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Who Pays for the Welfare State?

Preferences for Redistribution and Perceptions of the Costs Thereof

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Abstract

The basic assumption of rational voters with access to full information implies that the redistribution level in a democracy mirrors the well-being maximization of each citizen (Meltzer and Richard, 1981). Inferring individuals' demands from their income, however, is at odds with the empirical regularity of the lack of polarization between the poor and the rich in their attitudes toward progressive taxation. This article examines cognitive gaps that may weaken the link between income and support for welfare provision, either because individuals fail to associate policies with their potential costs, or because they are usually unable to predict if they would benefit from it or suffer drawbacks. Such mechanisms introduce measurement errors of attitudes in widely used survey questions that conceal the tax burden or place it in a vague category such as "the rich". Using an original survey-experiment nationally representative of Brazil (N=2209), I demonstrate the importance of apprising participants of redistribution costs and who would pay for them. Information describing taxes determines the level of support and establishes how attitudes relate to income. Provision of tax exemption brackets, instead of loosely defined groups of taxpayers, boosts the explanatory power of income. Beyond uncovering self-motivated actors, the conclusions also point to critical empirical implications that call for a revision of popular behavioral analysis measurement tools.

1   Introduction

The prominent definition of the political process as a matter of determining "who gets what, when and how" (Lasswell 1936) begs the question: "who pays what, when and how?" (Cansunar 2021). What makes a public policy redistributive is the explicit disjunction between "who gets" and "who pays", which reveals the opposing interests of these two groups (Lowi 1972). The effective preference polarization relies, however, not only on the assumption that agents maximize their utilities, but also on the belief that they correctly anticipate whether they would be net beneficiaries or contributors of the fiscal transference.

To assume rational voters with access to full information implies that the redistribution level in a democracy mirrors the overall optimal combinations between leisure and consumption for each citizen (Meltzer and Richard 1981). At the individual level, the support for progressive taxation would be conditioned on a voter's relative position in the income national ranking; at the aggregate level, most voters with below-mean income would be a sufficient requirement for welfare provision.

Inferring individuals' demands from their income, however, is at odds with the lack of polarization between the least and the most well-off in their attitudes toward progressive policies (Finseraas 2009; Gilens 2000; Kluegel and Smith 1986; Cramer e Kaufman 2011; Dion e Birchfield 2010; Kaufman 2009). Wide support for progressive transfers across all social strata has been established as an empirical regularity in public opinion data.

In the face of evidence inconsistent with the logic of Meltzer and Richard (1981), research in social psychology highlights the existence of mechanisms that suggest we should not rule out the self-interest hypothesis in preference formation. Cognitive gaps may weaken the explanatory power of income, either because individuals do not associate the policy with its costs, or because they do not know how to position themselves among its contributors or beneficiaries.

One strand of literature demonstrates the widespread lack of knowledge regarding the tax system (Eriksen and Fallan 1996; Dornstein 1987; Slemrod 2006) and of basic concepts such as the tax progressiveness (Roberts, Hite, and Bradley 1994; Edlund 2003). Although averse to economic inequality, individuals may fail to grasp the possible effects of public policies and thus end up supporting regressive measures (Bartels 2005). Some even believe they will never be favored by social programs despite being federal aid recipients (Mettler 2010).

The role of the optimizing calculus is thus conditioned by the clarity of the tangible costs and benefits involved (Sears and Funk 1990; 1991). Consequently, overcoming these cognitive gaps boosts the explanatory power of rationality (Chong, Citrin, and Conley 2001). The key question in these articles is not *if* self-interest matters, but rather *when* it does. Self-interest tends to be decisive in contexts where the policy is transparent in announcing what is at stake in terms of material interests.

More recently, another set of articles has investigated the cognitive process through which agents identify with social strata and based on this infer the winners and losers of each policy. In particular, since the publication of Cruces, Perez-Truglia and Tetaz (2013), the relationship between preferences and subjective self-placement on the income distribution scale has been more widely studied. From this perspective, self-interest results in poor people demanding less redistribution if they believe they are relatively richer, while potential taxpayers support progressive taxes on the assumption that they would not suffer drawbacks from them.

In surveys, the line that separates the recipients from the net contributors of a transfer is not salient. Questionnaire items selected as individual demand proxies describe policies that range from generic

government actions to tackle economic inequality, without explicit costs to the respondent, to progressive taxation measures that emphasize winning and losing social strata. However, placing the tax burden on the "rich" category might induce measurement errors of preferences since each person has his or her own preconceived notions about this group's composition. The chances of identifying with high-income strata are low even among members of the economic elite (Cansunar 2021).

This article seeks to test the effects produced by the (lack of) clarity about the costs of the welfare state — especially the question of who pays for them. The aim is to examine in which contexts the rational behavior assumption is confirmed in light of the definition of redistribution costs. For this, the evidence presented results from an original dataset representative of Brazil containing 2209 interviews.

Two experiments were carried out. The first measures how much of the support for state intervention in economic inequality is eroded by presenting its potential costs. The treatment in this case is the reference to higher taxes — a piece of information that is omitted from the control group. The second experiment explores different definitions of taxpayers using objective or subjective criteria to describe them. Each group was informed that the social spending would be funded either by a vague group referred to as "the rich", or by people that earn over a specific income threshold value per month in Brazilian *reais* (BRL).

The results document how widely used survey proxies of attitudes toward redistribution fail to supply information for a proper cost-benefit evaluation, which weakens the test of the self-interest hypothesis. In the context of reduced uncertainty surrounding the effects of progressive taxation, political behavior approaches the rationality assumed by classical models, thus boosting the explanatory power of the income variable. The more the fiscal transfer explicitly divides society, the more it opposes the preferences of rich and poor. This challenges the way individuals' rationality has been (mis)assessed and the consensus established in the literature that there is broad support for welfare provision across all social strata. Also, the findings explain in which contexts the predictions of Meltzer and Richard are confirmed and when they tend to lack the support of opinion data.

2   Theoretical discussion and hypotheses

Meltzer and Richard's rational behavior hypothesis has been less favored in modern political economy models. It has become almost a common element in literature to find results that follow the "Robin Hood paradox" (Lindert, 2004) — a higher level of progressive taxation in contexts of less, rather than greater, economic inequality (Alesina and Glaeser, 2004; Lupu and Pontusson, 2011). In unequal societies, the majority of voters do not seem to converge on alternatives that would make them better off.

As the predictive capacity of the median voter theory deteriorated, the rational behavior hypothesis also lost cogency. Academic interest migrated to factors other than self-interest that would explain such inconsistencies. Evidence in favor of the weight of values and beliefs about standards of justice came up in a series of articles (Heinemann, Bischoff and Hennighausen, 2009; Ackert, Martinez-Vazquez and Rider, 2006). In contrast to the *homo economicus*, altruism and religion also began to emerge as motivations for individual demand (Scheve and Stasavage, 2006; Alesina and Angeletos, 2005; Bénabou and Tirole, 2006).

However, some researchers hesitated rather than readily dismissed the self-interest hypothesis. They were careful enough to track a body of evidence that indicated that the general public was quite uninformed about the tax system, which could compromise the individual cost-benefit assessment of policies (Citrin, 1979; Dornstein, 1987; Eriksen and Fallan, 1996). It was found, for instance, that people have little idea of

the level of revenue and spending on social security (Boeri, Börsch-Supan, and Tabellini, 2002; Boeri and Tabellini, 2012) and the share of families on which the inheritance tax is levied (Slemrod, 2006; Sides, 2011).

At the same time, some studies that dealt with opinion data on certain governmental measures reached conclusions that were perfectly consistent with the theory of rational choice. Green and Gerken (1989) and Dixon et al. (1991) showed that the fee charged for cigarette consumption inspired hugely opposite demands between smokers and non-smokers. In the same vein, people who regularly consumed alcohol were less likely to support enhanced efforts to control drunk driving (Crowe and Bailey, 1995), and gun owners were more likely to oppose restrictions on the carrying and purchasing thereof (Wolpert and Gimpel, 1998).

The common element to all of these policies is that they clearly defined which groups would be more harmed than others. Although not directly related to progressive taxation, these articles offered the valuable insight that the role of the maximizing calculation would be conditioned to the clarity of the tangible costs and benefits involved in each situation. Such a degree of transparency was infrequent, but in specific contexts where it was known what was at stake in terms of material interests, self-interest was decisive in the preference formation (Sears and Funk, 1990; 1991).

When it comes to redistributive policies, a phenomenon captured in surveys that could compromise such clarity of expected costs and benefits is the systematically biased perceptions about self-placement in the social hierarchy. Contrary to what Meltzer and Richard assumed, it was found that individuals are not able to infer their relative position in the income ranking. Records on subjective stratification multiplied in several countries, and all followed the same pattern. The richest tend to underestimate and the poorest to overestimate their positions. This entails a concentration of perceived status on the median of the scale. Evans, Kelley, and Tolosi (1992) used surveys from Australia and Hungary to show that around 60% of the population claims to belong to the middle class — a pattern that persists in all spheres of education, income and occupation.

This inspired a design of survey-experiment in which half of the respondents were provided with the correct information about their actual place in the income distribution (Cruces, Perez-Truglia and Tetaz, 2013). The expectation was that, once aware of their own relative position, they would then be able to anticipate the effects of policies in terms of well-being — which would allow them to better formulate their demands. For example, those with a positive self-placement bias, aware that they would actually be poorer than estimated, should express greater support for redistribution compared to the control group. This experiment was a method of searching for causal evidence that subjective identification with richer or poorer groups tends to influence preference.

At least fifteen other articles[1] have replicated this method, reaching results that are mixed and inconclusive. Some of them confirm that correcting the relative position, in fact, changes the preference in the direction predicted by the self-interest hypothesis (Fernández-Albertos and Kuo, 2015; Nair, 2018; Balcells, Fernández-Albertos and Kuo, 2015; Brown-Iannuzzi et al., 2015; Condon and Wichowsky, 2020). Even so, despite the statistical significance, the magnitude of the effect gauged is small. The others do not observe a relevant impact of the treatment (Engelhardt and Wagener, 2018; Kuziemko et al., 2015; Bublitz, 2017; Armingeon and Bürgisser, 2021; Ballard-Rosa et al., 2021) or obtain a result with a sign opposite to the expected (Hoy and Mager, 2019).

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[1] Fernández-Albertos and Kuo (2015); Nair (2018); Balcells, Fernández-Albertos, and Kuo (2015); Brown-Iannuzzi et al. (2015); Condon and Wichowsky (2020); Engelhardt and Wagener (2018); Kuziemko et al. (2015); Bublitz (2017); Armingeon and Bürgisser (2021); Ballard-Rosa et al. (2021); Hoy and Mager (2019); Fehr, Mollestrom, and Perez-Truglia (2019); Fenton (2020); Karadja, Mollerstrom, and Sem (2017); Hvidberg, Kreiner, and Stancheva (2020).

In some studies, the treatment was enough to change the respondent's concern about economic inequality, but this did not translate into greater support for redistribution (Kuziemko et al., 2015; Hvidberg, Kreiner and Stancheva, 2020; Hoy and Mager, 2019). This result matches the frequent finding in the literature that preference is relatively inelastic to information provision (Hauser and Norton, 2017; Zilinsky, 2014; Kuklinski et al., 2000). The explanation by Ilyana Kuziemko et al. (2015) is that instructing the individual can change his or her perception of the problem of inequality, but the resistance to taxation caused by distrust in government undermines the support for state intervention.

One hypothesis that these articles do not discuss concerns the lack of information presented. The respondent, knowing whether he or she is more or less wealthy than estimated, may not know how to incorporate this data into his or her assessment of the cost-benefit of the progressive transfer. Engelhardt and Wagener (2018) report findings that points to this direction. The authors do not obtain significant impact from the treatment with the objective position of income, but specifying that the individual would be a contributor or net beneficiary of the taxation lowers the preference of those who would pay for it. This result is crucial because it suggests that the original treatment is not explicit enough to significantly affect the expected return from redistribution.

The advancement that this strand of literature has promoted in the field of political economy is undeniable. The main merit was in shifting the focus of questioning on the assumptions of the median voter theory — shifting it from rationality to the complete information of agents. Nonetheless, the articles are exclusively concerned with subjective self-placement, disregarding how individuals perceive the costs of redistribution — something that is also crucial for the calculation of individual cost-benefit.

Concerning these perceptions of the costs of the welfare state, promising contributions were recently made by researchers that pointed to limitations in conceptualizing the demand for redistribution as uni-dimensional. They proposed distinguishing between social spending and taxation. Schwartz, Doyle, and Castañeda (2021) argue that the trade-off between taxes and benefits is not given. This link is learned through experience and is more likely to be perceived in national contexts of prevailing progressive taxation. Cavaillé and Trump (2015) show how these two facets of redistribution prime different rationales. Self-oriented income maximization shapes support for redistribution from the "rich", whereas social affinity with welfare beneficiaries prevails when it comes to redistributing to the "poor".

However, from the perspective that considers these two facets of social policy, it remains an open question as to why the income variable is a bad predictor of attitudes, even the ones proxied by support for progressive taxation. In addition to identifying varieties of redistribution, it is important to explore the perceptual and informational dimensions of political behavior. Individuals may respond differently to the prospect of progressive tax reform depending on their degree of certainty as to who would pay more taxes.

The present article's survey design explores these key dimensions of preference formation. It acknowledges that the widely used proxies for attitudes toward redistribution impose serious limitations on the possibility of evaluating the self-interest hypothesis, because they give rise to uncertainty in the respondent about whether he or she would benefit or suffer drawbacks from the progressive taxation. Thus, in addition to these conventional statements used as preference proxies, the information given to the experimental groups describes the cost of policies and who would pay for them.

One of the most used proxies omits tax increases, referring only to the state's responsibility to reduce economic inequality. The expected effect of providing information with an eventual cost to the treatment group, assuming agents that maximize utilities, is the reduction in the chance of supporting the measure.

↪ **H1**: mentioning the redistribution costs (such as taxes or transfers) tends to lower the support, compared to when costs are omitted.

With regard to the definition of who bears this redistribution price, it has been established in the literature as an empirical regularity that statements that mention subjective categories of taxpayers such as "the rich" generate positive opinions that depend little on the individual's actual income. The hypothesis is that this evidence reflects the lack of clarity of the line that sets apart taxpayers from beneficiaries of progressive taxation.

One way to mitigate this uncertainty is the use of objective monetary criteria. Informing respondents that social spending would be financed with taxes from those who earn above a specific income threshold would avoid ambiguities regarding "who gets" and "who pays" — creating a scenario closer to that of perfect information, comparable, for instance, to the distinction achieved with the clear division between smokers and non-smokers.

Therefore, if the delimitation of net contributors to the redistributive policy follows an objective monetary criterion, rational individuals are expected to behave as in the context of complete information assumed by the median voter theory. The more this monetary value splits society, the greater the polarization of preferences tends to be — thus boosting the correlation coefficient between income and individual demand.

↪ **H2**: the information on the tax exemption limit based on an objective level of monthly income, compared to the use of vague categories to delimit taxpayers, tends to promote the negative relationship between objective income position and preference — a correlation that intensifies the more this monetary value divides society, or approaches the median income.

In addition to the effect on the explanatory power of the income variable, it is plausible to expect another impact associated with the objective criterion. As the tax exemption level decreases, distancing itself from the salary that the general public attributes to the category of the rich in society, the support for taxation tends to be weaker. This is because the idea of charging taxes from those who are seen as middle or lower class — and, therefore, from those who would not be part of the top of the social hierarchy — would have little support in public opinion.

↪ **H3**: a second effect associated with the objective criterion for defining taxpayers is the reduction in support as the exemption level becomes lower, and further away from what, in the people's perception, characterizes the category of the rich (supposedly the one that deserves to pay taxes).

3   Empirical evidence

The survey was conducted online by the market research institution Opinion Box and included randomly assigned questionnaire items for each subgroup of the sample. The interviews were divided into control and treatment groups balanced in terms of observed characteristics, as shown by the mean tests in the appendix. The experiments consisted of presenting respondents with sentences conventionally used to measure preference for redistribution. The treatment, as detailed in this section, will be via information provision that complements or alters parts of these statements.

Respondents answered whether they "totally agreed", "partly agreed", "neither agreed nor disagreed", "partly disagreed" or "totally disagreed" with these items. The econometric results of the experiments are displayed both with ordinal, with all response gradations, and with binary logistic regression, in which

the dependent variable takes only two values[2]. The advantage of the first method is to use all available information about the degree of agreement, but, unlike the second, it carries the so-called "proportional odds assumption", which is not met by all the specifications of the models used.

The use of logistic regression is complemented by Generalized Additive Models (GAMs). Due to its semi-parametric nature, this additional method has the important advantage of not making assumptions about the linearity of the relationship between the explained and the explanatory variable, as more conventional techniques do. The sum of a series of "base functions", each with a coefficient, is capable of capturing non-linear patterns of the data. In the absence of single estimators that translate the correlations of interest, they are shown via graphical analysis.

The technique of imputing multiple values into missing cells was used to avoid excluding observations (King et al. 2001). All econometric models control for individuals' sex, age, race, and education level. The appendix provides additional information about the methods, dataset, and regression results. Also, it includes administrative data on the real distribution of income in Brazil, which serves as a parameter for the analysis (see figure A-1).

3.1 Cost omission bias

The first experiment captures the effect of treatment via explicitation of costs from state intervention in inequality. Each half of the sample took a stance on a statement widely used in opinion polls to measure preference for redistribution. Without mentioning taxes or transfers, the sentence addresses the government's responsibility to reduce national income inequality. As shown in the table below, only the treated group received information about the tax increase.

| Control (without costs)	In a country like Brazil, it is the obligation of the government to reduce income inequality between the rich and the poor.
Treatment (with costs)	In a country like Brazil, it is the obligation of the government to reduce income inequality between the rich and the poor, even if this implies an increase in income tax.

The objective of the experiment is to evaluate the response to a strong term such as "obligation of the government", in all respondents, and the effect caused, in half of the sample, by the mention of a tax that is paid only by a wealthy minority of the population. In Brazil, about 20% of the adults declared income tax in 2020 and 2021. The statement does not make it clear whether the tax increase would only occur in those who are already taxpayers or if the taxable base would be expanded — uncertainty that may encourage risk aversion of being taxed.

Figure 1, which compares the share of responses in each group, indicates that the broad support for state action at no cost, close to 75%, drops to less than 46% due to the mention of the tax. The rejection more than doubles, mostly due to the change among those who totally disagree, almost three times higher in the treated group. The percentage of those who fully agree also drops from 46% to 18%.

The effect of the treatment gauged by the logistic regressions is shown in figure 2, already translated into the odds ratio as percentage. The inclusion of controls for the observable characteristics of respondents corrects possible imbalances between the two groups. The coefficient of the binary logit tells us that the mention of raised taxes increases the chance of rejecting government social intervention by 65%.
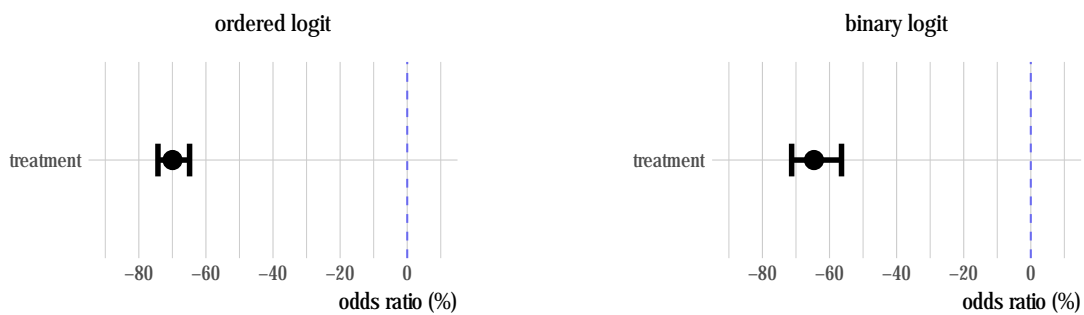
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[2]To better capture the variation in the rejection of policies, the binary dependent variable assumes a value of 0 for those who totally or partially disagree, and a value of 1 for the other answers.

Figure 1: Distribution of responses by experimental group
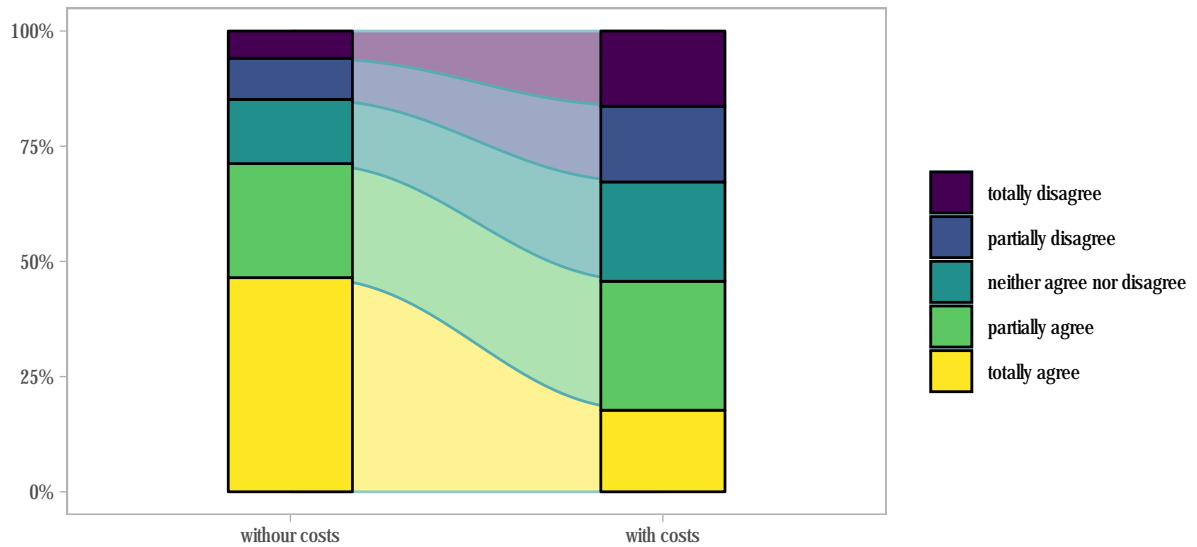
Note: data from Opinion Box (2021).

Figure 2: Effect of the treatment with costs on preference

Note: data from Opinion Box (2021). 95% confidence interval. Controls: income, sex, age, color and education level. Pooled results from five imputed datasets. Full model results available in the appendix (table A-1).

Such a pronounced impact on the treated group shows how support is sensitive to the explicitation of costs and to risk aversion of future losses. When income tax is mentioned, the policy's approval level falls well below that measured by the more usual proxies of preference for redistribution.

3.2   The definition of taxpayers

In order to test how each social stratum responds to objective definitions of contributors, the second experiment provides causal evidence of the impact of this information on preference. The sample was divided into three groups, and each opined on one of the following sentences about progressive transfers:

Control (tax on the rich)	The government should raise taxes on <u>rich people</u> to ensure better education, health and housing for those in need.
Treatment (tax on BRL 10,000+)	The government should increase taxes for <u>those who earn more than BRL 10,000 (ten thousand reais) per month</u> to ensure better education, health and housing for those in need.
Treatment (tax on BRL 2,400+)	The government should increase taxes for <u>those who earn more than BRL 2,400 (two thousand four hundred reais) per month</u> to ensure better education, health and housing for those in need.

This time, the control group also received the information about tax increases, but the financing of social spending was located in the category of "rich people", as do the proxies most used in surveys. The

treatment, in turn, provided specific values for taxpayers' income. The design of this experiment allows for a comparison between the objective and subjective definition of those who would pay for the redistribution.

The lowest value, of BRL 2,400 per month, is equivalent to the maximum exemption limit of the current income tax in Brazil[3]. About 18% of those interviewed declared having a family income *per capita* above this amount.

The highest value, of BRL 10,000 monthly, corresponds to a salary close to what most Brazilians from all social strata attributes to richest 10% in the country, as shown in the appendix. A considerable portion estimates even higher values, like millions of reais per month (see figure A-2). Less than 1% of the sample has *per capita* income above BRL 10,000.

Figure 3 displays the distribution of responses from the three groups. In comparison to control, specifying the value of BRL 10,000 causes a subtle reduction in support for the measure. This low variation was expected, since this level of exemption reflects, in general, the income attributed to the category of "rich people", mentioned in the statement of the control group.

Figure 3: Distribution of responses by experimental group
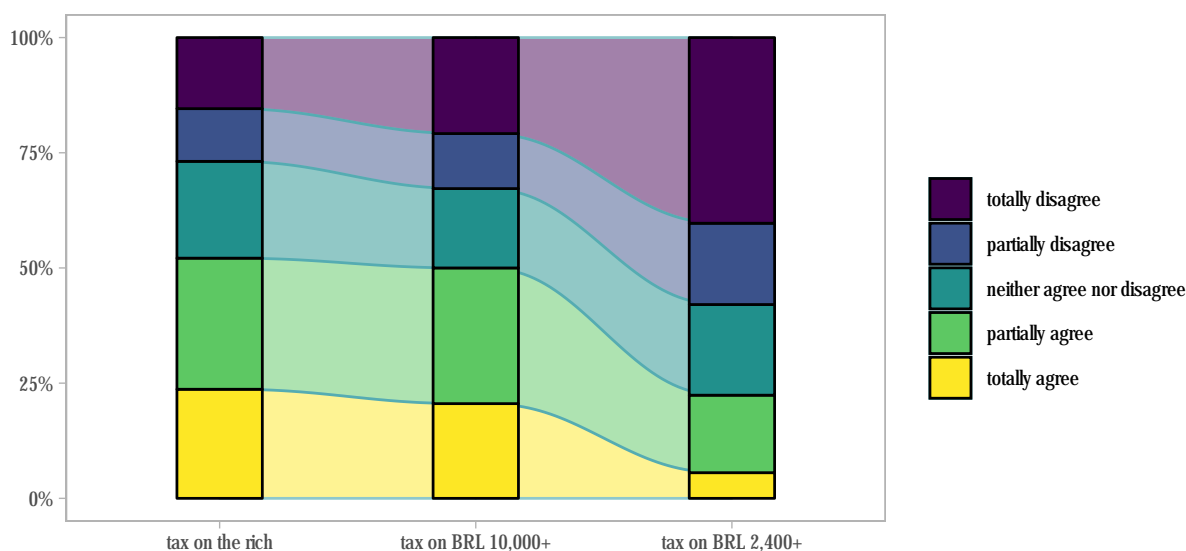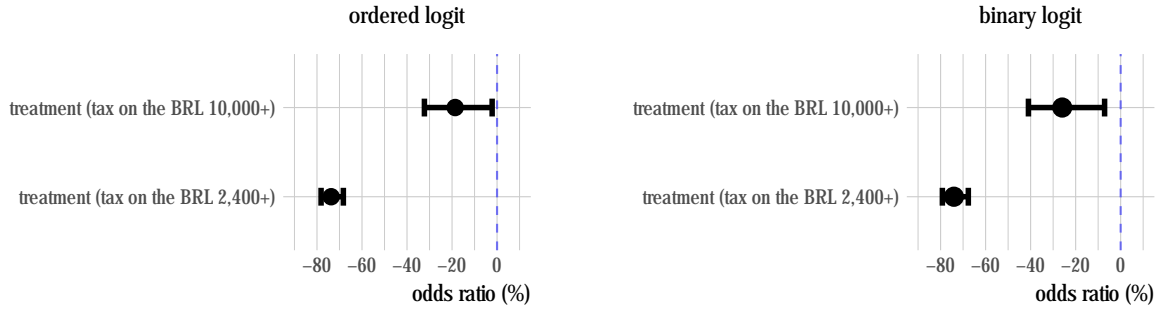

Note: data from Opinion Box (2021).

The most substantial difference in relation to the control group, however, occurs with the preference for tax increases in those earning more than BRL 2,400. The rate of agreement with transferring the tax burden to the "rich" is 52%, and it drops to less than half, reaching 22% among those who received the information of the lowest value for the tax exemption bracket. The disapproval, from just 27% in the first bar, rises to 33% in the second and reaches 58% in the third.

According to the interpretation that the binary logistic regression offers in figure 4, the treatment with the value of BRL 10,000 increases the chance of being contrary to the measure by 26%, controlling for the basic characteristics of the individuals. It is plausible that the increase in rejection caused by this information is related to the fact that a considerable portion of the population assigns even greater income values to the rich. If this is true, in their view, the BRL 10,000 criterion would not be high enough to represent the true economic elite.

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[3]The income tax exemption for the years 2019 and 2020 applies to individuals who had taxable income below BRL 28,559 annually (BRL 2,379 monthly).

The value of BRL 2,400 has a much more pronounced effect, increasing the chance of disapproval by 74%. This is also consistent with the fact that this level of income is much lower than the one attributed to the rich. According to public opinion, the top of society seen as deserving more taxes earns much more than that in a month.

Figure 4: Effects of the treatments with tax exemption brackets on preference

Note: data from Opinion Box (2021). 95% confidence interval. Controls: income, sex, age, color and education level. Pooled results from five imputed datasets. Full model results available in the appendix (table A-2).

Investigating support for each of the three policies across different social strata, figure 5 exhibits the distribution of responses by percentile of the national income scale. While in the first graph there is no apparent relationship, in the second the degree of rejection changes a little more clearly with income. This seems to indicate that the objective criterion makes the preference more dependent on the individual's income.

Figure 5: Preferences by income percentile
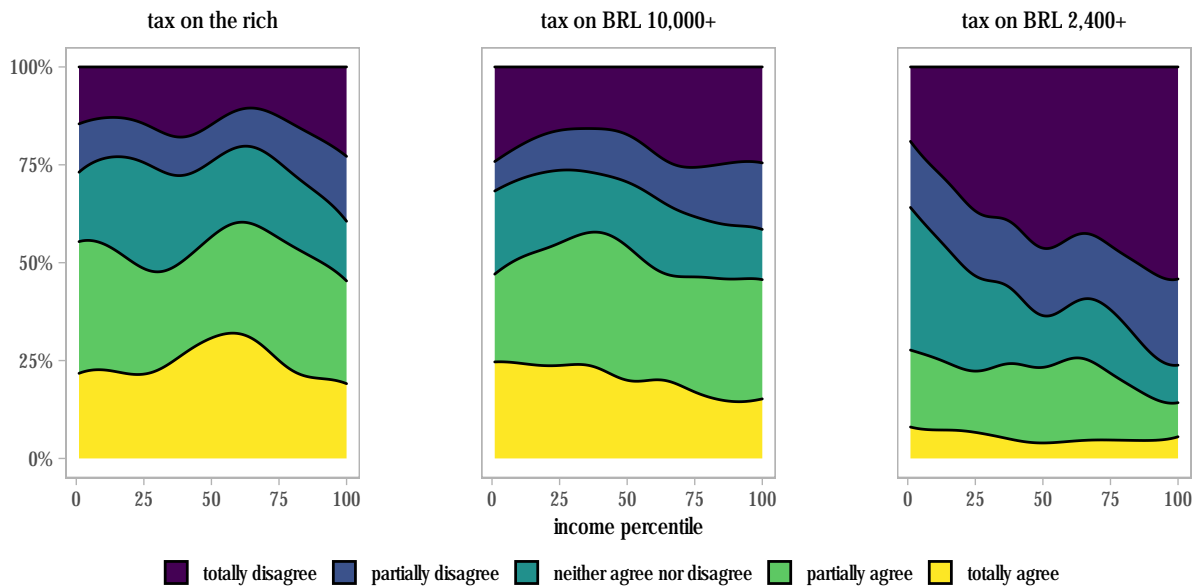
Note: data from Opinion Box (2021).

The third graph, in turn, makes it evident how the policy inspires more polarized responses between rich and poor, especially with regard to disapproval. On the bottom of distribution, less than 35% totally or partially disagreed with the tax increase on those earning more than BRL 2,400; at the top, this rate exceeds 75%. In this graph, the steepest slope in the approval curve occurs precisely in the region of the scale where the *per capita* income approaches the exemption limit.

Comparing the average policy support rate in each experimental group points to a pattern similar to that of the previous figures but allows for some additional conclusions. This method is eloquent, although simple, because the groups are balanced in terms of the observable characteristics of the individuals, which makes it reasonable to attribute the observed differences to the treatment effects. In figure 6, the graph on the left plots the opinion of the total population, while the one on the right breaks down the demands of rich and poor by dividing the sample on its median income.

It is noted that the treatments in the experiment exert more pronounced impacts on the richer half of the sample. There is some reduction in the average support rates, observed in the total population, between the control group and the one that received the information with the value of BRL 10,000, but this variation is entirely due to the responses of the rich. What is most important in the right graph in the figure is that it demonstrates how the preferences of the income strata are distanced from each other due to the provision of objective tax exemption limits. Given the loosely defined category of contributors, support is practically equal between rich and poor, and it becomes significantly different with the provision of the amount of BRL 2,400.

Figure 6: Comparison of average approval rates separating rich and poor
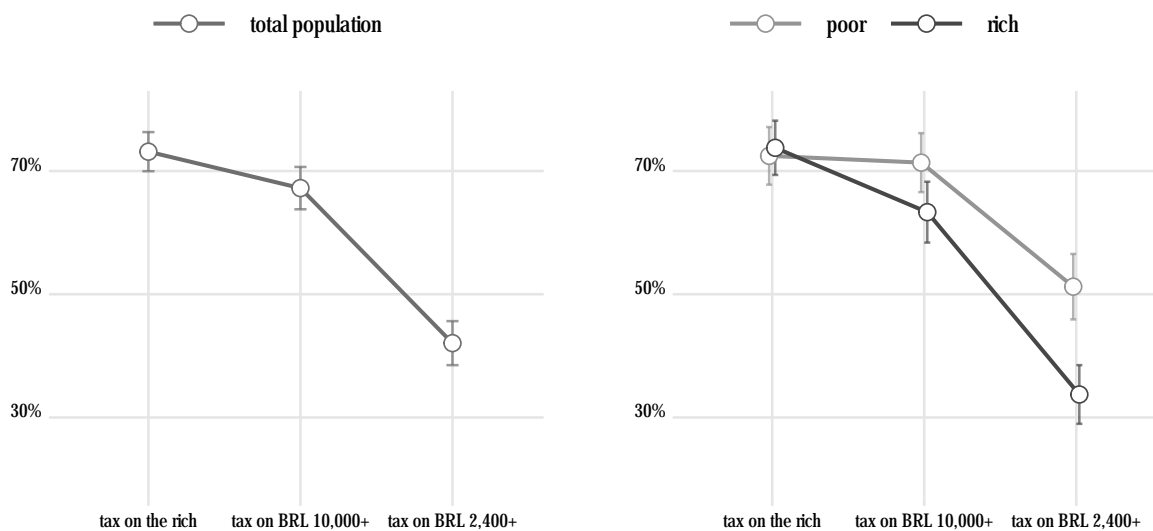
Note: data from Opinion Box (2021). Approval rates stand for the share of respondents who do not reject the policy. 95% confidence interval. Pooled results from five imputed datasets.

The econometric evidence via regressions for each experimental group, in figure 7, reaffirms that providing respondents with precise definitions of who pays for the redistribution, remedying the uncertainty associated with the category of taxpayers, increases the explanatory power of the income variable. In both models used, the objective position on the national scale has no statistically significant effect on preference for more taxes on "the rich". The information with the highest value for the tax exemption bracket makes the income variable significant at the level of 10%, while the lowest value prompts statistical significance under the tolerance of 1%.

One additional decile on the national income scale is associated with an approximately 13% greater chance of opposing redistribution financed by those earning more than BRL 2,400 — an effect that is close to triple that found in the control group and more than twice the other treatment. Finally, the coefficient reaches sufficient magnitude to oppose demands between rich and poor. Specifying the exemption bracket equivalent

to that of a tax paid by one-fifth of the country's adult population, produces results that are blatantly opposite to the empirical regularity documented in the literature on high approval of tax progressivity in all social strata.

Figure 7: Marginal effect of income decile on preference
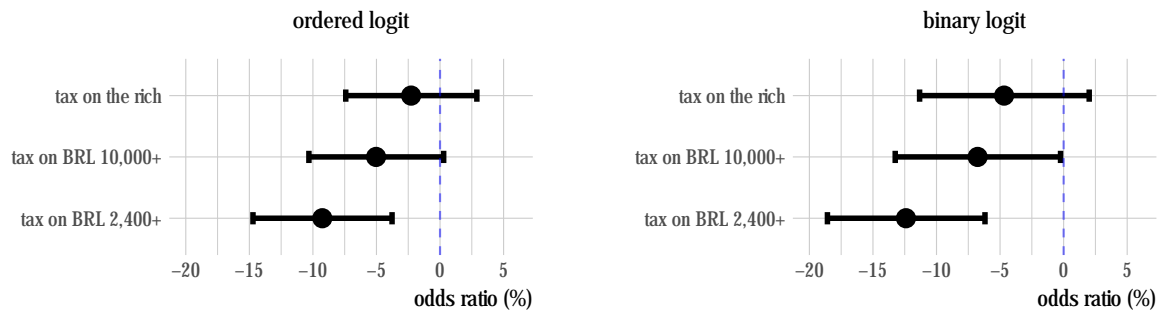
Note: data from Opinion Box (2021). 95% confidence interval. Controls: sex, age, color and education. Pooled results from five imputed datasets. Full model results available in the appendix (tables A-3, A-4, and A-5).

Furthermore, the logistic generalized additive model (GAM) reveals that, keeping all controls at their median values, the relationship of income to the predicted probabilities of supporting each measure is not exactly linear. From figure 8, it is evident that the demand for more taxes on the "rich" is quite constant up to the 75th percentile of the scale, and only decreases from that point on. This explains why this variable did not reach statistical significance in the regressions, despite a relatively sharp drop in the highest percentiles of the hierarchy. In the second graph, the negative relationship prevails, but the variation in predicted probability is small, which is justified as less than 1% of the sample said they had a family income *per capita* above BRL 10,000. In the third, in turn, the curve describes highly polarized preferences, and the chances of approving the policy antagonize the bottom and the top of the income distribution.

Figure 8: Relationship between income and preference estimated by the GAM
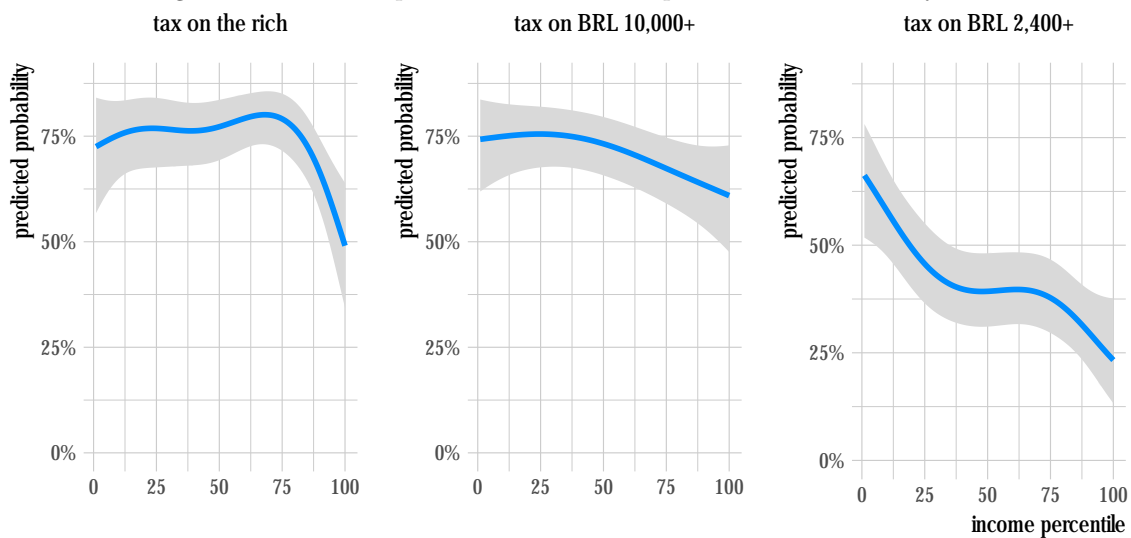
Note: data from Opinion Box (2021). Approval probability stands for the chances of not rejecting the policy. 95% confidence interval. Controls: sex, age, color and education level. Full model results available in the appendix (tables A-6, A-7, and A-8).

In this second experiment, it is thus possible to distinguish two types of effects caused by the treatments that may lower the support for progressive taxation. Information containing a cut-off value tends

to generate opposition on those who expect future losses, or even make the policy lose support among the ones who would not be harmed but disapprove taxing income groups that are not seen as the economic elite.

4   Discussion

Evidence showed cognitive gaps in the general population that impair the association of public policy expenditure with its corresponding revenue. If conventional indicators of support for progressive taxation point to positive opinions that hinge little on income, this may reflect their biases caused by cost omission or imprecise definition of taxpayers. Information correcting these gaps and reestablishing the trade-off between revenue and expenditure tends to bring out voters' rationality

Such widely used proxies in which policy costs are omitted or poorly defined allow only for a naive assessment of the self-interest hypothesis. It is even questionable whether they actually reflect attitudes toward redistributive policies. The idea that targeting the benefits of one part of society does not generate costs to the other part diverges from the very nature of redistribution, which stands for gains and losses to specific groups of actors (Lowi 1972).

The empirical implications go beyond calling for a revision of currently popular survey methodologies and measurement tools of behavioral analyses. The public debate around progressive taxation also usually refers to the category of those considered "rich" in each country, which strictly relies on preconceived notions. Therefore, without reference to objective criteria of potential taxpayers, the conflict of interest may not allude to policies' real allocative consequences.

Since the "rich people" category is systematically perceived as remote, political candidates that aim to expand their electoral base may explore redistributive platforms with such loosely defined taxpayer groups in order to gather support across all social strata. The use of vague contributor descriptions favors those who avoid divisive agendas. Nonetheless, presenting details of an eventual tax reform may be self-defeating as a campaign strategy. Besides, once elected, a politician voted in through such a campaign may face greater opposition in the policy implementation phase and be accused of burdening people who are seen as poor or middle-class.

This article's main conclusion is that objective monetary criteria boost the explanatory power of self-interested individual calculation. On the one hand, the division of the population into numerically comparable groups of beneficiaries and taxpayers generated a pattern of approval strongly correlated with income, which is in line with the prediction of conventional political economy models. On the other hand, there was limited support to this policy because the exemption value was much lower than the amount required to delimit the category of the rich to public opinion.

These findings shed light on the reason why Meltzer and Richard's model, according to which support for redistribution should be broad and highly dependent on individual income, end up never being fully corroborated by public opinion data. Taxation on the "rich" or on those who earn above a very high exemption threshold does not inspire a polarization of preferences, as it reconciles high approval across all social strata. Nonetheless, specifying a limit that effectively promotes a rift in society — thus boosting the coefficient of the income variable — precludes widespread approval, as the understanding of economic elite that ensues therein differs from the way people generally conceive of this category.

References

Ackert, Lucy F., Jorge Martinez-Vazquez, and Mark Rider. 2006. "Tax policy design in the presence of social preferences: Some experimental evidence." *Andrew Young School Research Paper* 06-03: 2004-33.

Alesina, Alberto and Edward Glaeser. 2004. *"Fighting poverty in the US and Europe: A world of difference."* Oxford University Press.

Alesina, Alberto, and George-Marios Angeletos. 2005. "Fairness and Redistribution." *American Economic Review* 95 (4), 960-980.

Armingeon, Klaus, and Reto Bürgisser. 2021. "Trade-offs between redistribution and environmental protection: the role of information, ideology, and self-interest." *Journal of European Public Policy* 28 (4): 489-509.

Balcells, Laia, José Fernández-Albertos, and Alexander Kuo. 2015. "Preferences for inter-regional redistribution." *Comparative Political Studies* 48 (10): 1318-1351.

Ballard-Rosa, Cameron, Ronald Rogowski, Kenneth Scheve, and Nicolaj Thor. 2021. "Inequality, Information, and Income Tax Policy Preferences in Austria and Germany." Unpublished manuscript.

Bartels, Larry M. 2005. "Homer gets a tax cut: Inequality and public policy in the American mind." *Perspectives on Politics* 3 (1): 15-31.

Bénabou, Roland, and Jean Tirole. 2006. "Belief in a just world and redistributive politics." *The Quarterly Journal of Economics* 121 (2): 699-746.

Boeri, Tito, and Guido Tabellini. 2012. "Does information increase political support for pension reform?." *Public Choice* 150 (1-2): 327-362.

Boeri, Tito, Axel Börsch-Supan, and Guido Tabellini. 2002. "Pension reforms and the opinions of European citizens." *American Economic Review* 92 (2): 396-401.

Brown-Iannuzzi, Jazmin L., Kristjen B. Lundberg, Aaron C. Kay, and B. Keith Payne. 2015. "Subjective status shapes political preferences." *Psychological Science* 26 (1): 15-26.

Bublitz, Elisabeth. 2017. "Misperceptions of income distributions: Cross-country evidence from a randomized survey experiment." No. 694. *LIS Working Paper Series.*

Cansunar, Asli. 2021. "Who Is High Income, Anyway? Social Comparison, Subjective Group Identification, and Preferences over Progressive Taxation." *The Journal of Politics* 83 (4), 000-000.

Chong, Dennis, Jack Citrin, and Patricia Conley. 2001. "When self-interest matters." *Political Psychology* 22 (3): 541-570.

Citrin, Jack. 1979. "Do people want something for nothing: Public opinion on taxes and government spending." *National Tax Journal* 32 (2S): 113-129.

Condon, Meghan, and Amber Wichowsky. 2020. "Inequality in the social mind: Social comparison and support for redistribution." *The Journal of Politics* 82 (1): 149-161.

Cramer, Brian D., and Robert R. Kaufman. 2011. "Views of Economic Inequality in Latin America." *Comparative Political Studies* 44 (9): 1206-37.

Crowe, James W., and William J. Bailey. 1995 "Self-interest and attitudes about legislation controlling alcohol." *Psychological Reports* 76 (3): 995-1003.

Cruces, Guillermo, Ricardo Perez-Truglia, and Martin Tetaz. 2013. "Biased perceptions of income distribution and preferences for redistribution: Evidence from a survey experiment." *Journal of Public Economics* 98: 100-112. Dion, Michelle L., and Vicki Birchfield. 2010. "Economic Development, Income Inequality, and

Preferences for Redistribution." *International Studies Quarterly* 54(2), 315-34.

Dixon, Richard D., Roger C. Lowery, Diane E. Levy, Kenneth F. Ferraro. 1991. "Self-interest and public opinion toward smoking policies; a replication and extension." *Public Opinion Quarterly* 55 (2): 241-254.

Dornstein, Miriam. 1987. "Taxes: Attitudes and perceptions and their social bases." *Journal of Economic Psychology* 8 (1): 55-76.

Edlund, Jonas. 2003. "Attitudes towards taxation: Ignorant and incoherent?." *Scandinavian Political Studies* 26 (2): 145-167.

Engelhardt, Carina, and Andreas Wagener. 2018. "What do Germans think and know about income inequality? A survey experiment." *Socio-Economic Review* 16 (4): 743-767.

Eriksen, Knut, and Lars Fallan. 1996. "Tax knowledge and attitudes towards taxation; A report on a quasi-experiment." *Journal of Economic Psychology* 17 (3): 387-402.

Evans, Mariah DR, Jonathan Kelley, and Tamas Kolosi. 1992. "Images of class: Public perceptions in Hungary and Australia." *American Sociological Review*, 461-482.

Fehr, Dietmar, Johanna Mollerstrom, and Ricardo Perez-Truglia. 2019. "Your place in the world: The demand for national and global redistribution." *NBER working paper w26555.*

Fenton, George. 2020. "How Elastic are Preferences for Redistribution? New Results on Partisan Polarization." *New Results on Partisan Polarization* (February 14, 2020).

Fernández-Albertos, José, and Alexander Kuo. 2018. "Income perception, information, and progressive taxation: Evidence from a survey experiment." *Political Science Research and Methods* 6 (1): 83-110.

Finseraas, Henning. 2009. "Income inequality and demand for redistribution: A multilevel analysis of European public opinion." *Scandinavian Political Studies* 32 (1): 94-119.

Gilens, Martin. 2000. "Why Americans hate welfare." *Journal of Sociology and Social Welfare* 27 (2): 202-203.

Green, Donald Philip, and Ann Elizabeth Gerken. 1989. "Self-interest and public opinion toward smoking restrictions and cigarette taxes." *Public Opinion Quarterly* 53 (1): 1-16.

Hauser, Oliver P., and Michael I. Norton. 2017. "(Mis) perceptions of inequality." *Current Opinion in Psychology* 18: 21-25.

Heinemann, Friedrich, Ivo Bischoff, and Tanja Hennighausen. 2009. "Choosing from the reform menu card – Individual determinants of labour market policy preferences." *Jahrbücher für Nationalökonomie und Statistik* 229 (2-3): 180-197.

Hoy, Christopher, and Franziska Mager. 2019. "Why Are Relatively Poor People Not More Supportive of Redistribution? Evidence from a Randomized Survey Experiment across 10 Countries." *American Economic Journal: Economic Policy.*

Hvidberg, Kristoffer B., Claus Kreiner, and Stefanie Stantcheva. 2020. "Social position and fairness views". No. w28099. *National Bureau of Economic Research.*

Karadja, Mounir, Johanna Mollerstrom, and David Seim. 2017. "Richer (and holier) than thou? The effect of relative income improvements on demand for redistribution." *Review of Economics and Statistics* 99 (2): 201-212.

Kaufman, Robert R. 2009. "The Political Effects of Inequality in Latin America: Some Inconvenient Facts." *Comparative Politics* 41 (3): 359-79.

Kluegel, James R., and Eliot R. Smith. 2017. *"Beliefs about inequality: Americans' views of what is and what ought to be".* Routledge.

Kuklinski, James H., Paul J. Quirk, Jennifer Jerit, David Schwieder, Robert F. Rich. 2000. "Misinformation and the currency of democratic citizenship." *The Journal of Politics* 62 (3): 790-816.

Kuziemko, Ilyana, Michael I. Norton, Emmanuel Saez, and Stefanie Stantcheva. 2015. "How elastic are preferences for redistribution? Evidence from randomized survey experiments." *American Economic Review* 105 (4): 1478-1508.

Lasswell, Harold D. 1936. *"Politics: Who Gets What, When, How."* Cleveland: Meridian Books.

Lindert, Peter H. 2004. *"Growing public: Volume 1, the story: Social spending and economic growth since the eighteenth century."* Vol. 1. Cambridge University Press.

Lowi, Theodore J. 1972. "Four systems of policy, politics, and choice." *Public Administration Review* 32 (4): 298-310.

Lupu, Noam, and Jonas Pontusson. 2011. "The structure of inequality and the politics of redistribution." *American Political Science Review* 105 (2): 316-336.

Meltzer, Allan H., and Scott F. Richard. 1981. "A rational theory of the size of government." *Journal of Political Economy* 89 (5): 914-927.

Mettler, Suzanne. 2010. "Reconstituting the submerged state: The challenges of social policy reform in the Obama era." *Perspectives on Politics* 8 (3): 803-824.

Nair, Gautam. 2018. "Misperceptions of relative affluence and support for international redistribution." *The Journal of Politics* 80 (3): 815-830.

Opinion Box. 2021. "Renovação Política." (dataset). Belo Horizonte.

Oxfam Brasil/Datafolha. 2017. "Nós e as desigualdades: percepções sobre desigualdades no Brasil." (dataset). São Paulo.

Oxfam Brasil/Datafolha. 2019. "Nós e as desigualdades: percepções sobre desigualdades no Brasil." (dataset). São Paulo.

Oxfam Brasil/Datafolha. 2020. "Nós e as desigualdades: percepções sobre desigualdades no Brasil." (dataset). São Paulo.

Roberts, Michael L., Peggy A. Hite, and Cassie F. Bradley. 1994. "Understanding attitudes toward progressive taxation." *Public Opinion Quarterly* 58 (2): 165-190.

Scheve, Kenneth, and David Stasavage. 2006. "Religion and preferences for social insurance." *Quarterly Journal of Political Science* 1 (3): 255-286.

Sears, David O., and Carolyn L. Funk. 1990. "The limited effect of economic self-interest on the political attitudes of the mass public." *Journal of Behavioral Economics* 19 (3): 247-271.

Sears, David O., and Carolyn L. Funk. 1991. "The role of self-interest in social and political attitudes." *Advances in Experimental Social Psychology* 24: 1-91.

Sides, John. 2011. "Stories, science, and public opinion about the estate tax." George Washington University Department of Political Science.

Slemrod, Joel. 2006. "The role of misconceptions in support for regressive tax reform." *National Tax Journal* 59 (1): 57-75.

Von Hippel, Paul T., Samuel V. Scarpino, and Igor Holas. 2016. "Robust estimation of inequality from binned incomes." *Sociological Methodology* 46 (1): 212-251.

Wolpert, Robin M., and James G. Gimpel. 1998. "Self-interest, symbolic politics, and public attitudes toward gun control." *Political Behavior* 20 (3): 241-262.

Zilinsky, Jan. 2014. "Learning About Income Inequality: What is the Impact of Information on Perceptions of Fairness and Preferences for Redistribution?." Available at SSRN 2485121.

Appendix

1   Methods

The article uses household earnings *per capita* as a proxy for individual income. Among the income measures collected in opinion polls, this is the one that best reflects the interviewee's standard of living. In the experiments, the treatments with provision of information describe individual income values as tax exemption criteria. The two measures (*per capita* and individual income) are distinct, but do not compromise the analysis of the relationship between income and treatment effect.

The survey questionnaire categorizes respondents into income brackets. The household income variable was obtained from the midpoint of each interval, with the exception of the upper category, which received the value determined by a robust estimator adapted to the Pareto distribution (Von Hippel, Scarpino and Holas, 2016). Dividing by the number of household members, the final amount was the *per capita* income level.

The binary variable that stands for the attitudes toward the policies of each statement assumes a value of 0 if the respondent totally or partially disagrees with the statement, and a value of 1 if he or she totally agrees, agrees in part or does not agree or disagree. This criterion was adopted so that this variable could better capture the variation in policy rejection. As the treatments provided costs to respondents, it makes sense to give this greater importance to response options that express disagreement.

The survey divided respondents into similar subgroups in terms of their observable characteristics. This means that the variables income, age, sex, race and education are balanced between these subgroups. In order to demonstrate this balance, the mean tests in the next section (Welch's T-test for two samples) confirm that there is no significant difference between the subgroups, either in the division made by the first experiment or in that made by the second.

In the econometric models, controls were included for greater robustness. They correct possible residual imbalances between the subgroups, but they would not be necessary due to the random selection of treatments.

Controls

Sex

0	female
1	male

Age

1	18 to 24 years old
2	25 to 29 years old
3	30 to 39 years old
4	40 to 49 years old
5	50 to 59 years old
6	60 years old or more

Education level

1	elementary school
2	primary school
3	high school
4	tertiary

Race

0	white or yellow
1	black, brown or indigenous

2 Difference in means tests between experimental groups

High p-values indicate that there is no significant difference between groups.

2.1 First experiment

variable	control	treatment	difference	p-value
per capita income	1645.09	1508.32	136.77	0.11
% male	0.48	0.49	-0.01	0.80
% 30 years old or more	0.32	0.35	-0.03	0.17
% black, brown or indigenous	0.51	0.51	0.00	0.86
% up to complete high school	0.45	0.43	0.03	0.23

2.2 Second experiment

variable	control mean	treat1 mean	diff	p-value
per capita income	1655.58	1541.64	113.94	0.29
% male	0.48	0.47	0.01	0.80
% 30 years old or more	0.34	0.34	0.01	0.79
% black, brown or indigenous	0.50	0.51	-0.02	0.55
% up to complete high school	0.46	0.43	0.03	0.26

variable	control mean	treat2 mean	diff	p-value
per capita income	1655.58	1533.49	122.09	0.28
% male	0.48	0.51	-0.03	0.28
% 30 years old or more	0.34	0.33	0.01	0.69
% black, brown or indigenous	0.50	0.52	-0.02	0.34
% up to complete high school	0.46	0.44	0.02	0.47

3 Data

The survey was designed to proportionally represent all income groups, age and regions of Brazil. It has 2209 respondents. The margin of error is 2.1 percentage points and there are no sample weights.

As it is an online survey, there is some degree of sample selection bias. Even though the survey was carried out in such a way as to proportionally represent all income groups in the country, the level of education of those interviewed was, on average, above national parameters. This may compromise the external validity of the results.

Moreover, the experiment was fielded in February and March 2021, a particular period in terms of the income variable in Brazil. On the one hand, the impact of the coronavirus outbreak caused the biggest drop in the level of job occupation of people aged 14 or over ever recorded by the Brazilian Institute of Geography

and Statistics (IBGE). According to national household survey data (PNAD Contínua and PNAD-Covid), this rate was, for the first time, below 50% in mid-2020, and remained at this level until March 2021. On the other hand, the standard of living of Brazilians during 2020 was also affected by emergency governmental aid, which directly benefited almost a third of the population. Although it is possible to argue that the application of the questionnaires in this context imposes some caveats to the data analysis, there is no reason to suppose that this compromises the external validity of the results found.

3.1 Dataset description

household income	%
Up to BRL 1,100	15,05
From BRL 1,101 to BRL 2,200	24,87
From BRL 2,201 to BRL 3,300	17,91
From BRL 3,301 to BRL 5,500	18,75
From BRL 5,501 to BRL 11,000	16,22
From BRL 11,001 to BRL 16,500	4,68
More than BRL 16,500	2,52

sex (%)	
male	female
48,44	51,56

age	%
18 to 24 years old	26,62
25 to 29 years old	13,99
30 to 39 years old	25,76
40 to 49 years old	17,97
50 to 59 years old	10,28
60 years old or more	5,39

race	%
black	11,77
brown	38,39
white	47,89
indigenous	0,81
yellow	0,91
other	0,23

education level	%
Illiterate / Elementary school incomplete	1,22
Elementary school complete / Primary school incomplete	2,72
Primary school complete	2,08
Incomplete high school	4,84
Complete high school	33,18
Incomplete tertiary	20,33
Complete tertiary	23,31
Postgraduate studies	12,31

4 National income distribution in Brazil

Figure A - 1: Income level by percentile of the national distribution
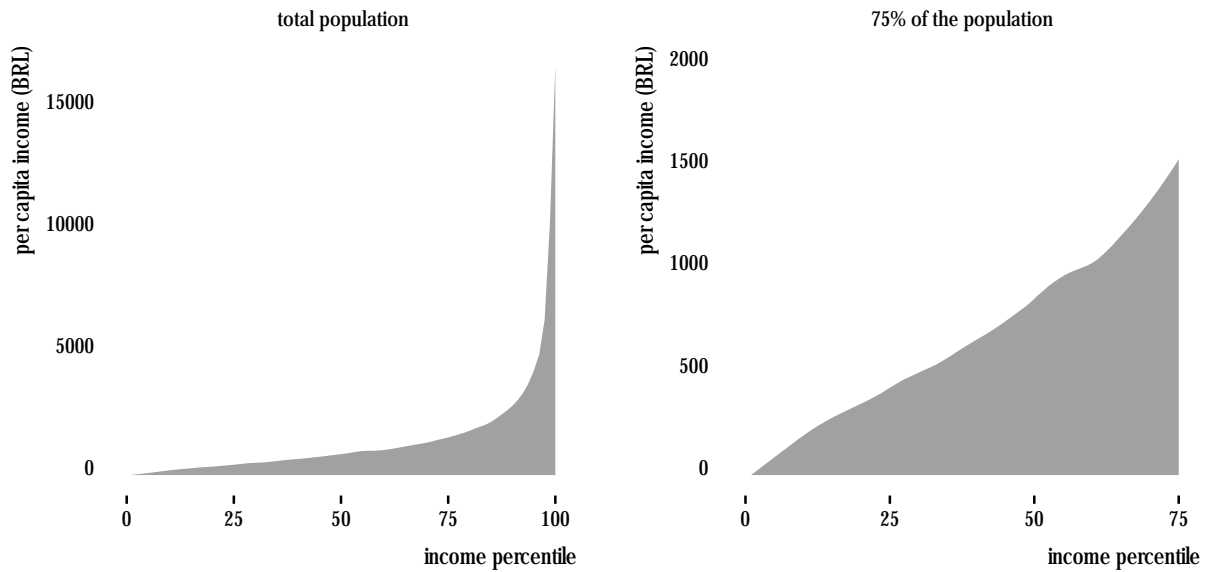

Note: data from national household survey data (PNAD Contínua 2019). The income variable stands for the household income *per capita*.

5 Income level estimation of the top 10%

The Oxfam Brasil/Datafolha nationally representative survey asks respondents "In your opinion, how much do you think a person needs to earn per month to be part of the richest 10% in Brazil?". The following figure plots the distribution of responses from the surveys fielded in 2017 (N=2,025), 2019 (N=2,086), and 2020 (N=2,079). As a benchmark, according to administrative records, the actual value of the 90th percentile of the national distribution of per capita household income is close to BRL 3,000.

Figure A - 2: Income population assigns to the rich in Brazil
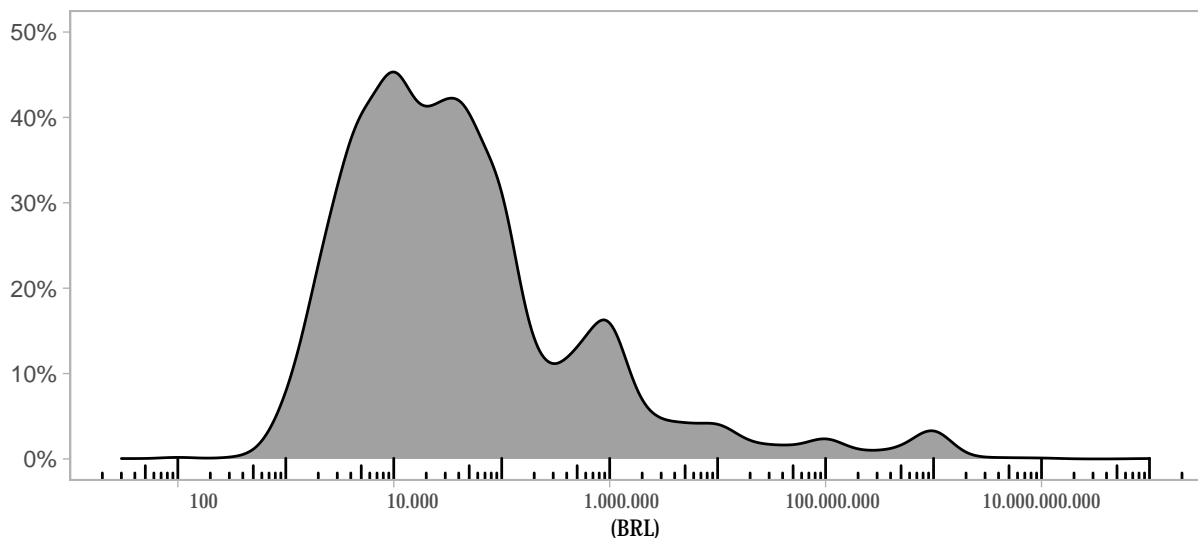
Note: data from Oxfam Brasil/Datafolha (2017; 2019; 2020).

6 Regression results

6.1 First experiment

Table A - 1: Treatment effect with costs

	Binary Logit		Ordered Logit	
	(1)	(2)	(3)	(4)
treatment	-1.028 (0.106)***	-1.039 (0.106)***	-1.199 (0.080)***	-1.202 (0.080)***
income percentile		-0.006 (0.002)**		-0.003 (0.002)+
sex		0.084 (0.103)		0.024 (0.077)
age		0.024 (0.035)		0.029 (0.027)
race		0.055 (0.107)		-0.005 (0.080)
education level		0.137 (0.073)+		0.155 (0.055)**
N	2209	2209	2209	2209

Note: data from Opinion Box (2021). Regressions from the first experiment.
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

6.2 Second experiment

Table A - 2: Treatment effect with exemption criterion

	Binary Logit		Ordered Logit	
	(1)	(2)	(3)	(4)
treatment BRL 10,000	-0.283 (0.114)*	-0.300 (0.116)**	-0.196 (0.093)*	-0.206 (0.094)*
treatment BRL 2,400	-1.322 (0.111)***	-1.350 (0.113)***	-1.318 (0.095)***	-1.335 (0.095)***
income percentile		-0.008 (0.002)***		-0.005 (0.002)***
sex		0.141 (0.092)		0.136 (0.077)+
age		-0.058 (0.032)+		-0.039 (0.027)
race		0.170 (0.095)+		0.111 (0.079)
education level		0.023 (0.066)		0.033 (0.055)
N	2209	2209	2209	2209

Note: data from Opinion Box (2021). Regressions from the second experiment.
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A - 3: Support for tax on the rich

	Binary Logit		Ordered Logit	
	(1)	(2)	(3)	(4)
income percentile	-0.004 (0.003)	-0.005 (0.003)	-0.001 (0.002)	-0.002 (0.003)
sex		0.015 (0.166)		0.091 (0.131)
age		-0.070 (0.056)		-0.027 (0.044)
race		-0.058 (0.171)		-0.052 (0.134)
education level		0.088 (0.114)		0.117 (0.091)
N	2209	2209	2209	2209

Note: data from Opinion Box (2021). Regressions from the second experiment, figure 5.
+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table A - 4: Support for tax on BRL 2,400+

	Binary Logit		Ordered Logit	
	(1)	(2)	(3)	(4)
income percentile	-0.015 (0.003)***	-0.012 (0.003)***	-0.012 (0.002)***	-0.009 (0.003)**
sex		0.264 (0.155)+		0.197 (0.135)
age		-0.035 (0.054)		-0.053 (0.048)
race		0.427 (0.158)**		0.363 (0.140)**
education level		-0.090 (0.110)		-0.040 (0.096)
N	2209	2209	2209	2209

Note: data from Opinion Box (2021). Regressions from the second experiment, figure 5.
+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table A - 5: Support for tax on BRL 10,000+

	Binary Logit		Ordered Logit	
	(1)	(2)	(3)	(4)
income percentile	-0.007 (0.003)*	-0.007 (0.003)*	-0.005 (0.002)*	-0.005 (0.003)+
sex		0.121 (0.161)		0.125 (0.134)
age		-0.068 (0.056)		-0.034 (0.047)
race		0.124 (0.168)		0.039 (0.139)
education level		0.068 (0.117)		0.001 (0.099)
N	2209	2209	2209	2209

Note: data from Opinion Box (2021). Regressions from the second experiment, figure 5.
+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

7 Generalized Additive Models (GAMs) results

A. parametric coefficients	Estimate	Std. Error	t-value	p-value
intercept	1.1637	0.5209	2.2341	0.0255
sex	0.0345	0.1716	0.2010	0.8407
age	-0.0833	0.0575	-1.4482	0.1476
race	-0.1087	0.1775	-0.6125	0.5402
education level	0.0676	0.1194	0.5664	0.5711
B. smooth terms	edf	Ref.df	F-value	p-value
income percentile	3.4924	3.8529	13.9701	0.0045

Table A - 6: GAM: tax on the rich

Note: model from figure 8. Data from Opinion Box (2021).

A. parametric coefficients	Estimate	Std. Error	t-value	p-value
intercept	-0.1927	0.4901	-0.3933	0.6941
sex	0.2674	0.1571	1.7020	0.0888
age	-0.0289	0.0543	-0.5309	0.5955
race	0.3978	0.1599	2.4874	0.0129
education level	-0.1032	0.1124	-0.9186	0.3583
B. smooth terms	edf	Ref.df	F-value	p-value
income percentile	2.9786	3.4800	21.7459	0.0002

Table A - 7: GAM: tax on BRL 2,400+

Note: model from figure 8. Data from Opinion Box (2021).

A. parametric coefficients	Estimate	Std. Error	t-value	p-value
intercept	0.4982	0.5277	0.9439	0.3452
sex	0.0980	0.1647	0.5951	0.5518
age	-0.0611	0.0569	-1.0731	0.2832
race	0.1774	0.1715	1.0342	0.3011
education level	0.0986	0.1183	0.8328	0.4050
B. smooth terms	edf	Ref.df	F-value	p-value
income percentile	1.8730	2.3121	6.7411	0.0617

Table A - 8: GAM: tax on BRL 10,000+

Note: model from figure 8. Data from Opinion Box (2021).