



Preferred tax rates depend on the rates paid by the rich[☆]

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ABSTRACT

Using survey experiment data, we investigate whether individuals in Mexico modify their stated preferred tax rate as a function of the rate paid by the rich. Our experimental treatment finds that participants increase their willingness to pay taxes by approximately 2.3 percentage points, or 19 percent, when informed that the rich will pay 60 percent of their income in taxes instead of 30 percent (control group). The effect is not statistically significant for other scenarios, in which the rich pay 50, 40, or 20 percent relative to the control group. As participants know that the current tax rate for the rich is 30 percent, the experiment can measure the willingness to pay more in taxes as a function of the proposed rate for the rich. Our results show that people expect a progressive system and are willing to pay more if the rich pay much more. Moreover, this increase in willingness to pay taxes is driven mainly by individuals with high socioeconomic status and individuals whose trust in the government is above the median. Our findings are in line with experiments using public goods games with inequality in endowments that highlight the importance of social norms concerning the behavior of the rich. However, they contradict the predictions of traditional economic and political science models in which an increase in taxes paid by the rich decreases the tax rates that others are willing to pay.

1. Introduction

Taxes are an important tool for mitigating the consequences of inequality. However, many countries that are afflicted by unequal wealth distributions, particularly middle- and low-income countries, are also characterized by low tax revenue. Among OECD countries, for instance, where tax revenue as a percentage of GDP averages 33.9 percent, it is lowest in Mexico (16.5 percent), Colombia (19.7 percent), and Chile (21.6 percent). Low tax revenue leaves these countries with insufficient resources to fight poverty and inequality, and the resulting erosion of citizens' trust in the government's capacity to improve the situation decreases their willingness to pay taxes (Campos-Vazquez

et al. 2022; see also Bartels 2005; Kuziemko et al. 2015).

In this paper we suggest that states can escape this problem by increasing top tax rates. Based on the results of a survey experiment, we show that, contrary to conventional theoretical predictions of tax preferences, people are willing to pay higher tax rates when the rich are taxed at higher rates, due to the social norms¹ underpinning their perceptions of tax justice. This is especially relevant in the high inequality countries of Latin America, where tax morale is low and evasion is high, as it suggests a mechanism to increase fiscal space by creating a social consensus around conditional cooperation.

In the case of Mexico, a common recommendation from international organizations is to increase the tax base and the progressiveness of taxes

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¹ A social norm is a way of thinking, feeling, or behaving that is deemed by the group as appropriate (MacPherson and Howard 2011). Kuntsche, Room and Kuntsche (2021) distinguish between injunctive norms (a person's view of what is right based on their own beliefs, morality, and others' views of suitable behavior) and descriptive norms (defined as the population's distribution of those beliefs). Our intervention focuses on descriptive norms, such as, for instance, a reference group effect.

by reducing the income threshold of the top tax bracket and fighting tax evasion (OECD 2019; United Nations 2017; IMF 2020). However, broadening the tax base, even to increase overall progressivity, can have mixed results. For instance, doing so led to social and political unrest in France in 2018 (the “yellow vest” protests; Rubin and Sengupta 2018), in Ecuador in 2019 (León Cabrera 2019), and in Colombia in 2021 (Turkewitz 2021). Such a policy can thus carry hefty political costs for implementing administrations.

Rather than avoiding the necessary progressive tax reforms, the key to escaping the taxation conundrum is to understand what motivates people to support tax increases: the main objective of this paper. Our primary hypothesis is that people’s preferred tax rates increase when their perceptions of the rates paid by the rich increase. This contrasts with the traditional models in economics and political science, which predict that an increase in taxes paid by the rich should decrease the tax rates preferred by the remaining poorer individuals (Dimick, Rueda, and Stegmueller 2016, 2018). Although these models may include individuals’ aversion to inequality, they ignore peer effects, that is, how individual responses are shaped by the behavior of others. The power of social norms and conditional cooperation (Fischbacher, Gächter, and Fehr 2001) has been convincingly shown in various fields of study.² Experiments using public goods games with inequality in endowments highlight the importance of the behavior of the rich.³ In particular, the contribution of the rich and the perception of fairness in the rest of the group are key to explaining cooperation in these experiments. At the same time, people’s tax compliance seems to correlate with their perception of compliance by others (Frey and Torgler 2007; Nathan, Perez-Truglia, and Zentner 2020) and the desired progressiveness of the tax system (Bergolo et al. 2020).

The contribution of this paper is to experimentally test whether people arrive at a preference for their own tax rates in relation to the rates paid by the rich. To answer this question, we hypothesize that individuals may modify the desired tax rate for themselves according to the rates paid by the rich. To test this hypothesis, we designed a survey on tax morale, public sector perceptions, and fairness-related social norms, including a pre-registered randomized intervention, and administered it in Mexico during the second quarter of 2021. The survey is representative at the urban level and was administered in person to randomly sampled households in eight cities. The survey includes 3,179 individuals divided into five groups, each of which receives different information. At the end of the questionnaire, an infographic showed the levels of income inequality and poverty in the country, including the tax rates paid by the poor (7 percent) and the rich (30 percent), according to official data from the Secretary of the Treasury (SHCP 2018). After receiving this information, individuals were asked how much they would be willing to pay in taxes if the rich paid different fixed percentages (treatment groups) or with no reference to the rich (baseline). As all groups knew that the current tax rate for the rich was 30 percent,

² For instance, energy saving (Allcott and Rogers 2014; Goldstein, Cialdini, and Griskevicius 2008), voting (Gerber and Rogers 2009; Panagopoulos and Abrajano 2014), littering (Cialdini, Reno, and Kallgren 1990; Torgler, Frey, and Wilson 2009), and other prosocial behavior (Chetty, Saez, and Sándor 2014; Frey and Meier 2004; Goette and Tripodi 2021; Shang and Croson 2009)

³ First, a high degree of inequality in endowments accelerates the decline in cooperation in numerous public goods games, driven mainly by a lower relative contribution of the rich (Brañas-Garza, Molis, and Neyse 2021; Cherry, Kroll, and Shogren 2005; Hargreaves Heap, Ramalingam, and Stoddard 2016; Hauser et al. 2019; Martinangeli and Martinsson 2020; Nishi et al. 2015). Second, when wealth is driven by cumulative outcomes of public goods games, resulting in inequality, individuals respond with costly punishment, bringing about lower incomes and lower levels of inequality than in a scenario without punishment (Gächter et al. 2017). Third, including tax progressivity (for instance by including progressive minimum contributions) results in higher levels of cooperation and lower levels of inequality, which leads to greater payments from the public goods fund for all (Keser, Marktädter, and Schmidt 2017).

their response indicates the change they would make in their own tax rates depending on the rates paid by the rich.

We find that indeed, people adjust their willingness to pay taxes according to the rate paid by the rich. Our experimental treatment finds that participants who are informed that the rich will pay 60 percent of their income in taxes increase the rate they are willing to pay by approximately 2.3 percentage points relative to a control group. The mean in the control group is 11.8 percent, so this corresponds to an increase of 19 percent. The effect is not statistically significant for the other scenarios. The implication of this result is that people expect a progressive system and are willing to pay more if the rich pay much more. This increased willingness to pay taxes is driven mainly by individuals of high socioeconomic status and those who display greater than average trust in the government.

We find three main results: first, individuals do adjust their preferred tax rate according to what the rich are assumed to pay, suggesting that reciprocal social norms about fairness are relevant for shaping redistribution preferences. Second, the elasticity in reaction to changes in the tax rate for the rich is not very great: only large increases lead to significant reactions. Third, the reaction is not universal, but depends on personal characteristics like wealth and trust in government, suggesting that improvements in tax compliance would require messages tailored to particular groups. Our findings, obtained in field experiments rather than less easily translatable proxy games, complement the existing literature on inequality, taxation, and redistribution preferences by further analyzing the underlying mechanisms. In our study, the segment of society that changes its views in response to information about the behavior of other groups is defined by class rather than political party, unlike the groups analyzed by Stantcheva (2020) and Blinder and Krueger (2004). Moreover, while Di Tella, Dubra, and Lagomarsino (2016) find that greater trust in government is associated with a decrease in preferred tax rates for the wealthy, our results show that the individuals most supportive of significantly higher taxes on the wealthy (as measured by their willingness to increase their own taxes) are those with high levels of trust in government and its efficiency. This has an important implication for improving tax compliance: a potential pull-effect of higher taxes for the wealthy runs contrary to the idea that a flat tax or a non-progressive tax system does not affect preferred tax rates of the less wealthy. Because we focus on effective tax rates, a limitation of our study for the purpose of policymaking is that higher nominal tax rates might lead to increased underreporting of income or tax evasion.

2. Previous literature and conceptual framework

Peer effects have often been conceived as a way of addressing the shortcomings of the expected utility framework in the context of tax compliance. In the classical model of Allingham and Sandmo (1972), the decision to pay or evade taxes is conceptualized as an individual risky investment decision based on risk aversion. While foundational, this framework is unable to explain the relatively low levels of evasion observed in real life. To account for high levels of compliance, researchers have proposed a variety of models with “moral components” (Erard and Feinstein 1994; Gordon 1989). Importantly for our purposes, Traxler’s (2010) extension of Allingham and Sandmo’s model adds a moral cost to evasion that decreases the levels of non-compliance, and a social structure of groups, whose behavior has a differential impact on the strength of the norm. This allows for the existence of “leading groups”: for instance, high-income groups or political elites.

This literature is closely related to the intent of our study, but differs from it in many critical ways. In contrast to the compliance literature focusing on the decision of whether or not to comply with taxation, we are focusing on increasing the fiscal space through higher taxation. In particular, we are studying how the willingness to pay taxes varies according to the effective tax rate paid by high-income groups. The literature on conditional cooperation suggests that there may be a greater

desire to contribute if high-endowment players are contributing what is perceived as a fair amount to a public good, and in the same vein, the contribution of high-income groups may affect the desire for greater redistribution through taxation (Brañas-Garza, Molis, and Neyse 2021; Cherry, Kroll, and Shogren 2005; Hargreaves Heap, Ramalingam, and Stoddard 2016; Hauser et al. 2019; Martinangeli and Martinsson 2020; Nishi et al. 2015).

However, evasion may play a part in the determination of the effective tax rate. For instance, Solano-García (2017) proposes a model where redistribution can be supported in low-enforcement contexts by a coalition of high- and low-income groups. In this equilibrium, middle-income groups, which face greater costs for evasion, become the highest net contributors to welfare policies, and redistribution benefits both low-income groups (through welfare) and high-income groups (through tax evasion). Such a situation, where evasion decreases effective tax rates relative to nominal rates, can have important policy implications for redistributive policies. These considerations do not, however, invalidate the internal consistency of our experiment, as we ask directly for the effective tax rate, which takes into account the effect of evasion.

In this paper, we are interested in whether people's preferred (effective) tax rates for themselves depend on (effective) tax rates of the rich. This question is usually not included in traditional theoretical models of redistribution.⁴ In their classical model, Meltzer and Richard (1981) describe individuals who prefer a tax rate that maximizes their marginal utility with regard to the tradeoff between work and leisure associated with earning taxable income. The higher an individual's income, the lower their preferred tax rate. Rising income inequality leads indirectly to redistribution because more people with relatively lower incomes will vote in favor of higher taxes (to benefit from redistribution), yet inequality in itself does not affect an individual's policy preferences. Dimick, Rueda, and Stegmueller (2016, 2018) extend the earlier model to individuals who care for others, including either a social welfare function (which they call income-dependent altruism) or using the inequality-aversion component from Fehr and Schmidt (1999). A key innovation of this model is that in contrast to Meltzer and Richard (1981), an exogenous increase in income inequality will increase the preferred tax rate (or redistribution; see Dimick, Rueda, and Stegmueller 2018, p. 446). This prediction is mainly driven by other-regarding preferences and holds true for both the social welfare function and the inequality aversion models. Likewise, an exogenous increase in taxes paid by the richest individuals decreases income inequality and therefore decreases the preferred tax rate for everyone else.

These theoretical models are challenged by evidence of conditional cooperation in public goods games with inequality in endowments. The rich are observed as a reference or leading group (see Traxler 2010 in a different context but with similar implications). This suggests that the tax rate paid by the rich may be used as a reference for others. Moreover, as Stantcheva (2020) has shown, redistributive demands depend on personal characteristics: in particular, considerations of fairness with regard to the distribution (which relate to ideological position and trust in institutions) prevail over concerns about efficiency.

Against this backdrop, our paper's main hypothesis is that if social norms matter and the rich are seen as a leading group (Traxler 2010), people's preferred rate for their own taxes moves in the same direction

as that for the rich. Our experiment thus aims to test the elasticity of preferred tax rates with respect to those of the rich. We also test whether there are heterogeneous effects in this estimate with respect to trust in government, as the literature on taxation suggests that trust in government affects tax collection and preferences for redistribution.⁵

3. Data and Intervention

3.1. Survey⁶

We designed and administered a survey of individuals aged 25-69, representative for urban areas (over 100,000 inhabitants) and across regions of Mexico. The survey was conducted face-to-face by a third-party firm (Suasor Consultores) at respondents' homes with randomly selected household members during May and June 2021.⁷ The final sample includes 3,179 individuals, 800 in the Mexico City metropolitan area, 422 in Guadalajara (Jalisco), 409 in Monterrey (Nuevo León), 304 in León (Guanajuato), 318 in Ciudad Juárez (Chihuahua), 321 in San Luis Potosí (San Luis Potosí), 321 in Mérida (Yucatán), and 265 in Oaxaca (Oaxaca). We use sample weights in all descriptive statistics and regressions.

The interview lasted 25-30 minutes. The questionnaire began by asking for sociodemographic information, followed by perceptions of income inequality, poverty, fairness in inheritance, taxes paid, tax evasion, the percentages of poor and rich people, and preferences in altruism. It then assessed willingness to modify specific taxes, trust in government, inheritances received, and preferences for potential future inheritances. The final part of the questionnaire included the intervention.

3.2. Randomized Intervention

The intervention consisted of four treatment groups of similar size and a control. Participants were assigned randomly to one of the five groups. All participants received an information card (shown in Supplementary Materials Fig. A1) which included (1) mean monthly income for the lowest and the highest income deciles in Mexico, and (2) taxes as a proportion of income paid by the lowest and the highest income deciles in Mexico (7 and 30 percent, respectively). After they received this information, the questions varied randomly among groups. In the control group, the interviewer asked "For every MXN \$100, how much would you be willing to pay in taxes?" In each treatment group, the interviewer asked "If the richest 10 percent paid MXN \$[amount] of each MXN \$100, how much would you be willing to pay in taxes?" The amount was 60, 50, 40, or 20 percent, depending on the treatment group. Since the highest income decile pays an average of 30 percent, our working hypothesis is that larger amounts (60, 50, or 40 percent) lead to preferences for higher rates for themselves, and that the lower rate (20 percent) leads to preferences for lower rates.

3.3. Balance in Observable Characteristics

The demographic characteristics surveyed are gender, age, marital

⁴ In these models, individuals know gross income of the rest of the population and select the desired tax rate such that it achieves a desired redistribution.

⁵ Flores-Macias (2018) shows that among people with low trust in government, the incorporation of features into the design of a tax that are meant to reduce uncertainty in the fiscal exchange, such as oversight, sunset, and earmark provisions, increases support for increased taxation. In an experimental study, Kuziemko et al. (2015) find that reduced trust in government reduces support for top tax rates (although only some of these effects are significant).

⁶ The intervention was pre-registered with the AEA RCT Registry (AEARCTR-0007664).

⁷ All interviewers used face masks for protection against COVID-19 and were insured by the third-party company (Suasor Consultores).

status, and employment status. We also construct four dummy variables that indicate whether the individual lives in Mexico City, central Mexico (León, Guadalajara, and San Luis Potosí), northern Mexico (Monterrey and Ciudad Juárez), or southern Mexico (Mérida and Oaxaca). We approximate socioeconomic status (SES) with a socioeconomic index, imputed from data that includes a neighborhood quality index, possession of a water heater, sewage system, car, bank account, hiring of domestic workers, years of schooling, health coverage, whether at least one parent speaks an indigenous language, whether one parent has at least junior high school, and average years of schooling in the neighborhood, using the first component of a principal component analysis (Torche 2015a, b). This method is commonly used as a proxy for economic well-being (Filmer and Pritchett 2001; Poirier et al. 2020; Wittenberg and Leibbrandt 2017). The neighborhood quality index is obtained with a principal component analysis of the perceived quality of street paving, sidewalks, street lighting, sewage system, and garbage collection at the neighborhood level.

We control for several perceptions at the individual level (all except the last set are measured as agreement on a 5-point Likert scale). These perceptions are summarized into a standardized index (questions included in each index are provided in the Supplementary Materials, Table A1). 1) We include perceptions of whether poverty exists for individual reasons, by asking about agreement with the following statements: “We all have the same opportunities,” “A person is poor mainly due to lack of effort,” “A person is poor primarily because of circumstances beyond their control,” “A person is rich mainly because they work harder than others,” and “A person is rich mainly because they had more advantages than others” (Campos-Vazquez et al. 2022; Roth and Wohlfart 2018). 2) Concern for inequality is measured by asking about agreement with statements like whether inequality is one of the country’s main problems, as well as “It is the government’s responsibility to reduce the gap between rich and poor,” “The wealth of the country should be distributed more equitably,” and “It is not fair that the children of a wealthy family have access to more goods and services” (Gründler and Köllner 2017; Weinzierl 2017). 3) Trust and satisfaction with government are measured with questions about trust in “government” and “the bureaucracy,” and satisfaction with “tax collection,” “the way the government spends taxes,” “the provision of education,” “the provision of public health,” and “the provision of public safety” (Torgler et al. 2008; Torgler 2011). 4) Support for taxation of the rich is related to preferences for fair wealth and inheritance taxation (Stantcheva 2021), and we ask about agreement with statements like “Inherited wealth is not as deserved as that obtained by effort,” “Having a wealth tax is fair,” “Having an inheritance tax is fair,” and “The government must be involved in the transmission of wealth from parents to children.” 5) For perceptions about the economy being affected by higher taxes we ask respondents if they agree that “If the richest pay more taxes it negatively affects the economy,” and how much higher taxes would cause people to “work less/more,” “avoid taxes,” or “save less,” or whether they “increase informal employment” (see Stantcheva 2021 for a similar index). 6) For perceptions on corruption and government expenditures we ask two questions: “For every MXN \$10 in taxes, how much do you think is wasted?” and “How much do you think goes to corruption?”

We also ask about respondents’ perceptions of the amount they and others pay in taxes. To control for the perceived progressiveness of the tax system, we ask specifically about the amount paid by the poor, middle-income, rich, and super-rich.⁸ The question asks about the amount paid in whole numbers for each MXN \$10 (like the question on corruption), but for simplicity, we describe the data here in percentages.

Table 1 includes the main descriptive statistics for these variables and shows balance across the intervention groups. These variables are the same as those used in the regression analysis; they are divided into

⁸ The meaning of poor, middle income, rich, and super rich is left to the subjective judgment of each individual.

demographic and geographic variables, socioeconomic status, perception indexes, and taxation perceptions. Half of our sample is female, the average age is 43.5 years, 66 percent are married or cohabitating, and 62 percent currently have paid employment. The perception indexes are standardized with a mean of zero. The respondents believe that close to half of taxes collected are wasted or go to corruption. They also believe they pay an average of 36.7 percent in taxes, where the poor pay 29.6 percent, the middle-income pay 37 percent, the rich pay 38.9 percent, and the super-rich pay 38.7 percent. They believe the system is progressive, but they also think that the tax rates for the rich and super-rich are equal and close to what the middle-income pay. The last column in the table shows the *p*-value of the test of whether the means of the five intervention groups are equal. All variables show balance in observable characteristics at reasonable statistical significance thresholds.

4. Results

4.1. Main Results

Fig. 1 shows our main result. After receiving the information card at the end of the questionnaire, participants were asked “How much would you be willing to pay in taxes?” in hypothetical scenarios where the rich paid different rates. The x-axis shows the treatment groups (with the rich paying 20, 40, 50, and 60 percent) and the control group (30 percent). The y-axis plots the average preferred tax rate for each group with 95 percent confidence intervals.

The participants were willing to pay higher tax rates if the rich also did so, but only if the rate for the rich were relatively high. If the rate for the rich were between 20 and 50 percent, there were no adjustments in individual preferences: participants were willing to pay 11–12 percent in taxes.⁹ However, with a tax rate of 60 percent for the rich, they increased their willingness to pay taxes: their average preferred rate increased to 14.2 percent.¹⁰

We corroborate these results with a regression analysis. We regress the tax rate that individuals are willing to pay on four indicator variables corresponding to each treatment group (tax rates for the rich of 20, 40, 50, and 60 percent). Thus, the coefficients are interpreted as a difference with respect to the control group (30 percent). Table 2 includes the results for five different regressions: (1) no controls, (2) adding demographic and geographic variables, (3) adding the socioeconomic status index, (4) adding the perception indexes, and (5) adding the five perceived tax rates (perceived tax rate for themselves, perceived tax rate for the poor, perceived tax rate for middle-income, perceived tax rate for the rich, and perceived tax rate for the super-rich). The table shows robust standard errors in brackets and 95 percent confidence intervals in parentheses. The bottom row shows different tests and their *p*-values: contrasting the effects of the treatment of 60 percent versus 20, 40, 60, and 50 percent, and a test of whether the coefficients from the 20, 40, and 50 percent treatments are equal.

As expected, given that the variables are balanced across intervention groups, Table 2 shows results that are similar to those in Fig. 1. The impact on the preferred tax rate is only statistically significant for the case where the wealthiest 10 percent pay a tax rate of 60 percent (all five columns). Columns (3) to (5) indicate that the impact is approximately 2.3 percentage points. The mean for the control group is 11.8 percent, so the preferred tax rate when the rich pay 60 percent corresponds to an increase of 19 percent. The impact is statistically significant not only

⁹ We refer to effective tax rates. Of course, willingness to pay does not necessarily coincide with tax compliance. However, in our study we are primarily interested in tax preferences, making this potential discrepancy less of an issue.

¹⁰ One important point that we do not discuss here is that individuals want to pay a substantially lower tax rate (12.3 percent) than they perceive they are paying (36.7 percent).

Table 1
Means, Standard Errors, and Balance Tests of Observable Characteristics Included in the Study.

	All	Treatment 20%	Baseline 30%	Treatment 40%	Treatment 50%	Treatment 60%	p-value
Number of observations	3,179	616	670	620	629	644	
A. Demographic and geographic variables							
Female	0.50 [0.01]	0.50 [0.02]	0.49 [0.02]	0.50 [0.02]	0.49 [0.02]	0.50 [0.02]	0.985
Age	43.46 [0.22]	44.13 [0.51]	43.70 [0.51]	42.77 [0.50]	42.91 [0.49]	43.75 [0.51]	0.450
% Married or Cohabiting	0.66 [0.01]	0.67 [0.02]	0.68 [0.02]	0.62 [0.02]	0.66 [0.02]	0.68 [0.02]	0.361
% Employed	0.62 [0.01]	0.64 [0.02]	0.61 [0.02]	0.62 [0.02]	0.64 [0.02]	0.61 [0.02]	0.828
Mexico City	0.54 [0.01]	0.54 [0.02]	0.53 [0.02]	0.54 [0.02]	0.54 [0.02]	0.53 [0.02]	0.998
North	0.20 [0.01]	0.19 [0.02]	0.20 [0.02]	0.20 [0.02]	0.20 [0.02]	0.20 [0.02]	1.000
Center	0.23 [0.01]	0.22 [0.02]	0.23 [0.02]	0.22 [0.02]	0.22 [0.02]	0.23 [0.02]	0.993
South	0.04 [0.00]	0.04 [0.01]	0.04 [0.01]	0.04 [0.01]	0.04 [0.01]	0.04 [0.01]	1.000
B. Socioeconomic status							
Socioeconomic status index	-0.00 [0.02]	-0.02 [0.04]	0.01 [0.04]	-0.02 [0.04]	-0.00 [0.04]	0.04 [0.04]	0.891
C. Perceptions							
Perception that poverty exists for individual reasons	0.00 [0.02]	0.03 [0.04]	0.08 [0.04]	-0.05 [0.04]	-0.06 [0.04]	0.00 [0.04]	0.227
Concern about inequality	-0.00 [0.02]	0.00 [0.04]	-0.02 [0.04]	0.07 [0.04]	-0.02 [0.04]	-0.02 [0.04]	0.569
Trust in government	-0.00 [0.02]	0.04 [0.04]	-0.08 [0.04]	0.00 [0.04]	-0.03 [0.04]	0.07 [0.04]	0.231
Support for taxation	0.00 [0.02]	-0.00 [0.04]	-0.01 [0.04]	-0.01 [0.04]	0.01 [0.04]	0.02 [0.04]	0.986
Perception that economy is affected by higher taxes	-0.00 [0.02]	0.02 [0.04]	-0.03 [0.04]	0.01 [0.04]	0.00 [0.04]	0.01 [0.04]	0.963
% taxes wasted	55.39 [0.40]	54.58 [0.88]	56.90 [0.88]	55.86 [0.88]	53.99 [0.88]	55.51 [0.91]	0.366
% taxes to corruption	47.41 [0.42]	46.56 [0.94]	48.68 [0.91]	46.77 [0.92]	47.27 [0.96]	47.67 [0.93]	0.720
D. Perceived tax rates							
Perceived tax rate (own)	36.67 [0.37]	37.73 [0.86]	35.12 [0.77]	36.77 [0.86]	37.94 [0.88]	35.92 [0.82]	0.231
Perceived tax rate for the poor	29.65 [0.38]	30.53 [0.88]	28.54 [0.80]	29.54 [0.86]	30.37 [0.86]	29.37 [0.81]	0.628
Perceived tax rate for middle income	37.03 [0.35]	36.91 [0.80]	36.11 [0.77]	37.56 [0.80]	37.89 [0.80]	36.75 [0.77]	0.727
Perceived tax rate for the rich	38.89 [0.37]	39.67 [0.83]	38.00 [0.78]	38.24 [0.82]	39.54 [0.86]	39.02 [0.82]	0.699
Perceived tax rate for the super rich	38.72 [0.42]	38.47 [0.91]	38.29 [0.88]	37.40 [0.99]	39.56 [0.99]	39.87 [0.97]	0.612

Notes: The table shows averages for the variables included in the study; the standard error is included below each average in brackets, and the p-value of the test of whether the means of the five intervention groups are equal is shown in the last column.

with respect to the control group, but also with respect to all other intervention groups. For instance, column (5) indicates that the difference between the coefficients of the 60 and 20 percent treatments is 3.1 percentage points; between 60 and 50 percent it is 1.9 percentage points. The effect of the tax rate paid by the rich is non-linear, and it is only affected by the treatment in which the rich pay 60 percent. The tests as to whether the effects of the 20, 40, and 50 percent interventions are equal cannot be rejected (*p*-values are shown in the bottom row). Finally, the effect in which the rich pay 60 percent is also statistically significant when the *p*-value is adjusted for multiple comparisons (Clarke, Romano, and Wolf 2020).

Thus, our results are consistent with a model in which the behavior of the rich matters for the respondents' preferred tax rate for themselves. It contrasts with models predicting that a decrease in inequality lowers the preferred tax rate (Dimick, Rueda, and Stegmüller 2016; Fehr and Schmidt 1999). Our results also show that preferred tax rates are relatively inelastic, and that individuals are willing to pay higher taxes only if the rich pay much higher taxes.

4.2. Heterogeneity

We also test whether the treatment effect depends on covariates such as socioeconomic status, perceived tax rates, government trust, perceptions of the causes of poverty, and concerns about inequality. Identifying this heterogeneity is essential to a better understanding of the driving mechanism behind our treatment. As Chernozhukov et al. (2020) point out, one issue with reporting treatment effects split by subgroups is that there might be a large number of ways to form these subgroups. But it is possible to use the data to find ex-post whether there is any relevant heterogeneity in treatment effect by covariates in a systematic way, using machine learning (ML) tools. Chernozhukov et al. (2020) propose a generic ML approach. The method is executed by splitting the sample (100) into two sets of equal size: the main set and the auxiliary set. Individuals from the auxiliary set are used to train ML methods (elastic net, boosted trees, neural network with feature extraction, and random forest) to learn about the relationship between the outcome and baseline characteristics of the individuals in the control and the treatment groups. These models are then used to predict a baseline effect for each individual in the main set (i.e., the outcome if the

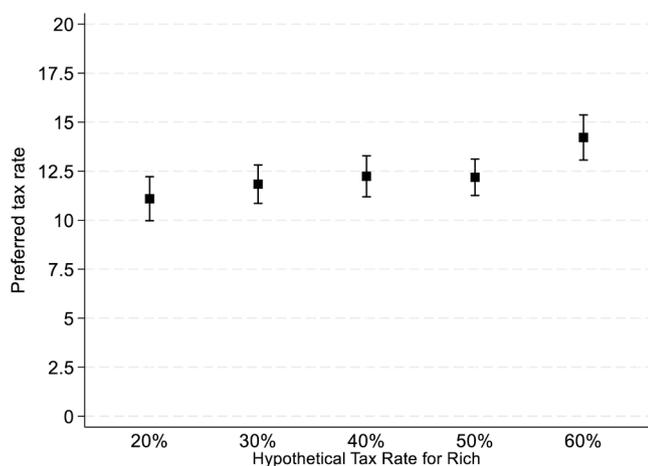


Fig. 1. Preferred Tax Rate for Self with Different Hypothetical Tax Rates for the Richest 10%.

Notes: Error bars show 95% confidence intervals. Average preferred rate for each hypothetical tax rate: 11.1% (20%), 11.8% (30%), 12.2% (40%), 12.2% (50%), and 14.2% (60%).

individual had been in the control group) and a treatment effect. Using the predicted individual treatment effects, three features of the data are then analyzed.¹¹ Our interest is in their “classification analysis” or the average characteristics of the 20 percent most affected and 20 percent least affected individuals. We focus on the best-performing ML methods, which are random forest and elastic net. The parameter estimates, confidence bounds, and *p*-values we report are the medians across 100 splits.

Since the procedure only accepts one treatment group, we estimate the model twice, once in which the control group is the baseline, where the rich pay 30 percent, and once in which it is the treatment, where the rich pay 20 percent. The results are in the Supplementary Materials, Tables A2 and A3, respectively. Regardless of the method used and the definition of the control group, the estimated difference in means between the most and least affected groups is positive and statistically significant for trust in government, but contingent on the choice of control group for the socioeconomic status index and the perception that taxes affect the economy. These results suggest that individuals with high SES, high trust, and a strong belief that taxes affect the economy are most influenced by the tax rates of the rich. To investigate this further, we performed regressions to see individuals’ preferred tax rates with values above or below the median for each of these characteristics, depending on their treatment status.

Table 3 shows the regression results controlling for all characteristics, as in column (5) in Table 2. The columns show values for socioeconomic status, trust in government, and the perception that taxes affect the economy that are greater or less than the median. As in Fig. 2, individuals with high SES are more willing than those with low SES to pay a higher tax rate where the rich pay 20 percent. The difference between the treatment where the rich pay 20 percent and that where they pay 60 percent is 3.7 percentage points in high SES individuals, but only 2.1 percentage points in those with low SES. For individuals with a high degree of trust in the government, the difference between these two treatments is 4.3 percentage points, as compared with 1.9 percentage points for those with a low degree of trust. For those who believe more strongly that taxes affect the economy, the difference is 3.7 percentage points. Individuals with high SES, a high degree of trust in government, and a strong belief that taxes affect the economy react more strongly to

¹¹ Our results for the best linear predictor of the conditional average treatment effect show no evidence of heterogeneity in treatment effects, as indicated by non-statistically significant estimates.

Table 2

Regression Results: Preferred Tax Rate for Self by Tax Rate for the Wealthiest 10%.

Tax Rate for Rich	(1)	(2)	(3)	(4)	(5)
20%	-0.743 [1.019] (-2.74, 1.26)	-0.845 [1.007] (-2.82, 1.13)	-0.770 [0.993] (-2.72, 1.18)	-0.739 [0.980] (-2.66, 1.18)	-0.813 [0.989] (-2.75, 1.13)
40%	0.403 [0.964] (-1.49, 2.29)	0.300 [0.946] (-1.55, 2.03)	0.402 [0.927] (-1.42, 2.22)	0.608 [0.925] (-1.21, 2.17)	0.486 [0.906] (-1.29, 2.09)
50%	0.352 [0.906] (-1.43, 2.13)	0.278 [0.895] (-1.48, 2.03)	0.342 [0.877] (-1.38, 2.06)	0.466 [0.870] (-1.24, 2.17)	0.371 [0.877] (-1.35, 2.09)
60%	2.384*** [1.015] (0.39, 4.37)	2.366*** [0.999] (0.41, 4.32)	2.289*** [0.982] (0.36, 4.21)	2.268*** [0.978] (0.35, 4.19)	2.286*** [0.976] (0.37, 4.20)
Number of observations	3,179	3,179	3,179	3,179	3,179
Adjusted R-squared	0.005	0.048	0.077	0.096	0.099
Demographic and geographic controls	No	Yes	Yes	Yes	Yes
SES index	No	No	Yes	Yes	Yes
Perception Indexes	No	No	No	Yes	Yes
Perceived tax rates	No	No	No	No	Yes
Mean of dependent variable in control group	11.84	11.84	11.84	11.84	11.84
Difference in 60% vs. 20% treatment	3.127***	3.211***	3.059***	3.007***	3.099***
<i>p</i> -value	0.004	0.003	0.004	0.004	0.003
Difference in 60% vs. 40% treatment	1.981*	2.066**	1.887*	1.660*	1.800*
<i>p</i> -value	0.058	0.042	0.058	0.095	0.064
Difference in 60% vs. 50% treatment	2.031**	2.088**	1.947**	1.803*	1.915**
<i>p</i> -value	0.040	0.032	0.042	0.055	0.042
20%, 40%, & 50% treatments have same impact (<i>p</i> -value)	0.466	0.450	0.434	0.334	0.353
Romano-Wolf <i>p</i> -Value Treatment 60%	0.022**	0.024**	0.026**	0.022**	0.024**

Notes: Robust standard errors in brackets; 95 percent confidence intervals in parentheses. Each column is a different regression that includes four regressors; dummy variables related to the intervention group are shown in each row. The bottom rows show the test of difference in the coefficients for the 60% vs. the 20%, 40%, and 50% treatments, and the *p*-value for the test of whether the 20%, 40%, and 50% treatments have the same impact. The last row shows the Romano-Wolf *p*-value (Clarke, Romano, and Wolf 2020) of the test of whether the coefficient of the treatment of 60% is equal to zero adjusting for multiple comparisons (500 replications). All the other coefficients are still non-significant. Asterisks denote statistical significance at the 1% (***), 5% (**), and 10% (*) levels.

how much the rich pay.

Our results for trust in government are consistent with the direction proposed by Kuziemko et al. (2015): willingness to pay more is only statistically significant for those who already have a high degree of trust. Those with a low degree of trust are more likely to be skeptical about the

Table 3

Regression Results: Preferred Tax Rate for Self for Higher or Lower Than the Median in SES, Trust in Government, and Perception That Taxes Affect the Economy.

Tax Rate for Rich	(1)	(2)	(3)	(4)	(5)	(6)
	SES		Trust in Government		Taxes Affect Economy	
	< median	≥ median	< median	≥ median	< median	≥ median
20%	0.213 [1.348]	-1.909 [1.421]	-0.566 [1.516]	-1.256 [1.289]	-1.629 [1.509]	-0.243 [1.287]
40%	0.372 [1.110]	0.380 [1.413]	1.610 [1.377]	-0.392 [1.219]	-0.712 [1.241]	1.352 [1.268]
50%	0.896 [1.242]	-0.376 [1.214]	0.901 [1.374]	-0.283 [1.143]	0.355 [1.415]	0.449 [1.087]
60%	2.264 [1.384]	1.839 [1.345]	1.364 [1.449]	3.061 [1.331]	0.601 [1.519]	3.421 [1.254]
Number of observations	1,632	1,547	1,469	1,710	1,547	1,632
Adjusted R-squared	0.066	0.116	0.083	0.126	0.087	0.115
Mean of dependent variable in control group	10.03	13.61	11.37	12.31	11.81	11.86
Difference in 60% vs. 20% treatment	2.051	3.748	1.93	4.317	2.23	3.664
p-value	0.167	0.009	0.215	0.002	0.165	0.007
Difference in 60% vs. 40% treatment	1.892	1.459	-0.245	3.453	1.313	2.069
p-value	0.124	0.307	0.859	0.009	0.334	0.117
Difference in 60% vs. 50% treatment	1.368	2.215	0.464	3.344	0.246	2.971
p-value	0.325	0.073	0.74	0.007	0.874	0.009
20%, 40%, & 50% treatments have same impact (p-value)	0.849	0.281	0.313	0.683	0.445	0.503

Notes: Robust standard errors in brackets. All regressions include full set of controls: demographic, geographic, and perception variables, as in Table 2, column (5). The bottom row shows the test of difference in the coefficients for the 60% vs. the 20%, 40%, and 50% treatments, and the p-value for the test of whether the 20%, 40%, and 50% treatments have the same impact.

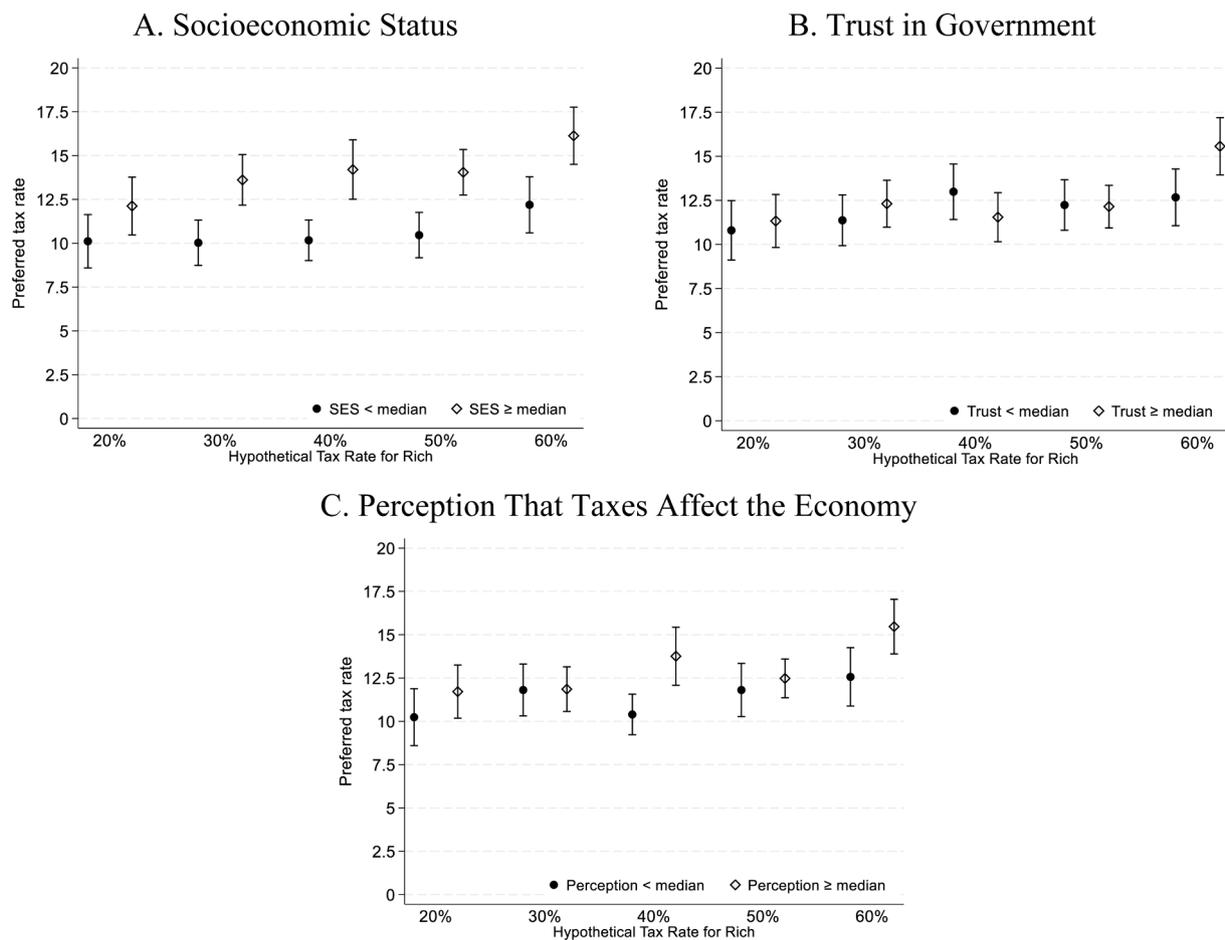


Fig. 2. Preferred Tax Rate for Self with Higher or Lower Than Median Socioeconomic Status, Trust in Government, and Perception That Taxes Affect the Economy. Notes: 95 percent confidence intervals are shown.

potential benefits of increasing tax rates (see also Bergman 2002; Fjeldstad 2004) and therefore less persuaded by how much others pay. The higher sensitivity we find in high SES individuals regarding their

preferred tax rate is consistent with the findings of Keser, Markstädter, and Schmidt (2017). In a public goods experiment with heterogeneous endowments, they find that minimum contributions exert norm-giving

character and may lead to an increase in average group contributions, particularly in their progressive schedule. On the individual level, this progressivity leads to greater relative contributions by the wealthier players.

5. Conclusions

We investigate whether people adjust their degree of preferred redistribution when information is provided on scenarios in which high-income individuals pay more taxes. To this end, we design and implement an original survey, representative for urban areas in Mexico, that includes questions on perception of income inequality, social mobility, income distribution, policy preferences, trust in government, perceptions of corruption and tax evasion, political affinity, and perception of the importance of inheritances. Upon completion of these sections of the survey, respondents are divided into five groups receiving information about scenarios in which the highest income group in the country would pay 60, 50, 40, 30, or 20 percent of their income in taxes. Individuals are then asked about their willingness to pay taxes, contingent on how much the rich pay.

Our experimental treatment finds that participants increase their willingness to pay taxes by approximately 2.3 percentage points relative to the control group when informed that the rich would pay 60 percent of their income. As the mean preferred tax rate in the control group is 11.8 percent, this corresponds to a 19 percent increase. The effect of the tax is non-linear, and is not statistically significant for the other scenarios. Thus, our results show that people expect a progressive system and are willing to pay more, but only if the rich pay much more. Moreover, this increase in willingness to pay taxes is driven mainly by individuals with high socioeconomic status and by those individuals with a higher degree of trust in the government.

Our results are consistent with a framework in which people's preferred tax rate depends on the rate paid by the rich. This contrasts with the prediction of traditional models that describe decreased inequality as associated with lower preferred tax rates and increased top tax rates, with a decrease in people's willingness to pay more taxes themselves. We find individuals making both upward and downward adjustments in their preferred tax rates in line with increases or decreases in the rate for the rich, but we also show that upward adjustments require the top rates to be raised substantially. This responsiveness does help explain the social backlash in countries that broaden the tax base and increase progressivity. Our results suggest that greater progressivity is needed for such broadening to be socially accepted. Another potential implication of our results is that a flat tax might not be acceptable to the less wealthy. Understanding elasticities, necessary conditions, and optimal thresholds for various local contexts will require further study.

Further research will also be required to better understand the non-linearity of the relationship between people's tax preferences for themselves and those for the rich, as our study does not have the statistical power to conclusively determine adjustments at the lower end and the middle of the distribution. Another important limitation of the current study is that we focus on effective tax rates. In countries with low levels of tax enforcement, the elasticity of taxable income may be higher than in countries with high enforcement levels, due to tax evasion or avoidance. Thus, the nominal tax rate may be much higher than the effective tax rate we are studying. Future studies could analyze preferred tax rates taking evasion into consideration. Lastly, our study relies on a self-reported measure of the willingness to pay. Even though this could be considered a limitation, prior studies have found that elicited responses in surveys correlate well with their real measures (Maestas et al., 2018 and Mas & Pallais, 2017 observe this for preferences for work arrangements; for a more general review which includes the willingness to pay for public goods, see Johnston et al. 2017). Nonetheless, a pending issue is to investigate how our measure of willingness to pay correlates with real outcomes. In the meantime, our results strongly

suggest that increasing top tax rates can create the fiscal space necessary to combat inequality more effectively.

Declaration of Competing Interest

None.

Data availability

Data will be made available on request.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.socecon.2023.102025](https://doi.org/10.1016/j.socecon.2023.102025).

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