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

Andreoli, Francesco; Olivera, Javier

Veröffentlichungsversion / Published Version
Zeitschriftenartikel / journal article

Empfohlene Zitierung / Suggested Citation:
Andreoli, F., & Olivera, J. (2020). Preferences for redistribution and exposure to tax-benefit schemes in Europe. *European Journal of Political Economy*, *63*, 1-19. https://doi.org/10.1016/j.ejpoleco.2020.101880

European Journal of Political Economy 63 (2020) 101880

Contents lists available at ScienceDirect

European Journal of Political Economy

journal homepage: www.elsevier.com/locate/ejpe

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

Francesco Andreoli [a,b], Javier Olivera [b,c,d,*]

[a] Department of Economics, University of Verona, Via Cantarane 24, 37129, Verona, Italy
[b] Luxembourg Institute of Socio-Economic Research (LISER), Maison des Sciences Humaines, 11 Pt de Sciences, L4366, Esch-sur-Alzette, Luxembourg
[c] Department of Economics, Pontificia Universidad Catolica del Peru (PUCP), Av. Universitaria 1801, Lima 32, Peru
[d] Department of Economics, KU Leuven, Naamsestraat 69, 3000 Leuven, Belgium

ARTICLE INFO

JEL classification:
D31
D63
D72
H20

Keywords:
Income inequality
Preferences for redistribution
ESS
EU-SILC
Tax-benefit system

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 support for redistribution by 1.4%–3% on baseline models, the effect being robust across a variety of specifications.

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, 2017) has put governments under pressure to implement redistributive measures that increase the generosity of the welfare state. These measures include shifting the burden of taxation and re-allocating benefits across individuals, with some individuals gaining and other losing out of this change. This aspect rises concerns about the political support for policy measures intended to combat inequality.

This paper investigates empirically if increasing the generosity of the tax-benefit system has an impact on preferences for redistribution, as measured by the extent of support to government intervention to limit inequalities. Income-based motives alone would suggest that, within a given society, rising generosity of redistribution increases support to redistribution among those who are in perspective enjoying positive benefits net of taxes, whereas it reduces support for all those that are net contributors to the system. The combined effect may be ambiguous, as long as it depends on the size of redistribution and the extent of inequality in the country

* Corresponding author. Luxembourg Institute of Socio-Economic Research (LISER), Maison des Sciences Humaines, 11 Pt de Sciences, L4366, Esch-sur-Alzette, Luxembourg.
E-mail addresses: francesco.andreoli@univr.it (F. Andreoli), javier.olivera@liser.lu (J. Olivera).

https://doi.org/10.1016/j.ejpoleco.2020.101880
Received 19 September 2019; Received in revised form 14 March 2020; Accepted 26 March 2020
Available online 1 April 2020

(defining losers and gainers). In the presence of inequality, other motives may justify, theoretically, both positive and negative effects.

The links between inequality, preferences for redistribution, and the implied size and generosity of the taxation and social welfare system have 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, i.e. in presence of income inequality. Empirical evidence about the positive relation between inequality and demand for redistribution is mixed (Alesina and Giuliano, 2011; Karabarbounis, 2011; Corneo and Neher, 2015). This reflect the different bearings of a multiplicity of motives for demand for redistribution.

Inequality in gross incomes captures market income risk and may be positively associated with demand for redistribution if motives for insurance are dominating, as shown in the lab experiment by Durante et al. (2014), whereas the relation turns negative when positional concerns are at stake. For instance, the political influence of economic elites (the top of the income distribution) 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 (see also Kim, 2019). 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). The role of perceptions and informational bias have been also addressed (Schokkaert and Truyts, 2017; Gimpelson and Treisman, 2018; Cruces et al., 2013; Karadja et al., 2017).

When the focus is on consumption and well-being (incorporating effects of market income risk and public intervention, given disposable income), insurance motives may be counterbalanced by income expectations. The Prospect of Upper Mobility (POUM) hypothesis (Benabou and Ok, 2001), for instance, predicts that relatively poor individuals with expectations of upward mobility would favour lower taxes, less redistribution and therefore more inequality. Alesina and La Ferrara (2005) find evidence that objective measures of upward mobility in income lead to similar conclusion (see also Checchi and Filippin, 2004), whereas Corneo and Grüner (2002) show the implications of positional expectations. Overall, insurance motives may imply more support for redistribution in response to a more generous welfare state, whereas income expectations and positional concerns may induce a negative effect.

As noted by Piketty (1995), differences in beliefs about the relative importance of effort and luck in generating income inequality may also explain different attitudes towards inequality and redistribution. In an influential paper, Alesina and Angeletos (2005) argue that even two identical societies displaying a preference for fairness (i.e. they tolerate income inequality insofar it reflects inequality in effort and talents) may end up choosing one of two very different redistribution schemes at equilibrium: either low taxes and redistribution when individual effort is believed to be the main source of income, or high taxes and redistribution when, instead, luck determines income. Di Tella and Dubra (2013) notice that to obtain multiplicity of equilibria it is necessary and meaningful to consider some redistribution even in the presence of a fair allocation of resources. When fairness motives prevail, a rise in welfare state generosity may correspond to a rising demand for redistribution if income inequality is driven by luck, whereas actual demand for redistribution shrinks when taxes and benefits compensate for fair inequalities.

This paper contributes to this literature by providing empirical evidence about the extent at which 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 benefits net of taxes accruing at individual level. 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.

A parsimonious way to model generosity of the welfare state is by rationalizing taxation through a flat-tax basic-income scheme, the basic income component representing benefits accruing to the individual. Assignment of the benefits may be random given income of the applicant, reflecting uncertainty in the assignment rules (which may depend on income realizations of eligible subpopulations). For poor people, likely those being net benefits recipients, a rise in generosity may have implications both on the extensive margins, rising the probability of being allocated with benefits, and the intensive margin, by rising the proportion of fiscal revenues allocated as cash benefits. Incorporating both extensive and intensive margins for benefits attribution within the model in Alesina and La Ferrara (2005) would reveal that exogenously rising the probability of receiving positive benefits net of taxes, as well as increasing the size of net benefits, also rises support for redistribution.[1] The prediction follows from considering risk averse individuals that are exclusively interested about maximizing own consumption, whereas the sign of the effect may be different if positional concerns or fairness views are taken into account.

[1] Consider gross individual income $\tilde{y}$ as stochastic (with population average $\overline{y}$). A tax τ is collected on every unit of gross income and redistributed. With probability π the agent receives a benefit $b\tau\overline{y}$ and with probability $1-\pi$ this benefit is zero. The parameter $b \in [0,1]$ represents the intensive margin of generosity. The agent's net income (consumption) is $\tilde{y}^d = (1-\tau)\tilde{y} + \pi b\tau\overline{y} - \frac{\tau^2\overline{y}}{2}$, the last term representing cost of administration and disincentives from taxation. We assume (for simplicity) that individual preferences $\boldsymbol{EU}$ follow the rank-dependent representation: $\boldsymbol{EU}(\tilde{y}) = \int_{[0,1]} (1-p)^2 y(p)dp$, where the weight $(1-p)^2$ indicates a distortion function applied to quantiles $y(p), p \in [0,1]$ of the distribution of stochastic income, representing risk aversion (see Andreoli, 2018). Demand for redistribution is given by the optimal tax rate τ^* satisfying $\frac{\partial EU(\tilde{y}^d)}{\partial \tau} = 0$. This is $\tau^* = \pi b\overline{y} - \frac{\boldsymbol{E}[\tilde{y}]}{\overline{y}}(1-G(\tilde{y}))$. Given expectations $\boldsymbol{E}[\tilde{y}]$ of gross income and the Gini index measuring market income risk $G(\tilde{y})$, a rise in generosity of the welfare state rises support for redistribution: $\partial\tau^*/\partial\pi > 0$ and $\partial\tau^*/\partial b > 0$. The same model predicts that support for redistribution rises with income risk and with inequality for the median voter (expecting $\boldsymbol{E}[\tilde{y}] = y(0.5)$).

This paper provides an empirical verification of the effects of interest. 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 economic 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.[2]

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 representative groups of respondents in EU-SILC, 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.

Our baseline 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 1.4%–3% in the preferred specifications. 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. We also include 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 contextualizes our contribution within the relevant empirical literature; Section 3 presents the data. Section 4 presents the empirical strategy. Section 5 presents and discusses the results. Section 6 provides the concluding remarks.

2. Related empirical 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 (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 correlate more strongly with perceived inequality than actual inequality (e.g. Cruces et al., 2013, Gimpelson and Treisman, 2018, Hauser and Norton, 2017, Kuhn, 2019 and Choi, 2019). Preferences for redistribution are also determined by individual beliefs about distributive justice, particularly by the source of inequalities.[3] 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., 2016, 2018), insurance motives and social concerns (Durante et al., 2014) are also part of these micro-level mechanisms behind the formation of redistributive attitudes.

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., 2020). Culture and identity emerged as an important driver for redistributive preferences (Shayo, 2009; Luttmer and Singhal, 2011; Costa-Font and Cowell, 2015; Bisin and Verdier, 2017), as well as immigration perceptions (Alesina et al. 2018, 2019).

The focus of these empirical contributions has been to disentangle the role of different motives, such as concerns for insurance against income shocks, for fairness in the process of income determination, or positional concerns, on the extent at which income inequality affects support for redistribution. The same motives may have opposing implications for the way generosity of redistribution

[2] 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). However, 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.

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

is perceived and supported. Empirical evidence on this respect is limited, because aggregate measures of redistribution (such as the difference in the extent of inequality before and after redistribution) fail to capture heterogeneity of exposure to benefits and taxes in the population, which is driven by the distribution of demographics and income, by employment status and by the actual fiscal policy rules. Exceptions are Sacchi et al. (2020) and Thewissen and Rueda (2019), who explore unemployment risk induced by the extent of automation in the economy to assess the extent at which welfare state generosity affects support for redistribution, holding income of the respondents and income inequality in the country as fixed.

Our approach follows this line, and considers explicit measures of taxes and benefits accruing at the individual level, predicted from EU-SILC individual data using a two-sample strategy. We hence devise measures of generosity of the welfare state at individual level, looking at both the probability of being a net benefit recipient as well as the extent of net benefits accruing to the individual. These measures capture in a compact way both the heterogeneity in exposure to welfare state generosity within the same country, depending on non-linear relations between individual income, demographics, employment status and redistribution policy parameters, as well as variation in policy rules across countries and time. We assess the effects of variations in generosity at individual level on support for redistribution, the response variables, within a regression framework. Identification rests on variation across countries and time in fiscal policy rules, holding demographics and country and time effects as fixed. Our strategy is related to the study by Akay et al. (2012), which exploits variation in tax rules across time to assess the impact of marginally rising taxation on happiness in Germany.

3. Data

3.1. Sample and variables

We utilize the 2008, 2010, 2012, 2014 and 2016 rounds of ESS. This survey collects information on attitudes, beliefs, values and behaviour patterns for a nationally representative sample of individuals living in Europe.[4] Alongside, we make use of data from EU-SILC cross-sections 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 across countries and time.

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 provides her opinion according to a 5-level Likert scale: strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree. The nature of this variable is ordinal, that is the scale only represents a qualitative value rather than a specific quantitative measure, and therefore, our baseline estimation strategy always involves ordered probit models.[5] This strategy has also been used by Fong (2001), Alesina and La Ferrara (2005), Yamamura (2012) and Guillaud (2013). To facilitate interpretation, we also report marginal effects of probit models and regression results including alternative measurements for the dependent variable (looking in particular at the probability of agreeing or strongly agreeing with the relevant preference for redistribution question).

The generosity of the tax-benefit system is the main treatment variable. In our baseline results, this is captured with 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 takes value zero otherwise. In additional regressions, we consider other variables capturing the intensity of the tax-benefit system experienced by the individual, such as the ratio of benefits to taxes.

The control variables at individual level are sex, marital status, educational level, age, age squared and any condition related to benefit recipient (retired, unemployed and handicapped) and number of members of the household. Educational levels are expressed as dummy variables for secondary and tertiary education; retirement, unemployed and disability variables are dummy variables as well. 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).[6] A dummy variable for left-oriented views takes value one if the respondent chooses four or less points, and takes value zero otherwise; while another dummy variable for right-oriented views takes value one if the respondent chooses six or more points, and takes value zero otherwise.

The analysis also includes country and time specific variables measuring income distribution and the size of redistribution. 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 150,543 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,

[4] 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.

[5] As the 1–5 scale has only an ordinal meaning, OLS regressions (used for instance in Alesina and Giuliano, 2011 and Kerr, 2014) may artificially introduce bias by assuming linearity of responses vis-à-vis the scale.

[6] The ESS question 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
Descriptive statistics of ESS data.

Variable	Mean	SD	Min	Max	N
Main individual variables:					
Preferences for redistribution (1–5)	3.886	1.036	1.0	5.0	150,543
1 Strongly disagree (0–1)	0.025	0.155	0.0	1.0	150,543
2 Disagree (0–1)	0.105	0.306	0.0	1.0	150,543
3 Neither agree nor disagree (0–1)	0.139	0.346	0.0	1.0	150,543
4 Agree (0–1)	0.423	0.494	0.0	1.0	150,543
5 Strongly agree (0–1)	0.308	0.462	0.0	1.0	150,543
Taxes (000's) (ppp)	28.563	66.306	0.0	1277.6	150,543
Benefits (000's) (ppp)	10.849	19.458	0.0	605.5	150,543
Net benefits (000's) (ppp)	−17.714	64.310	−1245.3	571.5	150,543
Receiving positive net benefits (0–1)	0.463	0.499	0.0	1.0	150,543
ben/tax<1	0.526	0.499	0.0	1.0	150,543
ben/tax ∈ [1.00,2.00[	0.066	0.249	0.0	1.0	150,543
ben/tax ∈ [2.00,3.00[	0.038	0.191	0.0	1.0	150,543
ben/tax ∈ [3.00, 6.00[	0.067	0.249	0.0	1.0	150,543
ben/tax > 6.00	0.303	0.459	0.0	1.0	150,543
(Benefits-taxes)/avg taxes in c-y (%)	32.653	256.403	−3144.9	5494.7	150,543
Male (0–1)	0.471	0.499	0.0	1.0	150,543
Married (0–1)	0.608	0.488	0.0	1.0	150,543
Household size	2.537	1.331	1.0	15.0	150,543
Primary education (0–1)	0.104	0.305	0.0	1.0	150,543
Secondary education (0–1)	0.604	0.489	0.0	1.0	150,543
Tertiary education (0–1)	0.292	0.455	0.0	1.0	150,543
Age	50.256	17.731	18.0	105.0	150,543
Age2/100	28.401	18.344	3.2	110.3	150,543
Pensioner (0–1)	0.268	0.443	0.0	1.0	150,543
Unemployed (0–1)	0.058	0.234	0.0	1.0	150,543
Handicapped (0–1)	0.026	0.160	0.0	1.0	150,543
Political view: Left (0–1)	0.327	0.469	0.0	1.0	136,267
Political view: Right (0–1)	0.354	0.478	0.0	1.0	136,267
Variables related with redistributive preferences:					
No large diff in incomes to reward talents & effort (0–1)	0.284	0.451	0.0	1.0	54,444
Diff in standard of living should be small (0–1)	0.640	0.480	0.0	1.0	54,526
Social benefits prevent widespread poverty (0–1)	0.605	0.489	0.0	1.0	53,972
Social benefits lead to a more equal society (0–1)	0.507	0.500	0.0	1.0	53,677
Macro-variables:					
Social contributions over GDP	0.312	0.130	0.022	0.557	150,543
Tax revenue over GDP	0.204	0.059	0.094	0.461	150,543
Market income mean (000's)	19.421	11.646	2.220	54.785	150,543
Income growth	1.205	2.383	−6.558	12.968	150,543
Gini market income	0.492	0.039	0.401	0.581	150,543
Gini disposable income	0.291	0.034	0.229	0.368	150,543
Bottom 10% income share	3.194	0.645	1.400	4.300	150,543
Top 10% income share	23.102	2.033	19.300	27.700	150,543
Top 5% income share	14.183	1.527	11.100	17.400	150,543
Mean-to-median income ratio	1.137	0.045	1.035	1.246	150,543

while Table A1, A2 and A3 in the Appendix report the composition of the ESS using sample and descriptive statistics of preferences for redistribution and tax-benefit generosity across countries and time.

Table 1 reports that, on average, 30.2% and 42.3% of individuals strongly agree or agree, respectively, 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, 13% of individuals in Denmark belong to households that are net benefit recipients, while in Ireland this figure is 72% (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 in 2008) to 0.35 (Latvia in 2009). The other macro variables also display 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: the two sample strategy

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. Table A4 in the Appendix provides summary statistics by country of the benefits and taxes distribution for the EU-SILC using sample (pooling 856,099 observations).

The matching procedure unfolds as follows. First, we obtain estimates from 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, handicapped and other). The estimating models for taxes (tax_i) and benefits (ben_i) are[7]:

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

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) handicapped; 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 (1) 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 for each individual in ESS, we construct measures of generosity of the tax-benefit rule, our main treatment variable, based on the empirical index $\widehat{ben}_i - \widehat{tax}_i$.

The pairing of EU-SILC and ESS at individual level performs correctly. Figure 1 shows that the original distributions (kernel) of observed net benefits, taxes and net benefits from raw data in EU-SILC almost entirely overlap the distributions estimated with the matched data simulated in ESS.[8] On average, we do not observe relevant discrepancies between these distributions in the overall sample or when comparison are broken down by country (see Fig. A1 in the appendix).

4. Empirical strategy

The empirical literature on preferences for redistribution routinely adopts multiscale questions eliciting individual redistributive preferences such as those reported in ESS. We use ordered probit regressions as in Fong (2001), Alesina and La Ferrara (2005), Yamamura (2012) and Guillaud (2013) to analyze the conditional effects of the treatments of interest. The estimating equation is:

$$PR^*_{i,c,t} = \alpha_c + \delta_t + \beta X_{c,t} + \gamma Z_{i,c,t} + \theta T_{i,c,t} + \varepsilon_{i,c,t} \tag{2}$$

The subscripts i, c and t stand for individual, country and time, respectively. $PR^*_{i,c,t}$ is a latent variable measuring the intensity of preferences for redistribution of individual i. In the data, we only observe a variable that takes values from 1 to 5 in the Likert scale where a higher number implies more support for redistribution as follows:

[7] We implement Tobit regressions in order to take into account the censoring feature of taxes and benefits. A non-negligible number of households have zero benefits or pay zero taxes.

[8] The matched ESS data clearly predict less volatility than the raw data from EU-SILC, being ESS data model-based predictions that cannot incorporate additional variability in the data. Nonetheless, the flexible specification of the estimating models allows to capture non-linearities in relevant covariates and in policy features.

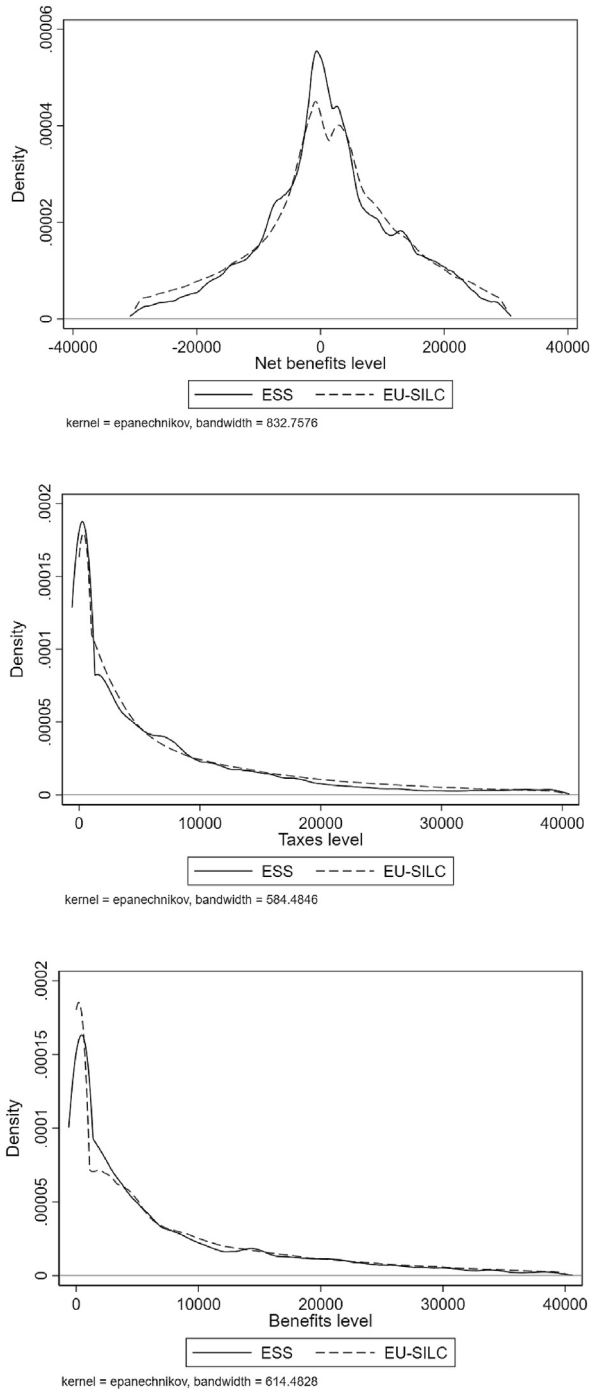

Fig. 1. Distribution of benefits and taxes in ESS and EU-SILC.

$$PR_{i,c,t} = j \quad if \quad \rho_{j-1} \leq PR^{*}_{i,c,t} < \rho_j \tag{3}$$

Where ρ_j (j = 1,…,5) are cut-off points to be estimated and it is assumed that $\rho_0 = -\infty$ and $\rho_5 = +\infty$. The main effect of interest is β, which sign and significance allow to meaningfully assess the implications of the treatment variables on preferences for redistribution. In our results, we also report marginal effects of probit regressions in order to facilitate interpretation. These regressions use the same specification as equation (2) to predict $\Pr[PR_{i,c,t} \geq 4]$, i.e. the probability that ESS respondents agree or strongly agree that the government should take measures to reduce differences in income levels. The marginal effects from the probit regressions provide a measure of the effect of the relevant treatment on the *probability* of supporting redistribution. Given the distribution of responses (with more than

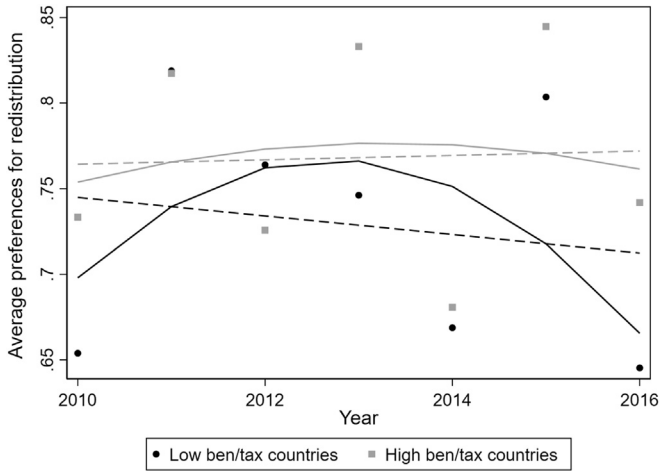

Fig. 2. Identification strategy. Note: countries are grouped by the extent of benefit/taxes ratio in 2008–2009. Preferences for redistribution are averages by year and country group. Polynomial and OLS fitted lines are based on averaged data.

70% of sample supporting redistribution), this effect is also informative on the marginal effect of the treatment on the *level* of support for redistribution from equation model 5.

Parameters α_c and δ_t control for country and year fixed effects, which account for country characteristics and general trends over time,[9] while $\varepsilon_{i,c,t}$ is the error term. 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 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[10]. 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 handicapped). 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. First, we consider whether the individual receives positive benefits net of taxes (=1 if $\widehat{ben}_i/\widehat{tax}_i > 1$). Second, we consider a variety of indicators for the generosity of the benefit-tax system, particularly the intensity of the benefit-to-tax ratio. In all cases, we always control for the size of the benefit net of taxes accruing to the individual's household.

The identification of the effect of individual exposure to tax-benefit on redistributive preferences rests on heterogeneity in redistribution policies 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 2 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 across these points. Time fixed effects capture trends over time in preferences for redistribution. Country fixed effects capture differences in levels of preferences for 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 fitted lines estimated with OLS, plotted in the graph, show that the group of high-generosity countries display a steeper (increasing) trend in preferences for redistribution compared to the other group of countries. The difference between the two trends identifies the effect of interest. A reduced form regression of country-year averages of preferences for redistribution[11] reveals that an increase in the probability of being a high-generosity country rises the probability of supporting redistribution by 4.1% (statistically significant at 5%), which is close to the range of our preferred estimates based on micro-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).

[9] 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.

[10] See Cojocaru (2014) for an empirical test of the POUM hypothesis.

[11] This regression is run over inequality indicators, year and group fixed effects, and an indicator for generosity of the redistribution system interacted with a post-2012 indicator.

Table 2
Linear models for preferences for redistribution.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	oprobit coeff	probit dy/dx	oprobit coeff	probit dy/dx	oprobit coeff	probit dy/dx	oprobit coeff	probit dy/dx	oprobit coeff	probit dy/dx
Receiving posit. net ben.	0.0294**	0.0140**	0.0311**	0.0144**	0.0306**	0.0137**	0.0335**	0.0145**	0.0124	0.0073
	(0.0144)	(0.0063)	(0.0143)	(0.0064)	(0.0138)	(0.0060)	(0.0153)	(0.0066)	(0.0188)	(0.0084)
Social contrib. over GDP			−0.9142	−0.3039	−0.4900	−0.0600	−0.4853	−0.0324	−0.4664	−0.0270
			(1.2307)	(0.4855)	(1.4066)	(0.4734)	(1.5595)	(0.4883)	(1.5567)	(0.4882)
Tax revenue over GDP			−1.3809*	−0.5198**	−1.2928	−0.4849*	−1.1510	−0.4802*	−1.1383	−0.4751*
			(0.7604)	(0.2631)	(0.7954)	(0.2656)	(0.8173)	(0.2665)	(0.8180)	(0.2664)
Market income mean (000's)			0.0024	0.0016	0.0046	0.0015	0.0056	0.0019	0.0055	0.0018
			(0.0068)	(0.0023)	(0.0072)	(0.0023)	(0.0074)	(0.0023)	(0.0074)	(0.0023)
Income growth					0.0038	0.0034	0.0030	0.0038	0.0031	0.0038
					(0.0089)	(0.0026)	(0.0098)	(0.0028)	(0.0097)	(0.0028)
Gini market income					0.3077	−0.2371	0.4679	−0.2900	0.4476	−0.2950
					(1.8899)	(0.5326)	(2.0207)	(0.5373)	(2.0117)	(0.5354)
Gini disposable income					2.6383	0.9076	2.3053	0.7890	2.3177	0.7930
					(3.4096)	(1.3202)	(3.3895)	(1.2519)	(3.3921)	(1.2530)
Bottom 10% income share					0.0002	−0.0111	−0.0145	−0.0181	−0.0153	−0.0182
					(0.0724)	(0.0223)	(0.0740)	(0.0216)	(0.0737)	(0.0216)
Top 10% income share					−0.1356	−0.0496	−0.1316	−0.0462	−0.1296	−0.0456
					(0.1095)	(0.0358)	(0.1071)	(0.0352)	(0.1071)	(0.0353)
Top 5% income share					0.1313	0.0520	0.1273	0.0506	0.1254	0.0500
					(0.1110)	(0.0347)	(0.1126)	(0.0356)	(0.1124)	(0.0356)
Left							0.2714***	0.0928***	0.2903***	0.0984***
							(0.0256)	(0.0085)	(0.0291)	(0.0107)
Right							−0.2444***	−0.0776***	−0.2881***	−0.0895***
							(0.0270)	(0.0084)	(0.0271)	(0.0089)
Left*I(net benefit>0)									−0.0434*	−0.0145
									(0.0254)	(0.0099)
Right*I(net benefit>0)									0.1013***	0.0290***
									(0.0215)	(0.0076)
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Income sources	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country and year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	150,543	150,543	150,543	150,543	150,543	150,543	136,267	136,267	136,267	136,267

Note: ***p < 0.01, **p < 0.05, *p < 0.1. The models 1, 3, 5, 7 and 9 show the coefficients of ordered probit regressions where the dependent variable is ordinal in 5 levels from strongly disagree to strongly agree with respect to the statement "The government should take measures to reduce differences in income levels". The models 2, 4, 6, 8 and 10 show the marginal effects of probit regressions where the dependent variable takes value one if the individuals agree or strongly agree with the previous statement, and takes value zero otherwise. Standard errors (in parenthesis) are robust and clustered by country.

Table 3
Alternative measures of attitudes towards redistribution.

Variable	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	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	oprobit coeff	probit dy/dx	oprobit coeff	probit dy/dx	oprobit coeff	probit dy/dx	oprobit coeff	probit dy/dx
Receiving posit. net ben.	0.0047	0.0030	0.0207	0.0031	0.0583***	0.0263***	0.0116	−0.0027
	(0.0140)	(0.0071)	(0.0156)	(0.0087)	(0.0154)	(0.0078)	(0.0131)	(0.0071)
Social contrib. over GDP	−6.9695***	−3.0027***	−8.8938***	−3.7431***	9.0741***	3.1063***	10.4212***	4.5149***
	(0.2502)	(0.0893)	(0.2890)	(0.0814)	(0.2403)	(0.1100)	(0.3972)	(0.1105)
Tax revenue over GDP	−0.7483	−0.8032***	−2.3421***	0.6864***	−1.7357***	0.1766	−1.1233*	1.0542***
	(0.6744)	(0.2066)	(0.3570)	(0.1441)	(0.3232)	(0.1370)	(0.5972)	(0.1743)
Market inc. mean (000's)	−0.0292***	−0.0091***	−0.0176***	0.0021	−0.0536***	−0.0171***	−0.0733***	−0.0231***
	(0.0077)	(0.0025)	(0.0035)	(0.0014)	(0.0040)	(0.0015)	(0.0075)	(0.0020)
Income growth	0.0273***	0.0117***	0.0659***	0.0296***	−0.0284***	−0.0041***	−0.0528***	−0.0151***
	(0.0075)	(0.0024)	(0.0042)	(0.0014)	(0.0039)	(0.0014)	(0.0080)	(0.0019)
Gini market income	−5.9266***	−2.1727***	−3.9737***	−1.4637***	−5.9566***	−3.2947***	−11.1431***	−4.5951***
	(0.9703)	(0.3203)	(0.5136)	(0.2242)	(0.5173)	(0.2473)	(0.8521)	(0.2529)
Gini disposable income	8.0763***	5.4540***	24.9860***	8.9117***	−12.6836***	−7.6531***	−9.4917***	−6.6618***
	(0.8395)	(0.2624)	(0.7814)	(0.1513)	(0.4807)	(0.1704)	(0.9174)	(0.2164)
Bottom 10% inc. share	0.6225***	0.3477***	0.8406***	0.4443***	−0.6058***	−0.1752***	−0.4707***	−0.1674***
	(0.0304)	(0.0092)	(0.0216)	(0.0076)	(0.0184)	(0.0065)	(0.0238)	(0.0059)
Top 10% inc. share	−0.0491	−0.0658***	−0.3801***	−0.1643***	0.5197***	0.2386***	0.6750***	0.2988***
	(0.0537)	(0.0169)	(0.0273)	(0.0085)	(0.0267)	(0.0094)	(0.0538)	(0.0124)
N	54,444	54,444	54,881	54,526	54,807	53,972	54,761	53,677

***p < 0.01, **p < 0.05, *p < 0.1. Specifications are as in models 5 and 6 of Table 2; yet, the gini of disposable income is rule out due to high autocorrelation. For model 1, the dependent variable is a 5-level Likert scale with respect to the statement "Large differences in income are acceptable to reward talents and efforts". For model 2, the dependent variable takes value one if the individual disagrees or strongly disagrees with the previous statement, and takes value zero otherwise. For model 3, the dependent variable is a 5-level Likert scale with respect to the statement "For a fair society, differences in standard of living should be small". For model 4, the dependent variable takes value one if the individual disagrees or strongly disagrees with the previous statement, and takes value zero otherwise. For model 5, the dependent variable is a 5-level Likert scale with respect to the statement "Social benefits/services prevent widespread poverty". For model 6, the dependent variable takes value one if the individual disagrees or strongly disagrees with the previous statement, and takes value zero otherwise. For model 7, the dependent variable is a 5-level Likert scale with respect to the statement "Social benefits/services lead to a more equal society". For model 8, the dependent variable takes value one if the individual disagrees or strongly disagrees with the previous statement, and takes value zero otherwise. The estimates are based on round 4 (2008) and 8 (2016) of ESS. All regressions control for demographics, income sources and country and year FE.

5. Econometric results

Models 1 and 2 of Table 2 report the results from regressions 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. The first column shows the coefficient of an ordered probit regression using the 5-level Likert scale for the dependent variable of preferences for redistribution, while the second column shows the marginal effect of a probit equation, where the dependent variable takes value one if the individual agrees or strongly agrees with the statement about supporting redistribution, and takes value zero otherwise. We find that holding positive net benefits rises preferences for redistribution by about 1.4% (model 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 produce comparable effects of a rise in social benefits conditional on the extent of actual net benefits.

In Models 3 to 6 of Table 2 we 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 magnitudes only change marginally after introducing further controls (it is about 1.4%).

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 1.37%, significant at standard confidence levels. In Table A6 in the Appendix (in model 1) we have computed the marginal effects of receiving positive net benefits on the probability of reporting each of the five categories of the relevant scale. We find that the treatment generates a compounded increase in the probability of supporting redistribution (items 4 and 5) of 1.48%, whereas the effect reduces the probability of not supporting redistributions (items 1 to 3).

In Models 7 and 8 of Table 2 we control for individual political attitudes, i.e. whether the person self-assess towards left-wing or right-wing political attitudes. Controlling for political attitudes is relevant for our identification strategy, since the political opinion delimits the voting attitudes across countries and time and hence shapes the actual redistribution system. Model 8 reports the effect of

receiving positive net benefits on support for redistribution. The magnitude of the effect is 1.45% and statistically significant, which is close to baseline estimates. Political views have the expected relationship with redistributive preferences (see for instance Bernasconi, 2006); individuals with left-wing views tend to be in favour of redistribution while individuals with right-wing views tend to be against. Model 9 and 10 extend the previous specifications by introducing interactions between the generosity of the tax-benefits system and political attitudes. We do not detect evidence of direct effects of generosity of the tax-benefit system on redistributive preferences by political views. Nonetheless, we find a statistically significant relationship between political attitude and being net benefit receiver. Particularly, we observe that right-oriented individuals receiving positive net benefits increase their support for redistribution (models 9 and 10) and that left leaning individuals receiving positive net benefits reduce their support for redistribution (only in model 9). Interestingly, this implies that even right-oriented individuals may be in favour of redistribution if they are exposed to enough advantageous redistribution.

Table 3 extends 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. As with our key variable about preferences for redistribution, the individuals express their agreement in a 5-level Likert scale to four different statements. These are "Large differences in income are acceptable to reward talents and efforts" (models 1–2); "For fair society, differences in standard of living should be small" (models 3–4); "Social benefits/services prevent widespread poverty" (models 5–6); and "Social benefits/services lead to a more equal society" (models 7–8). The levels of agreement are recorded in such a way that a larger level implies more support or taste for equality and redistribution and believing that inequality should be reduced.[12] In this way, we expect a positive correlation between preferences for redistribution and these alternative measures. Each of these variables represents one potential motive for demanding for redistribution. Estimates in Table 3 reveal that the generosity of the welfare state positively affects the belief that social benefits and services prevent widespread poverty (models 5 and 6), but not the other variables. This result implies that treated individuals do believe that the welfare state can help mitigating generalized poverty, which may lend support to the idea that other-regarding preferences play a role on preferences for redistribution (Dimick et al., 2016, 2018).

Table 4 reports estimates from separate models based on our preferred specification. In models 1–4, we use our baseline specification about preferences for redistribution. In the table, we report for each panel I-VI only the coefficients of the relevant treatment variable, capturing the intensity of the tax system generosity on support for redistribution. Panel I reports the effect of being a net benefit recipient on preferences for redistribution (as used in previous tables), capturing the extensive margins of redistribution. Panel II utilizes the levels of taxes and benefits jointly, where treatments are reported in thousands PPP euros. Rising benefits (taxes) holding taxes (benefits) fixed rises (decreases) support for redistribution, albeit the effect is insignificant across specifications. We find a similar pattern when looking directly at net benefits (panel III), normalized by the sample standard deviation. Cross-country variation in these monetary measures may be affected by the lack of a common scale for the size of the redistribution system. In the remaining panels, we consider relative measures of intensity of net benefits.

Panel IV of Table 4 reports instead a positional treatment, measuring the percentile rank occupied by each individual in her own country-period distribution of net benefits. We interpret the treatment as the effect of rising by one percentile in this scale, and we include a quadratic term to capture non-linearities. Rising positions by 10 percentage points rises the probability of supporting redistribution by about 0.7% (the quadratic term is relatively small compared to the size of coefficients), the effect being close to 0.017 on the scale estimated by the ordered probit model.

Panel V includes four levels of the benefit-to-tax ratio experienced by the individual's household.[13] These indicators break down the positive net benefits treatment of panel I into different categories, ranging from situations where benefits are smaller than double the amount of taxes but their difference is positive (i.e. $ben/tax \in [1.00,2.00[$), up to more extreme values. Our preferred specifications show that the recorded effects are of the size 0.8%–1.2% in model 4, and about 0.03 in model 3, albeit only coefficients associated to $ben/tax \in [1.00,2.00[$ yield a significant effect on support for redistribution.

Lastly, Panel VI reports the coefficients associated with rising net benefits, while net benefits are normalized across countries by the size of the tax base, so that net benefits are reported as a percent of this fraction (the size of the tax based is used as a further control in the model). To simplify readings of the table, we report the effect of a standard deviation increase in this variable. This measure of generosity makes net benefit relative to the size of redistribution in a given country and year. The effect of rising relative net benefits by one standard deviation is always significant at 5% level and amounts to rising support to redistribution by about 1% in model 4, which corresponds to an effect of about 0.034 along the scale measuring the intensity of support for redistribution.

In columns 5 and 6 of Table 4, we check how sensitive our results are to changes in the way we construct the dependent variable. Model 5 uses a recoded Likert scale with three categories: strongly disagree, disagree, and agree or strongly agree (the category 'neither agree nor disagree' is left out). Model 6 uses a dependent variable that takes value one if the individual agrees or strongly agrees with the statement about preferences for redistribution, and takes value zero if she disagrees or strongly disagrees (the category 'neither agree nor disagree' is left out). For what concerns the intensive margins of treatment, the effects we estimate using this scale are robust and in the range of those reported in models 3 and 4, respectively. The effect is non-significant for the measures of intensity of benefits in panel V

[12] For the probit regressions, the dependent variable of model 2 takes value one if the individual disagrees or strongly disagrees that large differences in income are acceptable to reward talents and efforts, and takes value zero otherwise. In model 4, it takes value one if the individual agrees or strongly agrees that for fair society, differences in standard of living should be small, and takes value zero otherwise. In model 6, it takes value 1 if the individual agrees or strongly agrees that social benefits and services prevent widespread poverty, and takes value zero otherwise. In model 8, it takes value 1 if the individual agrees or strongly agrees that social benefits and services lead to a more equal society, and takes value zero otherwise.

[13] The reference category for these indicators is whether the benefit-to-tax ratio is smaller than 1.0, that is, net benefits are negative.

Table 4
Generosity of the tax benefit system and attitudes towards redistribution.

Regression	Variable	(1)	(2)	(3)	(4)	(5)	(6)
		oprobit coeff	probit dy/dx	oprobit coeff	probit dy/dx	oprobit coeff	probit dy/dx
I.	Receiving posit. net ben.	0.0294**	0.0140**	0.0306**	0.0137**	0.0079	0.0066
		(0.0144)	(0.0063)	(0.0138)	(0.0060)	(0.0222)	(0.0067)
II.	Benefits (in '000)	−0.0006**	−0.0001	−0.0006**	−0.0001	−0.0003	−0.0001
		(0.0003)	(0.0001)	(0.0003)	(0.0001)	(0.0003)	(0.0001)
	Taxes (in '000)	−0.0001	−0.0000	−0.0001	−0.0000	−0.0001	−0.0000
		(0.0001)	(0.0000)	(0.0001)	(0.0000)	(0.0002)	(0.0000)
III.	Net benefits (in SD units)	0.0026	0.0005	0.0036	0.0011	0.0040	0.0011
		(0.0075)	(0.0024)	(0.0088)	(0.0027)	(0.0099)	(0.0022)
IV.	Net benefits pct (by c-y)	0.0017*	0.0007***	0.0017*	0.0007***	0.0029***	0.0006***
		(0.0009)	(0.0003)	(0.0009)	(0.0003)	(0.0009)	(0.0002)
	Net benefits pct 2 (by c-y)	−0.0000*	−0.0000**	−0.0000	−0.0000**	−0.0000***	−0.0000***
		(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
V.	ben/tax ∈ [1.00,2.00[	0.0310*	0.0062	0.0343**	0.0079*	0.0237	0.0061
		(0.0175)	(0.0049)	(0.0168)	(0.0047)	(0.0200)	(0.0043)
	ben/tax ∈ [2.00,3.00[	0.0316	0.0116	0.0330	0.0122	0.0192	0.0063
		(0.0276)	(0.0108)	(0.0270)	(0.0106)	(0.0401)	(0.0091)
	ben/tax ∈ [3.00, 6.00[	0.0071	0.0016	0.0079	0.0020	−0.0472	−0.0083
		(0.0255)	(0.0089)	(0.0245)	(0.0085)	(0.0355)	(0.0075)
	ben/tax > 6.00	0.0116	−0.0006	0.0118	−0.0002	−0.0156	−0.0041
		(0.0204)	(0.0077)	(0.0205)	(0.0077)	(0.0327)	(0.0071)
VI.	Net benefit/taxes (in SD units)	0.0343***	0.0101***	0.0341***	0.0101***	0.0308*	0.0062*
		(0.0122)	(0.0036)	(0.0124)	(0.0036)	(0.0167)	(0.0036)
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
Market income inequalities		No	No	Yes	Yes	Yes	Yes
Social contributions and tax revenues		No	No	Yes	Yes	Yes	Yes
N		150,543	150,543	150,543	150,543	129,582	129,582

***p < 0.01, **p < 0.05, *p < 0.1. Each panel reports the key coefficients about the generosity of the tax-benefit system of a separate regression. Coefficients of controls are not reported. Models 1 and 3 show the coefficients of ordered probit regressions where the dependent variable is ordinal in five levels (1-strongly disagree to 5-strongly agree). The models 2 and 4 show the marginal effects of probit regressions where the dependent variable takes value one if the individual agrees or strongly agrees with the statement about preferences for redistribution (categories 4 and 5), and takes value zero otherwise. The model 5 shows the coefficients of an ordered probit model with four categories: strongly disagree, disagree, and agree and strongly agree. The model 6 shows the marginal effects of a probit regression where the dependent variable takes value one if the individual agrees or strongly agrees with supporting redistribution, and takes value zero if she disagrees or strongly disagrees. Standard errors (in parenthesis) are robust and clustered by country.

(albeit the size and sign coincide), however, the effects for treatments in panels IV and VI in model 5 and 6 are significant and remarkably similar to those obtained for specifications 3 and 4. While dropping the Likert scale's category 3 from the analysis seems not to affect the implications of measures of intensity of net benefits on support to redistribution, we find that the extensive margins are affected. Model 6 shows that receiving positive net benefits has an effect of rising support for redistribution by about 0.6%, the effect being half the size of the coefficient estimated in model 4 and statistically insignificant. While reduced significance is reconciled with smaller sample size in models 5 and 6, lower estimated effects for the extensive margins of redistribution may be a consequence of dropping a category of response which is significantly and negatively affected by rising the probability of receiving positive net benefits. As Table A6's model 1 shows, receiving positive net benefits significantly reduces by about 0.5% the probability of disagreeing, strongly disagreeing or neither agreeing or disagreeing with the ESS question measuring support for redistribution. The same pattern is also registered for other indicators for the intensive margins of treatment, reported in columns 2, 3 and 4 of the table.

6. Concluding remarks

In this study, we document empirically that tax and benefit schemes have a significant independent effect on preferences for redistribution, even after accounting for many demographics and inequality indices. To obtain these effects, we have used a two-sample strategy to estimate individual level exposure to taxes and benefits on ESS, using EU-SILC data as a benchmark. By expanding the ESS dataset, we are able to fully account for the way redistribution policies interact with individual level attributes to generate the treatment of interest.

This paper exploits time and geographic variation in tax-benefit rules to provide robust evidence that rising generosity of the welfare state rises support for redistribution, holding income risk, income levels, income growth and country-time specific effects as fixed. Overall, we find that rising the probability of being a net benefit holder rises support for redistribution by about 1.4% in the preferred specification (model 4 in Table 2), the effect being mostly related to material poverty considerations (Table 3). The level of individual benefits vis-à-vis taxes, relative to the country-year size of redistribution, are also positively and significantly associated with support for redistribution. Rising the position in the net benefit distribution, or doubling the benefits-to-taxes ratio, or increasing net benefits relative to national fiscal revenues rises support for redistribution by about 1.0%. Effects estimated with non-linear models are close to those obtained by fitting linear (probability) models through OLS.[14]

Effects on the outcome level are also of interest. Compared to a sample average of 3.88 points (on the Likert scale), receiving positive net benefits rises outcome responses by 0.045 points.[15] Concerning relative measures of net benefit generosity, we find that the percentile ranking on the net benefit distribution yields positive but small effects on the support for redistribution scale, while rising net benefits or receiving benefits that are double as much as taxes is associated with an increase in the level of support for redistribution of 0.03 points. These effects, obtained with the preferred specification using non-linear models, coincide with point estimates from OLS regressions on the level of support for redistribution.

Models incorporating insurance motives, positional concerns and preferences for fairness predict ambiguous effects of rising welfare state generosity on support for redistribution. This paper contributes to this literature with evidence from micro data, providing robust indication that the effects of interest are positive and significant.

The results contribute to an ongoing debate, initiated with the Meltzer and Richard (1981) political economy model, about the role of changes in inequality on support for redistribution. The presence of redistribution, and the generosity of the welfare state, provide strong incentives for working decisions, for wealth accumulation and, more broadly, for human capital acquisition. Redistribution policy hence affects pre-fisc market income inequality through different channels. Rising generosity of the welfare state may create disincentives on the extensive margins of labour supply for low-income earners and increase income polarization at the top of the income distribution, widening market income inequalities. Holding market inequality and individual income as fixed, we show that differential exposure to taxes and benefits across the population has an impact on support for redistribution, which is comparable to that of rising by 3–4 points the Gini inequality index of market and disposable income (as reported in the literature using ESS or other sources, see Alesina and Giuliano, 2011; Olivera, 2015).

This paper motivates that generosity of the welfare system should be accounted for in the analysis of preferences for redistribution, and it shows how do it. Our results also highlight the importance of looking at taxes and benefits altogether in evaluating the effects of the welfare state expansion. Results are consistent with predictions from a model à la Alesina and Angeletos (2005) where the society holds a preference for fairness, whereas the outcome distribution is driven by luck. Integrating such models with benefits alongside taxes would shed light on the channels driving support for redistribution. Our results show that poverty reduction motivations are dominating.

Finally, we stress that this paper only considers in-cash benefits accruing to the survey respondent's family, whereas in modern welfare states a large share of transfers is supplied in kind thorugh public goods provision, such as free education. The extent at which universal in-kind trasnfers are redistributive depends on whether richer households prefer to sort into private provision while financing public provision with taxes (see Andreoli et al., 2018). Modelling and estimating the implications of in-kind transfers on support for redistribution is a pending task for future research.

Declaration of competing interest

None.

Acknowledgement

This paper benefitted from comments by Koen Decancq, Philippe Van Kerm and participants to the IT14 Winter School "Health Opportunity and Redistribution" (Canazei, Italy, 2019) and the "International workshop on what drives inequality" (Luxembourg, 2018). This work was supported by the French Agence Nationale de la Recherche [Ordineq grant ANR-16-CE41-0005-01] and the Luxembourg Fonds National de la Recherche [IMCHILD grant INTER/NORFACE/16/11333934 and PREFERME CORE grant C17/SC/11715898]. The usual disclaimer applies. Replication code and data, alongside additional results, are made available as a web appendix on the authors webpages.

[14] OLS estimates replicating baseline models in Table 2 are available in Table A5 in the Appendix.

[15] Table A6 in the Appendix reports, for selected measures related to intensive and extensive margins of net tax benefits, the effects on the level of support for redistribution (on the 1–5 scale). OLS estimates of the same effects are reported in the bottom panel of the table.

APPENDIX

Table A1
Available observations in less restrictive model specification

Country	Round 2008	Round 2010	Round 2012	Round 2014	Round 2016	Total
Austria	1373	1344		1282	1438	5437
Belgium	1476	1379	1595	1509	1604	7563
Bulgaria	1684	1902	1853			5439
Croatia	979	1094				2073
Cyprus	923	652	826			2401
Czech Re	1326	1562	1250	1386	1525	7049
Denmark	1322	1296	1109	1258		4985
Estonia	1257	1413	1795	1679	1858	8002
Finland	1932	1650	1959	1876	1751	9168
France	1784	1522	1726	1698	1808	8538
Germany	2167	2297	2406	2603	2395	11,868
Greece	1139	1712				2851
Hungary	1072	1171	1247	1122		4612
Iceland			550			550
Ireland	1501	1671		1800		4972
Italy			479			479
Latvia	1358					1358
Lithuania	1479	1068	1453	1522		5522
Netherlands	1504	1443	1529	1683	1453	7612
Norway	1419	1406	1478	1287		5590
Poland	1190	1209	1359	1108	1168	6034
Portugal	894	1045	896	952		3787
Romania	1355					1355
Slovakia	1149	897	1171			3217
Slovenia	920	962	861	925	1045	4713
Spain	1494	1411	1458	1388		5751
Sweden	1633	1322	1613	1574	1374	7516
Switzerland	1314	1159	1156	1193		4822
UK	1934	1812	1684	1849		7279
Total	37,578	34,399	31,453	29,694	17,419	150,543

Table A2
Preferences for redistribution (% of responses on 1-5 scale), 2008–2016

Country	Round 2008					Round 2010					Round 2012					Round 2014					Round 2016				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Austria	6.3	15.9	16.1	33.1	28.6	5.2	6.3	17.9	36.8	33.9						2.0	4.8	10.1	43.7	39.5	2.3	6.3	13.2	49.5	28.7
Belgium	2.5	13.0	13.0	44.6	26.9	2.3	12.0	14.2	44.0	27.4	3.5	11.3	13.5	45.5	26.2	3.6	11.4	12.5	43.3	29.1	2.2	12.0	12.5	44.8	28.4
Bulgaria	3.9	7.4	9.6	31.5	47.6	2.4	3.0	6.5	25.7	62.5	1.9	2.5	5.9	35.0	54.6										
Croatia	1.6	5.0	14.3	53.2	25.8	0.7	4.2	9.6	49.8	35.6															
Cyprus	1.5	9.9	9.5	46.0	33.0	0.9	3.5	7.1	46.9	41.6	1.9	5.8	9.2	42.0	41.0										
Czech Rep	8.6	13.3	20.4	29.6	28.1	4.0	10.6	19.6	31.8	34.0	3.4	10.7	19.2	35.3	31.4	5.7	13.0	22.2	35.1	24.0	7.6	20.1	23.1	36.2	13.0
Denmark	6.5	30.1	21.2	30.4	11.8	7.4	32.8	21.7	28.5	9.6	8.4	31.7	21.6	30.1	8.3	9.9	29.6	23.4	28.0	9.1					
Estonia	2.2	11.1	17.4	44.2	25.1	1.1	10.0	13.0	49.5	26.4	1.4	6.9	11.5	43.2	37.1	1.4	7.7	12.1	44.4	34.4	1.4	9.4	19.7	48.3	21.2
Finland	1.8	7.7	14.4	42.0	34.2	1.5	8.1	14.2	44.3	32.0	1.4	7.8	15.7	42.4	32.7	2.2	8.7	15.0	39.8	34.2	1.4	8.1	17.5	44.0	29.1
France	3.5	7.2	10.3	37.0	41.9	2.8	7.4	8.9	38.7	42.3	5.2	8.3	11.7	36.7	38.1	6.5	9.5	13.3	36.1	34.6	4.1	9.3	11.9	38.6	36.0
Germany	2.5	14.1	14.5	46.1	22.8	3.2	12.5	12.5	44.1	27.7	1.2	10.5	11.7	46.3	30.3	1.5	13.0	12.3	48.3	24.9	1.5	11.3	12.3	46.7	28.2
Greece	0.4	1.1	6.1	43.5	48.9	2.3	6.7	7.6	30.8	52.6															
Hungary	1.2	3.7	10.0	33.5	51.6	0.8	2.0	7.9	31.2	58.1	1.5	3.5	10.4	40.6	43.9	0.7	2.5	9.3	41.2	46.3					
Iceland											3.3	6.5	16.5	37.5	36.2										
Ireland	1.5	12.6	12.9	51.6	21.5	2.3	9.4	11.4	43.5	33.5						1.6	8.2	10.7	47.7	31.8					
Italy											0.6	5.4	8.1	36.3	49.5										
Latvia	1.1	5.2	11.4	43.1	39.2																				
Lithuania	0.9	4.9	13.2	55.1	25.8	0.2	2.8	6.6	47.9	42.4	0.2	1.4	6.5	50.8	41.0	0.4	1.9	8.1	38.2	51.4					
Netherlands	3.6	21.1	18.9	41.7	14.6	3.3	21.6	16.3	42.0	16.8	3.5	21.5	16.2	44.1	14.7	2.8	21.3	17.8	39.5	18.7	2.9	17.6	16.7	44.9	18.0
Norway	2.3	16.1	20.8	45.9	14.9	2.9	19.2	23.0	41.9	13.0	2.2	17.0	23.8	43.5	13.5	2.1	16.0	23.2	40.9	17.9					
Poland	2.5	11.4	11.2	49.1	25.8	2.6	12.2	9.4	47.2	28.6	1.7	8.6	10.9	40.8	38.0	3.0	7.4	10.3	40.5	38.8	2.6	10.0	13.3	47.0	27.1
Portugal	0.1	4.4	5.4	56.4	33.8	0.2	2.4	4.1	48.2	45.1	0.6	1.5	3.6	47.8	46.7	0.7	3.6	7.8	43.1	44.9					
Romania	0.8	3.1	14.2	41.8	40.0																				
Slovakia	1.7	9.1	16.8	42.0	30.5	1.4	5.9	10.6	38.4	43.7	0.9	4.9	12.8	37.8	43.6										
Slovenia	0.9	4.7	7.5	50.0	37.0	0.9	4.1	5.4	43.2	46.4	0.7	4.8	5.8	40.0	48.8	1.2	6.9	8.5	38.1	45.3	0.7	4.8	7.4	44.5	42.7
Spain	0.9	6.6	12.1	51.7	28.6	0.9	6.9	11.2	48.3	32.7	0.7	6.2	9.1	46.7	37.3	1.1	4.6	7.5	36.3	50.5					
Sweden	1.0	10.8	23.2	45.0	20.0	1.4	11.1	22.3	46.5	18.6	1.0	8.0	20.6	47.4	23.0	1.3	8.4	21.4	47.3	21.6	1.2	9.4	24.8	47.2	17.3
Switzerland	1.6	15.8	15.0	46.4	21.2	2.9	14.8	14.2	46.2	21.9	2.2	12.6	16.1	46.6	22.4	4.4	18.3	18.2	41.2	18.0					
UK	2.9	17.9	19.1	41.5	18.6	3.1	17.0	17.2	46.9	15.8	2.4	16.0	18.1	45.0	18.5	2.9	15.2	18.1	41.5	22.3					
Total	2.5	10.9	14.4	43.2	29.0	2.4	10.3	12.8	41.2	33.3	2.2	9.5	13.3	42.3	32.7	2.7	10.8	14.2	41.2	31.0	2.5	10.9	15.7	44.7	26.2

Note: Category 1 indicates 'Strongly disagree', 2 'Disagree', 3 ′Neither agree nor disagree', 4 ′Agree, and 5 ′Strongly agree'. The individual must indicate how much agree is with the statement "The government should take measures to reduce differences in income levels".

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

Country	Round 2008	Round 2010	Round 2012	Round 2014	Round 2016	Total
Austria	0.500	0.478		0.496	0.481	0.489
Belgium	0.472	0.496	0.488	0.480	0.511	0.490
Bulgaria	0.574	0.659	0.600			0.613
Croatia	0.481	0.581				0.534
Cyprus	0.433	0.506	0.438			0.455
Czech Re	0.560	0.762	0.114	0.159	0.187	0.366
Denmark	0.085	0.143	0.122	0.171		0.130
Estonia	0.126	0.118	0.580	0.584	0.605	0.434
Finland	0.467	0.552	0.556	0.534	0.556	0.532
France	0.535	0.558	0.566	0.535	0.547	0.548
Germany	0.474	0.474	0.477	0.451	0.435	0.462
Greece	0.380	0.394				0.388
Hungary	0.828	0.753	0.644	0.287		0.628
Iceland			0.575			0.575
Ireland	0.686	0.742		0.721		0.717
Italy			0.432			0.432
Latvia	0.615					0.615
Lithuania	0.533	0.680	0.412	0.480		0.515
Netherlands	0.373	0.376	0.387	0.438	0.421	0.400
Norway	0.249	0.272	0.223	0.197		0.236
Poland	0.397	0.240	0.313	0.397	0.390	0.345
Portugal	0.632	0.614	0.676	0.610		0.632
Romania	0.595					0.595
Slovakia	0.617	0.701	0.678			0.663
Slovenia	0.674	0.642	0.703	0.674	0.581	0.652
Spain	0.428	0.474	0.519	0.533		0.488
Sweden	0.059	0.216	0.139	0.271	0.118	0.159
Switzerland	0.326	0.264	0.271	0.287		0.288
UK	0.550	0.591	0.599	0.521		0.564
Total	0.463	0.491	0.457	0.449	0.446	0.463

Table A4
Taxes, in-cash benefits (in PPP Euros) and the proportion of positive net benefit recipients by country, using sample from EU-SILC, 2008–2016

Country	Taxes	Benefits	Receives positive net benefits	N
Austria	14,498.3	13,862.2	0.494	23,937
Belgium	11,520.8	11,469.0	0.467	27,345
Bulgaria	660.2	1919.2	0.713	16,837
Croatia	2231.9	3783.9	0.651	9521
Cyprus	4513.0	10,683.4	0.568	12,431
Czech Republic	2110.4	4347.9	0.589	43,602
Denmark	27,826.1	14,918.9	0.369	22,965
Estonia	2257.4	3717.0	0.592	27,397
Finland	15,600.0	11,694.4	0.465	51,794
France	9400.3	14,075.7	0.559	55,722
Germany	11,555.4	12,846.5	0.506	65,278
Greece	5602.2	7440.3	0.546	12,631
Hungary	1823.7	3409.9	0.618	38,197
Iceland	17,218.4	10,303.8	0.350	2989
Ireland	9235.5	15,158.9	0.667	14,447
Italy	10,950.4	11,114.2	0.507	19,538
Latvia	1716.6	2789.2	0.647	6247
Lithuania	1395.7	3054.0	0.639	20,602
Netherlands	21,283.4	10,602.5	0.368	53,454
Norway	27,129.1	19,114.8	0.404	22,482
Poland	2841.8	3600.5	0.557	63,834
Portugal	4661.2	7150.6	0.587	28,907
Romania	746.3	1656.2	0.665	7711
Slovakia	1557.5	3742.6	0.607	15,866
Slovenia	7572.0	8055.4	0.527	44,067
Spain	5266.0	8743.9	0.545	50,462
Sweden	15,779.9	15,823.6	0.477	32,249
Switzerland	25,961.5	18,222.4	0.364	29,683
United Kingdom	8291.1	11,352.9	0.587	35,904
Total	9881.8	9619.0	0.527	856,099

Table A5
Robustness check: OLS coefficients for *Receiving positive net benefits*. Direct reference to Table 2

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	PR = 1,2,3,4,5	PR = 4,5 vs 1,2,3	PR = 1,2,3,4,5	PR = 4,5 vs 1,2,3	PR = 1,2,3,4,5	PR = 4,5 vs 1,2,3	PR = 1,2,3,4,5	PR = 4,5 vs 1,2,3
Receiving pos. net ben.	0.0207	0.0057	0.0222*	0.0062	0.0219*	0.0063	0.0045	0.0013
	(0.0129)	(0.0055)	(0.0128)	(0.0055)	(0.0123)	(0.0053)	(0.0163)	(0.0075)
Left							0.2575***	0.1021***
							(0.0271)	(0.0128)
Right							−0.2880***	−0.1085***
							(0.0266)	(0.0121)
Left*I(net benefit>0)							−0.0622***	−0.0307***
							(0.0225)	(0.0102)
Right*I(net benefit>0)							0.1169***	0.0461***
							(0.0204)	(0.0092)
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
Market income inequalities	No	No	No	No	Yes	Yes	Yes	Yes
Social contrib. and tax revenues	No	No	Yes	Yes	Yes	Yes	Yes	Yes
N	150,543	150,543	150,543	150,543	150,543	150,543	136,267	136,267
R2	0.124	0.100	0.124	0.100	0.125	0.100	0.157	0.126

***p < 0.01, **p < 0.05, *p < 0.1. Models report OLS coefficients on preferences for redistributions measures on a cardinal 1–5 scale (models 1, 3, 5, 7) and for an indicator for items 4 and 5 (agrees or strongly agrees to the statement "The government should take measures to reduce differences in income levels") (models 2, 4, 6, 8). Standard errors (in parenthesis) are robust and clustered by country.

Table A6
Robustness check: OLS coefficients for various treatments compared to average effect on the outcome based on order probit

Outcome	Receives positive net benefits	Percentile in net benefits distributions	ben/tax ∈ [1.00,2.00[	(benefits-taxes)/avg taxes in the country (in SD units)
	(1)	(2)	(3)	(4)
Strongly disagree (1)	−0.0035***	−0.00003*	−0.0018*	−0.0018**
	(0.001)	(0)	(0.001)	(0.001)
Disagree (2)	−0.0076***	−0.00006	−0.0048**	−0.0048***
	(0.003)	(0)	(0.002)	(0.002)
Neither (3)	−0.0051***	−0.00003	−0.0038**	−0.0038***
	(0.002)	(0)	(0.002)	(0.001)
Agree (4)	0.0015**	0.00002	−0.0008**	−0.0008***
	(0.001)	(0)	(0)	(0)
Strongly agree (5)	0.0147***	0.0001	0.0112**	0.0112***
	(0.005)	(0)	(0.006)	(0.004)
Average effect on probabilities	0.0036	0.0000	0.0021	0.0020
Average effect on outcome	0.0456	0.0003	0.0301	0.0299
OLS marginal effect	0.0219*	0.0016*	0.0317**	0.0282**
	(0.0123)	(0.0008)	(0.0143)	(0.0121)
N	150,543	150,543	150,543	150,543
R2	0.1250	0.1250	0.1250	0.1253

***p < 0.01, **p < 0.05, *p < 0.1. The top panel displays average marginal effects for each outcome category, based on ordered probit estimates. The average effect on the outcome is based on the 1–5 scale assigned to preference for redistribution variable. The bottom panel reports OLS coefficients based on the 1–5 scale for preferences for redistribution. Each column corresponds to one specific treatment. Standard errors (in parenthesis) are robust and clustered by country. Standard errors for average effects on probabilities and on outcomes are not reported.

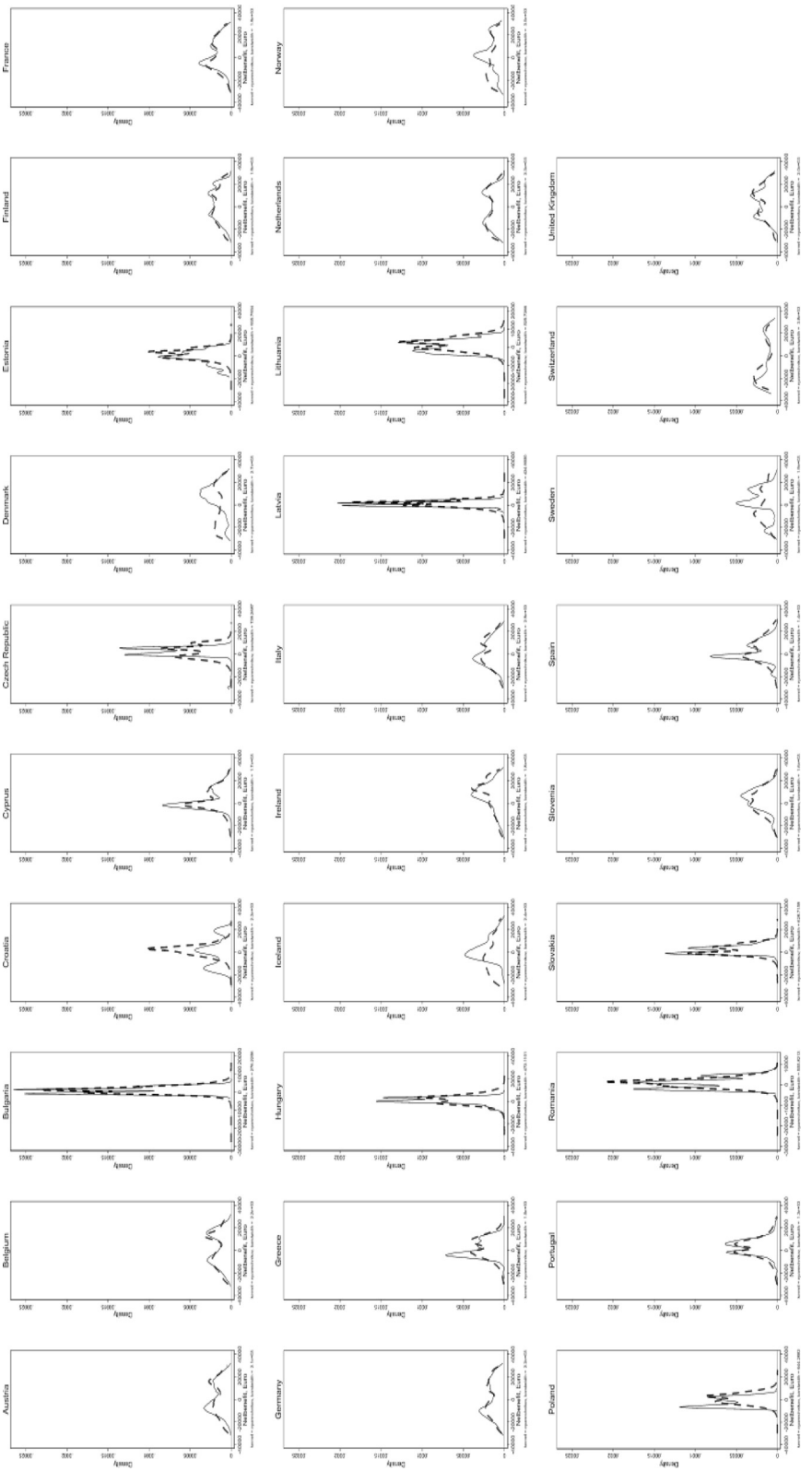

Fig. A.1. Density of benefits and taxes at the country level: ESS (solid line) and EU-SUILC (dashed).

References

Akay, A., Bargain, O., Dolls, M., Neumann, D., Peichl, A., Siegloch, S., 2012. Happy Taxpayers? Income Taxation and Wellbeing. IZA Discussion Papers, No. 6999. Institute for the Study of Labor (IZA), Bonn.

Alesina, A., Angeletos, G.M., 2005. Fairness and redistribution. Am. Econ. Rev. 95 (4), 960–980.

Alesina, A., La Ferrara, E., 2005. Preferences for redistribution in the land of opportunities. J. Publ. Econ. 89, 897–931.

Alesina, A., Giuliano, P., 2011. Preferences for redistribution. In: Bisin, A., Benhabib, J. (Eds.), Handbook of Social Economics (North-Holland).

Alesina, A., Murard, E., Rapoport, H., 2019. Immigration and Preferences for Redistribution in Europe. IZA Discussion Paper No. 12130.

Alesina, A., Miano, Stantcheva, S., 2018. Immigration and Redistribution. NBER Working Paper 2473.

Alvaredo, F., Atkinson, A.B., Piketty, T., Saez, E., 2013. The top 1% in international and historical perspective. J. Econ. Perspect. 27 (3), 1–21.

Alvaredo, F., Chancel, L., Piketty, T., Saez, E., Zucman, G., 2017. Global inequality dynamics: new findings from WID.world. Am. Econ. Rev.: Pap. Proc. 107 (5), 404–409.

Andreoli, F., 2018. Robust inference for inverse stochastic dominance. J. Bus. Econ. Stat. 36 (1), 146–159.

Andreoli, F., Casalone, G., Sonedda, D., 2018. Public education provision, private schooling and income redistribution. J. Econ. Inequal. 16 (4), 553–582.

Benabou, R., Ok, E.A., 2001. Social mobility and the demand for redistribution: the POUM hypothesis. Q. J. Econ. 116, 447–487.

Bernasconi, M., 2006. Redistributive taxation in democracies: evidence on people's satisfaction. Eur. J. Polit. Econ. 22 (4), 809–837.

Bisin, A., Verdier, T., 2017. Inequality, redistribution and cultural integration in the Welfare State, (2017). Eur. J. Polit. Econ. 50, 122–140.

Cappelen, A.W., Konow, J., Sørensen, E.Ø., Tungodden, B., 2013. Just luck: a experimental study of risk-taking and fairness. Am. Econ. Rev. 103 (4), 1398–1413.

Checchi, D., Filippin, A., 2004. An experimetal study of the POUM hypothesis. In: Cowell, F. (Ed.), Inequality, Welfare and Income Distribution: Experimental Approaches, Research on Economic Inequality, 11, pp. 115–136.

Choi, G., 2019. Revisiting the redistribution hypothesis with perceived inequality and redistributive preferences. Eur. J. Polit. Econ. 58, 220–244.

Cojocaru, A., 2014. Prospects of upward mobility and preferences for redistribution: evidence from the life in transition survey. Eur. J. Polit. Econ. 34, 300–314.

Corneo, G., Grüner, H.P., 2002. Individual preferences for political redistribution. J. Publ. Econ. 83, 83–107.

Corneo, G., Neher, F., 2015. Democratic redistribution and rule of the majority. Eur. J. Polit. Econ. 40, 96–109.

Costa-Font, J., Cowell, F., 2015. Social identity and redistributive preferences: a survey. J. Econ. Surv. 29 (2), 357–374.

Cruces, G., Perez-Truglia, R., Tetaz, M., 2013. Biased perceptions of income distribution and preferences for redistribution: evidence from a survey experiment. J. Publ. Econ. 98, 100–112.

Di Tella, R., Dubra, Juan, 2013. Fairness and redistribution: comment. Am. Econ. Rev. 103 (1), 549–553.

Dimick, M., Rueda, D., Stegmueller, D., 2018. Models of other-regarding preferences, inequality and redistribution. Annu. Rev. Polit. Sci. 21, 441–460.

Dimick, M., Rueda, D., Stegmueller, D., 2016. The altruistic rich? inequality and other-regarding preferences for redistribution. Quart. J. Polit. Sci. 11 (4), 385–439.

Durante, R., Putterman, L., Weele, J., 2014. Preferences for redistribution and perception of fairness: an experimental study. J. Eur. Econ. Assoc. 12 (4), 1059–1086.

Fisman, R., Kiziemko, I., Vannutelli, S., 2018. Distributional Preferences in Larger Groups: Keeping up with the Joneses and Keeping Track of the Tails. Boston University - Department of Economics - The Institute for Economic Development Working Papers Series DP301.

Fisman, R., Jakiela, P., Kariv, S., 2015. How did distributional preferences change during the Great Recession? J. Publ. Econ. 128, 84–95.

Fong, C., 2001. Social preferences, self-interest, and the demand for redistribution. J. Publ. Econ. 82 (2), 225–246.

Giuliano, P., Spilimbergo, A., 2014. Growing up in a recession. Rev. Econ. Stud. 81 (2), 787–817.

Gimpelson, V., Treisman, D., 2018. Misperceiving inequality. Econ. Polit. 30 (1), 27–54.

Guillaud, E., 2013. Preferences for redistribution: an empirical analysis over 33 countries. J. Econ. Inequal. 11 (1), 57–78.

Hauser, O.P., Norton, M.I., 2017. Mis)perceptions of inequality. Curr. Opin. Psychol. 18, 21–25.

Karabarbounis, L., 2011. One dollar, one vote. Econ. J. 121, 621–649.

Kerr, W., 2014. Income inequality and social preferences for redistribution and compensation Differentials. J. Monetary Econ. 66, 62–78.

Karadja, M., Mollerstrom, J., Seim, D., 2017. Richer (and holier) than thou? The effect of relative income improvements on demand for redistribution. Rev. Econ. Stat. 99 (2), 201–212.

Kim, D.G., 2019. Positional concern and low demand for redistribution of the poor. Eur. J. Polit. Econ. 56, 27–38.

Kuhn, A., 2019. The Subversive Nature of Inequality: Subjective Inequality Perceptions and Attitudes to Social Inequality. Forthcoming in European Journal of Political Economy.

Kuziemko, I., Norton, M.I., Saez, E., Stantcheva, S., 2015. How elastic are preferences for redistribution: evidence from randomized survey experiments. Am. Econ. Rev. 105 (4), 1478-150.

Lind, J.T., 2005. Why is there so little redistribution? Nordic J. Polit. Econ. 31, 111–125.

Luttmer, E.F.P., Singhal, M., 2011. Culture, context and the taste for redistribution. Am. Econ. J. Econ. Pol. 3 (1), 157–179.

Meltzer, A.H., Richard, S.F., 1981. A rational theory of the size of the government. J. Polit. Econ. 89 (5), 914–927.

Milanovic, B., 2000. The median voter hypothesis, income inequality and income redistribution: an empirical test with the required data. Eur. J. Polit. Econ. 16 (3), 367–410.

Milanovic, B., 2010. Four critiques of the redistribution hypothesis: an assessment. Eur. J. Polit. Econ. 26, 147–154.

Moene, K.O., Wallerstein, M., 2003. Earnings, inequality and welfare spending: a disaggregated analysis. World Polit. 55, 485–516.

Olivera, J., 2015. Preferences for redistribution in Europe. IZA J. Europ. Labor Stud. 4 (14), 1–18.

Perotti, R., 1996. Democracy, income distribution and growth: what the data says. J. Econ. Growth 1, 149–187.

Persson, T., Tabellini, G., 1994. Is inequality harmful for growth?: theory and evidence. Am. Econ. Rev. 84, 600–621.

Piketty, T., 1995. Social mobility and redistributive politics. Q. J. Econ. 110 (3), 551–584.

Pittau, M.G., Massari, R., Zelli, R., 2013. Hierarchical modelling of disparities in preferences for redistribution. Oxf. Bull. Econ. Stat. 75 (4), 556–584.

Rodriguez, F.C., 1999. Does distributional skewness lead to redistribution? evidence from the United States. Econ. Polit. 11 (2), 171–199.

Romer, T., 1975. Individual welfare, majority voting, and the properties of a linear income tax. J. Publ. Econ. 4, 163–185.

Roth, C., Wohlfart, J., 2018. Experienced inequality and preferences for redistribution. J. Publ. Econ. 167, 251–262.

Roth, C., Settele, S., Wohlfart, J., 2020. Beliefs about Public Debt and the Demand for Government Spending. CESifo Group Munich. CESifo Working Paper Series 8087.

Sacchi, S., Guarascio, D., Vannutelli, S., 2020. Risk of technological unemployment and support for redistributive policies. In: Careja, R., Emmenegger, P., Giger, N. (Eds.), The European Social Model under Pressure. Springer VS, Wiesbaden.

Schokkaert, E., Truyts, T., 2017. Preferences for redistribution and social structure. Soc. Choice Welfare 49 (3–4), 545–576.

Shayo, M., 2009. A model of social identity with an application to political economy: nation, class and redistribution. Am. Polit. Sci. Rev. 103, 147–174.

Shelton, C.A., 2007. The size and composition of government expenditure. J. Public Econ. 91, 2230–2260.

Thewissen, S., Rueda, D., 2019. Automation and the welfare state: technological change as a determinant of redistribution preferences. Comp. Polit. Stud. 52 (2), 171–208.

Yamamura, E., 2012. Social capital, household income, and preferences for income redistribution. Eur. J. Polit. Econ. 28, 498–511.