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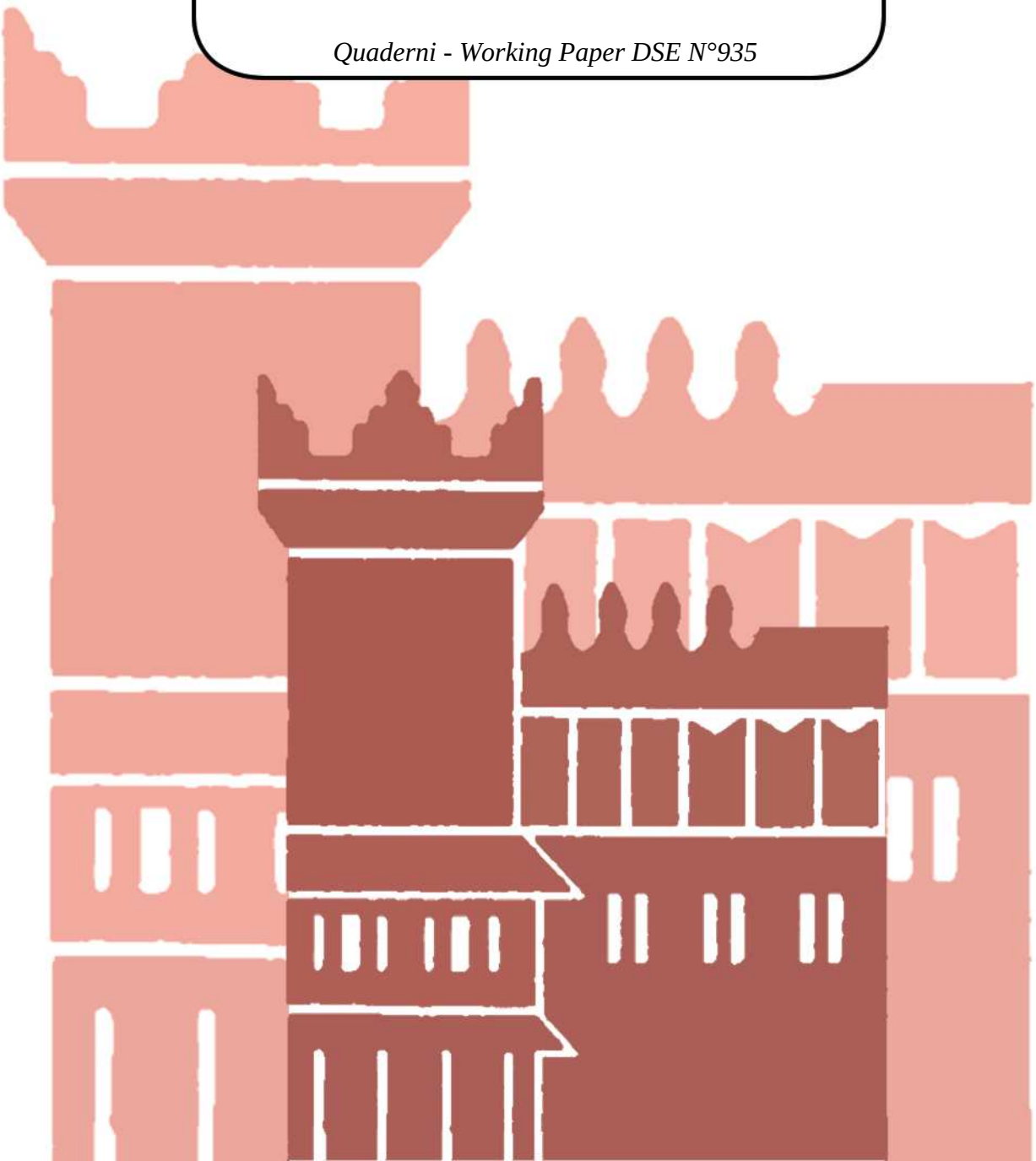

Does inequality harm democracy? An empirical investigation on the UK

Anna Soci(*), Anna Maccagnan(*), Daniela Mantovani(**)

April, 2014

Abstract

This paper presents an empirical investigation about the effect of an increase in economic inequality on some aspects of the quality of a democracy. The main novelty of the paper lies in its methodology: it applies to a single country (instead of a pool of countries) - the UK - in a long run perspective. Using survey data, we select three questions and check whether an increase in inequality alters the answers to these questions, subject to other control variables. Another novelty is the use of several measures of inequality (rather than the usual GINI only) both for disentangling what happens in the different parts of the income distribution and for avoiding the dependence of the results on the choice of the indicator. The main finding is that a higher level of income inequality impacts negatively on citizens' satisfaction with democracy and positively on their political participation.

JEL classification: D33; D72; D63; O15.

Keywords: income distribution, economic inequality, inequality indices, factor analysis, United Kingdom, quality of democracy, democracy-satisfaction, political discussion, participation into election.

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In western advanced economies the reduction in income inequality has been sharp and general since the 1st World War, with some countries - like Denmark, Norway and the US - starting even earlier. Data for the period post WWII-1970s still support the Kuznet's vision of an inverse-U relationship between development and inequality, but after the 1970s a sharp reversal of that equalizing tendency started to be the rule. Income inequality increased both in boom and recession and widened in the two decades since the mid-1980s. In the late 2000s the majority of OECD countries were experiencing high Gini coefficients: the English speaking area - notably the US and the UK - and several European countries were ranging from the minimum of 0.30 for the Netherlands to the maximum of 0.41 for the US in the 2000-2010 period, while Northern Europe (Scandinavian block first) and Japan positioned on average well below 0.30, which is considered a "very good Gini".[1] Moreover, English-speaking countries have been showing another peculiarity: in US, UK, Canada, Australia, New Zealand and Ireland the share of top 1 per cent in total income before tax is U-shaped with the rising portion appearing after the 1970s (while the continental Europe - precisely France, Germany, Netherlands, and Switzerland - exhibits an L-shaped form). The increase in inequality in the majority of the western economies and the huge disproportion between the top and the remaining of the distribution recently started to be recognized as a social problem.

This seems particularly true when considering that social mobility shrank in some countries of the first group: the correlation between sons' and fathers' incomes in 2005 was sensibly higher in the US and the UK than in Germany and Scandinavian countries: '*broadly, social mobility in the UK seems to have fallen from North*

[1] Stepan and Linz 2011, 847 and 854.

European to something close to US level';[2] the probability for the son of being in the same earnings quintile as his father is substantially higher in both the 1st and 5th quintile in the US and in the UK than in the Scandinavian group where the probability is smaller and equally distributed[3] the correlation between this intergenerational income elasticity and income inequality- the so called "Great Gatsby Curve"[4] - is high, and the US and the UK are still the countries which perform the worst; lastly, whilst a reliable measure of social disease - the index of health and social problems elaborated by Wilkinson and Pickett in 2010 - barely shows any relationship with the per-capita national income in rich countries, it appears strongly related to inequality. Thus, there is a piece of evidence that where income differences are bigger, social distances are bigger and social stratification becomes more remarkable. The social distance among population-groups can be enormous and it can lead to social exclusion through differences in consumption sphere, in health and housing conditions, in access to education and to labour market, and in the social-relation network. A harmful environment for the attractiveness of the democratic institutions to their citizens might easily develop.

The difficulties to a correct working of democracy when population is not uniform by income and wealth are widely dealt with in the political science (and also sociology) literature.[5] Since Aristotle, the scholars of politics have theorized that the proper functioning of a democracy depends on a relatively equal distribution of economic resources. For all, Tocqueville stated that the degree of equality is the best

[2] Glyn 2006, 174.
[3] OECD 2008, 206.
[4] Krueger 2012.
[5] See, for instance, Karl 2000; Bermeo 2009; Bartels 2008; Thorbecke and Charumilind 2002; Mueller 1988; Bollen and Jackman 1985; Boix 2003.

predictor of democracy stability, and of the quality itself of democracy. More recently, Dahl[6] reminds that economic resources easily become political resources and that an unequal distribution can generate frustration and can reduce the sense of community and legitimacy leading to a subtle deterioration of democracy. For our mature western democracies an appreciable degree of income inequality is not as dangerous as in provoking dramatic outcomes. Movements of de-democratization rather occur within the democratic regime inducing a failure in the proper functioning of institutions that eventually leads to a deterioration of trust and to an estrangement from participation. The trend of de-participation leaves empty spaces that may well lead to an oligarchic power (in the specific case of a wealth-driven power, the *plutarchy*, in the Hacker-Pierson terminology, or *plutonomy* elsewhere), or to a power that is centred more and more on the interest of the few. The desire to keep privileges can favour the partial restriction of an open democracy.[7]

The quantitative literature concerning the effects of inequality on democracy is very scant and it is not centred on the idea of testing *the quality* of democracy, with few exceptions[8] considering an array of countries. Our paper joins these contributions in so far as it aims precisely at evaluating the quality of democracy. More specifically, we first test how inequality impacts on citizens' satisfaction, which is a suitable indicator for the concept of "responsiveness".[9] Then, we inquire about the citizen's reaction towards two of the main characteristics of political life: participating in discussion and voting. In addition, we depart from the existing literature which performs cross-country analysis either on developing countries or on a mix of

[6] Dahl 1971 and 2000.
[7] Winters 2011.
[8] Sunde *et al*. 2007; Solt 2004 and 2008; Anderson and Beramendi 2008.
[9] Diamond and Merlino 2004, 27.

developing-developed ones.[10] We are not interested in a worldwide comparison because developing countries differ in fundamental ways from the developed ones, and democracies in transition have to be studied separately as well. Even within the universe of the developed countries with fully grounded democracy things are different: the kind and the reach of policies, their timing, the country-specific social norms and institutions, their position in the global economic context and so on. In fact, *'…our results suggest that inequality is determined by factors which differ substantially across countries'*.[11] This statement - based on a wide empirical evidence - implies that income inequality depends on the country-specific socio-politico-economic framework, which is sluggish to change, and it reflects the fact that the drivers of income inequality (changes in demography and living arrangements, labour market trends and government re-distribution, *in primis*) have varied sensibly across OECD countries: no single story holds for all. How could the effect on democracy - intended as citizens' reaction *vis-à-vis* institutions - be the same?

Thus, this paper will concentrate on a well-grounded democratic country only with a rich advanced economy, on which a time-series analysis for the last thirty years through the pooling of cross-section survey-data for the period 1974-2009 will be performed. The country chosen is the UK on the basis of the following criteria: i) though both the US and the UK have recently experienced an exacerbation in inequality, the income composition at the very top is less earnings- than wealth-based in the UK, making the fashionable top-incomes problem less relevant; ii) UK is a country with a higher taxation level and a greater redistribution than the US; iii) UK is

[10] See Thorbecke and Charumilind 2002 and Atkinson and Brandolini 2006 for reviews.
[11] Li *et al*. 1998, 27.

the country that invented the modern Welfare State and is a country with an historical level of inequality much lower than the U.S.

Lastly, we do not limit ourselves to the Gini index only as "the" indicator of inequality. We use several additional indicators aiming at disentangling what happens in the different parts of the income distribution and at avoiding the dependence of the results on the choice of a specific indicator.

The paper is organized as follows: the data and their sources, the variables and the model are illustrated; the results of the empirical investigation are provided and commented. Concluding remarks briefly summarize the findings.

Data sources and variables

The Eurobarometer Survey was used for the "quality of democracy" variables, being the only survey that covers the whole time period we are interested in.

As for income inequality, we computed inequality of household equivalent disposable income for the period 1971-2009 using *Family Expenditure* Survey (FES) and *Family Resources Survey (FRS)*. Inequality indices have been calculated on weekly income, using the two surveys separately. Data were then made uniform in order to work with a unique time-series (for each inequality index) describing the distribution of disposable income in UK for the entire period 1971 – 2009.

Dependent variables

As possible indicators of the quality of democracy we selected the three following questions:

1. *Democracy-Satisfaction*. It corresponds to Eurobarometer question "on the whole, are you very satisfied, fairly satisfied, not very satisfied or not at all satisfied with the way democracy works in your country?"

2. *Political Discussion*. This is the answer to the question: "when you get together with friends, would you say you discuss political matters frequently, occasionally or never?"

3. *Participation into Elections*. This variable is built from the question: "if there were a general election tomorrow, which party would you support?" We treated "I would not vote" or "I would spoil or blank my vote" as a non-participation decision and any other answer as a participation decision independently on the party chosen.

Few words on these questions. The first – as far as we know never used in this kind of studies – was selected as a useful approximation of the concept of *responsiveness*, in the Diamond and Morlino suggestion.[12] The second and the third recall what done by another author[13] with an overlap for the second question and a substantial difference with the third where, instead of focusing on the voting behaviour in the last election we look at the intention *today* to participate in hypothetical *tomorrow*-elections, which suits better our research purposes.

Independent variables

Inequality indices

Different indicators can tell a different story on inequality: should they show different trends, findings might be entirely due to the index choice. Thus, no choice

[12] Diamond and Morlino 2004.
[13] Solt 2004 and 2008.

has been made and ten distinct inequality indices have been computed using the above mentioned British household budget/expenditure surveys.

In addition to the well-known Gini index, we computed the P90/P10 and P90/P50 interdecile ratios, the share of the top 1%, 5% and 10%, and the share of the bottom 1%, 5% and 10%. Finally, we computed the Foster-Wolfson polarization index, which is '… *a Gini-like index measure of bipolarization based on the curve*...[that] *indicates how far each population percentile's income is from the median income*'.[14] The ten indices are highly correlated (see Appendix), all telling the same story about inequality in UK: income distribution has been relatively stable during the 1970s, then there was a sharp increase in inequality from late 1970s to the early 1990s followed by an up and down movement without any of the dramatic changes seen in the past.

This same high correlation suggests that they may be expression of the same *latent construct*, a concept used in factor analysis. The latent construct is reflected into observable indicators, called *reflective indicators*, meaning that the direction of causality goes from the unobservable construct to the observable indicators. The latent construct can thus be interpreted as the inequality imperfectly measured by

[14] Lambert 2010, p.241. Though the original paper by Foster and Wolfson dates 1992 it has been published only in 2010, as Lambert 2010 extensively tells. The index is based on the principle that polarization depends on the distance of incomes from the median. After having ordered incomes from the lowest to the highest one a curve is calculated, which represents the distance (normalized on the median) of the incomes from the median. As for the Lorenz curve, cumulative distributions are then calculated, getting a figure symmetrical with respect to the median. "In this paper we propose a range-free approach to measuring the middle-class and polarization… The approach yield two polarization curves which like the Lorenz curve in inequality analysis, signals unambiguous increases in polarization", J. E. Foster and M. Wolfson 2010, p. 247.

different indicators that are rough and partial realizations of a higher level concept.[15] Thanks to the high correlation of the inequality indices and using factor analysis, we are able to find (and measure) the latent variable lying behind (see Appendix). In the progress of the paper we will mainly focus on this variable - duly standardized - that we simply call "Inequality" leaning on the other inequality indices for comparison only. As we expect, given the high correlation, results are largely similar for all indicators.

Control variables

Personal and household characteristics were considered as control variables: age, education (university and secondary degree *vs.* lower educational level), gender (male *vs.* female), marital status (married *vs.* other status such as being single, divorced or widow). Additionally, we included information on occupational status: self-employed or entrepreneur, manager, white collar, manual worker, retired from work, unemployed, each *vs.* the group of non-active population. A dummy variable captures differences between individuals living in an urban area *vs.* individuals living in a rural area. Also a time trend and a dummy for the two parts of the UK where the person interviewed lives (Great Britain *vs.* Northern Ireland) have been included.

Subsequently also the household income variable has been considered in order to take care of another important difference able to influence the answers: how much "rich" people are. We did not include it in the first estimates because of some methodological shortcomings of the Eurobarometer variable. More on that follows.

[15] Bollen and Lennox 1991; Edwards and Bagozzi 2000.

The models

We estimated three distinct equations, one for each dependent variable. Due to the nature of data, ordered probit models were used for *Democracy-Satisfaction* and *Political Discussion* whilst *Participation into Elections* was treated with a probit. In particular, *Democracy-Satisfaction* is an ordinal variable, recoded from a descendant into an ascendant scale, taking value 1 if "Not at all satisfied", 2 if "Not very satisfied", 3 if "Fairly satisfied" and 4 if "Very satisfied". *Political Discussion* takes different values according to how often the interviewed discusses about politics. Recoded into a convenient way, it takes values: 1 if "Never"; 2 if "Occasionally"; 3 if "Frequently". *Participation into Elections* has been recoded to take value 1 if "Would vote" and 0 otherwise ("Would not vote/I would blank or spoil my vote/ I would definitely not vote").

The three models are:

$$satisfaction = \beta_1 inequality + \beta_2 age + \beta_3 male + \beta_4 married + \beta_5 university + \beta_6 secondary + \beta_7 selfemployed + \beta_8 manager + \beta_9 whitecollar + \beta_{10} manual + \beta_{11} retired + \beta_{12} unemployed + \beta_{13} urban + \beta_{14} year + \beta_{15} GB + u$$

$$discussion = \beta_1 inequality + \beta_2 age + \beta_3 male + \beta_4 married + \beta_5 university + \beta_6 secondary + \beta_7 selfemployed + \beta_8 manager + \beta_9 whitecollar + \beta_{10} manual + \beta_{11} retired + \beta_{12} unemployed + \beta_{13} urban + \beta_{14} year + \beta_{15} GB + u$$

$$vote = \beta_0 + \beta_1 inequality + \beta_2 age + \beta_3 male + \beta_4 married + \beta_5 university + \beta_6 secondary + \beta_7 selfemployed + \beta_8 manager + \beta_9 whitecollar + \beta_{10} manual + \beta_{11} retired + \beta_{12} unemployed + \beta_{13} urban + \beta_{14} year + \beta_{15} GB + u$$

Results

For the sake of simplicity we provide the entire estimated equation only where the main inequality indicator (Inequality) is present (Table 1). Where we use the ten remaining indicators, only their coefficient is shown (Table 2). The reported results

are informative only in terms of sign and statistical significance and they cannot be read quantitatively since our modelling framework is not linear. This is why we must calculate the "marginal effect",[16] which together with the predicted probability allows us to assess quantitatively the relation between the dependent and independent variables. Though the marginal effects are reported in the Appendix, Tables A7-9, we provide in the text an assessment of the quantitative relevance of the results for each question.

Democracy-Satisfaction

The first important result is that an increase in the level of inequality depresses *Democracy-Satisfaction* (first column of Table 1).

In addition, *Democracy-Satisfaction* increases with age (ageing people become wiser, or more indulgent, or more tolerant); males are more satisfied with democracy than women and married people more than individuals in another marital status (do women and singles have a greater sense of moral justice? Do they complain more about institutions that take care of them less than of men and families?); it increases with education - having university or a secondary degree *vs.* having a lower qualification - (does education helps in evaluating democracy and its virtues?). Also living in Great Britain *vs.* living in Northern Ireland impacts positively and significantly on *Democracy-Satisfaction*, while living in an urban area negatively affects it (do cities present more occasions for evaluating institutions than the country-side does?). There exists a positive time-trend in the probability of being

[16] Given the predicted probability of each outcome of the dependent variable (computed when all RHS variables do not change and are equal to their median value), the marginal effect is its changes when one RHS variable changes (in particular, they are computed changing the continuous variables from their minimum to their maximum while changing from 0 to 1 in the case of dummies).

satisfied with democracy. The coefficients relative to the various employment positions tell us the different probability that self-employed, managers, white collars, manual workers, retired from work and unemployed are more satisfied by democracy, all with respect to the control group: the non-actives. In particular, we find that managers and white collars are more satisfied while the opposite is found for manual workers and unemployed (who represent less-protected categories). On the contrary, self-employed and retired from work do not statistically differ from the non-actives in their level of *Democracy-Satisfaction*.

Quantitatively speaking (Table A7), the democracy-satisfaction increases in probability for an amount of several percentage points with age, with male gender, with education, with a good job, with geographical location (country side and North Ireland instead of urban places and Great Britain) and through time. Thus, on the quantitative side (see the Appendix for the marginal effects) the figures for *Democracy-Satisfaction* are on overall fairly important.

Political Discussion

The second column of Table 1 presents the results of the model for *Political Discussion*, showing that it is significantly revitalised by an increase in inequality. Relying on the precedent result on *Democracy-Satisfaction*, the discontent about the quality of democracy induced by an increase in inequality does not turn into any reduction in political participation. On the contrary, it appears nourishing a more lively *Political Discussion*.

Significant coefficients are also found for almost every regressor: ageing, being male, being married, being well educated, living in an urban area and living in Great Britain, all increase the frequency of talking about politics. It seems again that

experience and social status helps in being more involved with the surrounding world, while the gender-result reaffirms that it is not in women habits to talk about politics. The time trend has a negative coefficient, implying that *Political Discussion* today is not as frequent as it was in the past. The occupational status variables suggest that people in every category but unemployment are significantly more likely than non-actives in talking more frequently about politics. Contrarily to the previous question where the *Democracy-Satisfaction* depended on working conditions, here the results are uniform. Does having a job make everybody feel part of a community? Does it suggest that *Political Discussion* might be useful in one's own job-space? Does having a job just simply provide more opportunities for *Political Discussion*?

Table A8 in the Appendix gives us the quantitative effects: here again, the political discussion increases substantially in probability with age, male gender, better education and good job. Again, these figures too are quite important quantitatively.

Participation into Elections

The third column of Table 1 shows the results of the probit model on the decision of voting if there were a general election tomorrow. Again, a positive effect of inequality on political participation is confirmed: an increase in inequality increases the *Participation into Elections* with statistical significance.

In addition, ageing, being married, having a higher educational level, and living in GB increase the electoral participation (results are on average highly consistent with the previous ones on political discussion) with statistical significance. The time trend has a negative coefficient suggesting that, other things being equal,

Participation into Elections in UK is decreasing through time (as it was the *Political Discussion* attitude).

No statistically significant effect is found for being male and living in an urban area. On the contrary, occupational status is linked to electoral participation: managers and white collars are more likely to vote than non-actives, whilst the opposite is true for the unemployed (here again the results are consistent with the previous ones). No significant coefficient in found for the other occupational categories.

Table A9 in the Appendix shows that the likelihood of *Participating into Elections* is quantitatively less reactive than the two first questions, showing a relevant marginal effect only for time trend and geographical location. Thus, the overall results are quantitatively small.

The first synthesis is that *Democracy-Satisfaction* is the question most affected by the variable Inequality, whilst *Political Discussion* is the question which reacts more importantly in quantitative terms to all the RHS variables.

Table 1 - Estimation *results of ordered probit and probit models on Democracy-Satisfaction, Political Discussion and Participation into Elections*

	Democracy-Satisfaction	Political Discussion	Participation into Elections
Inequality	-0.078**	0.028**	0.092**
	(0.011)	(0.009)	(0.022)
Age	0.003**	0.008**	0.009**
	(0.000)	(0.000)	(0.001)
Male	0.036**	0.248**	0.025
	(0.012)	(0.010)	(0.023)
Married	0.052**	0.121**	0.139**
	(0.012)	(0.010)	(0.022)
Education: University	0.149**	0.597**	0.254**
	(0.019)	(0.016)	(0.042)
Education: secondary	0.135**	0.172**	0.093**
	(0.013)	(0.011)	(0.025)
Self-employed/entrepreneur	0.007	0.317**	-0.025
	(0.025)	(0.021)	(0.047)
Manager	0.090**	0.365**	0.166**
	(0.024)	(0.020)	(0.051)
White collar	0.065**	0.232**	0.103**
	(0.018)	(0.016)	(0.035)
Manual worker	-0.042*	0.026	-0.005
	(0.018)	(0.016)	(0.032)
Retired	0.014	0.051**	0.050
	(0.022)	(0.018)	(0.042)
Unemployed	-0.247**	-0.003	-0.105*
	(0.028)	(0.023)	(0.044)
Urban	-0.067**	0.072**	-0.014
	(0.011)	(0.009)	(0.022)
Year	0.009**	-0.010**	-0.028**
	(0.001)	(0.001)	(0.002)
Great Britain	0.477**	0.122**	0.465**
	(0.011)	(0.011)	(0.020)
Threshold 1/Constant	17.564**	-18.931**	-55.898**
	(2.175)	(1.690)	(4.633)
Threshold 2	18.482**	-17.408**	
	(2.175)	(1.690)	
Threshold 3	20.040**		
	(2.176)		
Obs	60,699	93,631	52,461

Note: robust standard errors in parentheses. *Source*: elaborations on Eurobarometer data
* $p < 0.05$; ** $p < 0.01$

As anticipated, we run the three models with the ten alternative indicators, starting with the traditional Gini, in order to check whether the results were robust everywhere along the entire distribution (Table 2). Our main indicator (Inequality) is presented again in the first row for the sake of comparison.

Table 2 - *Estimated coefficients of the 11 inequality indices*

	Democracy-Satisfaction	**Political Discussion**	**Participation in Elections**
Inequality	-0.078**	0.028**	0.092**
	(0.011)	(0.009)	(0.022)
Gini coefficient	-1.925**	0.689**	2.384**
	(0.265)	(0.222)	(0.556)
Foster-Wolfson index	-2.918**	0.981**	2.169**
	(0.285)	(0.234)	(0.606)
Interdecile ratio P90/P10	-0.147**	0.047**	0.106**
	(0.015)	(0.013)	(0.032)
Interdecile ratio P90/P50	-0.595**	0.278**	0.615**
	(0.075)	(0.063)	(0.156)
Share top 1%	0.045	0.028	2.864*
	(0.565)	(0.484)	(1.123)
Share top 5%	-1.776**	0.666	3.383**
	(0.455)	(0.392)	(0.932)
Share top 10%	-2.073**	0.827*	3.257**
	(0.407)	(0.349)	(0.844)
Share bottom 1%	349.047**	-66.771*	-97.847
	(33.642)	(30.259)	(67.628)
Share bottom 5%	37.248**	-12.823**	-33.853**
	(4.025)	(3.496)	(8.110)
Share bottom 10%	15.063**	-4.998**	-13.198**
	(1.656)	(1.399)	(3.368)

Note: robust standard errors in parentheses. *Source*: elaborations on Eurobarometer data
* $p < 0.05$; ** $p < 0.01$

No statistically significant result clashes with our first evidence: an increase in inequality, no matter how it is measured, reduces the level of *Democracy-Satisfaction,* and increases both *Political Discussion* and *Participation into Elections*. Just two indicators of inequality do not have effect: the share of top 1% for the first two questions, and the share of bottom 1% for the third one. In other words, there is

no repercussion on *Democracy-Satisfaction* and *Political Discussion* when the income-share of the "very rich" grows (is it not considered a problem by people?) and there is no repercussion on *Participation into Elections* when the income-share of the "very poor" grow (is it considered a problem not surmountable by voting?).

Does income matter?

Though moral aversion to inequality may theoretically be distributed roughly uniformly across income levels, it may reasonably be argued that a growing inequality let the riches be better off than the poor and, therefore, that the actual attitude is likely to differ for persons lying in different portions of income distribution. In order to investigate this feature we re-estimated the three models (*Democracy-Satisfaction, Political Discussion* and *Participation into Elections*) in two separate steps: first, the income level was added as an additional explanatory variable; thereafter, the population was segmented by income size and separate regression models for each income quintile were run. The new questions are: 1) does considering income just as an additional explanatory variable improve the overall estimation (and does the measure of inequality matter)? 2) does running the regressions over a population differentiated by income size (quintiles) improve the overall estimation (and does the measure of inequality matter)? In other words: is income important and which is the best way of considering it?

The income level variable of the first step – the household income decile – has always a positive and significant effect (Table 3): the richer you are the more satisfied with democracy and the more politically participative you are. As far as the other variables are concerned, the outcomes are different depending on the questions. All the variables – with the only exception of the marital status – keep sign and

significance in the case of *Political Discussion.* Moreover, the category "unemployed" becomes significant: once their (low) income has been taken out, their only anger remains.

Table 3 - *Estimation results of ordered probit and probit models on Democracy-Satisfaction, Political Discussion and Participation into Elections adding Household income-decile as an independent variable*

	Democracy-Satisfaction	**Political Discussion**	**Participation into Elections**
Inequality	-0.138**	0.129**	0.091**
	(0.019)	(0.016)	(0.034)
HH Income decile	0.045**	0.054**	0.030**
	(0.003)	(0.003)	(0.006)
Age	0.004**	0.008**	0.011**
	(0.001)	(0.001)	(0.001)
Male	0.021	0.215**	0.012
	(0.015)	(0.014)	(0.031)
Married	0.009	0.028	0.096**
	(0.016)	(0.014)	(0.031)
Education: University	0.047	0.505**	0.160**
	(0.026)	(0.022)	(0.055)
Education: secondary	0.131**	0.119**	0.087*
	(0.017)	(0.015)	(0.035)
Self-employed/entrepr.	-0.023	0.234**	-0.106
	(0.033)	(0.028)	(0.063)
Manager	0.000	0.260**	0.033
	(0.032)	(0.027)	(0.067)
White collar	0.021	0.168**	0.021
	(0.023)	(0.022)	(0.048)
Manual worker	-0.064**	0.011	-0.098*
	(0.023)	(0.022)	(0.044)
Retired from work	0.042	0.071**	-0.013
	(0.029)	(0.026)	(0.060)
Unemployed	-0.234**	0.163**	-0.037
	(0.038)	(0.032)	(0.061)
Urban	-0.061**	0.068**	0.019
	(0.015)	(0.013)	(0.030)
Year	0.018**	-0.023**	-0.028**
	(0.003)	(0.002)	(0.004)
Great Britain	0.530**	0.113**	0.449**
	(0.015)	(0.016)	(0.027)
Threshold 1/Constant	35.634**	-45.116**	-55.286**
	(5.095)	(4.228)	(8.727)
Threshold 2	36.564**	-43.552**	
	(5.095)	(4.228)	
Threshold 3	38.122**		
	(5.096)		
Obs	37,425	51,689	33,346

Note: robust standard errors in parentheses; *Source*: elaborations on Eurobarometer data;
* $p < 0.05$; ** $p < 0.01$

In the cases of *Democracy Satisfaction* and *Participation into Elections* an interesting aspect emerges: the statistical significance disappears mainly for the "rich categories" (identifiable through high level education and jobs) meaning that it is income what matters rather than these characteristics: for *Democracy-Satisfaction,* males, people married, and people with university degree and with a good job; for *Participation into Elections,* managers and white collar. Here again "unemployed" plays an interesting role in so far as its statistical significance disappears, meaning that it was low income rather than working position to depress their intention to vote.

The income variable has the same positive and significant effect also when the model is run with the ten additional inequality indices (Table 4). Like in the model

Table 4 - *Estimated coefficients of the 11 inequality indices in the models with income decile*

	Democracy-Satisfaction	**Political Discussion**	**Participation into Elections**
Inequality	-0.138**	0.129**	0.091**
	(0.019)	(0.016)	(0.034)
Gini coefficient	-3.433**	3.233**	2.410**
	(0.473)	(0.407)	(0.845)
Foster-Wolfson index	-4.616**	3.876**	2.403**
	(0.463)	(0.413)	(0.921)
Interdecile ratio P90/P10	-0.228**	0.212**	0.103*
	(0.025)	(0.023)	(0.049)
Interdecile ratio P90/P50	-0.847**	0.912**	0.579*
	(0.116)	(0.104)	(0.225)
Share top 1%	0.818	1.975*	1.258
	(0.914)	(0.781)	(1.543)
Share top 5%	-2.646**	3.553**	2.630*
	(0.796)	(0.679)	(1.239)
Share top 10%	-3.410**	3.930**	2.773*
	(0.722)	(0.617)	(1.239)
Share bottom 1%	438.620**	-208.983**	-108.855
	(49.583)	(45.486)	(92.007)
Share bottom 5%	52.355**	-43.941**	-33.742**
	(6.363)	(5.714)	(12.025)
Share bottom 10%	21.895**	-19.398**	-13.024*
	(2.636)	(2.385)	(5.072)

Note: robust standard errors in parentheses. *Source*: elaborations on Eurobarometer data
* $p < 0.05$; ** $p < 0.01$

without the variable income two indicators of inequality do not have effect: the share of top 1% for the first and the third question, and the share of bottom 1% for the third one.

In the second step, we run the three models with the population split by income quintile.

This procedure does not change substantially the results as far as the main indicator Inequality is concerned (Table 5 collects only the coefficients of the Inequality index for the different models).

Table 5 - *Estimated coefficients of Inequality with population split by income quintile*

	First quintile	**Second quintile**	**Third quintile**	**Fourth quintile**	**Fifth quintile**
Democracy-Satisfaction	-0.218**	-0.191**	-0.157**	-0.110**	-0.038
	(0.043)	(0.044)	(0.043)	(0.041)	(0.043)
Political Discussion	0.187**	0.119**	0.094*	0.104**	0.153**
	(0.036)	(0.039)	(0.037)	(0.036)	(0.037)
Electoral participation	0.072	0.030	0.157*	-0.010	0.186*
	(0.072)	(0.074)	(0.077)	(0.077)	(0.075)

Note: robust standard errors in parentheses; *Source*: elaborations on Eurobarometer data
* p < 0.05; ** p < 0.01

In the case of *Democracy-Satisfaction* the effect of the variable Inequality is negative at every income-interval, it decreases in absolute value from the poorest to the richest group and it is significant everywhere except for the richest group: that is, the frustrating effect of income inequality is particularly felt by the less rich and poorest individuals. As regards *Political Discussion*, there is a U-shaped profile: the effect of the variable Inequality for every income-interval is positive and significant, and higher for the poorest and the richest quintile. Perhaps both groups discuss more than others since they are particularly concerned with their position: the very poor need to improve their condition and the very rich need to preserve it. The effect of Inequality on *Participation into Elections* is less clear in so far as it is positive and significant only for the third and fifth income quintile: the “middle class” and the

very riches. Do the poorest people think there no possibility of changing their condition with elections, while the middle class and the top-class intend to defend their positions?

The coefficient of the controls (Table 6-8) shows - through a confrontation with Table 1 - in which quintile the statistical significance is really located.

Table 6 - *Model on Democracy-Satisfaction by income quintile*

	First quintile	**Second quintile**	**Third quintile**	**Fourth quintile**	**Fifth quintile**
Inequality	-0.218**	-0.191**	-0.157**	-0.110**	-0.038
	(0.043)	(0.044)	(0.043)	(0.041)	(0.043)
Age	0.006**	0.004**	0.004**	0.003	0.002
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Male	0.035	0.037	0.001	0.006	0.069*
	(0.038)	(0.037)	(0.035)	(0.034)	(0.034)
Married	-0.065	-0.016	0.061	0.091*	0.056
	(0.035)	(0.034)	(0.040)	(0.044)	(0.043)
Education: University	0.181	0.042	0.143*	0.009	-0.012
	(0.104)	(0.078)	(0.060)	(0.053)	(0.049)
Education: secondary	0.083*	0.176**	0.130**	0.173**	0.076
	(0.041)	(0.038)	(0.037)	(0.037)	(0.044)
Self-employed/entrepreneur	0.021	-0.060	0.077	-0.060	-0.138*
	(0.137)	(0.083)	(0.075)	(0.070)	(0.062)
Manager	0.029	0.235*	0.044	0.021	-0.114*
	(0.214)	(0.118)	(0.081)	(0.066)	(0.058)
White collar	0.140	0.088	-0.042	0.028	-0.079
	(0.090)	(0.058)	(0.049)	(0.049)	(0.052)
Manual worker	-0.040	0.001	-0.050	-0.093	-0.233**
	(0.061)	(0.050)	(0.047)	(0.052)	(0.060)
Retired	0.046	0.044	0.089	-0.003	-0.032
	(0.044)	(0.057)	(0.072)	(0.088)	(0.099)
Unemployed	-0.206**	-0.166*	-0.183	-0.325**	-0.154
	(0.062)	(0.072)	(0.101)	(0.122)	(0.138)
Urban	-0.105**	-0.045	-0.077*	-0.027	-0.047
	(0.034)	(0.034)	(0.034)	(0.032)	(0.032)
Year	0.032**	0.028**	0.017**	0.012*	0.005
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Great Britain	0.349**	0.435**	0.562**	0.657**	0.709**
	(0.033)	(0.032)	(0.033)	(0.035)	(0.037)
Threshold 1	62.836**	55.510**	32.703**	24.372*	8.653
	(11.698)	(11.649)	(11.239)	(11.119)	(11.300)
Threshold 2	63.743**	56.441**	33.638**	25.344*	9.584
	(11.700)	(11.650)	(11.239)	(11.120)	(11.300)
Threshold 3	65.087**	57.929**	35.240**	26.989*	11.242
	(11.702)	(11.652)	(11.240)	(11.121)	(11.301)

Note: robust standard errors in parentheses; *Source*: elaborations on Eurobarometer data
* $p < 0.05$; ** $p < 0.01$

Table 7 - *Model on Political Discussion by income quintile*

	First quintile	Second quintile	Third quintile	Fourth quintile	Fifth quintile
Inequality	0.187**	0.119**	0.094*	0.104**	0.153**
	(0.036)	(0.039)	(0.037)	(0.036)	(0.037)
Age	0.004**	0.007**	0.012**	0.011**	0.011**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Male	0.182**	0.174**	0.265**	0.226**	0.220**
	(0.032)	(0.033)	(0.032)	(0.030)	(0.031)
Married	0.027	0.008	-0.073*	0.017	0.072
	(0.030)	(0.031)	(0.034)	(0.038)	(0.039)
Education: University	0.637**	0.601**	0.501**	0.522**	0.487**
	(0.066)	(0.059)	(0.053)	(0.044)	(0.047)
Education: secondary	0.145**	0.102**	0.098**	0.115**	0.136**
	(0.036)	(0.033)	(0.032)	(0.034)	(0.040)
Self-employed/entrepreneur	0.455**	0.344**	0.218**	0.172**	0.168**
	(0.102)	(0.078)	(0.062)	(0.062)	(0.060)
Manager	0.396**	0.419**	0.250**	0.257**	0.226**
	(0.145)	(0.095)	(0.075)	(0.057)	(0.056)
White collar	0.165*	0.226**	0.167**	0.119**	0.124*
	(0.074)	(0.054)	(0.046)	(0.046)	(0.051)
Manual worker	0.030	0.017	-0.014	0.005	-0.101
	(0.053)	(0.047)	(0.046)	(0.048)	(0.060)
Retired	0.092*	0.190**	0.008	0.032	-0.077
	(0.040)	(0.052)	(0.066)	(0.078)	(0.093)
Unemployed	0.166**	0.157*	0.057	0.061	0.165
	(0.051)	(0.062)	(0.082)	(0.099)	(0.109)
Urban	0.027	0.025	0.098**	0.087**	0.103**
	(0.030)	(0.030)	(0.030)	(0.029)	(0.029)
Year	-0.025**	-0.026**	-0.021**	-0.025**	-0.024**
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Great Britain	0.119**	0.182**	0.026	0.104**	0.112**
	(0.035)	(0.036)	(0.034)	(0.037)	(0.039)
Threshold 1	-50.226**	-50.283**	-40.619**	-49.829**	-47.992**
	(9.544)	(9.853)	(9.500)	(9.280)	(9.377)
Threshold 2	-48.906**	-48.839**	-39.012**	-48.182**	-46.230**
	(9.544)	(9.851)	(9.499)	(9.279)	(9.376)

Note: robust standard errors in parentheses; *Source*: elaborations on Eurobarometer data
* $p < 0.05$; ** $p < 0.01$

Table 8 - *Model on Participation into Elections by income quintile*

	First quintile	Second quintile	Third quintile	Fourth quintile	Fifth quintile
Inequality	0.072	0.030	0.157*	-0.010	0.186*
	(0.072)	(0.074)	(0.077)	(0.077)	(0.075)
Age	0.012**	0.006*	0.010**	0.019**	0.009*
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Male	0.102	-0.072	-0.019	0.065	-0.043
	(0.072)	(0.074)	(0.068)	(0.065)	(0.074)
Married	0.082	0.076	0.065	0.016	0.197*
	(0.066)	(0.067)	(0.070)	(0.078)	(0.086)
Education: University	0.003	0.238	0.240	0.407**	-0.006
	(0.168)	(0.146)	(0.142)	(0.110)	(0.108)
Education: secondary	0.050	0.170*	-0.060	0.268**	0.031
	(0.075)	(0.077)	(0.071)	(0.074)	(0.093)
Self-employed/entrepreneur	0.344	-0.170	-0.115	-0.301*	0.022
	(0.248)	(0.155)	(0.130)	(0.133)	(0.130)
Manager	0.316	0.042	0.008	-0.133	0.159
	(0.459)	(0.225)	(0.169)	(0.140)	(0.125)
White collar	0.143	0.096	-0.015	-0.147	0.148
	(0.171)	(0.120)	(0.098)	(0.103)	(0.113)
Manual worker	-0.131	-0.055	-0.033	-0.178	-0.129
	(0.100)	(0.098)	(0.091)	(0.105)	(0.119)
Retired	-0.120	0.267*	0.006	-0.204	-0.113
	(0.092)	(0.117)	(0.151)	(0.189)	(0.280)
Unemployed	-0.070	-0.087	0.159	-0.182	0.135
	(0.097)	(0.117)	(0.162)	(0.219)	(0.258)
Urban	0.041	-0.020	-0.072	0.027	0.108
	(0.065)	(0.067)	(0.068)	(0.065)	(0.069)
Year	-0.014	-0.032**	-0.036**	-0.018	-0.039**
	(0.009)	(0.009)	(0.010)	(0.010)	(0.010)
Great Britain	0.473**	0.461**	0.351**	0.536**	0.469**
	(0.057)	(0.058)	(0.062)	(0.063)	(0.072)
Constant	-27.381	-64.407**	-71.582**	-35.725	-78.390**
	(17.945)	(18.515)	(20.124)	(20.035)	(19.804)

Note: robust standard errors in parentheses; *Source*: elaborations on Eurobarometer data
* p < 0.05; ** p < 0.01

In the case of *Democracy-Satisfaction*, age, secondary education, being unemployed, time trend and living in Great Britain are significant almost

everywhere, whilst male-gender, marital status, university degree, having a good job and living in an urban area loose significance almost everywhere (each remaining significant in a quintile only, generally the higher ones, except for the urban area). For *Political Discussion* age, male-gender, university and secondary degree, being self-employed, manger and white collar, time trend and living in Great Britain are significant everywhere, whilst marital status, being unemployed and living in an urban area loose significance almost everywhere, with the latter keeping significance only in the upper quintiles and being unemployed only in the lower ones. In the case of *Participation into Elections* age, time trend and living in Great Britain are significant almost everywhere whilst being manager, white collars and unemployed loose significance everywhere. Marital status and secondary university degree remain significant in the upper quintiles.

Tables 9-11 show the regressions run with the ten additional inequality indices. The general pattern found with Inequality is confirmed for the first two questions, except when the extreme income-shares are used as indicators, whilst more exceptions are present in the third one. In particular, for *Democracy-Satisfaction* the top 1% share does not have any effect on any income quintile, the top 5% share negatively affects only the poorest quintile, whilst the bottom 1% share affects positively and significantly every single group, as if people would be aware of inequality as a problem for democracy only when it hits the poor. As for *Political Discussion*, once the other indices are used the pattern does not change generally. The coefficients related to the top 1% and top 5% share confirm that the effect of inequality is higher for the poorest and the richest quintile, though no statistically significant effect is found for the intermediate quintiles. On the contrary, when the

share of bottom 1% is the variable for inequality the effect is higher for the first and third quintile, not for the richest any longer: the very poor are even more sensible to their position whilst the very rich do not need reacting since their position is unaffected by the change in inequality.

Table 9 - *Estimated coefficients of the 11 inequality indices in the model for Democracy-Satisfaction by income quintile*

	First quintile	Second quintile	Third quintile	Fourth quintile	Fifth quintile
Inequality	-0.218**	-0.191**	-0.157**	-0.110**	-0.038
	(0.043)	(0.044)	(0.043)	(0.041)	(0.043)
Gini coefficient	-5.675**	-4.819**	-4.002**	-2.699**	-0.598
	(1.068)	(1.076)	(1.053)	(1.017)	(1.059)
Foster-Wolfson index	-7.042**	-6.159**	-5.391**	-3.866**	-1.180
	(1.064)	(1.048)	(1.023)	(1.006)	(1.024)
Interdecile ratio P90/P10	-0.331**	-0.311**	-0.254**	-0.203**	-0.065
	(0.058)	(0.058)	(0.056)	(0.055)	(0.056)
Interdecile ratio P90/P50	-1.312**	-1.269**	-1.033**	-0.759**	-0.012
	(0.265)	(0.260)	(0.262)	(0.245)	(0.259)
Share top 1%	1.369	2.378	0.446	0.899	-0.751
	(2.086)	(2.080)	(2.077)	(1.952)	(2.029)
Share top 5%	-4.486*	-3.320	-3.366	-1.842	-0.774
	(1.785)	(1.808)	(1.799)	(1.703)	(1.787)
Share top 10%	-5.588**	-4.721**	-4.309**	-2.497	-0.667
	(1.613)	(1.639)	(1.629)	(1.542)	(1.625)
Share bottom 1%	520.199**	563.376**	388.173**	301.267**	439.893**
	(115.938)	(114.257)	(108.674)	(109.996)	(106.327)
Share bottom 5%	77.721**	73.991**	50.049**	44.498**	20.743
	(15.021)	(14.447)	(14.082)	(13.669)	(13.970)
Share bottom 10%	33.915**	30.760**	22.324**	18.814**	6.205
	(6.117)	(6.042)	(5.837)	(5.687)	(5.801)

Note: robust standard errors in parentheses; *Source*: elaborations on Eurobarometer data
* p < 0.05; ** p < 0.01

In the case of *Participation into Elections*, when inequality is measured by the 90/50 interdecile ratio, the top 1%, 5% and 10% income shares, a positive and significant effect is found only for the richest quintile (while no significant result is found on the other quintiles) and no statistically significant result is found when the

variable for inequality is the share of bottom 1%: the richest want to consolidate their position with an electoral action whilst nobody thinks that elections might be useful when inequality comes through an increase in the poorest part of the population. When the 90/10 interdecile ratio and the shares of the bottom 5% and 10% are considered, the only significant effect is found on the third quintile.

Table 10 - *Estimated coefficients of the 11 inequality indices in the model for Political Discussion by income quintile*

	First quintile	**Second quintile**	**Third quintile**	**Fourth quintile**	**Fifth quintile**
Inequality	0.187**	0.119**	0.094*	0.104**	0.153**
	(0.036)	(0.039)	(0.037)	(0.036)	(0.037)
Gini coefficient	4.752**	3.076**	2.269*	2.613**	3.721**
	(0.900)	(0.955)	(0.906)	(0.891)	(0.922)
Foster-Wolfson index	4.953**	3.834**	2.837**	3.874**	4.057**
	(0.932)	(0.953)	(0.928)	(0.918)	(0.918)
Interdecile ratio P90/P10	0.262**	0.209**	0.146**	0.208**	0.243**
	(0.051)	(0.053)	(0.051)	(0.051)	(0.051)
Interdecile ratio P90/P50	1.034**	0.994**	0.584*	0.988**	1.012**
	(0.233)	(0.243)	(0.235)	(0.228)	(0.234)
Share top 1%	4.670**	0.437	1.571	-0.272	4.165*
	(1.737)	(1.834)	(1.742)	(1.670)	(1.773)
Share top 5%	6.051**	2.679	2.563	2.025	4.994**
	(1.492)	(1.603)	(1.517)	(1.457)	(1.547)
Share top 10%	6.034**	3.317*	2.744*	2.937*	5.089**
	(1.353)	(1.457)	(1.377)	(1.327)	(1.407)
Share bottom 1%	-349.456**	-168.917	-295.226**	-55.019	-181.429
	(101.556)	(103.879)	(100.088)	(102.217)	(102.177)
Share bottom 5%	-60.942**	-42.413**	-34.878**	-33.506**	-50.155**
	(12.690)	(13.178)	(12.648)	(12.885)	(12.767)
Share bottom 10%	-27.170**	-19.075**	-14.344**	-15.428**	-21.895**
	(5.304)	(5.519)	(5.285)	(5.328)	(5.355)

Note: robust standard errors in parentheses; *Source*: elaborations on Eurobarometer data
* p < 0.05; ** p < 0.01

Table 11 - *Estimated coefficients of the 11 inequality indices in the model for Participation into Elections by income quintile*

	First quintile	Second quintile	Third quintile	Fourth quintile	Fifth quintile
Inequality	0.072	0.030	0.157*	-0.010	0.186*
	(0.072)	(0.074)	(0.077)	(0.077)	(0.075)
Gini coefficient	1.967	0.820	4.204*	-0.119	4.690*
	(1.789)	(1.848)	(1.916)	(1.916)	(1.847)
Foster-Wolfson index	2.170	-0.081	5.355**	-0.132	4.176*
	(1.989)	(2.002)	(2.051)	(2.122)	(2.034)
Interdecile ratio P90/P10	0.071	-0.051	0.252*	0.013	0.208
	(0.108)	(0.105)	(0.109)	(0.115)	(0.108)
Interdecile ratio P90/P50	0.495	0.004	0.985	0.022	1.325**
	(0.486)	(0.492)	(0.520)	(0.509)	(0.486)
Share top 1%	-0.025	2.616	-0.528	-3.335	7.286*
	(3.336)	(3.449)	(3.432)	(3.325)	(3.636)
Share top 5%	1.629	2.004	2.971	-1.291	7.395*
	(2.821)	(2.957)	(3.055)	(2.926)	(3.045)
Share top 10%	2.050	1.662	3.841	-1.130	6.985*
	(2.598)	(2.732)	(2.837)	(2.731)	(2.761)
Share bottom 1%	-46.206	44.351	-265.456	6.838	-226.234
	(206.873)	(191.013)	(191.620)	(200.620)	(226.186)
Share bottom 5%	-28.809	-5.111	-68.147**	-11.979	-47.246
	(26.876)	(25.731)	(26.397)	(27.868)	(26.432)
Share bottom 10%	-10.415	0.211	-27.807*	-4.429	-19.583
	(11.273)	(10.844)	(11.158)	(11.854)	(11.063)

Note: robust standard errors in parentheses; *Source*: elaborations on Eurobarometer data
* $p < 0.05$; ** $p < 0.01$

Though the re-estimation of the models with a focus on income and more specifically on population segmented by income size is a necessary step, and notwithstanding the illuminating results we obtained, the Eurobarometer "income" variable does not possess a satisfactory statistical appeal. First, data source does not collect all the information needed for calculating the household equivalized income. Second, household income has many missing observations, and a problem of selection-bias arises whether the non-response is not purely random, as it is often the case. Thirdly, income is not reported as such but it is collected in classes that differ in size and

number from year to year. In order to create an ordinal income class variable, we must at least assume that it is uniformly distributed within classes. Lastly, the concept of income used is not disposable income, but *gross* income, which includes benefits though being before taxes and social contributions. Unfortunately, we must be sticking to the Eurobarometer survey data, which is the only survey that covers the whole time period we are interested in.

Concluding remarks

As far as we know, this paper is the first one relating income inequality - measured through a wide array of indicators - to some aspects of the quality of a democracy in an advanced-economy and rooted-democracy country, in a long-run perspective.

We tested the impact of inequality on three (possible) indicators of the quality of democracy: citizens' satisfaction and citizens' attitude to participation in the two aspects of political discussion and intention to voting. The hypothesis that growing inequality has effect on the perception of the quality of democracy somehow captured through our three questions is highly confirmed no matter how inequality is measured. In summary, *Democracy-Satisfaction* is the question most affected by the variable Inequality and *Political Discussion* is the question which reacts more importantly in quantitative terms to all the RHS variables. Our results are robust vis-à-vis whatever indicator of inequality is used, arraying from the standard Gini to the interdecile ratios and a polarization index. Moreover, the robustness is substantially unaffected by a more refined analysis able to distinguish the population's answers by income-size.

Our findings reveal that inequality decreases citizens' satisfaction and stimulates their participation. Though a positive reaction to a discontent is one of the

two possible outcomes debated in the political theory,[17] a rationale for an opposite result[18] with very similar data and method has to be provided. We maintain that this difference is due to our focus on a single country only with a fully rooted democracy rather than on a pool of countries. Therefore, the problem we are facing is the effect of the persistence of dissatisfaction – the long run effect of the degree of inequality – and how the citizens react as a strategy to cope with inequality rather than their reaction to the dissatisfaction as such. Whilst the latter might easily be a sort of renounce to any participation, the first requires an action to be reverted. This leads, amongst others, to the issue of sustaining an active citizenship and of limiting inequality as an engine of deterioration in the quality of democracy.

Lastly, though this paper focusses on the effects of inequality on (still rough indicators of) democracy, some side-results of a more sociological nature are worthwhile noticing. All the three variables – *Democracy-Satisfaction, Political Discussion* and *Participation into Elections* – seem have increased through time and seem to be positively linked to age, marital status, education, and – on average – on good employment positions, and a female gender detachment from politics emerges. Living in Great Britain instead of Northern Ireland seems to provide a more reactive attitude towards institutions, and living in an urban location plays a positive role for participation and a negative role for democracy satisfaction, which is in line with the opportunities and the shortcomings that an urban area offers.

[17] Solt 2008, 48-9.
[18] Solt 2008.

APPENDIX

Descriptive statistics

Tables A1-A4 contain the main descriptive statistics of the variables. Table A1 relates to the three dependent variables, and Tables A2, A3, and A4 to the independent variables.

As for the first dependent one, during the whole period around 47 per cent of the sample feels on average "fairly satisfied" with how democracy works in UK, only 9 per cent is "very satisfied" with it, 29 per cent is "not very satisfied" and 15 per cent is "not satisfied at all". The second one has been continuously collected since 1975 and, still on average, about a half of the sample discusses "occasionally" about politics, 35 per cent "never" and 14 per cent "frequently". Lastly, 92 per cent on average of the sample would participate in elections if there were a general election very soon.

Table A1 - *Descriptive statistics on the dependent variables*

	Obs	Percentage
Democracy-Satisfaction		
Very satisfied	60,699	8.5%
Fairly satisfied	60,699	47.6%
Not very satisfied	60,699	29.2%
Not satisfied at all	60,699	14.7%
Political Discussion		
Frequently	93,631	14.1%
Occasionally	93,631	51.0%
Never	93,631	34.9%
Participation into Elections		
Would participate	52,461	92.4%
Would not participate	52,461	7.6%

Source: elaborations on Eurobarometer

Descriptive statistics on the inequality indices are presented in Table A2 (their temporal profile will be presented in Figures A1a-c), while those for controls are given in Tables A3 and A4. In particular, Table A3 presents descriptive statistics on the sample of individuals for which we estimate the ordered probit model on *Political Discussion* with reference to continuous and ordinal variables. This sample is larger than both *Democracy-Satisfaction* and *Participation into Elections*, as this variable was collected over the whole study period except for 1974 only. Table A4 presents descriptive statistics for the dummy variables (in this case, standard deviations and minimum and maximum values have no meaning).

Table A2 - *Descriptive statistics on the inequality indices*

	Obs	Mean	SD	Min	Max
Gini coefficient	39	0.306	0.037	0.246	0.358
Foster-Wolfson index	39	0.256	0.030	0.207	0.292
Interdecile ratio P90/P10	39	3.534	0.670	2.514	4.222
Interdecile ratio P90/P50	39	1.973	0.124	1.764	2.107
Share top 1%	39	0.058	0.013	0.038	0.093
Share top 5%	39	0.157	0.019	0.126	0.196
Share top 10%	39	0.247	0.022	0.211	0.288
Share bottom 1%	39	0.001	0.001	0.000	0.003
Share bottom 5%	39	0.016	0.004	0.011	0.022
Share bottom 10%	39	0.038	0.008	0.029	0.051

Source: elaborations on FES-FRS

Table A3 - *Descriptive statistics on the independent continuous and ordinal control variables*

	Obs	Mean	SD	Min	Max
Age	93,631	45.6	18.2	15	99
Year	93,631	1992	9.7	1975	2009
Household Income decile	51,689	5.5	2.9	1	10

Source: elaborations on Eurobarometer

Table A4 - *Descriptive statistics on the dummy control variables*

	Obs	Percentage
Male (vs. female)	93,631	47.0%
Married (vs. other marital status)	93,631	65.3%
Urban (vs. rural)	93,631	62.5%
GB (vs. NI)	93,631	77.7%
Education:		
University	93,631	12.0%
Secondary	93,631	46.3%
Lower than secondary	93,631	41.7%
Occupational status:		
Self-employed/entrepreneur	93,631	6.6%
Manager	93,631	8.1%
White collar	93,631	15.9%
Manual worker	93,631	22.8%
Retired	93,631	20.6%
Unemployed	93,631	6.9%
Non-actives	93,631	19.2%

Source: elaborations on Eurobarometer

Inequality indices

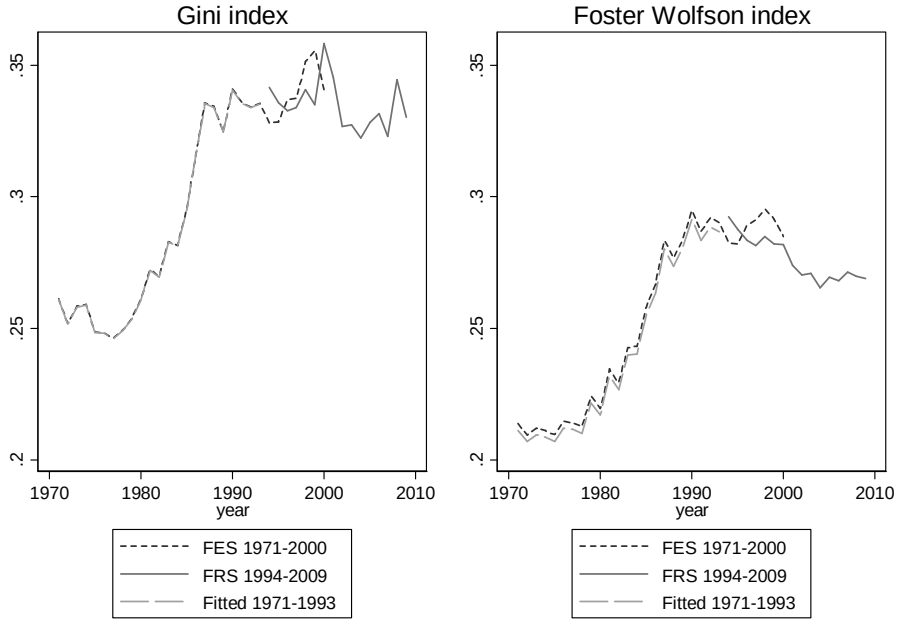
Inequality indices were computed using the Family Expenditure Survey data covering the 1971-2000 period, and the Family Resources Survey data covering the 1994-2009 period[19]. FES surveys covering years before 1971 have not been used because of some inconsistency of the variable collected, true for the 1993 FRS survey too.

As it can be seen from the Figures A1a, A1b and A1c, when the two surveys overlap (1994-2000) there is a discrepancy between the inequality indices calculated using FES and those calculated using FRS. This is inevitable when using different survey data and might be due to systematic differences in the sampling procedures or

[19] Both surveys were downloaded by the UK data archive (http://data-archive.ac.uk/).

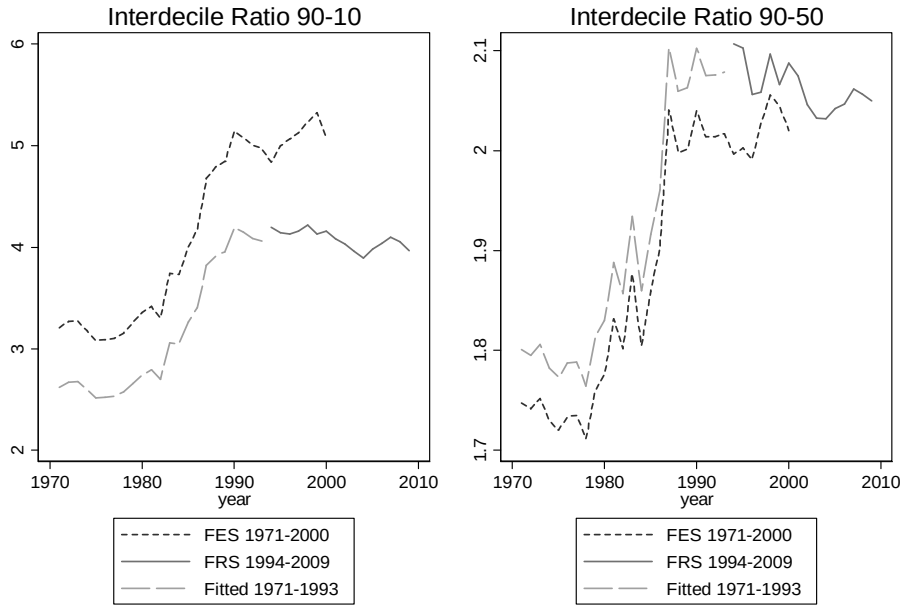
in the questionnaires. In order to overcome this problem, we analysed the relationship between the two series. We regressed FRS indicators on FES ones for the overlapping period, then the regression coefficients were used to build data for the 1971-1993 period for the FRS (see the long dashed line). It must be noticed that it is possible to see from the graphs the presence of some outliers in both surveys' indices, especially for the share of top incomes computed using FRS. This comes from the fact that, differently from FES, in some series of the FRS survey some especially high income levels are recorded.

Figure A1a - *Inequality indices: Gini index and Foster-Wolfson index*



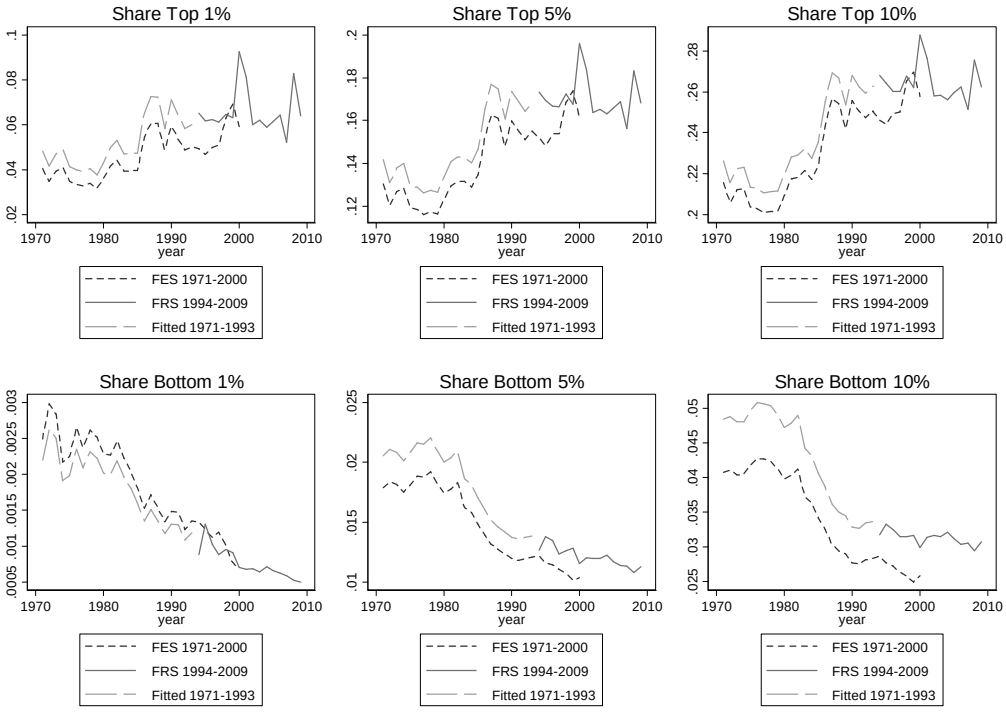
Source: elaborations on FES and FRS

Figure A1b - *Inequality indices: Interdecile-Ratios*



Source: elaborations on FES and FRS

Figure A1c - *Inequality indices: Shares of Top and Bottom Incomes*



Source: elaborations on FES and FRS

Factor analysis on inequality indices

Very high correlation coefficients - obviously negative for the bottom-shares - among all inequality indicators emerge both from the previous graphs and from the correlation matrix (Table A5). Before running the FA, the internal consistency of our set of inequality indicators has been tested by a standardized Cronbach alpha=0.99. The standardized version of Cronbach alpha has been preferred to the raw measure, as our indicators dimensionally differ: Gini ranges from 0 to 1, shares of top and bottom incomes also range between 0 and 1, interdecile ratios can take any positive number greater than 1 being ratios between a greater and a smaller quantity, FW can assume any value greater than 0.

Table A5 - *Correlation matrix of the inequality indicators*

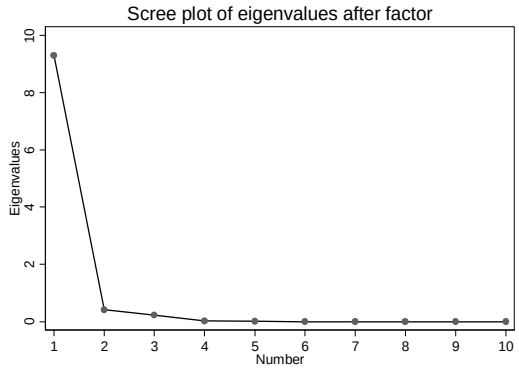
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Gini	(1)	1									
FW	(2)	0.973	1								
P90/P10	(3)	0.983	0.975	1							
P90/P50	(4)	0.983	0.984	0.983	1						
Top 1%	(5)	0.882	0.778	0.798	0.816	1					
Top 5%	(6)	0.970	0.901	0.917	0.928	0.965	1				
Top 10%	(7)	0.988	0.934	0.949	0.958	0.939	0.995	1			
Bottom1%	(8)	-0.897	-0.843	-0.907	-0.866	-0.752	-0.846	-0.873	1		
Bottom 5%	(9)	-0.955	-0.909	-0.967	-0.934	-0.798	-0.902	-0.930	0.975	1	
Bottom 10%	(10)	-0.975	-0.941	-0.986	-0.958	-0.809	-0.918	-0.947	0.954	0.995	1

Source: elaboration on FES-FRS data

The structure of the data has then been analysed using Explorative Factor Analysis (EFA). Using both the Kaiser criterion (i.e. eigenvalues>1) and the scree plot of eigenvalues (Figure A2), the suggested number of factors to be extracted is 1 revealing that the ten indicators are expression of a unique latent construct. This leads us to run a Confirmative Factor Analysis (CFA) on a single latent factor. In Table A6 the factor loadings - *i.e.* the coefficients measuring the linear relationship

between the inequality indicators and the latent factor of the CFA - are reported. As expected from the variance-covariance matrix, they are very close to one (or minus one).

Figure A2 - *Scree plot of eigenvalues after EFA*



Source: elaboration on FES-FRS data

Table A6 - *Factor loadings of the CFA*

	Factor loadings (λ)
Gini coefficient	0.997
Foster-Wolfson index	0.959
Interdecile ratio P90/P10	0.983
Interdecile ratio P90/P50	0.977
Share top 1%	0.883
Share top 5%	0.969
Share top 10%	0.987
Share bottom 1%	-0.923
Share bottom 5%	-0.972
Share bottom 10%	-0.985

Source: elaboration on FES-FRS data

Predicted probabilities and marginal effects in probit and ordered probit models

In the first case - *Democracy-Satisfaction* - the predicted probabilities are: “not at all satisfied” with democracy, 0.153 (that means 15.3 per cent of the sample is “not at all satisfied”); “not very satisfied”, 0.305 (30.5 per cent); “fairly satisfied”,

0.469 (46.9 per cent); "very satisfied", 0.073 (7.3 per cent). The marginal effects are shown in Table A7.

Table A7 - *Ordered probit model on Democracy-Satisfaction: marginal effects*

	Not at all satisfied	**Not very satisfied**	**Fairly satisfied**	**Very satisfied**
Inequality (min → max)	0.053	0.040	-0.058	-0.036
Age (min → max)	-0.048	-0.035	0.053	0.031
Male (0 → 1)	-0.008	-0.006	0.009	0.005
Married (0 → 1)	-0.012	-0.008	0.014	0.007
Education: University (0 → 1)	-0.032	-0.026	0.035	0.023
Education: secondary (0 → 1)	-0.030	-0.023	0.032	0.021
Self-employed/entrepr. (0 → 1)	-0.002	-0.001	0.002	0.001
Manager (0 → 1)	-0.020	-0.015	0.022	0.013
White collar (0 → 1)	-0.015	-0.011	0.016	0.009
Manual worker (0 → 1)	0.010	0.007	-0.011	-0.006
Retired (0 → 1)	-0.003	-0.002	0.004	0.002
Unemployed (0 → 1)	0.066	0.033	-0.070	-0.029
Urban (0 → 1)	0.015	0.011	-0.017	-0.010
Year (start → end)	-0.065	-0.046	0.070	0.041
Great Britain (0 → 1)	-0.139	-0.048	0.140	0.047

Source: elaboration on Eurobarometer data

An increase in Inequality from its observed min to the max increases the probability of being "not at all satisfied" with democracy by 0.053 (*i.e.*, 5.3 percentage points) and of being "not very satisfied" by 0.040 (4 percentage points); in parallel, the probability of being "fairly satisfied" decreases by 0.058 (5.8 percentage points) and of being "very satisfied" by 0.036 (3.6 percentage points).

As far as the effect of age is concerned, ageing people are more likely to display higher levels of *Democracy-Satisfaction*: an increase in age from its min to its max determines a 4.8 percentage points fall in the probability of being "not at all satisfied", a 3.5 points decrease in the probability of being "not very satisfied", a 5.3 increase in the probability of being "fairly satisfied" and a 3.1 increase in the probability of being "very satisfied".

Males are more likely than females to display higher levels of *Democracy-Satisfaction*: the likelihood of being "not at all satisfied" and "not very satisfied" is 0.8 and 0.6 percentage points respectively lower than for females; on the contrary, the probability of being "fairly satisfied" and "very satisfied" are respectively 0.9 and 0.5 points higher. The marital status figures do not depart substantially from these values: -1.2, -0.8, +1.4, +0.7.

Better educated individuals are more likely than less educated to display higher levels of *Democracy-Satisfaction*: the likelihood of being "not at all satisfied" decreases by 3.2 percentage points if the individual has a university degree and by 3.0 percentage points if the individual has a secondary degree (both compared with a lower degree). Similarly, the likelihood of being "not very satisfied" declines by 2.6 percentage points if the individual has a university degree and by 2.3 percentage points if the individual has a secondary degree. On the other hand, the probability of being "fairly satisfied" for people with university degree is 3.2 percentage points higher than for people with lower education. In the case of secondary degree, it is 3.2 percentage points higher; and the probability of being "very satisfied" is 2.3 percentage points higher for people with university degree and 2.1 percentage point higher for people with secondary degree.

Individuals in managerial and clerk position are more likely to be more satisfied with democracy (compared with the non-actives): they show respectively a 2 and 1.5 percentage points lower probability of being "not at all satisfied"; a 1.5 and 1.1 points lower probability of being "not very satisfied", while showing a 2.2 and 1.6 percentage points higher probability of being "fairly satisfied" and 1.3 and 0.9 percentage points higher probability of being "very satisfied". On the contrary,

manual workers and unemployed are significantly less satisfied with democracy. They have higher probabilities of being “not at all satisfied” and “not very satisfied”: respectively +1 and +0.7 percentage points in the case of manual workers and +6.6 and 3.6 percentage points in the case of unemployed. In parallel, they are less likely to be “fairly satisfied and very satisfied”: -1.1 and -0.6 percentage points if manual workers and -7 and -2.9 percentage points if unemployed.

The probability of being “not at all” and “not very satisfied” if living in an urban area is 1.5 and 1.1 percentage points higher than in a rural area. The dummy variable distinguishing individuals living in Great Britain from those living in Northern Ireland has a greater (quasi-dramatic) effect: the former has a 13.9 percentage points lower probability of being “not at all satisfied” with respect to the latter, a 4.8 percentage points lower probability of being “not very satisfied”, a 14.0 percentage points higher probability of being “fairly satisfied” and a 4.7 percentage points higher probability of being “very satisfied”.

As far as the time trend is concerned, the probabilities of being “not at all satisfied” and “not very satisfied” decrease by 6.5 and 4.6 percentage points, whilst the probabilities of being “fairly satisfied” and “very satisfied” increase by 7.0 and 4.1 percentage points.

Table A8 relates to the *Political Discussion* model. Again, for a better understanding of these figures, we first show the predicted probability once all the explanatory variables assume their median value. The probability of “never” discussing about politics is 0.451 (45.1 per cent), of “occasionally” discussing about politics is 0.468 (46.8 per cent) and of doing it frequently is 0.081 (8.1 per cent).

Table A8 - *Ordered probit model on Political Discussion: marginal effects*

	Never	**Occasionally**	**Frequently**
Inequality (min → max)	-0.034	0.022	0.012
Age (min → max)	-0.245	0.134	0.111
Male (0 → 1)	-0.096	0.052	0.044
Married (0 → 1)	-0.048	0.032	0.017
Education: University (0 → 1)	-0.215	0.085	0.130
Education: secondary (0 → 1)	-0.067	0.038	0.029
Self-employed/entrepr. (0 → 1)	-0.121	0.062	0.059
Manager (0 → 1)	-0.138	0.069	0.069
White collar (0 → 1)	-0.090	0.049	0.041
Manual worker (0 → 1)	-0.010	0.006	0.004
Retired (0 → 1)	-0.020	0.012	0.008
Unemployed (0 → 1)	0.001	-0.001	-0.001
Urban (0 → 1)	-0.028	0.018	0.010
Year (start → end)	0.131	-0.082	-0.049
Great Britain (0 → 1)	-0.048	0.032	0.017

Source: elaboration on Eurobarometer data

As stated by Table A8, an increase in Inequality from its min to its max decreases the probability of "never" talking about politics by 0.034 (3.4 percentage points), increases of 0.022 (2.2 percentage points) the probability of "occasionally" talking about politics and of 0.012 (1.2 percentage points) the probability of frequent *Political Discussions*.

The older people are, the more frequently they have *Political Discussions*: changing age-variable value from its min to its max (while holding all other variables fixed at their median) makes the probability of "never" talking about politics to fall by 0.245 (24.5 percentage points) and increases the probability of talking about politics "occasionally" and "frequently" by respectively 13.4 and 11.1 percentage points.

Males, married and better educated individuals, together with those living in an urban area are likely to discuss more frequently about politics. In particular, males'

likelihood of discussing “never” is 9.6 percentage points lower than for females, while their likelihood of discussing “occasionally” and “frequently” is respectively 5.2 and 4.4 percentage points higher. Concerning married individuals, the change in the predicted probabilities of the three outcomes is respectively of -4.8, +3.2 and +1.7 percentage points.

Similarly to what seen for *Democracy-Satisfaction*, individuals with a university degree are more likely to talk about politics than those with secondary degree who, in turn, are more likely to talk about politics than the reference group of individuals with a lower education level. People with a university degree are less likely than the reference group to “never” discuss about politics (-21.5 percentage points), while are more likely to discuss “occasionally” (+8.5) and “frequently” (+13). The analogous percentage point changes in the case of individuals with secondary school degree are -6.7, +3.8 and 2.9.

As far as the employment condition is considered, self-employed/entrepreneur and managers are much less likely to discuss “never” about politics (respectively -12.1 and -13.8 percentage points) and more likely to discuss “occasionally” (+6.2 and +6.9 percentage points) and “frequently” (+5.9 and +6.9 percentage points). Also white collars and retired from work discuss about politics more than the non-actives, the magnitude of this effect not being so relevant as in the previous case: respectively -9 and -2 percentage points probability of “never” discussing about politics; +4.9 and +1.2 percentage points probability of discussing “occasionally” and +4.1 and +0.8 percentage points probability of discussing “frequently”.

Living in an urban area rather than in a rural area decreases the probability of “never” talking about politics by 2.8 percentage points, while increasing by 1.8 and 1

percentage points the probability of “occasionally” and “frequently” talking about politics. Living in Great Britain positively affects the frequency of *Political Discussion*, the effect being not as high as in the case of *Democracy-Satisfaction*: a 4.8 percentage points decrease of “never” talking about politics with respect to people from Northern Ireland, and a 3.2 percentage points increase of “occasionally” talking about politics and a 1.7 percentage points increase of “frequently” talking about politics. *Political Discussion* declines over time: “never” talking about politics is 13.1 percentage points more likely at the end of the considered period than at the beginning. In the same time span, the probability of occasional and frequent *Political Discussion* decreases respectively by 8.2 and 4.9 percentage points.

Table A9 shows the marginal effects of the probit model on *Participation into Elections*. Let us recall that the predicted probability of participating in elections (again, setting all explanatory variables at their median value) is equal to 0.940 (94.0 per cent).

A rise in Inequality (from its minimum to its maximum value) increases the probability of participating in elections by 0.037 (3.7 percentage points). Also getting older increases the probability of participating in elections by 7.3 percentage points.

Married individuals’ likelihood to vote is 1.9 percentage points higher than individuals with a different civil status. Individuals with university degree show a 2.5 percentage points higher probability to vote with respect to individuals with no university degree; the change is of +1.0 percentage points in the case of secondary education.

Table A9 - *Probit model Participation into Elections – marginal effects*

	Participation into Elections
Inequality (min → max)	0.037
Age (min → max)	0.073
Male (0 → 1)	0.003
Married (0 → 1)	0.019
Education: University (0 → 1)	0.025
Education: secondary (0 → 1)	0.010
Self-employed/entrepr. (0 → 1)	-0.003
Manager (0 → 1)	0.017
White collar (0 → 1)	0.011
Manual worker (0 → 1)	-0.001
Retired (0 → 1)	0.006
Unemployed (0 → 1)	-0.014
Urban (0 → 1)	-0.002
Year (start → end)	-0.099
Great Britain (0 → 1)	0.078

Source: elaboration on Eurobarometer data

Regarding the employment condition, individuals in managerial and white collar occupations are more likely to participate in elections (+1.7 and 1.1 percentage points). On the contrary, being unemployed decreases this probability by 1.4 percentage points. The probability of participating in election is 7.8 percentage points higher in Great Britain than in Northern Ireland. Similarly to *Political Discussion*, *Participation into Elections* decreases through time: going from the beginning to the end of the period, voting probability goes down by 9.9 percentage points.

As far as the additional ten indicators of inequality are concerned, the results are consistent (Tables A10, A11 and A12). Moreover, the indicators which have the greater effects are unambiguously the shares of bottom income, in particular the 1%, which seems quite understandable.

Table A10 - *Marginal effects for all inequality variables in the Democracy-Satisfaction model*

	Not at all satisfied	Not very satisfied	Fairly satisfied	Very satisfied
Inequality	0.053	0.040	-0.058	-0.036
Gini coefficient	0.048	0.037	-0.052	-0.033
Foster-Wolfson index	0.053	0.041	-0.057	-0.037
Interdecile ratio P90/P10	0.055	0.043	-0.059	-0.038
Interdecile ratio P90/P50	0.045	0.035	-0.048	-0.031
Share top 1%	-0.001	0.000	0.001	0.000
Share top 5%	0.028	0.021	-0.031	-0.018
Share top 10%	0.036	0.027	-0.039	-0.024
Share bottom 1%	-0.136	-0.102	0.144	0.094
Share bottom 5%	-0.087	-0.068	0.094	0.062
Share bottom 10%	-0.069	-0.054	0.075	0.049

Note: marginal effects are calculated changing all variables from their minimum to their maximum; *Source*: elaboration on Eurobarometer data

Table A11 - *Marginal effects for all inequality variables in the Political Discussion model*

	Never	Occasionally	Frequently
Inequality	-0.034	0.022	0.012
Gini coefficient	-0.031	0.019	0.011
Foster-Wolfson index	-0.033	0.021	0.012
Interdecile ratio P90/P10	-0.032	0.020	0.012
Interdecile ratio P90/P50	-0.038	0.024	0.014
Share top 1%	-0.001	0.000	0.000
Share top 5%	-0.018	0.012	0.007
Share top 10%	-0.025	0.016	0.009
Share bottom 1%	0.049	-0.031	-0.018
Share bottom 5%	0.057	-0.037	-0.021
Share bottom 10%	0.042	-0.027	-0.015

Note: marginal effects are calculated changing all variables from their minimum to their maximum; *Source*: elaboration on Eurobarometer data

Table A12 - *Marginal effects for all inequality variables in the Participation into Elections model*

	Participation into Elections
Inequality	0.037
Gini coefficient	0.036
Foster-Wolfson index	0.024
Interdecile ratio P90/P10	0.024
Interdecile ratio P90/P50	0.029
Share top 1%	0.019
Share top 5%	0.030
Share top 10%	0.033
Share bottom 1%	-0.022
Share bottom 5%	-0.049
Share bottom 10%	-0.037

Note: marginal effects are calculated changing all variables from their minimum to their maximum; *Source*: elaboration on Eurobarometer data

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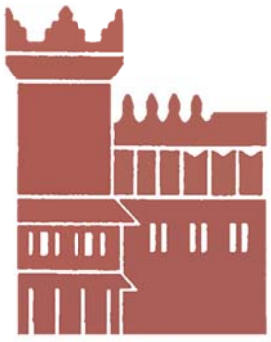

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