Preferences over Taxation of High Income Individuals: Evidence from Online and Laboratory Experiments

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Abstract

Mobility of high income individuals across borders puts pressure on governments to lower taxes. A central tenet of the underlying theoretical and empirical models is that mobile individuals react to tax differentials through migration, and in turn immobile households vote for lower taxes in the face of a migration threat. In light of research on behavioural economics it is not clear, however, whether this premise holds. We use an experimental survey design and elicit answers from more than 3,000 households in the German Internet Panel (GIP), who are assigned roles as rich or poor and must choose a redistributive tax. We use various treatments to understand the role of mobility and ideology in tax choice. We observe substantial deviations from the predicted theoretical equilibrium. In many cases comparative static results prevail however. Political ideology matters: left-leaning households choose higher taxes than right-leaning persons, and center-right leaning individuals tend to emigrate more when the tax at home is high. We compare the results with those from a closely related lab experiment, in which subjects appear to behave more rationally.

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1 Introduction

According to a standard economic argument, globalization of factor markets entails tax competition for mobile factors and hence leads to lower taxes for the mobile than in a closed economy. Since international mobility tends to increase in income, this argument implies that, tax schemes will – and should – become less progressive in more globalized countries (see, for example, Simula and Trannoy 2010, Bierbrauer et al. (2012)). However, not all governments, voters and politicians appear to be fully convinced and often advocate what appear to be excessively high taxes on the rich.

An example is the announcement of French president Hollande in 2012 to impose a 75% income tax on very high income levels in France. The subsequent and well-covered move of the famous French actor Gérard Dépardieu, who exchanged his French for the Russian citizenship to pay lower taxes, constitute salient but inconclusive evidence for the textbook argument and can hence be justly ignored by the proponents of highly progressive taxation. More systematic evidence for the role of ideology in tax setting is hard to generate. Recent survey (Heinemann and Janeba, 2011) and experimental evidence (Janeba, 2014) suggests that political ideology may play a role in the setting of tax policies (that goes beyond the well understood roles of differences in endowments) and the beliefs about the effects of taxes in open economies. The relatively low number of survey observations and the design of the experiment make the findings not fully conclusive however.

In this context two related questions arise: First, are the rich and mobile really as ready to act upon their advantage and migrate for tax reasons, as predicted by the above textbook argument, or are Dépardieu-like migration decisions rare exceptions? Second, do those on the left and those on the right of the political spectrum differ in their answer to this question and therefore in their views on how progressive taxes should be? Or do they hold on to purely ideological views about appropriate taxation that are independent of the expected intensity of tax competition? We address these questions in a large survey experiment with a representative sample of subjects and complement the study by a standard lab experiment. In the former, we implement an online experiment in the 18th wave of the German Internet Panel (GIP), a large online panel of more than 3,000 households representative of the German population aged 16 to 75.

In the online experiment, we randomly assign the roles of rich and poor and two treatment conditions to our subjects and use the strategy-method to elicit their voting choices between three possible tax rates (high, medium, and low) for different levels of tax rates in a fictitious neighboring country. In the baseline treatment, subjects are all immobile; in the control treatment, the rich may migrate into the neighboring country, then bearing some migration cost that is lower than the difference between the high and the medium tax rate but higher than the difference between the medium and the low tax rate. Hence, the rich are predicted to migrate if and only if they are mobile, taxes in their home country are high, and low or medium in the other country. Again, we use the strategy method to elicit migration choices.

We also elicit beliefs about the choices of the subjects in the other role, i.e., what subjects in the role of the poor believe about the choices of the subjects in the role of the rich (tax rate and migration) and vice versa. We match these experimental data with data obtained in the other parts of the German Internet Panel, in particular self-declared attitudes on redistribution, party adherence, position on the left-right spectrum, and social demographics like income, age, gender and education. We use both non-parametric tests and probit regressions to analyze the determinants of tax and migration choices and to isolate the treatment effect and the effect of political ideology on these choices.

In the lab experiment, we implement an extended design that contains the full game of tax competition in the control treatment, i.e., tax choices and, afterwards, migration choices are made simultaneously in two ex ante symmetric countries. Moreover, the roles of rich and poor are earned during a real-effort task, not randomly assigned as in the survey experiment.

In the online experiment, we find that the mobile migrate on average less than predicted by standard economic arguments. However, this is not the reason why leftists want to tax them highly; instead, experimental subjects across the entire political spectrum expect the mobile to act selfishly and migrate whenever it pays. Still, leftists want to tax the mobile more than rightists; hence, we find that ideology matters, independently of the – well-understood – monetary migration incentives created by design. Moreover, we find a compromise effect on tax choices: Both subjects in the role of the rich and in the role of the poor choose medium-range tax rates far more often than predicted by standard economic considerations. Since their beliefs exhibit both a good understanding of the incentive structure and a projection of the homo oeconomicus on other subjects, we conclude that they have preferences that differ from the standard economic assumptions but underestimate such deviations by others.

In the lab experiment, we do not find any of these substantive deviations; instead, most subjects play close to equilibrium, and the standard textbook argument is supported by the data. This sheds doubt on the use of isolated lab experiments when studying the role of political ideology for redistributive attitudes. At the same time, further work under both experimental designs seems necessary. We discuss this at the end of our paper.

Our work relates to a large theoretical and empirical literature on taxation and migration. The standard approach to optimal income taxation by Mirrlees (1971) applied to a closed economy situation. Mirrlees (1971, p. 176) noted himself, however, that "the threat of migration is a major influence on the degree of progression in actual tax systems". While early contributions like Wilson (1980) considered the problem of optimal linear income taxation when workers are mobile, the theoretical literature on optimal taxation with labor mobility has advanced and generalized Mirrlees' approach in various ways.

Simula and Trannoy (2010) analyze the optimal nonlinear income tax schedule when workers are mobile at a cost, while holding tax policy in the outside country fixed. Among their results is that marginal tax rates decrease everywhere relative to the case without mobility even when the policy maker pursues a Rawlsian social welfare func-

tion. Moreover, in numerical simulations for France the effect on the tax schedule is quantitatively large even if only few highly productive individuals are potentially mobile. Those individuals who find emigration just not attractive share a large burden from potential migration of high income individuals, a phenomenon that is termed the "curse of the middle class".

Recent work has analyzed optimal income taxation when competition among governments of several countries takes place (Piaser, 2009; Blumkin, Sadka and Shem-Tov, 2015; Morelli, Yang and Ye, 2012; Lehmann, Simula and Trannoy, 2014; Bierbrauer, Brett and Weymark, 2013), which is modeled as a Nash game. The contributions differ in terms of the level and distribution of migration cost for individuals and the number of skill types, among other things. For example, Blumkin et al. (2014) show that the optimal non-linear tax system involves a zero tax rate at the top asymptotically even when the skill distribution is unbounded. In simulations it is shown that the zero tax result is not only a local property at the very top, but extends further down the skill distribution. This is in line with Bierbrauer et al. (2012) who demonstrate that in a discrete-type Mirrlees model with strategic government behaviour the highest type pays no tax when labor is perfectly mobile, and the lowest type does not receive any subsidy.

A general characterization of the optimal nonlinear income tax schedule under government competition is provided by Lehmann et al. (2014) when income effects on labor supply are absent, productivity and migration cost are private information of workers, but no correlation structure on the latter two parameters is imposed. The key parameter is the semi-elasticity of migration, which is defined as the percentage change in the mass of taxpayers of a given skill level when their consumption is increased by one unit. The optimal function depends on this semi-elasticity and its slope, and thereby modifies the Diamond-Saez optimal tax formula.

Most contributions postulate standard social welfare objectives for policy makers who select the tax schedule. Morelli et al. (2012) introduce political economy considerations into a model with three skill types. Decentralized tax setting, and thus tax competition, may lead to higher output and consumption but lower welfare than a uniform (centralized) regime. Whether at a constitutional stage an independent regime or a uniform (centralized) tax regime is chosen by a majority of voters depends on the preferences of the middle type, and their relative skill position in particular.

The effect of taxation on the mobility of high income individuals has also been the subject of recent empirical research. For example, Kleven, Landais and Saez (2013) analyze the role of taxes on the incentives for foreign football players to play in Denmark. They find an elasticity of the probability of playing in a foreign country with respect to the net-of tax rate to be around 0.5 and substantially higher for younger and top players. The result is in line with Kleven, Landais, Saez and Schultz (2014) who find high elasticities of working abroad for high income individuals in a study of preferential income taxation in Denmark. Elasticities around 1 are also found by Akcigit, Buslandze and Stantcheva (2016) for foreign superstar inventors, while much lower elasticities prevail for domestic inventors. Overall, the empirical studies suggest that mobility of top earners is substantial.

4

The rest of the paper is organized as follows. In the next section we present the simple model of redistributive taxation that is used in the empirical implementation. Section 3 we first explain in detail the setup of the online experiment within the German Internet Panel, then we discuss the hypotheses based on the theoretical model and the literature, and finally present the main results. The lab experiment, including the setup and results, is covered in section 4. Section 5 concludes.

2 A Simple Model of Redistributive Taxation

A country (Home) is populated by two types of individuals $i = \{p, r\}$, called poor and rich, with exogenously given incomes $y_p = 20$ and $y_r = 90$. In the base case (closed economy: no migration) the country has two poor and one rich inhabitant. We model a purely redistributive tax-transfer system. A rich person pays a tax that is distributed among the poor. The set of feasible tax rates is limited to three - low, medium, high - with the following values:

$$t_L = 10 \ \ t_M = 20 \ \ t_H = 40 \tag{1}$$

A rich individual pays the tax $t_k = \{L, M, H\}$, which is then divided to the two poor. Under a balanced government budget without other spending the transfer to each poor individual becomes $T = t_k/2$. The net income $z(y_i)$ of a person as function of the tax rate is therefore for a poor person

$$z_p = 20 + \frac{t_k}{2} \tag{2}$$

and for a rich individual

$$z_r = 90 - t_k \tag{3}$$

Notice that even under the highest tax the ranking of pre-tax incomes is preserved post tax and transfer, that is, $z_p < z_r$ holds under any tax.

In the experimental design the tax rate is chosen by a random dictator mechanism. We therefore derive the preferred tax rate for each type. It is straightforward to see that in a closed economy without migration the most preferred tax rate of a poor person is the highest possible tax rate t_H, which generates net incomes of $z_p(t_H) = 40$ and $z_r(t_H) = 50$. By contrast, the net income maximizing tax rate of a rich person is the lowest tax rate t_L, which gives a poor person a net income of $z_p(t_L) = 25$, and for the rich person $z_r(t_L) = 80$.

We now modify the model and allow for migration of the rich person (open economy) to a a second country, called foreign, in which the rich person earns the same gross income $y_r = 90$. The tax rate in the foreign country is exogenously given and from the same set of feasible tax rates: $t_k^* \in \{10, 20, 40\}$. Migration is costly for the rich, however, and involves an expense of $m = 15$. If the rich person emigrates to the other country, there is no tax revenue generated at home. In that case the net income of a poor person in home equals his gross income: $z_p = y_p$.

The timing of decisions is as follows: First the home country chooses its tax (by a random dictator mechanism in the experimental setup), and then the rich person, observing the tax at and home and abroad, makes the decision to migrate or not. Finally, taxes are collected and transfers paid (in home when applicable).

Solving the model from the back, migration of a rich person is beneficial for her if and only if the net income at home is less than net income abroad, that is $z_r(t_k) = 90 - t_k < 90 - t_k^* - m = z_r^*(t_k^*)$, which is equivalent to

$$m < t_k - t_k^* \tag{4}$$

Given the model parameters migration therefore occurs if and only if the tax rate at Home is high (40), but medium (20) or low (10) in foreign. In all other cases the rich person stays at Home.

Moving to the stage of tax setting, a rich person at home still prefers the lowest possible tax t_L. Migration is never optimal then because migration is costly and the lowest tax rates are the same across both countries. For a poor person the preferred tax rate depends on the tax level in the foreign country. Emigration of the rich person is the worst case for the poor as the transfer becomes zero, while the transfer is positive whenever the rich person stays at home. Therefore the preferred tax rate of a poor must be consistent with no migration, that is, must violate (2). From the previous step we know that migration happens only if the tax rate at home is high but lower than that in foreign. Therefore the net income maximizing tax rate of a poor is t_M if $t^* \in \{t_L, t_M\}$ and t_H if $t^* = t_H$.

In the lab experiment we consider the case with two countries, home and foreign, that compete for rich individuals. Countries are symmetric in terms of the initial number of rich and poor individuals, gross incomes, set of tax rates, and migration cost for the rich. Countries set tax rates simultaneously, and thus play a Nash game. After observing the tax rates the rich individuals in both countries decide on migration, and finally tax revenues are distributed as transfers. If the rich end up in the same country, the transfer to a poor person is $T = t_k$ instead of $t_k/2$ (analogously in foreign), because two rich individuals finance the transfer to two poor households. The subgame perfect equilibrium of that game is as follows: Without migration option (closed economy), the equilibrium mirrors the closed economy case described above. With migration (open economy), the rich still prefer the low tax rate. The poor have a (weakly) dominant preference for a medium tax in both countries and in equilibrium no migration occurs. Undercutting a medium tax is not worthwhile because the rich person of the other country does not move because of too high moving cost.

3 Online Experiment

3.1 German Internet Panel

We implement the above-described model of optimal redistributive taxation in an experimental setting using the German Internet Panel (GIP), a probability-based longitudinal panel survey conducted by the Collaborative Research Center "Political Economy of Reforms" (SFB 884) at the University of Mannheim. Although the GIP is online-based, it is representative for the general population in Germany aged from 16 to 75 living in private households. This is achieved by providing households without internet connection with the necessary devices to participate in the panel as well as clear technical instructions on their usage (Blom et al. 2015). The selection of the panel is based on a stratified random sample of both the online and offline population. In comparison to other population statistics the GIP shows high congruence with regard to personal characteristics like age, unemployment, urbanity, and regionality (Blom et al. 2015, Blom et al. 2016).

All participants of the GIP are first recruited in face-to-face interviews and then take part in bimonthly surveys of around 20 minutes resulting in a panel data set. The GIP started in September 2012 and has a special focus on the opinions and preferences of the population on political reforms. The surveys are accompanied by quality assurance measures such as extensive plausibility tests conducted by an expert team of the GIP as well as a pre-test concerning the technical implementation. These provisions are in place to ensure the comprehensibility of questions about complex issues for the general population. In order to maintain the GIP's high retention rates (73% - 80%) there is an incentive scheme in place (Blom et al. 2015). Participants are getting 4€for every survey that they take place in and on top of that there is a bonus for those who participated in every survey of the year (10€) and those who only missed one survey (5€) respectively.

In the experiment every questionee of the panel is randomly assigned a treatment according to the model. One quarter of the panel is acting as the control group by getting the "closed economy" treatment, which is referring to the reduced model without migration, while the rest gets the "open treatment", which reflects the full model as described above. Within both the mobile and immobile partition of the panel two-thirds are assigned to be "poor" and one third to be "rich". The "open economy" types are also exogenously assignment to a foreign tax rate, 40% are facing a low foreign tax rate, 40% are facing a medium foreign tax rate and 20% are facing a high foreign tax rate (see Table 1 for an overview). This mechanism of random assignment allows us to identify the treatment effects of mobility, type and foreign tax rate on the chosen home tax rate by simple ordered logistic regression. All participants of the panel are required to go through a detailed explanation of the model - the questionees took an average time of about eleven minutes to do so - specifically tailored to their type and treatment(s). This includes detailed step-by-step descriptions and multiple examples of possible outcomes written in easy language as well as simple graphics illustrating the timing of events and the voting system. Furthermore, tables visualizing all potential outcomes of the model

	closed economy	open economy		
		low foreign tax	medium foreign tax	high foreign tax
poor	16,67%	20%	20%	10%
rich	8,33%	10%	10%	5%
total	25%	30%	30%	15%

Table 1: Treatment assignment

are presented not only during the explanation, but also depicted when individuals have to make their decisions.

After reading the description the model and before making their tax rate and immigration choices, the participants are made aware that there is an extra incentive scheme on top of the general GIP scheme described above. After the experiment 20 out of 1020 countries are randomly drawn and the participants, who were part of these countries, are getting their hypothetical income from the game as a bonus payment. This translates into 60 out of 3060 participants receiving an average bonus payment of 41,33€. Depending on their type, treatment and their own decisions this payment can range between 20€ (poor type when the rich migrates) and 80€ (rich type if she stays and low taxes are elected). Finally, all participants are asked the following questions: What tax do you vote for? Which tax do you think will the respective other type vote for? If the questionee is part of the "open economy" treatment and of the type "rich", she is additionally asked conditional on every single possible tax rate in her home country (low, medium and high) whether she would migrate. Analogously, "open economy" participants of the type poor are asked whether they believe that the "rich" in their country will migrate again conditional on every single possible tax rate at home. Therefore, we collect data not only on tax rate and migration decisions, but also on the beliefs about the behavior of other participants. Using the panel structure we can link these variables to various questions about political opinions and party preference as well as personal characteristics such as gender, age, income and education level (see Tables 2 - 4 for summary statistics).

3.2 Hypotheses

Based on the equilibrium predictions of the game theoretic model, we can derive the following hypotheses:

Hypothesis 1. *Without mobility, rich players vote for low taxes and poor players vote for high taxes.*

Hypothesis 2. *With mobility, rich players vote for low taxes and poor players vote for medium taxes if taxes in the foreign country are low or medium (and vote for high taxes if foreign taxes are high).*

Experimental participants frequently deviate from theoretical point predictions. Thus we would not expect all participants to follow the predicted behavior exactly. However,

comparative static predictions often hold. Hence we expect weaker versions of the previous two hypotheses to be supported:

Hypothesis 3. *1. Rich players vote for lower taxes than poor players.*

    2. Under mobility with taxes in the foreign country being low or medium, poor players vote for lower taxes than either without mobility or with mobility and taxes in the foreign country being high.

In other words, poor players are more likely to vote for L or M with mobility and low or medium high foreign taxes than without mobility or with high foreign taxes under mobility.

In equilibrium, players should have correct expectations. That implies the following hypotheses for beliefs that replicate those for behavior.

Hypothesis 4. *Without mobility, poor players expect rich players to vote for low taxes and rich players expect poor players to vote for high taxes.*

Hypothesis 5. *With mobility, poor players expect rich players to vote for low taxes and rich players expect poor players to vote for medium taxes if taxes in the foreign country are low or medium (and to vote for high taxes if foreign taxes are high).*

Hypothesis 6. *1. Poor players expect rich players to vote for lower taxes than the tax levels rich players expect poor players to vote for.*

    2. Rich players expect poor players to vote for lower taxes with mobility if the taxes in the foreign country are low or medium than without mobility, or if taxes in the foreign country are high. More specifically, rich players expect poor players to be more likely to vote for L or M with mobility and low or medium higher foreign taxes than without or with high foreign taxes.

Furthermore, based on intuitive considerations about the impact of general political views on tax and migration choices, we derive the following hypotheses:

Hypothesis 7. *Supporters of left-of-center parties vote for higher taxes than supporters of right-or-center parties, both if they are rich and if they are poor.*

Regarding migration, we expect the standard theoretical prediction is that rich players migrate if and only if it pays:

Hypothesis 8. *In the mobility treatment, rich players migrate if and only if they domestic taxes are high and foreign taxes are low or medium.*

Social preferences or norms may prevent rich players from migration even if it pays. Not migrating even if it pays to do so appears to be more consistent with left-wing ideology. Hence, assuming that not all rich players migrate whenever it pays, we derive the following comparative statics hypothesis regarding migration choices and political preferences:

Hypothesis 9. *Left-leaning participants and those more in favor of government redistribution have a lower propensity to migrate when it pays than other participants.*

3.3 Results

In this section, we will first show that while tax and migration choices frequently deviate from equilibrium predictions, beliefs are much closer to equilibrium, which suggests that deviations from equilibrium are not primarily due to misunderstanding of the underlying game. We will also show that comparative statics predictions are largely supported. We will then show that political ideology has the expected impact on tax and migration choices, but does not influence beliefs in an important way. Following standard conventions, we understand statistical significance being at the 5%-level and will note weak significance at the 10% level explicitly.

3.3.1 Tax Choices and Beliefs

Figure 1 shows the distribution of tax choices by rich and poor players when rich players cannot migrate. Surprisingly, behavior is not only far from equilibrium, as more than 60% of choices are for the medium tax rate and less than 20% of poor people and less than 30% of rich people choosing their equilibrium action, H, or L, respectively, but furthermore, while the results are in line with the comparative statics predictions, the differences between rich and poor players are relatively small. The statistical support is mixed. In the NoMobility treatment, while the distributions are significantly different according to chi-square test, they differ according to a Mann-Whitney test only at the 10%-level and are not significantly different according to an ordered probit regression, that controls for age and gender. In the Mobility treatment, all three tests find a significant difference between rich and poor, but the effect is small. The marginal effect of being rich on choosing low taxes is 3.1 percentage points and -2.2 percentage points on choosing high taxes.

Comparing the NoMobility to the Mobility treatment, we see that while in the latter the medium tax rate is again the dominant choice (see Figure 2), poor people react to the possibility of emigration by the rich because the frequency of high tax choices decreases by about a third (from 18.7% to 12.2%).[1] Moreover, in the Mobility treatments, poor players qualitatively react to the foreign tax rate as expected, because the frequency of high tax choices is nearly identical when foreign taxes are low or medium (9.7% and 10.6%, respectively), but substantially and significantly higher when foreign taxes are high (17.8%), see Figure 3.

We thus find no support for Hypothesis 1 and the only result supporting Hypothesis 2 is that poor players choose most often medium taxes if foreign taxes are low or medium, but the latter appears to be more a coincidence because the prediction in this case agrees with the strong general tendency for the medium tax rate for both player types in both treatments. Hypothesis 3, however, is supported qualitatively, even though differences are far smaller than expected.

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[1]In the ordered probit the marginal effects of mobility on choosing low taxes are 4.6 and 4.9 percentage points for rich and poor players, respectively and on choosing high taxes they are -3.5 and -5.4 for rich and poor, respectively.
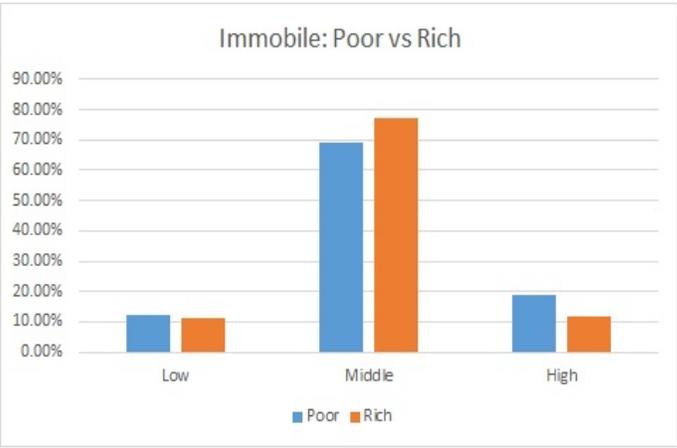
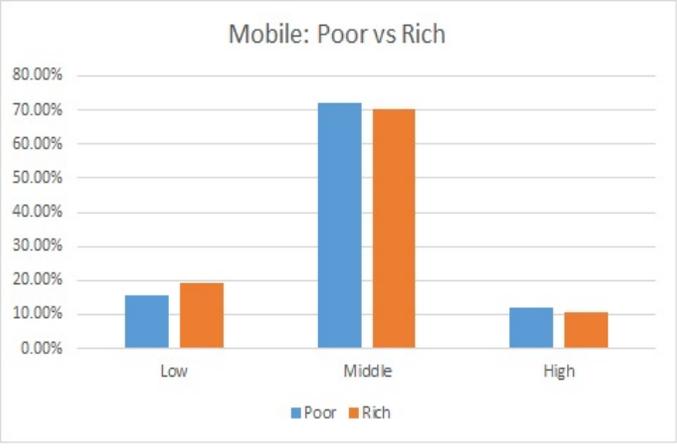Figure 1: Distribution of tax choices by type in the Immobility treatment

Figure 2: Distribution of tax choices by type in the Mobility treatment
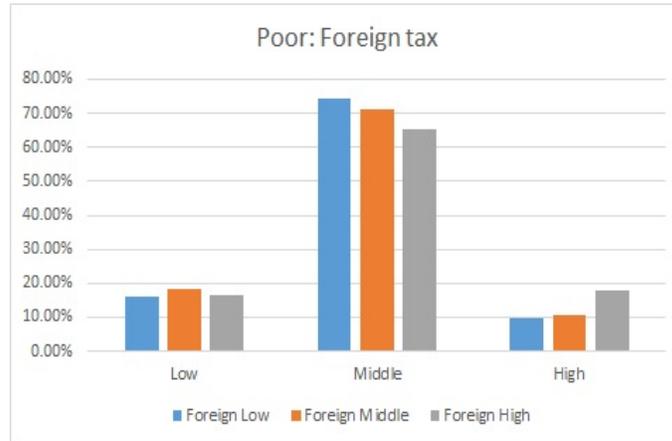
Figure 3: Distribution of tax choices of poor type in the Mobility treatment by foreign tax level

We summarize these observations in

Result 1. *Tax choices in all conditions have a strong tendency towards the medium tax rate and hence deviate from equilibrium predictions except when this happens to be the medium tax rate. Comparative statics results are supported for player types in the Mobility treatment, but at best weakly so in the NoMobility treatment. They are statistically significant with respect to treatment differences and foreign tax rate. While economically not negligible, these effects are relatively small.*

While it is common that experimental results do not support theoretical point predictions and that comparative statics predictions are supported qualitatively, but not quantitatively, the strong concentration of tax choices on the medium level and the relatively weak difference between player types, treatments and foreign tax rates is surprising. A possible reason could be misunderstanding of the experimental task, which is arguably more likely to be a problem in an online experiment than in a laboratory experiment because participants cannot ask clarifying questions and also because a sample with a larger variety in terms of education and age than a typical student sample may on average have more problems understanding the task.

For two reasons, we do not believe that misunderstanding is the dominant factor behind our relatively weak support for the theoretical predictions. First, we run robustness checks for our tests where we exclude participants who appear most likely to be confused, namely those who are the fastest or slowest in completing the experiment. Very fast players are likely to not have carefully read the instructions and to have thought deeply about their decisions. Very slow players are likely to think long because they have trouble understanding. Excluding either the fastest 30% of participants, or the slowest 30% of participants, or both the fastest 20% and the slowest 20% does not overall affect our test results much.

The second reason why we do not believe that participants' misunderstanding is the main driver for the tendency to choose the medium tax is that beliefs about others' choices are much closer to the equilibrium prediction. Indeed, 64.6% of poor players expect rich players to choose the low tax rate and 50.4% of rich players expect poor players to choose a high tax rate and 29.8% a medium tax rate if rich players are immobile or the foreign tax rate is high, whereas 42.2% of rich players expect poor players to choose the medium tax rate and 40.7% the high tax rate if foreign taxes are low or medium. Hence in all cases, the modal belief equals the equilibrium prediction, in contrast to actual behavior. Beliefs about tax choices significantly differ from actual tax choices in all cases according to chi-square tests.

We interpret this observation that most participants understand the incentives quite well and expect others to choose in line with their incentives, but they themselves typically do not just choose the expected-payoff maximizing option. Possibly social preferences are a strong motivator but participants underestimate that this is true also for other participants. Specifically, for both player types the medium tax rate is kinder towards the other player than the equilibrium prediction, while still not the worst for players themselves, to they might consider it a good compromise between self-interest and satisfying some kind of social preferences such as altruism. We note, however, that for poor players the deviation from self-interest is also inconsistent with inequality aversion (Fehr and Schmidt, 1999, Bolton and Ockenfels, 2000) because even with high taxes, the rich players still have higher payoffs than the poor players. Choosing high taxes increases poor player's own payoff while also reducing inequality. Hence, inequality-averse poor players should choose high taxes when rich players are not mobile or foreign taxes are high.

While inequality aversion could explain in principle that rich players choose high or medium tax rates, the linearity of the Fehr-Schmidt model implies that if rich players are sufficiently inequality averse in order not to choose low taxes, they should choose high, but not medium taxes. Also if one considers non-linear forms such as the Bolton-Ockenfels model that could in principle allow for interior solutions, it does not appear too plausible that more than 70% of rich players have such an intermediate level of inequality aversion. Altruism instead would be in line with the choice of the medium tax rate for both rich and poor players, but again, it would appear surprising that such a high number of participants have the corresponding altruism level. This is particularly true because the choice of the medium tax rate is only consistent with an altruistic utility function that is concave in the other players' utility. But then assuming the same distribution of altruism parameters for the rich as for the poor, we would expect more altruistic behavior by the rich than by the poor and hence more non-selfish choices by the rich than by the poor.

What could then explain this tendency towards intermediate tax levels? One possibility is that people take real tax rates as sensible benchmarks into account. Indeed, $2/9 = 22.2\%$ is a reasonable approximation for the average tax rate of the median income person in Germa, while $4/9 = 44.4\%$ is much higher. However, people have a tendency to confuse average and marginal tax rates (see, e.g., Bartolome, 1995). Cou-

pled with the effect that we explicitly talk about taxing the "rich" in this experiment and that Germany has a "rich tax" with a marginal tax rate of 45% (for incomes above 250,000 Euros for unmarried individuals and 500,000 for married couples), the 44.4% tax rate actually appears rather appropriate.

Alternatively, people could take their personal tax rate as a guidance of an appropriate tax rate. If that was true, we would expect that tax rate choices in the experiment correlate with actual household income, but we do not find such an effect.

The most likely explanation for the concentration of choices of medium tax rate thus appears to us to be perceived social norms. It seems that many participants, both in the rich and poor roles, have the impression that it is appropriate that the rich share some of their income but that it would be excessive to tax them so highly that the difference is almost eliminated. For many of our participants the experiment was probably also an unusual situation and hence they may have been unsure about the appropriate action. Choosing then the "middle" may have looked for many as a good compromise that makes them neither look like too greedy nor like a fool for forgoing too much.

We also check whether answers to questions in the GIP that are not related to this experiment also have a tendency to center in the middle. We find that other questions with three or five item response options show a tendency towards the center, though much weaker. Across all questions with three items in waves 17 and 18 of the GIP, the distribution across left, middle, and right is 37%, 41%, and 23%. Participants shy away more from extremes in questions with five items, where the distribution of answers across the five options from left-most to right-most is (11%/36%/27%/26%/2%). These questions were typically less complicated than ours and hence participants may have felt less unsure and thus show a weaker tendency towards the center.

3.3.2 Mobility Choices and Beliefs

We next address migration choices by rich players in the Mobility treatment and the beliefs of poor players regarding these. In contrast to tax choices, mobility choices are reasonably in line with equilibrium predictions. If the tax rates are such that moving is maximizing payoffs (i.e., if domestic taxes are high, while foreign are not), then 62.6% of rich players move, whereas if moving is not maximizing payoffs (i.e., domestic taxes are low or medium or foreign taxes are high), only 9.8% of rich players move. Qualitatively, this patterns supports Hypothesis 8, but again, the deviation from the point prediction is quite large, though not as substantial as for the tax choices.

The deviation from the equilibrium prediction is again largely in line with altruism (or in this case also inequality aversion), as the more frequent deviation of not moving when it pays is increasing the poor players' payoff. Interestingly, beliefs appear again to largely disregard these social preferences. Poor players expect rich players to migrate much more frequently when it pays (90.2% of the time, see Figure 4). When moving does not pay, poor players expect rich players to move somewhat more frequently (18.1%) than they actually do (see Figure 5). They seem to either consider rich players to be less rational or outright spiteful than they actually are. Alternatively, since beliefs are
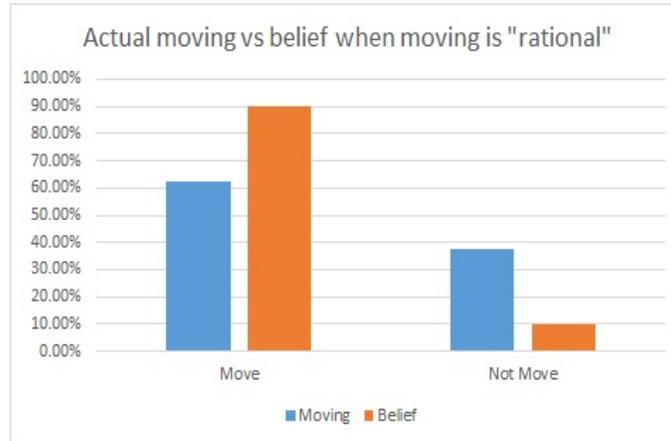
Figure 4: Distribution of tax choices of poor type in the Mobility treatment by foreign tax level

hypothetical, poor players may think less hard about rich players' choices than the rich players themselves, such that the deviation is pure error. Migration beliefs and choices differ significantly according to chi-square tests except for the case where taxes in the home country are low. We summarize the mobility choices and beliefs in

Result 2. *Modal mobility choices are in line with equilibrium prediction. The far more common deviation not to migrate when this pays in in line with social preferences such as altruism or inequality aversions. Beliefs on migration choices are again more in line with selfish choices and slightly more irrational or spiteful choices that actual decisions.*

3.3.3 Political Attitudes and Tax and Mobility Choices

Our main research question addresses whether controlling for observable variables such as household income and education, political attitudes have an impact on preferences about taxation. In order to address this, we relate experimental tax and mobility choices both to political party preferences as well as to a direct question about preferences for redistribution.

Figures 6 and 7 show the distribution of tax choices in the mobile treatment by political party preferences. While again for all parties and both roles, the medium tax is the modal choice, there are discernable patterns that are consistent with an intuitive view of the preferences of followers of different parties. In both roles, supporters of the most left-leaning party in Germany, the left Party ("Die Linke"), vote more often for high and less often for low and medium taxes than supporters of any other party. Supporters of more conservative or pro-business parties (Christian Democrats, CDU/CSU, Free Democrats FDP) are more likely to vote for low and less likely to vote for high or medium taxes than supporters of other parties.
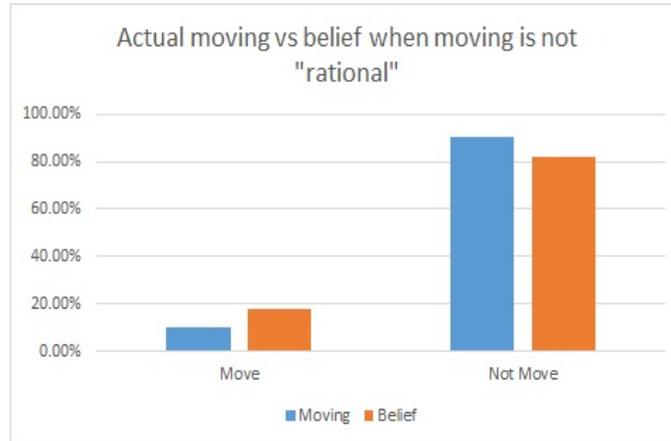
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Figure 5: Distribution of tax choices of poor type in the Mobility treatment by foreign tax level
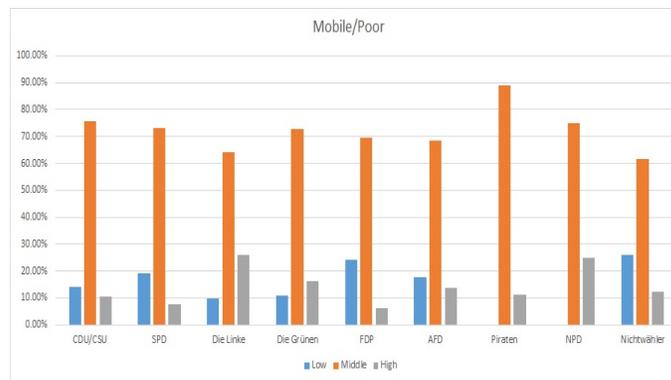

Figure 6: Tax choices of poor players in mobile treatment by political party preference

While for all parties in both roles the medium tax rate is by far the most frequent choice (with the exception the extreme right-wing party NPD in the rich role, which is not relevant due to small number of observations), all differences between the omitted group of those who stated no party preferences are significant except for the supporters of the Green Party and some differences are also substantial, e.g., more than a quarter of "rich" supporters of the Left Party vote for high taxes, but nearly none of the FDP supporters does.

In order to study the effect of party preferences in a more systematic way we follow the sorting of parties sorting by the Comparative Manifesto Project (data and information at https://manifesto-project.wzb.eu/) on a left-right scheme. This shows that in both roles, supporters of more left-leaning participants choose higher taxes than supporters of more right-leaning parties in the mobility treatment, but actually not in the immobility treatment.
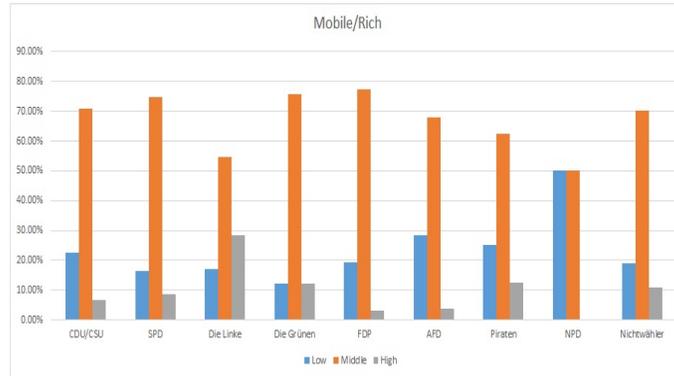
Figure 7: Tax choices of rich players in mobile treatment by political party preference
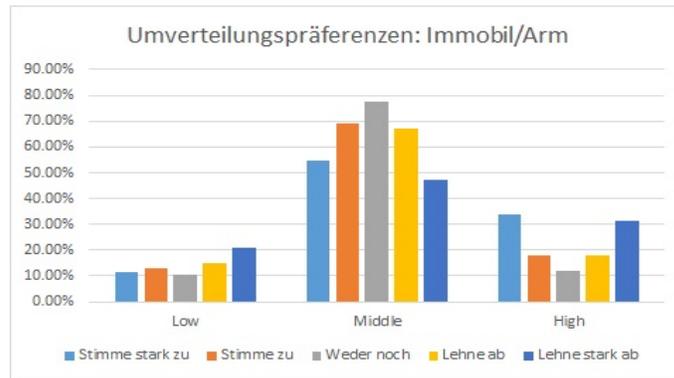

Figure 8: Tax choices in poor role by answers to survey question regarding redistribution preferences

Using a direct question about an indiviudal's preference for redistribution ("government should employ policies to lower income inequality") turns out to be a better predictor of tax choices. Those who support government redistribution vote for higher taxes in both roles. Interestingly, this holds even when controlling for beliefs of the poor about migration decisions and hence the impact of ideology on chosen tax rates does not work exclusively through beliefs about others' migration choices, as one could expect. Indeed, migration beliefs and political party preferences are not significantly related and hence the estimates for the party dummies on tax choices are not substantially changed if we add migration beliefs. The relationship between the survey question regarding redistribution preferences and chosen tax rates in the immobility treatments, where migration beliefs are irrelevant, is illustrated in Figures 8 and 9. Interestingly, while those who strongly agree to the statement that government should redistribute consistently vote in both role for higher taxes than other groups, those who strongly oppose this statement clearly want low taxes when they are rich but are the second most likely to vote for high taxes when they are poor and are thus the most selfish group.
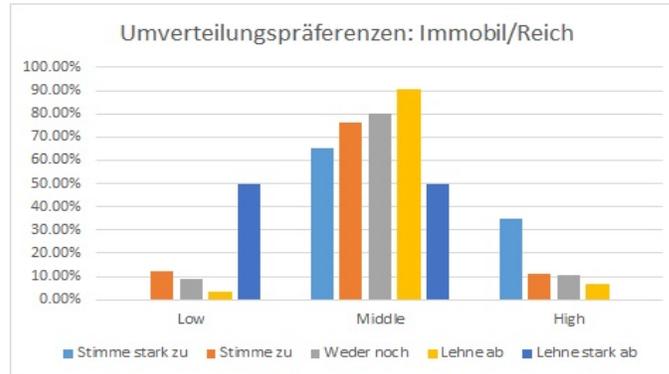
Figure 9: Tax choices in rich role by answers to survey question regarding redistribution preferences

Political ideology also matters for migration decisions. When taxes in the home country are high, supporters of the left party migrate less, while FDP and AfD[2] supporters migrate more. Similarly, participants who believe more strongly in the efficiency of the market mechanism are more likely to migrate. The preference for redistribution, in contrast, does not predict migration choices.

4 Laboratory Experiment

Prior to the online experiment we ran a more conventional laboratory experiment, in which 108 individuals (mostly students) participated. The general setup parallels the one described above in section 2. In particular, we kept the composition of a country with one rich and two poor individuals, identical distribution of gross incomes, the set of tax rates, the cost of mobility, and the random dictator voting mechanism. At the same time there are several relevant differences conceptually and in the empirical implementation.

4.1 Experimental design

At the conceptional level, there are at least three major differences. One concerns the nature of strategic interaction. In the online experiment we paired subjects ex post to determine payoffs and used the strategy method to see how subjects make choices conditional on assumed behavior elsewhere. By contrast, in the lab experiment we paired subjects into countries during the experiment and thereby created full strategic interaction. A second difference relates to the assignment of roles. In the lab experiment the roles of rich and poor were based on the outcome of simple, five minute counting

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[2]Ironically, thus, supporters of this anti-immigration party are most likely to be economic migrants in our study.

exercise. Those subjects who performed best in adding four two-digit numbers were awarded the role of a rich person, who has much higher gross income. A third difference arose from the first one in that the lab experiment allowed us to study behavioural dynamics as we repeated rounds of tax and migration choices. After each round subjects are informed about tax rate and migration choices in both countries. Finally, and to the advantage of the online experiment we have a representative sample of the German adult population, including about 200 students. Subjects in the lab experiment are mostly students.[3]

In the lab experiment we considered two treatments. In the ImmobMob treatment subjects repeated the closed economy setup with no migration option for the rich 15 rounds, followed by another 15 rounds of the open economy setup with potential migration of the rich. In the second treatment MobMob, subjects interacted 30 rounds in the same setup with the migration option. In both treatments subjects were informed about the nature of the interaction in the second phase only after phase 1. At the beginning of the experiment, however, subjects were told that the experiment lasts for 30 periods and new instructions are provided after 15 rounds of play. The two treatments allow us to compare the role of mobility both across subjects pools (periods 1-15 in the two treatments) as well as within the same subject pool (periods 16-30 versus periods 1-15).

Subjects were paid on the basis of one randomly chosen period of each phase. Four points in the experiment translated into one Euro payout. No show-up fee was paid.

The experiment was conducted in the computerized mLab at the University of Mannheim, using z-Tree and ORSEE.

4.2 Results

The following table displays the distribution of tax votes by treatment, phase and type. A large majority of tax votes is in line with equilibrium prediction. Particularly noteworthy are the 92% of poor voting for high tax rates in the absence of mobility, as well as the almost fully selfish play by rich subjects who choose almost always low tax rates, although there are some votes for medium tax rates in the absence of mobility. Interestingly there are also some votes for high taxes among the poor when the rich are mobile. Note that phase 2 behavior is nearly identical across treatments.

Treatment	Phase	Poor			Rich		
		L	M	H	L	M	H
ImmobMob	1	2.4%	5.6%	92%	88.5%	11.1%	0.4%
	2	7%	73%	20%	97.8%	2.2%	0%
MobMob	1	5.4%	57.2%	37.4%	99.6%	0.4%	0%
	2	5.2%	69.3%	25.6%	97.4%	2.6%	0%

[3]The difference between the Internet panel experiment and laboratory experiment does not originate from behavioral differences between students and non-students. Among the 3000 observations in the GIP experiment, about 200 are students. These show a similar bias towards the medium tax rate.

We test for treatment differences using linear and ordered probit regressions with standard errors clustered at individual level or linear regression with individual-level random effects. For poor subjects we find that they vote for higher taxes without mobility (as expected) and vote for lower taxes in the second than in the first phase of treatment 2 (MobMob). As for rich subjects, they vote for higher taxes without mobility (contrary to expectation),and there are no differences across phases, as well as no treatment difference in second phase.

As in the online experiment it is important to understand who deviates from equilibrium? Among rich players in the MobMob treatment 7 out of 8 votes for the medium tax M come from the same female subject, who would vote for the center-right party CDU, but thinks that both socialism and capitalism are in principle good ideas and society is not very fair. In the first treatment (ImmobMob) 17 out of 36 votes for M in phase 1 come from the same male subject, who switches to the low tax rate L after period 17. This individual would vote for the Pirate Party (a niche party), thinks socialism is in principle a good idea and that society is largely fair. Another 8 votes for the medium tax M come from two CDU voters.

We also take a closer look at the role of party preference for the tax vote. We use linear regressions with individual-level random effects in which the omitted category are those without stated party preference. For poor subjects green voters choose higher taxes ($p<0.05$), FDP ($p< 0.05$) and Left Party (!) ($p<0.1$) voters choose lower taxes. Among rich players Pirate party supporters choose higher taxes ($p<0.05$). There are no other significant differences. In general these results are derived from a low number of observations and thus have little statistical power (40 out of 108 subjects in the lab experiment did not answer the question about party preference). An exception are the results for supporters of the Green Party.

As substitute for party preference, we use survey questions on political attitudes among participants in the lab experiment. We ask to rate various statements such as i) socialism/capitalism is a good idea, ii) the rich should show solidarity with the poor, and iii) society is largely fair. Essentially none of them has a significant impact once we control for dependence of observations. Only the attitude toward socialism and a dummy for the role of luck for economic outcomes are significant for the tax choice of the rich if we include treatment and other controls. However, many coefficients do not even have the expected sign. An example is the belief that luck determines income is related to lower tax choices of the rich.

We finally turn to an analysis of the migration behaviour by rich subjects. Rich players almost always switch when they should: When the tax rate in the own country is high, while low or medium in the other country, and thus the condition for profitable migration is met, the switch rates are between 82% and 100%. Rich players very rarely switch when they should not. Exceptions are the following: Migration rates are 19% from a medium tax country to a low tax country, and 12.5% between high tax countries. Overall, out of 131 migration choices made by rich players only 19 are not in line with subgame-perfect Nash equilibrium.

More systematic analysis using probit regression with individual-level random effects show that the probability to migrate increases in the tax rate in own country and decreases in the tax rate in other country, as one would expect. Supporters of the center-left Social Democrats (SPD) are more and supporters of center-right Christian Democrats are less likely ($p<0.05$) to migrate than those without stated party preference. Interestingly those individuals who are thinking society is fair and those thinking income is determined by luck, or by achievement, are all less likely to migrate ($p<0.05$).

5   Conclusion

to be completed

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