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Preferences for redistribution and exposure to tax-benefit schemes in Europe*

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Abstract

This paper provides evidence that attitudes towards redistribution are associated with the extent of generosity of the redistributive context experienced by the individual, as measured by the likelihood of receiving positive benefit transfers net of fiscal contribution. We estimate reduced form tax-benefit equations with the EU Statistics on Income and Living Conditions (EU-SILC), and match the implied parameters to the respondents of the European Social Survey (ESS) on the basis of their characteristics. The period of analysis is 2008-2016. For identification, we exploit exogenous cross-country and time variation in tax rules and market income to disentangle implications of exposure to tax-benefit rules on preferences for redistribution from the effects of changes in income inequality. We find that exposure to positive net benefits increases demand for redistribution by about 1.2%, the effect being robust across a variety of specifications. The signs of the effects are consistent with those predicted by a simple model where exposure to redistribution affects expectations for consumption, but risk averse individuals discount this effect by the nature of income shocks they are exposed to in the market.

Keywords: Income Inequality, Preferences for redistribution, ESS, EU-SILC, tax-benefit system.

JEL Classification: D31, D63, D72, H20.

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1. Introduction

Individuals form their attitudes towards income redistribution on the basis of multiple factors such as prior beliefs on distributive justice, self-interest, inequality levels, as well as the extent of redistribution they actually face in the economy. Understanding whether income redistribution has a separate impact on support for redistribution is of central importance for assessing the stability of political support towards these measures. In recent decades, the sustained rise in income inequality (Alvaredo et al. 2013 and 2017) has put governments under pressure to implement redistributive measures. These measures include shifting the burden of taxation and allocating benefits across individuals. This paper investigates empirically if increasing the generosity of the tax-benefit system has an impact on preferences for redistribution.

The link between inequality, preferences for redistribution and the implied size and generosity of the taxation and social welfare system has been studied in political economy literature. In seminal works, Romer (1975) and Meltzer and Richard (1981) show that, under majority rule, the median voter is decisive in pushing for more redistribution when the median income is sufficiently lower than the mean income. In a setting of maximizing utility derived from leisure and consumption and having a flat income tax rate and a lump-sum transfer benefit, richer (poorer) individuals demand less (more) redistribution, as captured by the tax rate magnitude. The prevailing tax rate in the voting equilibrium is that of the median voter, thereby predicting that actual redistribution rises with inequality in equilibrium.

The equilibrium outcome of the above median voter model is tempered by alternative mechanisms explaining preferences for redistribution. For example, the Prospect of Upper Mobility (POUM) hypothesis (Piketty 1995, Benabou and Ok 2001) establishes that relatively poor individuals may have expectations of upward mobility so that they would favour lower taxes, less redistribution and therefore more inequality. Alesina and Angeletos (2005) show that societies where individual effort is believed to be the main source of income formation prefer less taxes and redistribution, while the contrary holds for societies that believe that luck determine income. Even in a context of rising inequality, the political influence of economic elites may prevent the realization of redistribution through lower taxes (this is the "one dollar, one vote" equilibrium found by Karabarbounis (2011)). Furthermore, under the "last-place aversion" hypothesis developed by Kuziemko et al. (2015), low-income individuals may oppose redistribution if they believe this helps individuals just below them in the income distribution. Individuals may also prefer redistribution taking place locally above them and in the top, i.e.

reducing incomes of individuals located just above them in the income distribution and in the top of the distribution (Fisman et al. 2018). Other approaches that seek to enrich and challenge the median voter theorem predictions focus on the role of perceptions and informational bias (Schokkaert and Truyts 2017; Gimpelson and Treisman 2018; Cruces et al. 2013; Karadja et al. 2017).

All these contributions analyse explicitly the role of experienced or expected inequalities on preferences for redistribution, holding the exposure to actual redistribution as fixed. There is little evidence on the effect of the actual welfare state generosity on preferences for redistribution, holding income risk and inequality fixed (two exceptions are Sacchi et al. 2020 and Thewissen and Rueda 2017).

The present study contributes to this literature by assessing empirically the extent at which the generosity of the welfare state shapes individual preferences for redistribution. Generosity is captured by the likelihood of being a net benefit recipient and by the level of the benefits-to-taxes ratio. We argue that taxes and benefits account, on the one hand, for the degree of exposure of the individuals to the shape of the tax-benefit system and to redistribution (as captured by objective parameters) and, on the other hand, for differences across societies in setting the redistribution parameters driving public spending.

We first incorporate these aspects in a theoretical model drawing from Alesina and La Ferrara (2005), where we additionally consider individual income realizations to be stochastics. We model exposure to social transfers by introducing a parameter that measures the likelihood that a given social benefit is transferred to the individual. This parameter incorporate uncertainty in the assignment rules, which may depend not only on own past income, but also on past income realizations of eligible subpopulation. We refer to an increase in this probability as an expansion in generosity of the welfare state, given taxes and income. The model predicts that an exogenous increase in the likelihood of receiving social transfers rises preferences for redistribution, the effect being separable from other potential mechanisms.

We argue that the position of each individual within the redistribution scheme should be carefully measured, and that variations within country have an impact on individual perspectives for redistribution. The position of the individual can also vary along the life-cycle, socio-demographic characteristics, country, time, income, and circumstances. Therefore, including a country-year specific measure of inequality (such as the Gini index of net and gross income) in

a regression of individual preferences for redistribution would lead to an imperfect way to account for the position of the individual within the structure of taxes and transfers[1].

We overcome these limitations by using a two-sample strategy, which consists in pairing individual data of preferences for redistribution drawn from the European Social Survey (ESS) with individual-level predictions of exposure to tax-benefit schemes drawn from the EU Survey of Income and Living Conditions (EU-SILC). Our ESS sample includes all the rounds of interviews taken between 2008 and 2016 (five cross-sections), while the EU-SILC sample includes all the yearly rounds (nine cross-sections) fielded between 2009 and 2017. Taxes and benefits for ESS respondents are predicted from tax-benefit functions parameters estimated from regressions on EU-SILC on representative groups of respondents, and matched conditionally on country, year and non-linear combinations of disposable income, number of household members, marital status and labour market characteristics of household members. Identification of the effect of net benefits exposure on individual preferences for redistribution exploits exogenous variations in tax-benefit eligibility rules across countries, years, marriage, labour status of household members and household size.

The main results show that treating the individual with positive net benefits, hence identifying a net recipient from redistribution, yield a significant increase in the probability of supporting redistribution of 1.2% in the preferred specification. The effect is robust to a variety of specifications and after adding relevant controls. Among these controls we include individual demographics and household disposable income, in order to control for living standards and the main drivers of the tax schedule; country and time fixed effects; size of the income redistribution system in the country; measures of market income inequality to control for uncertainty on income sources and hence hold insurance motives as constant; and measures of inequality in disposable income alongside national income growth predictions.

The rest of the paper is organized as follows: the next section sketches a model describing the main effects we aim identifying. Section 3 presents the data. Section 4 presents the empirical strategy. Section 5 presents and discusses the results. Section 6 provides some concluding remarks.

[1] Although a number of studies utilize measures of inequality and redistribution at the country level and across periods to account for the effect of inequality on preferences for redistribution (e.g. Yamamura 2012, Pittau et al. 2013, Kerr 2014, Olivera 2015, Roth and Wohlfart 2018), we consider that this strategy gives only an approximate perspective about the role of the structure of taxation and benefits in the country on preferences for redistribution.

2. Theoretical framework

2.1 Literature

The median voter theorem, applied in the context of income taxation and redistribution (Meltzer and Richard 1981), predicts that rising income inequality leads to more redistribution. A whole body of empirical studies has investigated its validity. One group of empirical studies uses macro-level variables at the country or region level that capture inequality and redistribution (e.g. the Gini coefficient and social expenditures), while another group focusses on individual preferences for redistribution. In the first group, the effect of inequality on redistribution has not received much significant empirical support. Examples are Rodriguez (1999), Persson and Tabellini (1994), Perotti (1996), Moene and Wallerstein (2001, 2003), Lind (2005) and Shelton (2007), although some exceptions are Milanovic (2000, 2010) and Karabarbounis (2011). The second group of studies focus on the determinants of individual preferences for redistribution, with some evaluating the role of income inequality on redistributive preferences (e.g. Alesina and Giuliano 2011, Yamamura 2012, Pittau et al. 2013, Kerr 2014, Olivera 2015, Roth and Wohlfart 2018, Dimick et al. 2016).

The literature has taken several directions in the pursuit of enhancing the predictions of the median voter model. One is the role of perceptions and informational bias, particularly the finding that individual redistributive preferences can be more strongly related with perceived inequality than actual inequality (e.g. Cruces et al. 2013, Gimpelson and Treisman 2018, Hauser and Norton 2017 and Kuhn 2019). Preferences for redistribution are also determined by individual beliefs about distributive justice, particularly by the source of inequalities[2]. Underlying beliefs such as fairness, luck and effort (Karadja et al. 2017) are prominent determinants studied mostly in the lab and field experimental surveys. Self-interest, other regarding preferences (Dimick et al., 2006 and 2018), insurance motives and social concerns (Durante et al. 2014) are also part of these micro-level mechanisms behind the formation of redistributive attitudes.

As mentioned in the introduction, prospects of upper mobility (the POUM hypothesis, see Benabou and Ok 2001 and Cojocaru 2014) can deter individuals of supporting redistribution if

[2] See for example Piketty (1995), Fong (2001), Alesina and Angeletos (2005), Cappelen et al. (2013), Durante et al. (2014) and Schokkaert and Truyts (2017).

they believe that in the future they will move up in the income distribution, while for Piketty (1995) the support for redistribution depends on personal experiences of mobility. Alesina et al. (2018a) implement a field experiment survey in the US and four European countries and find that, in general, individuals have incorrect perceptions of actual intergenerational mobility (too optimistic in US and too pessimistic in Europe).

The effects of the economic environment -captured by macro variables- on preferences for redistribution has also received recent attention: economic recessions experienced at young age (Giuliano and Spilimbergo 2014); income inequality experienced at young age (Roth and Wohlfart 2018); the recent Great Recession (Fisman et al. 2015) and actual public debt (Roth et al. 2019). Culture and identity have also emerged as an important driver for redistributive preferences (Shayo 2009, Luttmer and Singhal 2011, Costa-Font and Cowell 2015), as well as immigration perceptions (Alesina et al. 2019, Alesina et al. 2018b).

There is not much literature looking at the effects of taxes and benefits paid and received by the household on preferences for redistribution. Although some studies use country-level measures for income inequality and social expenditure to explore the relationship between redistribution and individual redistributive preferences, this can only provide an incomplete idea about such relation. The main reason is that each individual is affected distinctively by the tax-benefit schedule.

2.2 A simple model

This section sketches a simple theoretical model to analyse how inequality and exposure to tax-benefit rules affect preferences for redistribution. We analyse the behaviour of a representative agent who selects the desired level of taxation given her budget constraint and preferences over consumption. In a model with no labour supply, we assume that agent's utility over consumption depends on her disposable income after taxation and redistribution.

We consider a setting where gross individual income $\tilde{y}$ is stochastic (with population average $\overline{y}$). Its distribution represents income risk in the market. Redistribution is in the form of basic income-flat tax scheme, where a tax τ is collected on every unit of gross income and redistributed (not necessarily equally) across agents, with a per-capita redistribution of $b\tau\overline{y}$. The parameter $b \in [0,1]$ represents the probability that the individual receives the benefit she is entitled to. This probability represents uncertainty in the benefits assignment rules. Benefits are often allocated on the basis of needs, identified by the rank of eligible individuals ordered by their households'

demographics and their past income story. The probability of receiving the (full) benefit thus depends on own and on others' eligibility status and might differ across individuals. There is a cost related to administration of redistribution and to potential disincentives (the leaky bucket assumption, see Okun 1975), which we assume quadratic in the tax schedule. The agent's net income is denoted $\tilde{y}^d$ and is also stochastic. It corresponds to the gross income minus taxes, plus transfers reduced by the loss factor, and it is formally defined as:

$$\tilde{y}^d = (1-\tau)\tilde{y} + b\tau\overline{y} - \frac{\tau^2\overline{y}}{2} \qquad (1)$$

The agent is an expected utility maximize, holding preferences towards stochastic consumption. We assume that individual preferences satisfy the dual independence axiom for risky lotteries, which implies that the agent's preferences can be represented by an expected utility function $\boldsymbol{EU}$ that is linear in incomes but not in probabilities (contrary to the standard expected utility model that is linear in probability but attaches a Von Neumann-Morgestern utility weight to these probabilities). As a consequence, preferences are translation invariant, indicating that the risk evaluation of the agent over risky prospects remains constant with respect to any affine transformation of incomes. Therefore, if gross income risky distribution $\tilde{y}$ is preferred to $\tilde{y}'$, then it is guaranteed that the agent does not reverse the order after receiving lump sum positive income transfers from the government (this might not the case with expected utility models). Preferences satisfying this property can be represented by a rank-dependent function, which weights outcomes through a weighting function that distort probabilities (i.e., ranks) that a given outcome occurs. Denote p the probability that $\tilde{y}$ is smaller than an income threshold y, and the corresponding quantile being $y(p)$. Let $w(p) \in [0,1]$ indicate a distortion function which is decreasing in p. The function attaches more weight to more adverse realizations of $\tilde{y}$, expressing risk aversion. The $\boldsymbol{EU}$ function satisfying these properties writes:

$$\boldsymbol{EU}(\tilde{y}) = \int_{[0,1]} w(p)y(p)dp \qquad (2)$$

The agent's problem is to maximize her expected consumption given her resource constraint (equation 1), i.e., to choose the optimal level of taxation τ^* that maximizes $\boldsymbol{E}U(\tilde{y}^d)$. This identifies the individual demand for redistribution as a function of features of the gross income distribution and of preferences for consumption. Demand for redistribution, hence, reflects the agent's preferences for consumption, which in turn depends on disposable income.

A convenient formulation for the agent's preferences involves the "Gini weights" $w(p) = (1-p)^2$, which allows to write $\boldsymbol{E}U(\tilde{y}) = \boldsymbol{E}[\tilde{y}]\big(1 - G(\tilde{y})\big)$, with $G(\tilde{y})$ the Gini coefficient of the lottery $\tilde{y}$ and $\boldsymbol{E}[\tilde{y}]$ the agents income expectation (see Andreoli 2018). The implied demand for redistribution is obtained by solving $\frac{\partial EU(\tilde{y}^d)}{\partial \tau} = 0$ and gives:

$$\tau^* = b - \frac{\boldsymbol{E}[\tilde{y}]}{\overline{y}}\big(1 - G(\tilde{y})\big) \qquad (3)$$

This simple models highlights the implicit trade-offs between individual expectations, income risk and the size and generosity of redistribution in explaining people attitudes towards redistribution. First, the demand for redistribution is driven by features of expected and realized income. The term $\overline{y}$ defines the size of the redistribution, which is proportional to the average income collected in the society. A rise in the size of redistribution has a positive effect on demand for redistribution ($\partial\tau^* / \partial\overline{y} > 0$): holding individual gross income expectations as constant, more income being redistributed increases support for redistribution as the individual can trade-off one unit of contribution to the public good through the taxation system ($\tau\tilde{y}$) with a higher share of the public good generated.

A related effect is that of rising the probability of benefit assignment, b. Its effect on preferences for redistribution is positive ($\partial\tau^* / \partial b > 0$), implying that rising exogenously the chances of benefits assignment also rises support to redistribution. Altogether, rising chances of allocating benefits and the size of redistribution imply a rise in generosity of the redistribution system (by rising the extent of benefits net of taxes accruing at the individual level), which in turn has a positive impact on preferences for redistribution. The extent of the impact attributable to rising eligibility is independent from the size of redistribution and from other drivers of preferences for

redistribution, notably inequality. Conversely, the effect of rising the size of redistribution depends on other parameters of the model.

The effect of a change in average income $\overline{y}$ is contrasted with the effect of rising individual expectation towards the gross market income, i.e., $\boldsymbol{E}[\tilde{y}]$. Expectations might differ from per capita income because individuals experience different sources of market income distributional uncertainty, for instance by region of residence and labour market characteristics. Individual expectations are more likely driven by factors upon agent's control, such as human capital investment, seniority on the job and labour supply, as well as by agent's skills and talents. These factors interact with each other in defining income expectations. Alone, expectations of income have a negative effect on demand for redistribution ($\partial\tau^* / \partial \boldsymbol{E}[\tilde{y}] < 0$): the agent willingness to contribute through taxation is offset by the possibility of enjoying only a residual part $(1-\tau)$ of the income increase, while enjoying an increase in income through redistribution that is proportional to the per-capita income. Furthermore, having prospects for upward mobility (POUM) weakens individual demand for redistribution. Recall that under the POUM hypothesis, individuals may demand less redistribution and accept more inequality if they have expectations of upper mobility, i.e. higher incomes in the future. This intuition holds, however, only when risk considerations are not taken into account. As the simple model illustrates, risk-averse individuals discount implications of upper mobility by the Gini coefficient, expressing the degree of risk implicit in the gross market income distribution. Risk-averse individual prefer to insure against risk by increasing their demand for redistribution ($\partial\tau^* / \partial \boldsymbol{G}(\tilde{y}) > 0$).

Lastly, in the presence of proportional individual income growth across the population, the income quantile occupied by one individual in the ex-post income distribution may represent a good prediction for the expectation. For the median voter, the best income prediction is the median level of income, implying $\boldsymbol{E}[\tilde{y}] = y(0.5)$, with $y(p)$ being the inverse empirical income distribution evaluated at fractional rank p. The attitudes for redistribution of this individual are of special interest, as they determine the overall level of redistribution as a simple voting equilibrium outcome. These preferences depend on the extent of societal inequality, given by the measure $\frac{\overline{y}}{y(0.5)}$ (as in Meltzer and Richard 1981). Inequality is larger when the gap between average and median income increases. Ceteris paribus, rising inequality has a positive impact on preferences for redistribution, holding other factors as fixed ($\partial\tau^* / \partial \frac{\overline{y}}{y(0.5)} > 0$).

To sum up, the simple theoretical model predicts a rise in the demand for redistribution if there is: i) an increase in the potential of redistribution captured by average income; ii) a rise in the probability of benefit assignment; iii) an increase in income risk captured by the Gini coefficient; and iv) a decrease of expected income. The next section empirically tests these predictions.

3. Data

3.1 Sample and variables

We utilize the 2008, 2010, 2012, 2014 and 2016 rounds of the European Social Survey (ESS). The ESS collects information on attitudes, beliefs, values and behaviour patterns for a nationally representative sample of individuals living in Europe.[3] Alongside, we make use of data from the European Union Statistics on Income and Living Conditions (EU-SILC) fielded between 2009 and 2017 to estimate taxes and benefits (section 3.2 provides details of this matching). The EU-SILC is the leading survey in the European Union to provide official measures of income, poverty, social exclusion and living conditions in a comparable way.

The key question in ESS that measures preferences for redistribution is the following: "To what extent do you agree or disagree with the statement: the government should take measures to reduce differences in income levels". The individual must choose one of five responses: i) strongly agree, ii) agree iii) neither agrees nor disagree, iv) disagree, and v) strongly disagree. To facilitate the interpretation of the coefficients in the regression models, we use a dependent variable that takes value one when the individual answers "strongly agree" and zero otherwise.

The generosity of the tax-benefit system is the main treatment variable. We consider two types of indicators capturing generosity: i) a dummy variable that takes value one if the individual's household is a net recipient of benefits (i.e. whether received benefits are larger than paid taxes) and zero otherwise; and ii) five dummy variables indicating for each respondent the proportion that benefits represent with respect to taxes, i.e. whether the benefit-to-tax ratio is between 0.2 and 0.5; 0.5 and 1.0; 1.0 and 3.0; 3.0 and 6.0 or larger than 6.0. The three last variables reflect that benefits are larger than taxes for the individual's household, and that therefore the household

[3] We do not use the 2002-2006 rounds of ESS because the definition of household income (particularly the number and range of income brackets) is different with respect to other years.

is a net positive recipient of the tax schedule in the country. These indicators capture the intensity of the tax-benefit generosity experienced by the individual.

The control variables for the individual are sex, marital status, educational level, age group and any condition related to benefit recipient (retired, unemployed and disable) and household size. Educational levels are expressed as dummy variables for secondary and tertiary education; age groups are expressed as dummy variables for ages 25-45, 45-60, and over 60; the retirement, unemployed and disability variables are also dummy variables. For robustness check, we additionally control for individual self-assessed political view, ranging on a 0-10 points political scale between left (0) and right (10).[4] A dummy variable for left-oriented views take value one if the respondent choses four or less points, and zero otherwise; while another dummy variable for right-oriented views take value one if the respondent choses six or more points, and zero otherwise.

The analysis also includes variables that measure income distribution and the size of redistribution that are country and time specific. We compute Gini indices of equivalized market income (pre-tax and pre-transfers) and disposable income (post-tax and post-transfers) with EU-SILC data. The mean and median of equivalized disposable income and the shares of national income owned by the bottom 10%, top 10% and top 5% of the income distribution are estimated from EU-SILC data on the relevant income year. The variables for country-year redistribution levels are the ratios of social transfers to GDP and tax revenues to GDP, which are drawn from the World Bank Development Indicators (WBDI). We also include the income growth rate (averaged across three subsequent years) from the WBDI.

After dropping observations with missing information in the variables of interest and for those countries and years with no match between ESS and EU-SILC, we gather a using sample of 150,715 individuals from 29 European countries observed over the period 2008-2016. The sample size reduces further when we perform some robustness checks. The descriptive statistics are reported in Table 1, while Table A1 in the appendix reports the composition of the sample across years and countries.

[4] The ESS question for this variables is “In politics people sometimes talk of left and right. Using this card, where would you place yourself on this scale, where 0 means the left and 10 means the right?”.

(Table 1 about here)

On average, 30.2% of individuals strongly agree that "the government should take measures to reduce differences in income levels", though there is substantial heterogeneity across countries and years (see Table A2 in the Appendix for details). On average, half of the individuals of the sample belong to households that are net benefit recipients and the other half are net tax payers. Nevertheless, countries differ markedly. For example, in the whole analysed period, 16% of individuals in Denmark belong to households that are net benefit recipients, while in Ireland this figure is 76% (see Table A3 for more details).

The extent of inequality in the distribution of disposable income displays heterogeneous patterns across years and countries in our data. The Gini index of disposable income ranges from 0.20 (Slovenia 2008) to 0.35 (Latvia 2009). The other macro variables also show important differences across countries and years. For example, the top 10% and 5% income share span from 19% to 29% and from 11% to 19%, respectively, and the mean-to-median ratio varies between 1.04 and 1.25. The income growth rate over the period of interest is 1.2% on average, albeit the data display substantial variability. A different measure of inequality is the Gini index of market income, which captures riskiness in the market income distribution. This index ranges between 0.40 and 0.58 in our sample, reflecting the sharp increase in inequality experienced by many of the countries we consider over the Great Recession. The redistribution system reduces inequality by about one third (i.e., by comparing the Gini indices of market and disposable income). The extent of this effect depends on the size of the redistribution system, which is captured by the country-year specific share of average income that is collected as social contribution or tax revenue.

3.2 Matching ESS and EU-SILC

Information about individual exposure to tax-benefit rules has to be imputed from data other than ESS, which only reports disposable income at household level, alongside demographics. We use an indirect statistical matching method based on a two-sample strategy to link characteristics of taxpayers' households provided in ESS to parametric estimates of the tax and benefit scheme of a particular country and year recovered from EU-SILC. Information on income is supplemented with characteristics of the household and of its components, along with information about labour market attachment of workers and their earnings. The reference period for incomes, taxes and

benefits used in EU-SILC is the year prior to fieldwork. Therefore, the ESS survey fielded in a particular year must be paired with the EU-SILC cross-section of the following year.

The matching procedure unfolds as follows. First, we obtain estimates rom EU-SILC of specific parameters that capture the tax-benefit scheme of each country and year and reveal the exposure of individuals to taxes and benefits conditional on key observables that determine the link between gross and disposable income (labour and marital status in the household and household size). Operationally, we do so in a reduced form setting by regressing separately the amount of taxes paid and benefits received by each household on non-linear combinations of disposable household income brackets, number of household members, marital status and labour market characteristics of household members (full- or part-time work, unemployed, studying, pensioner, disable and other). The estimating models for taxes (tax_i) and benefits (ben_i) are:

$$y_i = \gamma_0 + \sum_d y_i(d) * (\gamma_0(d) + \sum \gamma_{1s}(d)\, X_i + \gamma_2(d) M_i + \gamma_3(d) S_i) + \varepsilon_i\,, \qquad (4)$$

where $y_i = \{tax_i, ben_i\}$ for a given country and year. The parameters of interest, $\gamma(d)$, are estimated regressing taxes and benefits accruing at the household level on a vector of characteristics of the household X_i, including dummy variables indicating whether any member of the household is i) working full-time; ii) working part-time; iii) a pensioner or is unemployed; iv) self-employed; v) a student; vi) disabled; vii) other. The covariate M_i takes value one if any member of the household is married and zero otherwise, a relevant information for assignment of benefits and for taxation in those countries with a joint filing system. S_i indicates the number of members in the household. All these variables are interacted with indicators $y_i(d)$ of 10 income brackets (*d=1,…,10*) as defined by the deciles of the household disposable income distribution in the corresponding country and year. Thereby, parameters $\gamma(d)$ vary along characteristics of the household and the income decile d that the household belongs to. We use household disposable income brackets instead of nominal values because ESS only reports information about disposable income at household level in brackets corresponding to the country-year income distribution deciles. To guarantee statistical match of EU-SILC estimates on ESS, we use the same definition of income brackets reported in ESS. Although this simplification induces bias in estimating tax-benefit rules parameters, the interactions between income brackets and household characteristics introduced in equation 4 help us to control for it.

Finally, the regression parameters estimated in EU-SILC are assigned to the ESS respondents by identifying the same household type the respondent belongs to. This means that the pairing is conditional on non-linear combinations of income, household size, marriage and labour status of household members, which allow us to predict taxes and benefits for each individual in ESS, denoted $\widehat{tax}_i$ and $\widehat{ben}_i$. Once taxes and benefits are predicted to individuals in ESS, we construct measures of generosity of the tax-benefit rule, our main treatment variable, based on the empirical index $\frac{\widehat{ben}_i}{\widehat{tax}_i}$.

4. Empirical strategy

The empirical literature on preferences for redistribution routinely uses the multiscale questions that inquire about individual redistributive preferences from well-known surveys like the ESS and others. We use linear estimators, and probit as a robustness check (following the empirical strategies in Kerr 2014, Alesina and Giuliano 2011, Luttmer and Singhal 2011). The estimating equations is:

$$PR_{i,c,t} = \theta_c + \delta_t + \beta X_{c,t} + \gamma Z_{i,c,t} + \theta T_{i,c,t} + \varepsilon_{i,c,t} \quad (4)$$

The subscripts *i*, *c* and *t* stand for individual, country and time, respectively. The dependent variable $PR_{i,c,t}$ is a dichotomous variable that measures preferences for redistribution of individual i, it takes value one if i strongly agrees with the statement that "the government should take measures to reduce differences in income levels" and takes value zero otherwise. θ_c and δ_t control for country and year fixed effects, which account for country characteristics and general trends over time[5]. The vector $X_{c,t}$ includes country and year specific variables related to income distribution. First, the distribution of pre-tax income in the country affects both the degree of redistribution in force in the country (size and generosity) and is potentially correlated with individual attitudes towards redistribution. To account for this spurious correlation, we consider

[5] The inclusion of country dummies is common practice in order to control for unobserved characteristics at the country level that can be related with individual preferences for redistribution. Karabarbounis (2011), for instance, cite legal origins, political institutions, persistent cultural characteristics, ethnic fragmentation, prospects of upward mobility, and social beliefs about fairness.

information about the country disposable income distribution, including the mean, median, and measures of inequality such as the income shares held by the richest 10% and 5% of the population, as well as by the bottom 10%. Second, we control for the size of redistribution in the country by holding the share of tax revenues and social contribution over income as fixed. Third, $X_{c,t}$ also include controls for market income inequality, representing the extent of income uncertainty faced by the individuals. Fourth, we control for the extent of income growth (on average) to account for the implications of the POUM hypothesis on preferences for redistribution. The vector $Z_{i,c,t}$ collects information on socio-demographic characteristics of the respondents: sex, marital status, education, age and any condition related to the individual being a benefit recipient (retired, unemployed and disable). The variables in $T_{i,c,t}$ represent the treatment indicators for exposure of the individual's household to the tax-benefit schedule. We consider two sets of indicators, defining alternative specifications of the estimating model: The first indicator is for receiving positive benefits net of taxes (=1 if $\widehat{ben}_i/\widehat{tax}_i > 1$); the second group of indicators are for the intensity of the benefit-to-tax ratio (depending on whether $\widehat{ben}_i/\widehat{tax}_i$ falls in one of the five classes outlined above). In all cases, we always control for the size of the benefit net of taxes accruing to the individual's household. Lastly, $\varepsilon_{i,c,t}$ is the error term.

(Figure 1 about here)

The identification of the effect of individual exposure to tax-benefit on preferences for redistribution rests on heterogeneity across countries and years, holding fixed the individual characteristics that enter into the net-benefit equations as well as the features of the income distribution. Figure 1 hints on the identifying information exploited in the empirical analysis. It plots average levels of preferences for redistribution in each ESS round for two groups of countries. The group of low (resp. high) ben/tax countries gathers the bottom (top) half of countries ranked by the proportion of households receiving benefits that are at least double as much larger than taxes paid over the period 2008-2010. On the same figure, we report a polynomial fit of these points. Time fixed effects capture trends over time in preferences for redistribution. Country fixed effects capture differences in levels of preferences of redistribution across the two groups of countries. Identification rests on differences in trends among these two

groups of countries over time, being defined by the extent of generosity of the tax and benefit system. The linear regression fits plotted in the graph show that the group of high-generosity countries display a steeper trend in preferences for redistribution compared to the other group of countries, which identifies the effect of interest. A reduced form regression of country-year averages of preferences for redistribution on year and group fixed effects, inequality indicators and an indicator for generosity of the redistribution system interacted with a post-2012 indicator reveals that an increase in the probability of being a high-generosity country rises preferences for redistribution by 1.14%, which is close in value to our preferred estimates based on microd-data. The effect might be explained either by the way high and low ben/tax countries react to implications of the great recession, or by the implications of the recession for the distribution of income (and then generosity of the tax-benefit system).

5. Econometric results

In Table 2's model 1, we report results from a regression of preferences for redistribution on individual characteristics and on exposure to the actual redistribution, holding individual characteristics such as education, sex, age and income as fixed, and including country and time fixed effects. We find that holding positive net benefits rises preferences for redistribution by about 1.2%. Among the individual correlates, age is strongly correlated with the source of income and exposure to income shocks. We include additional controls for the amount of social benefits entitled to the individual and for the interaction with the treatment indicator. In this way, we make sure to produce comparable effects of a rise in social benefits make conditional on the extent of actual net benefits.

(Table 2 about here)

In model 2 we break down the effect of receiving positive net benefit by the intensity of the benefits received. Intensity is measured by indicators for five levels of the benefit-to-tax ratio experienced by the individual's household. The reference category for these indicators is whether the benefit-to-tax ratio lies between 1.0 and 2.0. Given that some predicted benefits were negative and included in this reference category, while some predicted taxes were negative and

included in the "ben/tax ≥ 6.00" variable, for consistency we control in our regressions for the amount of net benefits. Receiving benefits that are about 0.2-0.5 times the estimated tax expenditure yields a rise in support for redistribution by about 0.76%, albeit this effect is insignificant. Receiving benefits that are about 0.5-1.0 times the amount of taxes increases support for redistribution by 2.5% at statistically significant levels. Similarly, the effects of the other benefit-to-tax ratio brackets on support for redistribution are statistically significant and are between 2.04%-2.39%.

Models 3 to 6 in Table 2 control for potential cofounders related to differences in the size of income inequality and redistribution. Estimates from these models account for a variety of features of the income distribution in a given country-year, alongside information about the size of the redistribution system. Compared to estimates in model 1 and 2, the effects of interest remain significant and their size only marginally reduces after introducing further controls.

Our preferred specification is that of models 5 and 6, where the features of the country-year income distribution are also controlled for. Particularly, the inclusion of the Gini index of market income and income growth control for the exposure to uncertainty in future income and the POUM hypothesis. We find that increasing exposure to generosity of the tax-benefit system rises support for redistribution by 1.2%, significant at standard confidence levels, whereas, as before, the result is driven by families entitled with benefits substantially overweighting taxes (model 6). Interestingly, the estimates in models 5 and 6 bring evidence that support for redistribution rises with inequality, as predicted by the theoretical model, whereas both the effects of market income inequality (related to insurance motives) and of disposable income inequality are insignificant.

(Table 3 about here)

Table 3 reports additional results when we add a variety of covariates. Our main results are robust to a variety of extensions. Models 1 and 2 report estimates of the baseline specification, where controls are restricted to demographics, income and country and year fixed effects. The direction and significance of the effect of receiving positive net benefits on support for redistribution still holds even in this simple setting, although the magnitude of the effect is smaller. Models 3 and

4 are similar to models 5 and 6 from Table 2. In model 5 and 6 we control for individual political attitudes, i.e. whether the person self-assess herself towards left-wing or right-wing political attitudes. Controlling for political attitudes is relevant for our identification strategy, since political opinion delimit the voting attitudes across countries and time and hence shape the actual redistribution system. Model 5 reports the effect of receiving positive net benefits on support for redistribution. The magnitude of the effect is 1.11% and statistically significant, that is similar compared to baseline estimates. The effects of the indicators for the extent of generosity of the redistribution system (model 6) are also similar to the ones found in the baseline model, albeit slightly smaller. Political views have the expected relationship with redistributive preferences; individuals with left-wing views tend to be in favour of redistribution while individuals with right-wing views tend to be against. Model 7 and 8 extend the previous specifications by introducing interactions between the generosity of the tax-benefits system and political attitudes. We do not find evidence of direct effects of generosity of the tax-benefit system on redistributive preferences by political views. Nonetheless, the only statistically significant relationship specific to political attitudes is that right-oriented individuals receiving positive net benefits (model 7) or sizeable benefits with respect to taxes (model 8) increase their support for redistribution. Interestingly, this implies that even right-oriented individuals may be in favour of redistribution if they are exposed to enough advantageous redistribution[6].

(Table 4 about here)

Table 4 provides additional robustness checks by extending our results with related concepts about preferences for redistribution. We make use of round 4 (2008) and round 8 (2016) of ESS –specifically the thematic ESS's module on welfare attitudes– to recover these concepts as new dependent variables. The variables we consider are indicators for whether the respondent agree or disagree with the following statements: i) "Large differences in income acceptable to reward talents and efforts" (models 1-2); ii) "For fair society, differences in standard of living should be small" (models 3-4); iii) "Social benefits/services prevent widespread poverty" (models 5-6); and iv) "Social benefits/services lead to a more equal society" (models 7-8). As with the key

[6] An additional robustness check consists in estimating our preferred models 5-6 of Table 2 with probit regressions. Both the statistical significance and directions of the probit marginal effects (not reported but available upon request) are pretty similar to those of our preferred specification.

question on redistributive preferences, the individual chooses from a 5-level scale: strongly agree; agree; neither agrees nor disagree; disagree; and strongly disagree. For the first variable, we use an indicator variable that takes value one if the individual answers 'strongly disagree' and zero otherwise. For the other three variables, the indicator variable takes value one if the individual answers 'strongly agree' and zero otherwise. In this way we expect a positive correlation between preferences for redistribution and these alternative measures. Each of these variables clarify one potential motive for demanding for redistribution. Empirical estimates in Table 4 reveal that the generosity of the welfare state positively affects each of the four indicators for preferences for redistribution. Effects are generally small, below 1%, yet significant in all cases except for model 3.

As predicted by the theoretical model, we find that rising benefits, here measured by the probability of receiving positive net benefits, rises preferences for redistribution. Our preferred estimate of this effect is of 1.2%. The effect is significant and consistent across specifications of the model. Our theoretical model also implies a form of separability between the effect of exogenously rising net benefits and the effect of rising income uncertainty and inequality in disposable income. In Figure 2, we exploit cross-country variation in the effects of interest to test separability. We first estimate regressions of our preferred model specification 3 and 4 in table 3 at the country level, to obtain country-specific estimates of the effect of receiving positive net benefits on individual's on support for redistribution. In this setting, identification rests exclusively on variations across time, implying that differences in coefficients across countries express also the contribution of country-specific features of the redistributive scheme. We then correlate country-specific estimates with three inequality indicators. The graphs in Figure 2 discards any relation between the effect of exposure to tax-benefits and inequality, as captured by the ratio of median to mean income (where the median may well represent the expected income of the median voter), the Gini index for market income inequality and the top-to-bottom decile income share ratio. The same conclusion holds when we look at the average coefficients for exposure to high ben/tax ratio. Lack of association persists even when we use other measure of welfare system generosity, supporting the separability result predicted by the simple theoretical model.

(Figure 2 about here)

6. Concluding remarks

In this study we document that tax and benefit schemes have a significant role on preferences for redistribution, even after accounting for many demographics and inequality indices. In particular, we find that individual support for redistribution is larger when the ratio of benefits over taxes in the household is larger. Our results are in line with findings in the literature and talk more directly to results in Akay et al. (2013), who use a similar identification strategy to assess the effect of exposure to tax-benefit schemes on subjective well-being evaluations. Furthermore, we uncover a large heterogeneity in the responsiveness of preferences for redistribution to net benefits, but we do not observe any significant relationship between this responsiveness and income inequality in the country. This result supports the prediction of a theoretical model, indicating that the effect we estimate is capturing more closely changes in the generosity of the actual tax and benefit system rather than size effects.

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Tables and figures

Table 1. Descriptive statistics

Variable	Mean	SD	Min	Max	N
Main individual variables:					
Preferences for redistribution	0.308	0.462	0.000	1.000	150715
Receiving positive net benefits	0.496	0.500	0.000	1.000	150715
ben/tax ϵ [0.20, 0.50[	0.148	0.355	0.000	1.000	150715
ben/tax ϵ [0.50, 1.00[	0.106	0.308	0.000	1.000	150715
ben/tax ϵ [1.00, 3.00[	0.134	0.341	0.000	1.000	150715
ben/tax ϵ [3.00, 6.00[	0.083	0.276	0.000	1.000	150715
ben/tax ≥ 6.00	0.278	0.448	0.000	1.000	150715
Male	0.471	0.499	0.000	1.000	150715
Married	0.608	0.488	0.000	1.000	150715
Household size	2.536	1.331	1.000	15.000	150715
Secondary education	0.604	0.489	0.000	1.000	150715
Tertiary education	0.292	0.455	0.000	1.000	150715
Age 25-45	0.323	0.468	0.000	1.000	150715
Age 45-60	0.267	0.442	0.000	1.000	150715
Age >60	0.317	0.465	0.000	1.000	150715
Pensioner	0.268	0.443	0.000	1.000	150715
Unemployed	0.058	0.234	0.000	1.000	150715
Disable	0.026	0.160	0.000	1.000	150715
Political view: Left	0.327	0.469	0.000	1.000	136396
Political view: Right	0.354	0.478	0.000	1.000	136396
Variables related with redistributive preferences:					
No large diff in incomes to reward talents & effort	0.065	0.247	0.000	1.000	54504
Diff in standard of living should be small	0.154	0.361	0.000	1.000	54582
Social benefits prevent widespread poverty	0.095	0.293	0.000	1.000	54028
Social benefits lead to a more equal society	0.065	0.246	0.000	1.000	53731
Macro-variables:					
Social contributions over GDP	0.312	0.130	0.022	0.557	150715
Tax revenue over GDP	0.204	0.059	0.094	0.461	150715
Market income mean (000's)	19.414	11.646	2.220	54.785	150715
Income growth	1.204	2.384	-6.558	12.968	150715
Gini market income	0.492	0.039	0.401	0.581	150715
Gini disposable income	0.291	0.034	0.229	0.368	150715
Bottom 10% income share	3.194	0.645	1.400	4.300	150715
Top 10% income share	23.102	2.032	19.300	27.700	150715
Top 5% income share	14.183	1.527	11.100	17.400	150715
Mean-to-median income ratio	1.137	0.045	1.035	1.246	150715

Table 2. Linear models for preferences for redistribution

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Receiving positive net benefits	0.0120**		0.0120**		0.0119**	
	(0.0051)		(0.0051)		(0.0051)	
ben/tax ϵ [0.20, 0.50[		0.0076		0.0079		0.0076
		(0.0073)		(0.0074)		(0.0076)
ben/tax ϵ [0.50, 1.00[		0.0251***		0.0252***		0.0256***
		(0.0081)		(0.0081)		(0.0080)
ben/tax ϵ [1.00, 3.00[		0.0215**		0.0219**		0.0218**
		(0.0081)		(0.0080)		(0.0080)
ben/tax ϵ [3.00, 6.00[		0.0239***		0.0240***		0.0240***
		(0.0085)		(0.0085)		(0.0085)
ben/tax ≥ 6.00		0.0204**		0.0206**		0.0206**
		(0.0094)		(0.0094)		(0.0093)
Social contributions over GDP			-0.3586	-0.3913	-0.3334	-0.3446
			(0.3904)	(0.3926)	(0.5114)	(0.5129)
Tax revenue over GDP			-0.3977	-0.4098	-0.3872	-0.3930
			(0.2549)	(0.2591)	(0.2822)	(0.2852)
Market income mean (000's)			-0.0010	-0.0011	0.0002	0.0002
			(0.0024)	(0.0024)	(0.0024)	(0.0024)
Income growth					-0.0007	-0.0009
					(0.0038)	(0.0038)
Gini market income					0.4725	0.4468
					(0.7539)	(0.7538)
Gini disposable income					0.6442	0.9113
					(1.1591)	(1.1439)
Bottom 10% income share					0.0170	0.0181
					(0.0280)	(0.0279)
Top 10% income share					-0.0330	-0.0381
					(0.0420)	(0.0427)
Top 5% income share					0.0285	0.0310
					(0.0415)	(0.0418)
Constant	0.2573***	0.2504***	0.4670***	0.4741***	0.3272	0.3378
	(0.0188)	(0.0202)	(0.1450)	(0.1460)	(0.4836)	(0.4840)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes
Income sources	Yes	Yes	Yes	Yes	Yes	Yes
Country and year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	150715	150715	150715	150715	150715	150715
R2	0.077	0.077	0.077	0.077	0.077	0.077

***p<0.01, **p< 0.05, *p< 0.1. The dependent variable takes value when the individual strongly agreed with the statement “To what extent do you agree or disagree with the statement: the government should take measures to reduce differences in income levels” and zero otherwise. Standard errors (in parenthesis) are robust and clustered by country. All regressions include dummy variables for countries and years; and the interaction between the variables "Recipient of net positive benefits" and the amount of the net benefits received. The reference variable for education and age groups is primary or less and less than 25 years. The reference for the dummy variables of the relative size of benefits and taxes is "ben/tax ϵ [0.00, 0.20[".

Table 3. Linear models for preferences for redistribution: extending covariates

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Receiving positive net benefits	0.0085*		0.0119**		0.0111**		0.0060	
	(0.0049)		(0.0051)		(0.0053)		(0.0061)	
ben/tax ϵ [0.20, 0.50[		0.0053		0.0076		0.0064		
		(0.0080)		(0.0076)		(0.0070)		
ben/tax ϵ [0.50, 1.00[		0.0216**		0.0256***		0.0241***		
		(0.0088)		(0.0080)		(0.0070)		
ben/tax ϵ [1.00, 3.00[		0.0175*		0.0218**		0.0206***		
		(0.0086)		(0.0080)		(0.0074)		
ben/tax ϵ [3.00, 6.00[		0.0194**		0.0240***		0.0237***		
		(0.0093)		(0.0085)		(0.0079)		
ben/tax ≥ 6.00		0.0158		0.0206**		0.0165*		
		(0.0096)		(0.0093)		(0.0085)		
Gini market income			0.4725	0.4468		0.5272	0.5484	0.5287
			(0.7539)	(0.7538)		(0.7930)	(0.7930)	(0.7914)
Gini disposable income			0.6442	0.9113		0.8597	0.6152	0.8510
			(1.1591)	(1.1439)		(1.1502)	(1.1591)	(1.1473)
Left					0.0898***	0.0899***	0.0895***	0.0974***
					(0.0082)	(0.0082)	(0.0093)	(0.0114)
Right					-0.0565***	-0.0564***	-0.0635***	-0.0610***
					(0.0071)	(0.0071)	(0.0084)	(0.0096)
Left*I(net benefit>0)							0.0006	
							(0.0087)	
Right*I(net benefit>0)							0.0149*	
							(0.0080)	
Left*{ben/tax ϵ [0.20, 0.50[}								-0.0083
								(0.0115)
Left*{ben/tax ϵ [0.50, 1.00[}								-0.0233
								(0.0142)
Left*{ben/tax ϵ [1.00, 3.00[}								0.0044
								(0.0148)
Left*{ben/tax ϵ [3.00, 6.00[}								-0.0046
								(0.0114)
Left*{ben/tax ≥ 6.00}								-0.0141
								(0.0129)
Right*{ben/tax ϵ [0.20, 0.50[}								0.0045
								(0.0090)
Right*{ben/tax ϵ [0.50, 1.00[}								-0.0147
								(0.0151)
Right*{ben/tax ϵ [1.00, 3.00[}								0.0120
								(0.0126)
Right*{ben/tax ϵ [3.00, 6.00[}								-0.0125
								(0.0150)
Right*{ben/tax ≥ 6.00}								0.0205*
								(0.0117)
Constant	0.2594***	0.2533***	0.3272	0.3378	0.2709	0.2814	0.2712	0.2737
	(0.0193)	(0.0206)	(0.4836)	(0.4840)	(0.4922)	(0.4930)	(0.4920)	(0.4926)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Income sources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country and year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Net benefit amount	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Net benefit*I(net benefit>0)	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Market income inequalities	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Social contributions and tax revenues	No	No	Yes	Yes	Yes	Yes	Yes	Yes
N	150715	150715	150715	150715	136396	136396	136396	136396
R2	0.077	0.077	0.077	0.077	0.091	0.091	0.091	0.091

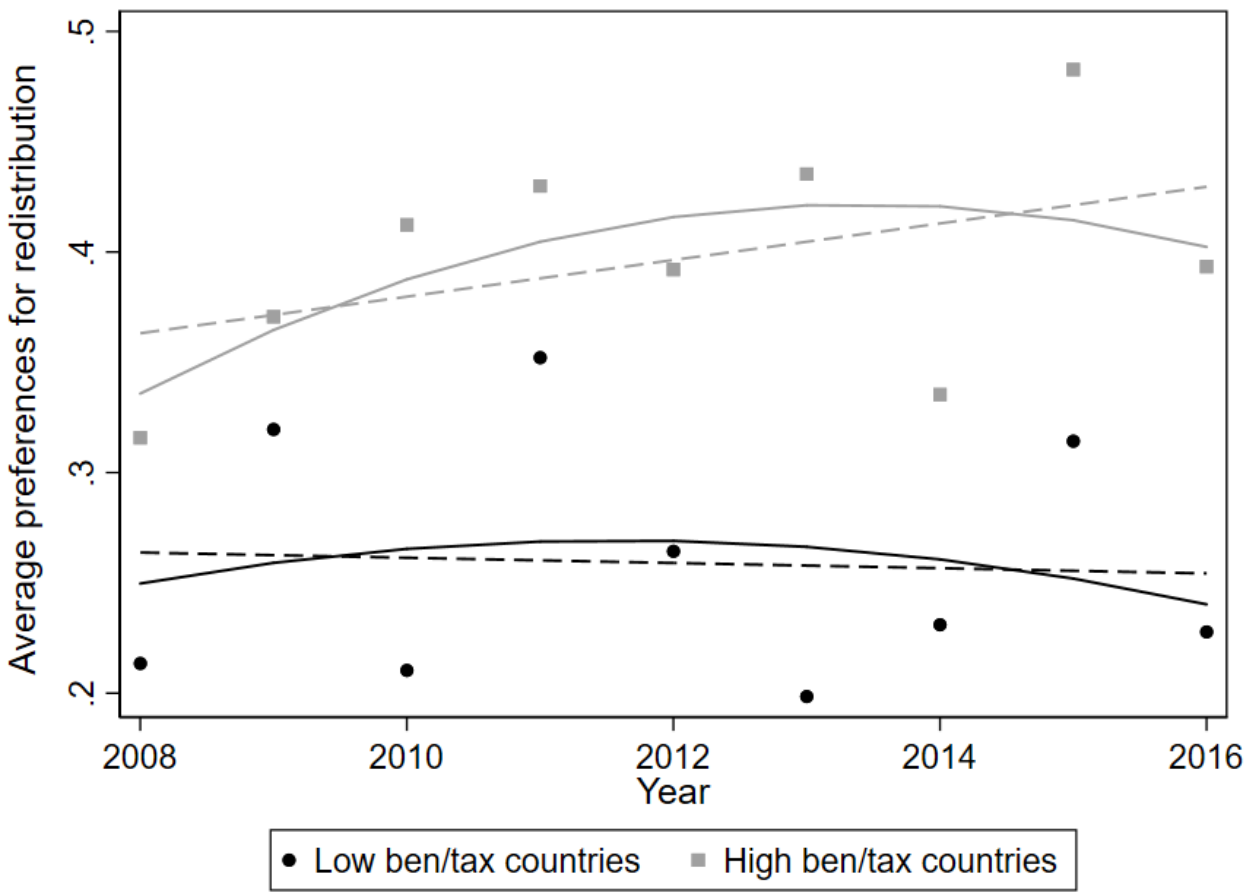
***p<0.01, **p< 0.05, *p< 0.1. The dependent variable takes value when the individual strongly agreed with the statement “To what extent do you agree or disagree with the statement: the government should take measures to reduce differences in income levels” and zero otherwise. Standard errors (in parenthesis) are robust and clustered by country. All regressions include dummy variables for countries and years; and the interaction between the amount of net benefits received and "Recipient positive net benefits". The reference value for the relative size of benefits and taxes is "ben/tax ϵ [0.00, 0.20[". Left and right are dummy variables computed from the 0-10 points scale of self-placement political views (left: 0-4; centre: 5; right: 6-10).

Table 4: Alternative measures of attitudes towards redistribution

	No large diff in incomes to reward talents & effort		For a fair society, diff in standard of living should be small		Social benefits prevent widespread poverty		Social benefits lead to a more equal society	
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Receiving pos. net ben.	0.0111***		0.0074		0.0087*		0.0056*	
	(0.0039)		(0.0054)		(0.0045)		(0.0031)	
ben/tax ϵ [0.20, 0.50[		0.0020		0.0022		-0.0033		0.0021
		(0.0042)		(0.0051)		(0.0039)		(0.0024)
ben/tax ϵ [0.50, 1.00[		0.0064		0.0016		0.0093*		0.0042
		(0.0083)		(0.0073)		(0.0047)		(0.0041)
ben/tax ϵ [1.00, 3.00[		0.0171**		0.0073		0.0108		0.0094**
		(0.0064)		(0.0080)		(0.0065)		(0.0045)
ben/tax ϵ [3.00, 6.00[		0.0059		0.0082		0.0057		0.0010
		(0.0064)		(0.0113)		(0.0075)		(0.0044)
ben/tax ≥ 6.00		0.0128*		0.0169*		0.0144**		0.0113**
		(0.0073)		(0.0084)		(0.0066)		(0.0050)
Social contrib. over GDP	8.7360***	8.7385***	31.8023***	31.6097***	5.8336***	5.8395***	7.1312***	6.9731***
	(0.4485)	(0.5185)	(0.5264)	(0.6715)	(0.5700)	(0.3716)	(0.3643)	(0.3073)
Tax revenue over GDP	-4.9052***	-4.9854***	-15.9069***	-15.8408***	-3.3195***	-3.4078***	-4.2409***	-4.2318***
	(0.2762)	(0.3118)	(0.3077)	(0.3693)	(0.3292)	(0.2260)	(0.1952)	(0.1548)
Market inc. mean (000's)	0.0435***	0.0441***	0.1764***	0.1752***	0.0256***	0.0261***	0.0326***	0.0320***
	(0.0034)	(0.0038)	(0.0039)	(0.0048)	(0.0043)	(0.0027)	(0.0025)	(0.0021)
Income growth	0.0741***	0.0748***	0.2393***	0.2376***	0.0376***	0.0380***	0.0422***	0.0412***
	(0.0039)	(0.0046)	(0.0046)	(0.0058)	(0.0049)	(0.0032)	(0.0032)	(0.0026)
Gini market income	0.4716**	0.5356**	4.4890***	4.4633***	1.1652***	1.2326***	0.7684***	0.7814***
	(0.1950)	(0.2042)	(0.2239)	(0.2428)	(0.2290)	(0.1619)	(0.1138)	(0.0919)
Bottom 10% inc. share	-0.5345***	-0.5391***	-2.0887***	-2.0737***	-0.4338***	-0.4384***	-0.4852***	-0.4762***
	(0.0320)	(0.0366)	(0.0390)	(0.0474)	(0.0422)	(0.0274)	(0.0251)	(0.0208)
Top 10% inc. share	-0.8215***	-0.8279***	-2.8807***	-2.8700***	-0.4908***	-0.4974***	-0.5959***	-0.5889***
	(0.0454)	(0.0536)	(0.0515)	(0.0666)	(0.0567)	(0.0376)	(0.0352)	(0.0291)
Top 5% inc. share	0.8779***	0.8817***	3.0014***	2.9916***	0.5047***	0.5090***	0.6469***	0.6388***
	(0.0427)	(0.0511)	(0.0482)	(0.0637)	(0.0533)	(0.0357)	(0.0341)	(0.0285)
Constant	5.6599***	5.7430***	19.2139***	19.1290***	3.5611***	3.6369***	3.9915***	3.9636***
	(0.3254)	(0.3811)	(0.3751)	(0.4755)	(0.4069)	(0.2723)	(0.2476)	(0.2020)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Income sources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country and year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	54504	54504	54582	54582	54028	54028	53731	53731
R2	0.045	0.045	0.062	0.062	0.019	0.020	0.019	0.019

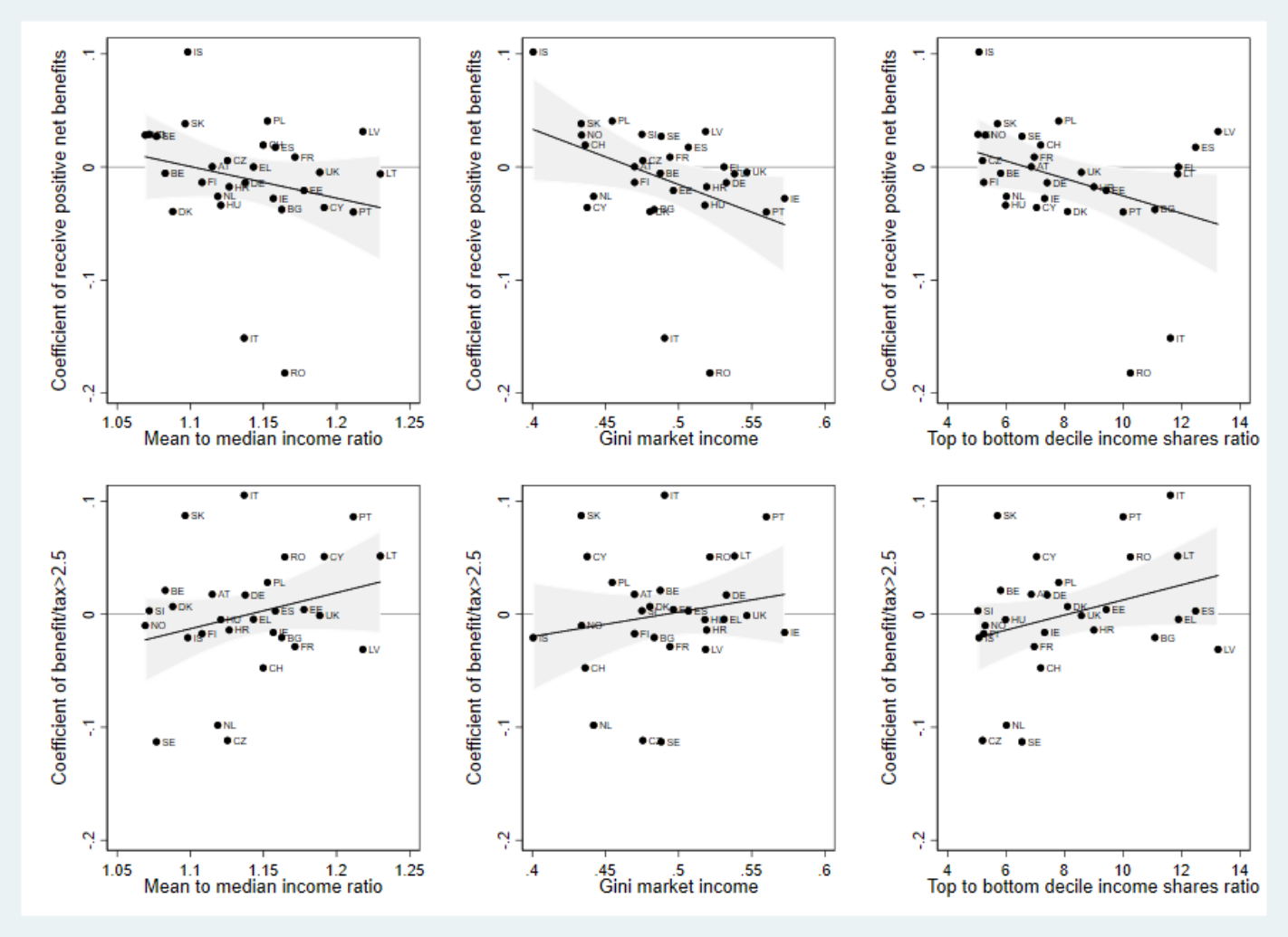
***p<0.01, **p< 0.05, *p< 0.1. Specifications are as in models (5)-(6) in table 2; yet, the gini of disposable income is rule out due to high autocorrelation. The dependent variable for models (1)-(2) is an indicator for whether the respondent strongly disagree with the statement "large differences in income are acceptable to reward talents and efforts". The dependent variable for models (3)-(4) is an indicator for whether the respondent strongly agrees with the statement "for a fair society, differences in standard of living should be small". The dependent variable for models (5)-(6) is an indicator for whether the respondent strongly agrees with the statement "social benefits/services prevent widespread poverty". The dependent variable for models (7)-(8) is an indicator for whether the respondent strongly agrees with the statement "social benefits/services lead to a more equal society". The estimates are based on round 4 (2008) and 8 (2016) of ESS.

Figure 1. Identification strategy



Note: countries are grouped by the extent of benefit/taxes ratio in 2008-2010. Preferences for redistribution are averages by year and country group. Polynomial and linear fit is based on averaged data.

Figure 1. Responsiveness of preferences for redistribution to net benefits and income inequality in the country



Note: each point in the graph plots the coefficient of the variable "receive positive net benefits" estimated for each country (model 1 in Table 3) and the ratios of the shares of the top decile and bottom decile of the income distribution in the country.

APPENDIX

Table A1. Selected countries and available observations in less restrictive model specification

Country	Year									**Total**
	2008	2009	2010	2011	2012	2013	2014	2015	2016	
Austria				1,375		1,344		1,283	1,441	**5,443**
Belgium	1,476			1,379	1,595		1,509		1,604	**7,563**
Bulgaria		1,684		1,903		1,853				**5,440**
Croatia		993		1,101						**2,094**
Cyprus	923			656	829					**2,408**
Czech Republic		1,326		1,562		1,264		1,389	1,525	**7,066**
Denmark	1,322		1,296			1,109	1,258			**4,985**
Estonia		1,257		1,413	1,795		1,681		1,858	**8,004**
Finland	1,932		1,650		1,959		1,876		1,751	**9,168**
France	1,784		1,522			1,726	1,701		1,808	**8,541**
Germany	2,173		2,297		2,408		2,605		2,395	**11,878**
Greece		1,140		1,712						**2,852**
Hungary		1,072	1,171		1,247			1,122		**4,612**
Iceland					550					**550**
Ireland		1,507		1,671			1,805			**4,983**
Italy						485				**485**
Latvia		1,358								**1,358**
Lithuania		1,479		1,086		1,453		1,522		**5,540**
Netherlands	1,504		1,443		1,529		1,686		1,453	**7,615**
Norway	1,419		1,406		1,478		1,287			**5,590**
Poland	1,190		1,209		1,359			1,108	1,168	**6,034**
Portugal		894		1,045		896		952		**3,787**
Romania		1,373								**1,373**
Slovakia	1,158		897		1,173					**3,228**
Slovenia	920		972		861		925		1,045	**4,723**
Spain	1,495			1,413		1,458		1,388		**5,754**
Sweden	1,633		1,322		1,614		1,575		1,374	**7,518**
Switzerland	1,314		1,160		1,156		1,194			**4,824**
United Kingdom	1,938		1,814		1,690		1,857			**7,299**
Total	**22,181**	**14,083**	**18,159**	**16,316**	**21,243**	**11,588**	**20,959**	**8,764**	**17,422**	**150,715**

Table A2. Preferences for redistribution, 2008-2016 (Share of individuals strongly agreed with 'the government should take measures to reduce differences in income levels')

Country	Year									**Average**
	2008	2009	2010	2011	2012	2013	2014	2015	2016	
Austria				0.287		0.339		0.394	0.287	**0.325**
Belgium	0.269			0.274	0.262		0.291		0.284	**0.276**
Bulgaria		0.476		0.624		0.546				**0.552**
Croatia		0.258		0.357						**0.310**
Cyprus	0.330			0.419	0.410					**0.382**
Czech Republic		0.281		0.340		0.314		0.240	0.130	**0.259**
Denmark	0.118		0.096			0.083	0.091			**0.098**
Estonia		0.251		0.264	0.371		0.344		0.212	**0.291**
Finland	0.342		0.320		0.327		0.342		0.291	**0.325**
France	0.419		0.423			0.381	0.347		0.360	**0.385**
Germany	0.228		0.277		0.303		0.249		0.282	**0.268**
Greece		0.489		0.526						**0.511**
Hungary		0.516	0.581		0.439			0.463		**0.499**
Iceland					0.362					**0.362**
Ireland		0.214		0.335			0.318			**0.292**
Italy						0.495				**0.495**
Latvia		0.392								**0.392**
Lithuania		0.258		0.424		0.410		0.514		**0.401**
Netherlands	0.146		0.168		0.147		0.186		0.180	**0.166**
Norway	0.149		0.130		0.135		0.179			**0.147**
Poland	0.258		0.286		0.380			0.388	0.271	**0.318**
Portugal		0.338		0.451		0.467		0.449		**0.427**
Romania		0.401								**0.401**
Slovakia	0.305		0.437		0.436					**0.389**
Slovenia	0.370		0.463		0.488		0.453		0.427	**0.439**
Spain	0.286			0.326		0.373		0.505		**0.371**
Sweden	0.200		0.186		0.230		0.216		0.173	**0.203**
Switzerland	0.212		0.219		0.224		0.181			**0.209**
United Kingdom	0.185		0.158		0.186		0.223			**0.188**
Average	**0.252**	**0.351**	**0.276**	**0.391**	**0.299**	**0.381**	**0.263**	**0.422**	**0.262**	**0.308**

Table A3. Proportion of net tax benefit recipients by country and survey year, 2008-2016

Country	Year									**Total**
	2008	2009	2010	2011	2012	2013	2014	2015	2016	
Austria				0.581		0.520		0.515	0.503	**0.530**
Belgium	0.512			0.529	0.515		0.500		0.542	**0.520**
Bulgaria		0.588		0.664		0.647				**0.635**
Croatia		0.362		0.579						**0.476**
Cyprus	0.561			0.724	0.737					**0.666**
Czech Republic		0.431		0.599		0.367		0.363	0.366	**0.429**
Denmark	0.092		0.160			0.188	0.214			**0.162**
Estonia		0.321		0.410	0.613		0.637		0.624	**0.539**
Finland	0.476		0.570		0.571		0.562		0.587	**0.552**
France	0.558		0.596			0.611	0.564		0.580	**0.581**
Germany	0.490		0.499		0.498		0.482		0.449	**0.483**
Greece		0.415		0.473						**0.450**
Hungary		0.625	0.701		0.665			0.411		**0.603**
Iceland					0.520					**0.520**
Ireland		0.737		0.752			0.780			**0.758**
Italy						0.505				**0.505**
Latvia		0.683								**0.683**
Lithuania		0.521		0.692		0.403		0.479		**0.512**
Netherlands	0.384		0.396		0.398		0.472		0.457	**0.422**
Norway	0.080		0.193		0.192		0.202			**0.166**
Poland	0.427		0.500		0.315			0.409	0.434	**0.414**
Portugal		0.636		0.657		0.720		0.653		**0.666**
Romania		0.578								**0.578**
Slovakia	0.553		0.731		0.704					**0.657**
Slovenia	0.666		0.629		0.712		0.678		0.640	**0.663**
Spain	0.647			0.625		0.695		0.697		**0.666**
Sweden	0.178		0.268		0.196		0.152		0.134	**0.184**
Switzerland	0.328		0.267		0.265		0.298			**0.291**
United Kingdom	0.530		0.535		0.587		0.553			**0.550**
Total	**0.430**	**0.542**	**0.461**	**0.601**	**0.487**	**0.528**	**0.481**	**0.502**	**0.487**	**0.496**