the low tax rate (even not being the optimal one) because they do not properly understand how the tax rate is related with income redistribution.

Our second hypothesis concerns the evidence in the literature of two phenomena. First, low-skilled workers may overestimate their income ranking ("Lake Wobegon effect") or their productivity ("Dunning-Kruger" effect). Indeed, some empirical studies demonstrate these effects (e.g. Lawrence and Sides (2014), Kuziemko et al.(2014) and Gimpelson and Treisman (2018)). Another possibility is related to the prospect of upward mobility (see Bénabou and Ok (2001)), by which low-skilled workers believe that in the future they will be closer to the high-skilled than to the low-skilled workers in their group. In our model we assume that workers learn their productivity level perfectly. If we assume that low-skilled workers can overstimate their productivity they may have incentives to vote for the low tax rate.

Hypothesis 3. **(H3):** Those low-skilled workers who believe that they are much more productive than the other low-skilled workers vote more frequently for the low tax rate.

Finally, our last hypothesis is based on taxes' disincentive for productivity. We assume in our model that low-skilled workers can perfectly calculate the effect of taxes on high skilled workers productivity. If we relax this assumption and asumme that low-skilled workers can overstimate this effect, their optimal tax rate may be reduced. In particular, if low-skilled workers believe that high-skilled workers will be disincentivized when the implemented tax rate increases, even to the point that low-skilled payoffs after redistribution will also decrease (Laffer curve effect), then this may explain why low-skilled workers vote more than expected for the low tax rate. Note that here the relevant result is whether low-skilled workers believe that this happens and not whether this actually happens. Thus, the inclusion of leisure in our design might be crucial for unskilled workers having these beliefs, since in a lab experiment where there are not other alternatives to perform the real effort task is very unlikely that skilled workers will just stop working for some time.

Hypothesis 4. **(H4):** Low-skilled workers who believe that high-skilled workers will work less with a higher tax rate, vote more frequently for the low tax rate.

We next present the four additional treatments designed to test the former three hypotheses.

5.2. New treatments

Information Treatments (Info_0.4 and Info_0.6). These treatments are the same as the baseline ones (same phases and decisions, high tax rate 0.4 and 0.6), but with more exhaustive information at the end of each period. In particular, all screens were exactly the same except the last screen of each period, which was a feedback screen informing subjects about productivity, payoffs and the winner tax rate in their group. In the Info treatment we add in this screen this same information but for the tax that was not selected in the voting stage. This alternative payoff is calculated assuming that productivity will remain constant within groups, that is, assuming that the number of correct tables solved by groups members would not change with the tax rate (we explicitly inform subjects about this assumption on the screen). In Appendix B Figs. B.2.4 and B.2.5 we present a comparison between the Baseline and the Info treatments for those feedback screens.

Belief Treatments (Belief_0.4 and Belief_0.6). In these treatments, the only difference with the Baseline treatments is that we introduce a new stage before subjects vote for the tax rate in order to elicit subjects' beliefs over the number of correct tables under the low and the high tax rates. In particular, they have to guess the number of correct tables for all members of their group (including themselves). With these beliefs, we compute their own payoffs after redistribution for each tax rate scheme and we show them their payoffs on a new screen (see Fig. B.2.6 in Appendix B). They earn 5€ if those payoffs (own payoffs computed with their beliefs on productivity) were correct in a randomly chosen round.

Notice that in the Belief treatment, subjects may infer some information on the functionality of the tax rate as an instrument of income redistribution, which may help them to think about the effect of taxes on their payoffs (and therefore, it may change their voting decisions respect to the control treatment). Nevertheless, **in the Belief treatment our only focus will be on the analysis of the beliefs whereas in the Info treatment we are mainly interested in the comparison of voting decisions with the Baseline.**[23]

To test the Information and Belief treatments we run a new lab experiment. Like the previous experiment, it was conducted at the University of Valencia by the LINEEX experimental laboratory in 4 sessions (one per treatment) with 120 new subjects (30 subject per sesion), who were recruited online with software developed by LINEEX. All sessions were run in the lab, using z-Tree software (Fischbacher, 2007). No one was allowed to participate in more than one session (including those of the previous experiment). We summarize all our treatments, both initial and additional, in Table 1 and present a new flow chart of the experiment that includes all treatments in Fig. 5.

6. Final results

In this section, we test our hypotheses H2 to H4 using the data collected from the lab experiment. To do so, we mainly study the voted and implemented tax rates, then, we analyze beliefs on productivity. To test the validity of our hypotheses, we use both nonparametric statistics and econometric analysis. For the latter analysis, we will use Random Effects Logit to check the robustness of our statistical results.

Again, before analyzing the differences in individual behavior, we should check the differences in the skill distribution.[24] Fig. 6a and 6b plot the corresponding histograms for the distribution of this variable within each treatment for both scenarios regarding the level of polarization of the tax rates proposed. The visual result of no important differences between skill distributions for both high tax rates is statistically confirmed (minimum $p = 0.212$, $p = 0.286$, for 0.4 and 0.6 high tax rates, respectively; two-tailed tests, pairwise comparisons) except for Basel_0.4 and Belief_0.4 where the differences are weakly significant ($p = 0.168$, two-tailed).[25] To account for this, in our econometric analysis we will control for the skill in the task.

Once we have checked that the skill distribution is similar between treatments, we can analyze individual behavior in a more transparent way. Figs. 7a and 7breports the mean of the percentage of votes for the low tax rate (t = 0.2) for different groups in each of our six treatments. We also plot the confidence interval at a 95% for those means. The left graph refers to those treatments were the high tax rate was 0.4 whereas the right one refers to high tax rate equal 0.6.[26 27]

Note: *Rich[Poor]* refers to those subjects receiving the high [low] wage. The interval signs at the top of the bars represent confident intervals of the mean at a 95% level.

6.1. Information

Our focus here is on the comparison between decisions in the Baseline and in the Info treatments to test H2. Our first result is that the implementation of the high tax rate is more likely in the Info treatment than in the Baseline and it is highly significant.[28] This result is clearly driven by low-skilled workers' voting behavior since high-skilled workers voted in a very similar manner in all treatments.[29] The low-skilled workers vote significantly more frequently for the low tax rate in the Baseline than in the Info treatments for both high tax rates, the 0.4 (36% vs. 13%) and the 0.6 (56% vs. 26%) ($p = 0.013$ and $p < 0.001$, for Basel vs. Info, for the 0.4 and 0.6 high tax rates, respectively). Therefore, H2 is highly supported.

This result is in line with the findings in Paetzel et al. (2018). They also obtain an increase in the level of redistribution in a framing experiment in which voters vote over two payoff-equivalent ways of redistribute income. In particular, they obtain that "the vote choice as a decision about a minimum income rather than a redistributive tax rate almost doubles the level of redistribution" (Paetzel et al. (2018), p. 170). Although through different experimental design, this study and ours arrive to the same conclusion: getting voters better informed about consequences of income redistribution is an effective measure to increase the support for redistributive policies.

To check the robustness of previous results, we develop an econometric analysis. Here, we can take advantage of the panel data set structure (time, agents) and we do not lose individual information as we did with the tests. We consider a Random Effects (RE) Logit model where the dependent variable is the probability of voting for the low tax rate in the next period. We cluster errors at an individual level. As explanatory variables, we use a dummy for high-skilled workers (*Rich*), the total amount of tax collected within each

[23] This diminishes highly the harm of the effect of eliciting beliefs before the voting decision since we are not going to compare voting decisions between the Baseline and the Belief treatments.

[24] As before, we consider the average number of correct tables provided by subjects in the two practice rounds (see the Training phase in the experimental design section).

[25] We have also performed a Kruskal-Wallis equality-of-populations rank test for 3 independent samples and the differences are not significant (p = 0.212, p = 0.286, for 0.4 and 0.6 high tax rates, respectively; two-tailed tests).

[26] Again, we can compute those cases where low-skilled workers earnings after tax redistribution are higher for the high tax rate than for the low one. This only happened in 8%, 5%, 2%, 3%, 8% and 8% of the cases in Basel_0.4&0.6, Info_0.4&0.6, Belief_0.4&0.6, resp.

[27] For exact figures on voting decisions for the low tax rate see Table D1 on Appendix D.

[28] This result also holds for the comparison between Info and Belief although it is not significant. For the 0.4 high tax rate, $p = 0.008$, $p = 0.373$, for Basel vs Info, for Belief vs Info, respectively. For the 0.6 high tax rate, $p = 0.042$, $p = 0.470$, for Basel vs Info, for Belief vs Info, respectively.

[29] For the 0.4 high tax rate, $p = 0.646$, $p = 0.717$,$p = 0.755$, for Basel vs Info, for Basel vs Belief and for Belief vs Info, respectively. For the 0.6 high tax rate, $p = 0.551$, $p = 0.825$,$p = 0.298$, for Basel vs Info, for Basel vs Belief, for Belief vs Info, respectively. All these tests are two-tail.

Table 1
Initial and additional treatments.

Treatments	Additional feature	Low tax rate	High tax rate	Subjects
Basel_0.4	–	0.2	**0.4**	87
Basel_0.6	–	0.2	**0.6**	87
Info_0.4	Extra information on the role of taxation	0.2	**0.4**	30
Info_0.6	Extra information on the role of taxation	0.2	**0.6**	30
Belief_0.4	Elicitation of beliefs on productivity	0.2	**0.4**	30
Belief_0.6	Elicitation of beliefs on productivity	0.2	**0.6**	30

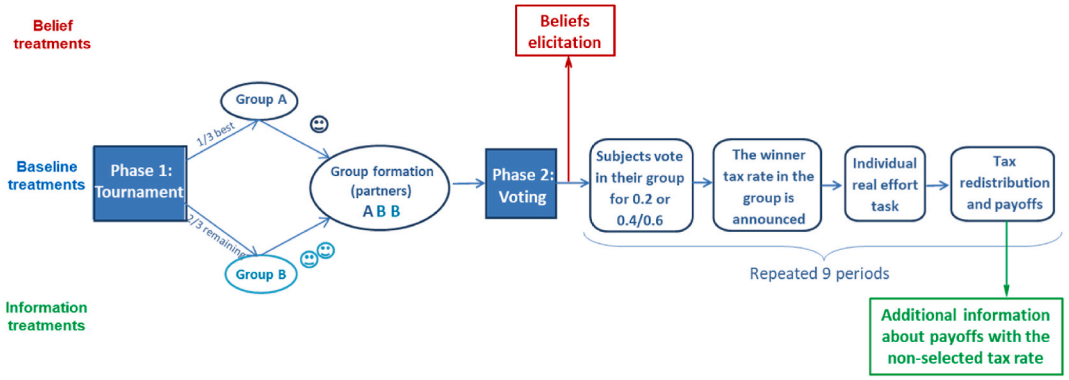


Fig. 5. Timeline all treatments.

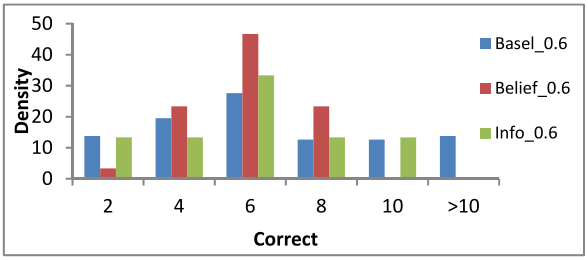


Fig. 6a. Skill distribution in the treatments with high tax rate = 0.4.

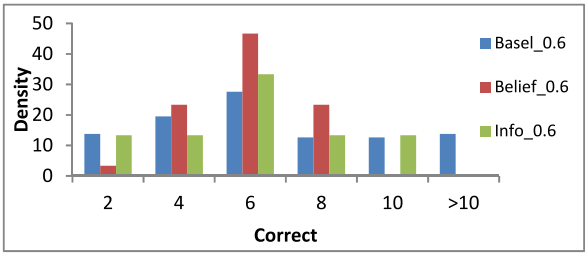


Fig. 6b. Skill distribution in the treatments with high tax rate = 0.6.

group in the present period (*Tax collect*), the number of correct tables in the present period (*Correct*), the amount of web-surfing time in the present period (*Surf*), a dummy, which is 1 if the implemented tax rate was the low rate after the voting procedure in the present period (*Winner low tax*), the current period (*Period*), the group identification number (*Group*) and the treatment dummy for the Baseline (*Baseline*).[30] As our focus is on the behavior of the low-skilled workers, we report two specifications, one including all the observations

[30] We include the explanatory variables *Tax collect* and *Group* in order to control in some way for the effect of all the periods being with the same partners in the group.

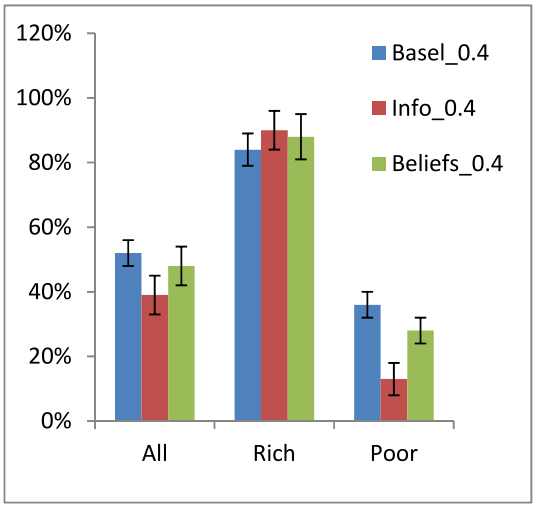


Fig. 7a. Mean percentage of votes for the low tax rate when the high tax rate = 0.4.

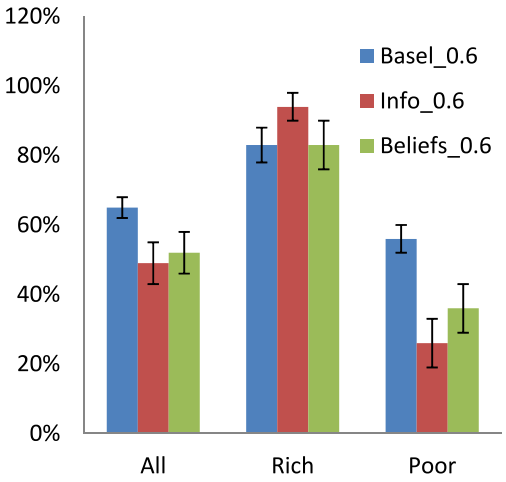


Fig. 7b. Mean percentage of votes for the low tax rate when the high tax rate = 0.6.

of the Baseline and Info treatments (*All*) and another including only the low-skilled workers subsample (*Poor*). Table 2 reports the coefficients (marginal effects) of these regressions.

Once more, we find that the low tax rate is less frequently voted for in the Info than in the Baseline treatment (Baseline dummy positive and highly significant). Again, this result supports H2 (confirming our previous statistical findings).We also find a negative effect of the amount collected by the tax on the likelihood of voting for the low tax rate, which is quite intuitive if agents believe that they will increase their earnings by voting for the high tax rate. Nevertheless, this effect is only significant under the 0.4 high tax rate.[31]

Even though we do not report the coefficients for the high-skilled workers subsample (*Rich*), we have computed them for the same specifications as those in Table 2 and the only variable that is significant (and positive) is the surfing time. That is, those high-skilled workers who used the surfing time more frequently are more likely to vote for the low tax rate in the next period. Thus, it seems that even if on average the use of leisure in the workplace is very reduced, it has an effect on the voting behavior, although only significant for the high-skilled workers. Note that this is really a lower bound of the real effect of leisure in the workplace, because in real life workers do not clearly lose a big part of their salaries when not being productive. All in all, we can state the following result:

[31] For robustness check we have run the same regressions as in Table 2 but considering a Random Effects Generalized Method of Moments model. Significance is very similar and does not change for the Baseline treatment dummy.

Table 2
Probability of voting the low tax rate in the next period.

	BASELINE VS INFO (High tax rate = 0.4)		BASELINE VS INFO (High tax rate = 0.6)	
Variables	(1) All	(2) Poor	(1) All	(2) Poor
Rich	5.043***	–	3.960***	–
	(0.746)		(0.756)	
Tax collect	−0.004*	−0.005**	−0.001	−0.002
	(0.002)	(0.002)	(0.002)	(0.002)
Correct	0.121	0.0893	0.045	−0.008
	(0.065)	(0.078)	(0.070)	(0.073)
Surf	−0.002	−0.019	0.012**	0.007
	(0.005)	(0.024)	(0.00)	(0.005)
Winner low	0.313	0.778	−0.061	−0.227
Tax	(0.496)	(0.530)	(0.728)	(0.789)
Group	−0.098	−0.038	−0.038	0.032
	(0.071)	(0.074)	(0.071)	(0.071)
Period	0.0004	0.0353	0.004	−0.005
	(0.061)	(0.068)	(0.057)	(0.064)
Baseline	0.441**	0.649***	0.487***	0.650***
	(0.155)	(0.192)	(0.171)	(0.204)
Constant	9.959***	0.063	9.628***	2.444*
	(1.730)	(1.287)	(2.001)	(1.312)
N	936	624	936	624

Note: Robust standard errors in parentheses ***p < 0.01, **p < 0.05, *p < 0.1.

Result 2. Low-skilled workers vote more frequently for the high tax rate when they receive information on how the tax rate is related to the income redistribution.

6.2. *Beliefs about performance in the task*

To test our third and fourth hypotheses, we analyze the beliefs over individuals' productivity elicited in the Belief treatments. There are two possible ways to analyze this: within and between subjects. The former will be obtained by the comparison of subjects' beliefs between the two tax rates within each treatment, that is, the low vs the high tax rate. For the latter, we will compare beliefs between the two high tax rates (0.4 vs 0.6) between treatments. Remind that it makes no sense for these hypotheses to compare voting decisions between the Belief and the Baseline treatment (see explanation on page 22).

The first possible explanation of this anomalous voting behavior among low-skilled workers was related with the overestimation of own productivity. Consequently, we first test whether low-skilled workers who believe that they are more productive than the other low-skilled workers in their group vote more frequently for the low tax rate. We will consider two different measures. First, we check whether low-skilled workers' beliefs about the (positive) difference between their own correct tables and those of the other poor in the same group is higher when they voted for the low tax rate than when they vote for the high one. This is the case in both treatments: 6.33 vs. 2.94 and 3.43 vs. 2.11, for Belief_0.4 and Belief_0.6, respectively. However, these differences are not statistically significant. A possible issue with this variable is that the total number of cases where the low-skilled workers voted for the low tax rate and also satisfied the former conditions is quite small. A different measure which diminishes this issue is the correlation coefficient between the frequency of votes for the low tax rate and the (positive) difference between own correct tables and those of the other poor in the same group. The correlations amount to 40% and 38%, for Belief_0.4 and Belief_0.6, respectively. In this case, the coefficients are highly significant ($p < 0.001$ both). We need an additional econometric analysis to provide a better conclusion regarding H3.

Table 3 reports the effect of the low-skilled workers' beliefs about the other low-skilled workers' productivity on their voting behavior. We include two additional explanatory variables: *Belief difference for the low [high] tax rate*. These are the differences between the low-skilled workers' beliefs about their own number of correct tables minus their beliefs about the number of correct tables of the other low-skilled worker in the same group; if both beliefs are under the low [high] tax rate and provided that the difference is strictly positive. In this way, we can analyze whether the low-skilled workers change their vote more frequently for the high tax rate when they believe that they are more productive than the other low-skilled workers in their group. To this end, we interact the previous variables with the treatment dummies for Basel_0.4 and Basel_0.6. We also include the variable *Skill* to account for differences in the skill distribution between treatments. We consider two different specifications of the RE logit model, since beliefs about productivity under the low tax rate are highly correlated with those beliefs under the high one.

As expected, if low-skilled workers believe that they are more productive than the other low-skilled workers in their group, it is more likely that they vote for the low tax rate. This effect is only significant for the Basel_0.6 treatment (*Belief difference for the low tax rate*Belief_0.6*), whereas under the high tax scheme, these coefficients are significant for both Belief treatments.

Result 3. Those low-skilled workers who believe that they are more productive than the other low-skilled workers in their group vote more frequently for the low tax rate. This is enhanced in the scenario with a high polarization of policy platforms.

Table 3
Voting behavior and low-skilled workers' beliefs about other low-skilled workers' productivity.

	(1)	(2)
Variables	Probability of voting for the low tax rate	Probability of voting for the low tax rate
Belief difference for the Low tax rate* Belief _0.4	0.285	
	(0.336)	
Belief difference for the Low tax rate* Belief _0.6	0.998**	
	(0.465)	
Belief difference for the High tax rate* Belief_0.4		0.495*
		(0.297)
Belief difference for the High tax rate* Belief_0.6		1.273**
		(0.505)
Tax collection *in t-1*	−0.020***	−0.013***
	(0.007)	(0.004)
Correct *in t-1*	−0.099	−0.298
	(0.322)	(0.269)
Skill	0.132	0.152
	(0.319)	(0.308)
Group	0.169	0.066
	(0.243)	(0.202)
Period	0.262	0.213
	(0.226)	(0.184)
Constant	−1.408	−1.033
	(2.569)	(2.295)
Observations	136	144

Note: *Belief difference for the low [high] tax rate* is the difference between the low-skilled workers' beliefs about their own number of correct tables minus the low-skilled workers' beliefs about the number of correct tables of the other low-skilled workers in the same group, if both beliefs are under the low [high] tax rate and only if the difference is strictly positive. Robust standard errors in parentheses ***p < 0.01, **p < 0.05, *p < 0.1.

Now we explore whether the low-skilled workers who believe that high-skilled workers will work less with a higher tax rate will vote more frequently for the low tax rate. The within-treatment comparison seems a very straightforward and intuitive way, since we will compare the voting decisions of the same individuals under the two tax regimes. In Belief_0.4 the increase in votes from the low to the high tax rate is quite moderate (20%), so we may expect a moderate effect. Those low-skilled workers who believe that the high-skilled workers' productivity decreases under the high tax rate (0.4) vote for the low tax rate 57% of the time, while the low-skilled workers who belief that the high-skilled workers' productivity will increase vote for the low tax rate just 40% of the time.[32] When the high tax rate is 0.6, the increase from the low to the high tax rate is now 40%, so we expect a higher impact of beliefs on the voting behavior. Those low-skilled workers who believe that the high-skilled workers' productivity decreases under the high tax rate (0.6) vote for the low tax rate 45% of the time, while the low-skilled workers who believe the opposite vote for it just 18% of the time. Only when the high tax rate is 0.6, those differences are weakly significant, so H4 is mainly supported when the tax schemes proposed are highly polarized.[33] [34]

Next, and as a robustness check, we perform the between-treatments comparison. As before, we need to verify that the skill distribution is not statistically different between treatments.[35] Here, we will compare voting behavior under the high tax rate in the two Belief treatments, so the increase between tax rates is now 20%. Thus, this may in some way, be compared with the results found in the within-subjects analysis of the Belief_0.4 treatment. First, we need to check whether the low-skilled workers actually think that the high-skilled workers will decrease their productivity when increasing the high tax rate from 0.4 to 0.6. The low-skilled workers' beliefs about the high-skilled workers' number of correct tables were 8.70 and 6.83 for 0.4 and 0.6 high tax rates, respectively.[36] Interestingly, although the difference in beliefs is significant ($p = 0.044$), the high-skilled workers' actual productivity was not statistically different between those treatments (8.88 vs. 7.56, for Belief_0.4 vs. Belief_0.6, $p = 0.684$, two-tailed). This is in line with the findings of Cappelen et al. (2018) in which subjects overestimate the negative effects of taxes. As reported in Table 4, the low-skilled workers voted for the low tax rate 28% and 36% in Belief_0.4 and Belief_0.6, respectively. Although quantitatively this result supports H4, the differences are

[32] In the Belief_0.4 treatment, we have eliminated an outlier observation (beliefs about Rich's productivity under 0.2) of 999.
[33] $p = 0.969$, two-tailed and $p = 0.087$ for Belief_0.4 and Belief_0.6, respectively, Wilcoxon signed-rank test.
[34] Other important variable regarding beliefs about productivity and their effects on tax choices is the surfing time. An analysis of the surfing time and its effect in voting decision is presented in Appendix E. Although subjects use a small amount of time on leisure we observe that, in general, subjects used more seconds for surfing time when the tax rate implemented is the high one (with only one exception from low-skilled workers if the tax implemented goes from 0.2 to 0.6). Moreover, we obtain that the surfing time has a significant positive impact on the voting for the low tax rate in the next period. All this justifies the introduction of this feature in our experimental design.
[35] $p = 0.481$ for the comparison of the correct number of tables between Belief_0.4 and Belief_0.6, two-tailed test.
[36] In the Belief_0.4 treatment, we have eliminated an outlier observation (beliefs about high-skilled workers' productivity under 0.4) of 100.

Table 4
Effect of low-skilled workers' beliefs about high-skilled workers' productivity for higher tax rates on the probability of voting for the low tax rate.

	(1)	(2)
Variables	Probability of voting for the low tax rate	Probability of voting for the low tax rate
Beliefs for rich disincentive	–	1.190 (1.057)
Beliefs for rich disincentive* Belief_0.4	0.702 (1.466)	
	1.870* (1.036)	
Beliefs for rich disincentive* Belief _0.6		
	−0.009***	−0.009***
Tax collection in t-1		
	(0.003)	(0.003)
Period	0.194**	0.199***
	(0.097)	(0.097)
Skill	0.032	0.027
	(0.289)	(0.273)
Belief_0.6	–	1.075
		(0.883)
Constant	−0.219	−0.756
	(1.708)	(1.745)
Observations	320	320

Note: *Beliefs for rich disincentive* is a dummy that is 1 if the low-skilled workers' beliefs about the high-skilled workers' number of correct tables under the low tax rate are higher than under the high tax rate. Robust standard errors in parentheses ***p < 0.01, **p < 0.05, *p < 0.1.

not statistically significant.[37] Hence, this is in line with what we found previously for Belief_0.4.

A possible caveat in the previous statistical comparisons is that the number of cases in which low-skilled workers believe that high-skilled ones will decrease their productivity is small. Thus, we should go one step further in the analysis and conduct some regressions in order to check whether our data support H4.

In Table 4, we consider two different regressions to test H4, that is, whether the low-skilled workers vote more frequently for the low tax rate when they believe that the high-skilled workers will decrease their productivity for a higher tax rate. The first specification, (1), accounts for the within-subjects analysis (we compare productivity's beliefs within the same treatment between the low and the high tax rate). Thus, we consider a RE Logit on the probability of voting for the low tax rate. We cluster errors at an individual level. We include an additional variable: *Beliefs for rich disincentive*, a dummy that is 1 if the low-skilled workers' beliefs about the high-skilled workers' number of correct tables under the high tax rate are smaller than under the low one. We interact the last dummy with each treatment dummy to see whether there is a significant effect of these beliefs on the voting behavior in each treatment independently. We aim to study the between-subjects effect with the second specification, (2), of the previous model (we compare productivity's beliefs between the two Belief treatments only for the high tax rate). Now, we do not consider the former interaction of the dummies but the treatment dummy *Belief_0.6*. Therefore, we can check whether subjects vote more frequently for the low tax rate in Belief_0.6 than in Belief_0.4. For both regressions, we only consider those observations from low-skilled workers' voting decisions of the two Belief treatments (Belief_0.4 and Belief_0.6).[38] Table 4 reports the coefficients (marginal effects) of these regressions.

In regression (1) of Table 4, we observe that the interaction between *Beliefs for rich disincentive* and the dummy treatment for Belief_0.4 is not significant, while it is weakly significant (and positive) for Belief_0.6. This is exactly the same result we found with the tests. Thus, we find no support for H4 when the tax rate increases from 0.2 to 0.4 and a weak support when it increases from 0.2 to 0.6. Similarly, we find no significant effect when increasing the high tax rate from 0.4 to 0.6 (dummy Belief_0.6 in regression (2)) when we control for the effect of low-skilled workers' beliefs about tax disincentive on the high-skilled ones' productivity. It is not surprising that as the difference between tax rates increases, beliefs about disincentive on the high-skilled workers' productivity have a higher effect on the low tax rate voted by the low-skilled workers.[39]

Result 4. Those low-skilled workers who believe that the high-skilled workers will significantly decrease their productivity if a high tax rate is chosen are more likely to vote for the low tax rate only when the alternative tax rate is high enough.

6.3. Evolution of voting behavior

In order to have a different perspective of voting decisions (and not only the average of all periods), let us now examine the evolution of the voting behavior in time. Fig. 8a and 8b display the average percentage of votes for the low tax rate (t = 0.2) by the low-skilled workers in each of the 9 periods for the six treatments. For the treatments in which the high tax rate is 0.4 (Fig. 8a), although the

[37] $p = 0.358$, two-tailed.
[38] We have eliminated 29 observations from those subjects who provide beliefs about Rich productivity of 0, 50 or 99 correct tables (the average number of correct tables by the Rich was 10).
[39] In fact, on average the low-skilled workers believe that the high-skilled workers will make 2.6 more correct tables in Belief_0.4 than in Belief_0.6.

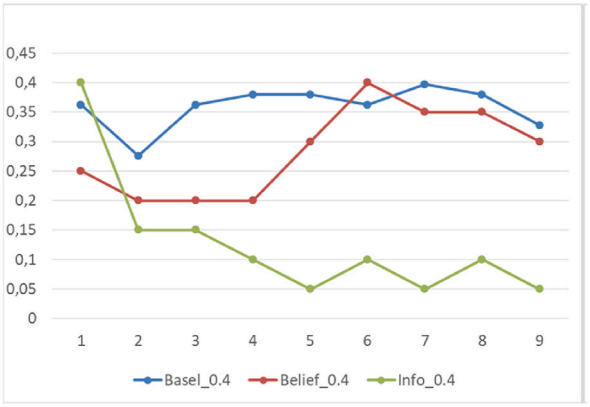


Fig. 8a. Evolution of the mean percentage of votes for t = 0.2 by poor when the high tax rate = 0.4.

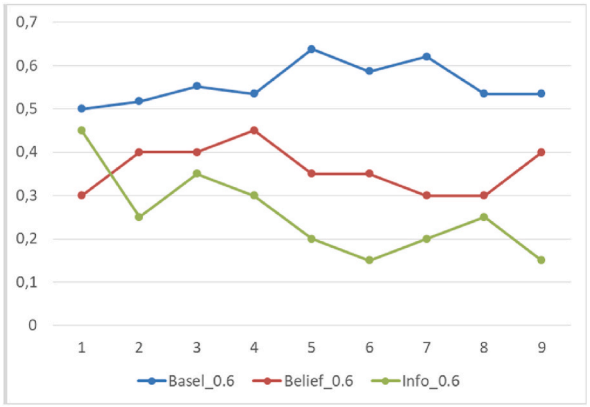


Fig. 8b. Evolution of the mean percentage of votes for t = 0.2 by poor when the high tax rate = 0.6.

percentage of votes for the low tax rate is pretty stable between 30% and 40% in the Baseline, this percentage keeps falling gradually down to 5% in the Info treatment. Note, however, that the evolution of the Belief treatment is somehow erratic with some ups and downs. This may be due to the effect of the information not being so clear and transparent as in the Info treatment.

When the high tax rate is 0.6 (Fig. 8b), the evolution in time is very similar to the previous one, except that the percentage is around 10% higher on average. This is in line with *Corollary 1*, which states that a higher polarization increases the likelihood that the low tax rate will be implemented.

Finally, although not related to our hypothesis, we briefly summarize our findings about productivity, efficiency and income inequality. Overall, the high-skilled workers do not decrease their productivity when the tax rate increases ($p = 0.471$). This is in line with Saez et al. (2012), who find no "convincing evidence in the short or medium run of large real economic activity responses of upper earners to tax rates". Nevertheless, we observe that the low-skilled workers increase their productivity when the tax rate implemented increases ($p = 0.027$), which might be explained by social preferences such as guilt or reciprocity (especially in our setting where there is meritocracy in earning the right to belong to the high-skilled group). Also, when the policy platforms are not very polarized, information about how the tax rate operates in redistributing income lowers efficiency but also income inequality. For further results on these variables, see Appendix F.

7. Concluding remarks

According to the Eurobarometer[40], 84% of Europeans think that income differences are too great, and more than 60% consider that governments should take measures to reduce those differences.[41] Despite this concern, income inequality is increasing in most

[40] The Eurobarometer is a series of surveys carried out periodically by the European Commission since 1973. Its main function is to analyze and summarize public opinion on certain issues related to the European Union around the member states, thus being one of the more relevant instruments for analyzing the evolution of citizen opinion. See https://es.wikipedia.org/wiki/Eurobar%C3%B3metro.

[41] See the report "Special Eurobarometer, How fair do Europeans think life in the EU is?" published in Brussels, on 23rd April 2018.

countries. This article complements the existent literature trying to solve this puzzle. In particular, we are interested in explaining the support from low-income voters of tax policies that increases income inequality. To this end, we test a model based on the Meltzer and Richard (1981) framework through a lab experiment in which individuals vote over two exogenous tax rates and their pre-tax income is determined according to their performance in a real-effort task with leisure. We show that a large proportion of low-income workers vote for the low tax rate even though that is the rate that minimizes their payoffs.

We propose two treatments to try to explain this counter-intuitive voting behavior. First, following Bartels (2005) and Kuziemko et al. (2015), we exploit the role of the lack of connection between tax rates and income redistribution. In particular, we provide information about the payoffs subjects would have earned if the alternative tax rate had been implemented (all other things being equal). We show that, once the low-income voters learn that the high tax rate benefits them more than the low one, a large proportion of those voters shifts their votes towards the high tax rate. Using completely different designs, we obtain the same qualitative conclusion as Paetzel et al. (2018): additional information enables voters to make decisions that are beneficial for them. However, around 10% of the votes cast by low-income voters remain for the low tax rate.

Second, we study the impact of low-income voters' beliefs about their own and others' productivity on voting behavior. A possible reason for the low-skilled workers voting for the low tax rate is the overestimation of their own future productivity. This is related to the theory of prospect of upward mobility in Bénabou and Ok (2001). In line with this theory, our results in the experiment confirm that those low-income voters who overestimate their productivity are more likely to vote for the low tax rate. Another reason that can explain this voting behavior is that a high tax rate may reduce productivity and so income redistribution. We only find support for this motivation when the high tax rate is very high.

We are aware that our study is not free of caveats. Although we include the possibility of leisure in our experimental design, the time spent on leisure is rather small and this may underestimate the effect of tax rate on productivity. A possible solution may be to pay for the leisure time spent, as per Sausgruber et al. (2021). However, in line with our results, empirical evidence supports the limited effect of taxes on top earners' productivity.

Finally, the policy implications of our findings (and from Paetzel et al. (2018)) indicate that we should expect that parties against a high welfare state would try to make the connection between taxes and income redistribution weaker, while parties in favor would emphasize it. Moreover, less redistributive parties would stress the prospect of social mobility and beliefs that taxation reduces economic activity (even if neither of them were real).

Author contribution

All authors have participated in (a) conception and design, or analysis and interpretation of the data; (b) drafting the article or revising it critically for important intellectual content; and (c) approval of the final version.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

If the manuscript is accepted, we will make all data and programs available except the ztree software whose property belongs to LINEEX laboratory.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ejpoleco.2022.102325.

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