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Mass media and attitudes to inequality

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# Mass media and attitudes to inequality

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**Abstract.** We aim to investigate which is the potential of various mass media to influence individuals' attitude to inequality. A theoretical model is proposed to formalize how preferences towards redistribution are formed. It is then tested empirically by using the data from the European Social Survey offering information on the time people spend watching TV and using internet. Mass media are assumed to affect the value people attach to equality, and in particular equality of opportunity, which is reflected in their attitude towards income redistribution. This process is modeled by using the ordered probit technique and the conditional mixed process estimator. Moreover, by estimating the dose-response function, we highlight that the relation between exposure to mass media and attitudes to inequality is non-linear. We also test the impact of various media market and personal characteristics and point out some cross-country differences in the way attitudes to inequality are shaped.

**Keywords:** mass media, attitudes to inequality  
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## Introduction

This paper seeks to identify the role of mass media in shaping individuals' preferences for redistribution. The political economy literature, originated from the seminal paper by Meltzer and Richards (1981), emphasized the self-interest motive whereby preferences for redistribution depend on income. Individuals with income below the mean favour redistribution policies, while individuals with income above the mean oppose them. Majority voting, in turn, would entail that higher income inequality translates into more redistribution. However, empirical evidence suggests there is much less redistribution than that implied by Meltzer and Richard's results. Several explanations have been put forward to explain the so-called "limited redistribution puzzle". Some emphasize a different distribution of power among voters than that implied by majority voting; others stress the relevance of variables beside current income in shaping individuals' preferences for redistribution. Among non-economic variables, the literature has pointed out the important role played by culture and values as determinants of preferences for redistribution.

In this paper, we focus on the influence of values on individuals' preferences formation and in particular on individual's attitudes to the equality of incomes. Our hypothesis is that individuals who think that 'everybody should have equal opportunities in life' are more in favour of redistribution than individuals with the same socio-economic situation but different beliefs about fairness. We thus interpret a person's attitudes towards equality of opportunity<sup>3</sup> as an indicator of his/her value system.

If values do influence preferences for redistribution, then the question of what determines individuals' values becomes important. Values are partly exogenous (i.e. depend on individual's characteristics) but are also influenced by society. News, political and entertainment programs provide information and influence individuals' values and behavior. Through these channels, mass media affect public opinion on key political issues. Characteristics of the media market, such as concentration, ownership and pluralism, contribute to the possibility of information manipulation by interested parties.

We first propose a theoretical model, which is meant to formalize our vision on how preferences towards redistribution are being formed, with information transmitted through mass media playing the key role. Empirical estimates are then performed to understand which is the potential of various mass media to influence attitudes to inequality. In that, we rely on the European Social Survey data (2010). The key explanatory variables are the time people spend watching TV and using internet, in

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<sup>3</sup> The idea of equality of opportunity embodies two basic principles. The compensation principle, which requires inequalities due to circumstances to be eliminated, and the reward principle, which considers how to reward efforts amongst individuals with identical circumstances (Ramos and Van de Gaer 2015)

a set of 27 countries the majority being EU Member States. In addition, we consider a wide range of country, media market and personal characteristics, which are meant to shape people's attitudes to inequality.

We hypothesize that mass media affect the value people attach to equality, and in particular equality of opportunity, which then translates in their attitude to redistribution of incomes. The process is modeled by using the ordered probit technique and the conditional mixed process estimator. The dose-response function is also used to emphasize the non-linear relation between exposure to mass media and attitudes to inequality.

To the best of our knowledge, this is the first paper to address the link between mass media and income inequality at the micro-level, from a theoretical and an empirical point of view.

In what follows, we provide a brief survey of existing studies that address such issues as redistribution and the power of media to influence political outcomes. Section two puts forward a theoretical model in which rich individuals have an incentive to manipulate mass media in order to influence individuals' values and thus their preferences for redistribution. Section three is devoted to empirical analysis, it first describes the data and methodology used and then presents the main findings. Some concluding remarks follow.

## **1. Literature review**

Our study was inspired by Petrova (2008), who was among the first to reconstruct the link between media capture and inequality. She puts forward a theoretical model, further proved by empirical estimates, showing that higher inequality is associated with lower media freedom, at country level.<sup>4</sup> The novelty of our study is to get down to the individual level in order to identify how exposure to different types of media may affect attitudes towards inequality.

The paper thus builds on two strands of literature: the literature on the politics of income redistribution and the literature on media bias.

### *1.1. The politics of income redistribution*

Preferences for redistribution policies are influenced by self-interest, as emphasized by the political economy literature originated from the seminal paper by Meltzer and Richard (1981). Under

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<sup>4</sup> Bandyopadhyay (2014) performs similar analysis for a wider set of countries and provides further evidence on associations of ICTs and mass media with inequality and poverty.

majority voting, the outcome is the policy preferred by the median voter.<sup>5</sup> Accordingly, the greater the distance between median and mean income, the more redistributive should be the policy implemented. The prediction is therefore a positive association between inequality and redistribution. Cross-country data, however, do not seem to support such prediction.<sup>6</sup> A variety of reasons has been offered to explain the so-called “limited redistribution puzzle”.<sup>7</sup> These include the “prospect of upward mobility”, according to which voters whose income is below the mean hope that they or their children will someday be richer than the average and thus be hurt by redistribution; the evidence on poor individuals voting turn-out, which is proportionally lower than rich individuals’; lobbying and other asymmetries in political influence. Another explanation for the limited redistribution puzzle, complementary to the ones mentioned above, is that an important role is played by social beliefs, culture and values, which “bias” preferences purely based on the economic motive (see Tabellini, 2007; Benabou and Tirole, 2006). If an individual value system is supportive of equality (of opportunities) then he would be more in favour of redistribution than an individual with the same income but a value-system less pro-equal. Alesina and Glaeser (2004) compare value-systems in the EU and the US at the macro level and, supported by empirical evidence, argue that the US see laziness as the main cause of poverty/low income while Europeans believe poor individuals to be unlucky. Accordingly, US citizens are, *ceteris paribus*, less supportive of redistribution policies than EU citizens.

Along the same lines, Alesina et al. (2012) suggest that different beliefs about fairness and redistribution are able to keep otherwise identical countries on different development paths for a long time. The comparison between the East and West Germany, in particular, results in an estimate of one to two generations needed for the attitudes towards redistribution to converge in the two parts of the country (Alesina and Fuchs-Schundeln 2007).

Corneo and Gruner (2002) investigate the relationship between income and individuals’ preferences for redistribution using survey micro-data. They focus on the role of income and values in shaping individuals’ preferences for redistribution and conclude that the economic motive is not the only determinant of preferences for redistribution policy and that the individual’s value system

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<sup>5</sup> A serious drawback of the median voter approach is that the equilibrium is guaranteed under the assumption of single-peaked preferences in a one-dimensional issue space. If preferences are not single-peaked or if the issue space is multidimensional, the median voter theorem cannot be applied. Thus, in multidimensional settings policy outcomes might strongly differ from those predicted by the majority voting approach.

<sup>6</sup> Perotti (1996), Rodriguez (2004), see also studies reviewed in Benabou (1996), Clark and D'Ambrosio (2015). Olivera (2015) nevertheless finds that changes in income inequality positively affect changes in preferences for redistribution in a set of 34 European countries.

<sup>7</sup> See Harms and Zink (2003) as well as Alesina and Giuliano (2010).

and in particular the attitude towards equality of opportunity are also relevant in shaping preferences for redistribution. “An individual who thinks that family background is the major determinant of individual’s income is expected to favour redistribution. On the other hand, an individual who believes that individual effort is important for economic success is expected to oppose redistribution.”

Here we focus on the role of mass media in shaping individuals’ attitude towards equality of opportunity (EO) and equality of incomes (EI). EO requires eliminating the effect of circumstances (i.e. those aspects that are beyond one’s control) on outcomes while allowing for differences in outcomes due to effort (which is assumed to be a choice variable for the individual). The idea is that an individual is held responsible for effort and choice but should be compensated for the effects of birth, luck etc. (Roemer 1998, Roemer and Trannoy 2015). For example, the outcome might be the adult wage, circumstances could include several aspects of childhood and family environment, and effort could be years of schooling. EO allows differences in wage due to own education, but not to parents’ education (Fleurbaey 2008, Ferreira and Peragine 2016).

### *1.2. Media influence*

In recent years, the economic and social impact of exposure to the media have been widely analyzed.<sup>8</sup> The political economy literature has stressed that if voters’ preferences are influenced by media, then government, companies and interest groups have an incentive to manipulate the media and induce them to report biased information.<sup>9</sup>

Media outlets might report biased information because of the ideological position of the owners (Baron, 2006) or because of a sort of confirmation bias by consumers who like to hear news that confirm their prior beliefs (Mullainathan and Shleifer, 2005). Gentzkow and Shapiro (2010) try to estimate what determines the ideological position of US newspapers and conclude that the bias mainly depends on the ideological leanings of the audience. Another reason why media might report biased information is due to media capture. In Besley and Prat (2006)  $n$  media outlets report news relevant to voters. The incumbent politician might offer each media outlet a monetary contribution to suppress relevant information. An outlet’s objective is to maximize the sum of audience related revenues, which depend on the quality of information, and bribes from politicians. They show that pluralism makes media capture harder.

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<sup>8</sup> See Della Vigna and La Ferrara (2015) for a survey.

<sup>9</sup> See Prat and Stromberg (2011) and literature therein cited.

The characteristics of the media market, such as ownership and concentration, appear to be very important in the extent of media bias and media capture. Djankov et al. (2003) ponder on the role of media ownership, and sustain that higher government shares have been associated with less free press, fewer political rights for citizens, inferior governance, less developed capital markets, and inferior health outcomes. In Corneo (2006) a monopolist media outlet can collude with various interest groups. He shows that media capture is more likely if ownership concentration is high.

Noam (2013) provides the most recent estimates of media concentration worldwide and puts forward alternative measures of media power, which are subject to debates in the literature. Prat (2014) provides a survey of existing measures, attained mainly by aggregating market shares across platforms, and offers yet another possibility. The new measure performs cross-platform aggregation at the level of individual voters based on their attention shares. While it is out of the scope of the paper to judge the appropriateness of different measures of media power, the shift towards individual gives more cogency to our study.

In the following section, we present a model in which individuals' preferences for redistribution depend on income and values. Values, in turn, are influenced by, possibly biased, media.

## 2. Theoretical model

We present a simple model to describe the role of values in the formation of individual's preferences for income redistribution. We assume that values depend on individual's characteristics and media influence. To formalize media influence we derive the individual's demand for a generic media considering two relevant dimensions: ideology and pluralism of content. Lastly, we model media bias as the outcome of a lobbying pressure by rich individuals.

### 2.1. The basic set up

Consider an economy with a continuum of citizens of measure one. Income is distributed in  $[0, Y]$  according to a distribution function  $F$  with mean  $\bar{y}$  and such that median income is lower than the mean:  $y \sim F(\cdot)$ ,  $E(y) = \bar{y}$ ,  $F(y^m) = \frac{1}{2}$  and  $y^m < \bar{y}$ . We also assume that the richest individual has income more than twice the average: i.e.  $Y > 2\bar{y}$ .

Individuals' utility function is assumed to be linear in private consumption  $c$  and concave in the public good  $g$  with  $H(0)=0$ :<sup>10</sup>

$$u = c + H(g)$$

The public good is financed by a proportional income tax  $\tau$  and the government's budget is balanced, i.e.  $\tau\bar{y} = g$ .

There is only one period, so individuals consume all of their income:  $c = (1 - \tau)y$ .

Income-based preferences for the public good/income tax are obtained by maximizing the indirect utility function, which, using the government budget constraint, we write as a function of the income tax:<sup>11</sup>

$$W(\tau) = (1 - \tau)y + H(\tau\bar{y})$$

Let  $\tau^*(y) = \arg \max W(\tau)$  be the tax rate preferred by an individual with income  $y$ .

We assume that  $\tau$  can take only two values:  $\tau \in \{0, 1\}$  and that individuals with average income are indifferent between the two:

**Assumption 1:** If  $y = \bar{y}$  then  $W(\tau = 0) = W(\tau = 1)$ .

The above assumption implies that  $H(\bar{y}) = \bar{y}$ .<sup>12</sup> It follows that poor individuals – i.e. individuals with income below average – prefer  $\tau = 1$ , while rich individuals – i.e. individuals with income above average – prefer  $\tau = 0$ .<sup>13</sup> In fact,

$$W(\tau = 0) = y > W(\tau = 1) = H(\bar{y}) \quad \text{if } y > \bar{y}$$

$$W(\tau = 0) = y < W(\tau = 1) = H(\bar{y}) \quad \text{if } y < \bar{y}$$

**Result 1:** If the tax rate is decided by majority voting, then  $\tau = 1$ .

Result follows from having assumed  $y^m < \bar{y}$ .

## 2.2. The role of individual values

<sup>10</sup> Quasi-linear preferences imply that consumption absorbs all income effects.

<sup>11</sup> Given the Government budget constraint, one could write the indirect utility function as a function of the public good:

$$W(g) = (1 - \tau)y + H(\tau\bar{y}) = (\bar{y} - g)\frac{y}{\bar{y}} + H(g).$$

<sup>12</sup> Recall that  $H(0)=0$ .

<sup>13</sup> Alternatively, we could have assumed  $\tau$  to take values in the closed interval  $[0,1]$  and consider two groups of individuals – low and high income- with extreme preferences, so that low (and median) income individuals would prefer

$\tau = 1$  while high-income individuals would prefer  $\tau = 0$ , that is:  $\frac{\partial W^L}{\partial \tau}(\tau = 1) = -y^L + \bar{y}H'(\bar{y}) > 0$  and

$\frac{\partial W^H}{\partial \tau}(\tau = 0) = -y^H + \bar{y}H'(0) < 0$ .



Let's now consider a "value bias" in individuals' income-based preferences. Values are ideological opinions about an issue, in our case redistribution, which "bias" individuals' economic preferences. Thus, an individual with income  $y$  might prefer a tax rate higher (lower) than  $\tau^*(y)$  if he has a pro-equal (anti-equal) attitude.

Let  $x = \frac{y}{V}$  be the "value-adjusted income". The income tax rate preferred by an individual with income  $y$  and values  $V$  is  $\tau^{**}(y, V) = \tau^*\left(\frac{y}{V}\right) = \tau^*(x)$ .

Note that if  $V = 1$  income is the only determinant of preferences for redistribution, as in the standard Meltzer and Richard (1981) framework. On the other hand, if  $V < 1$  ( $V > 1$ ) the individual prefers a tax rate lower (higher) than the value implied by his income.<sup>14</sup>

**Result 2:** *If the tax rate is decided by majority voting, the winning policy is the tax rate preferred by the individual with median value-adjusted income.*<sup>15</sup>

As documented in our empirical analysis below, individuals' opinions depend on socio-demographic and economic characteristics - such as age, gender, religion, culture, etc. - and on media influence.

Let  $\Omega$  denote the ideological component of the "value bias" determined by the individual's characteristics, which we assume to be independent of income and symmetrically distributed in  $[1 - \bar{\Omega}, 1 + \bar{\Omega}]$ , with  $\bar{\Omega} \leq 1$  and let  $I = \{0, 1\}$  be an indicator of media influence, where  $I = 0$  means media neutrality. Then  $V = V(\Omega, I)$  indicates the "value bias" of an individual with ideological position  $\Omega$  when media influence is  $I$ .

To concentrate on media influence, we assume that ideology alone, while affecting individuals' value, does not alter the political equilibrium:<sup>16</sup>

**Assumption 2:** *Under media neutrality "redistribution" ( $\tau = 1$ ) would still be the winning policy of a majority vote.*

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<sup>14</sup> Formally, this is equivalent to assuming uncertainty about the benefit from the public good or about the cost of a public project (as in Petrova, 2008). If  $V > 1$  ( $V < 1$ ) then the perceived benefit from the public good is higher (lower) than the true value.

<sup>15</sup> Note that we are ranking individuals according to  $x$ , therefore the winning policy is the policy preferred by the individual with median value of the parameter (see discussion of single-crossing property in Persson and Tabellini, 2000). The median could be a poor or some pro-equal rich. To find the median value of  $x$ , one would have to consider the properties of the joint distribution  $\Phi(y, V)$ , but this is outside the scope of the present paper.

<sup>16</sup> This is not to say that individual's characteristics do not bias values; rather, since we are assuming ideology to be independent of income, the average opinion for each income level is equal to 1. Therefore, absent media influence on average, values are unbiased. Formally,  $EV(\Omega, 0) = 1$ .

### 2.3. Media demand and media influence

We consider two media. All individuals have free access to the first media (M1). Access to the second media (M2) is costly, so only a fraction of the population consumes M2. Media report “opinions”, which can be pro-equal or anti-equal. M2, the costly media, is pluralist i.e. it reports all opinions.<sup>17</sup> The free media (M1) can be bribed to omit some opinions. Of course, if the cost of accessing M2 is zero, so that the entire population has access to pluralist information, then there is no incentive to bribe M1. In this case, individuals’ opinions would not be influenced by media. Thus, a necessary condition for media influence is that access cost to pluralist information is sufficiently high. In this case, there is an incentive to bribe M1 to influence voters’ opinions and preferences.

Access to the costly media depends on income and price. Assuming that individuals devote a share  $\gamma$  of their income to media consumption and recalling that M1 is free so that  $p_1 = 0$ , the individual with income  $y$  has access to M2 if  $p_2 \leq \gamma y$ . In the literature, pricing in media markets is discussed in the framework of two-sided networks where users and advertisers interact through platforms (web portals, radio stations, newspapers, television channels) which collect revenues from both sides.<sup>18</sup> Since our focus is on pluralism and media influence on preferences, we do not discuss pricing by media outlets and exogenously assume a free media and a costly media, the last so expensive that the individual with median income cannot access it.

**Assumption 3:** *Subscription price to M2 is sufficiently high so that the individual with median income does not have access to it, i.e.  $p_2 > \gamma y^m$ .*

To derive media demand, we consider two dimensions of product differentiation: location along the ideology line (horizontal differentiation) and pluralism of content, which we interpret as quality of information (vertical differentiation).<sup>19</sup>

Let  $\Omega_M$  be the average opinion reported by media  $M$ , that is the media’s (ideological/editorial) “position” on  $[1 - \bar{\Omega}, 1 + \bar{\Omega}]$ . A pluralist media is by definition unbiased, that is:  $\Omega_M = 1$  and we define media  $M$ ’s bias as  $|1 - \Omega_M|$ .<sup>20</sup>

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<sup>17</sup> M1 can be thought of as free television while M2 as Internet, where an infinite variety of opinions is (potentially) available.

<sup>18</sup> Reisinger (2012), Battagion and Drufuca (2014), Ribeiro et al. (2014), Gabsewitz et al. (2012).

<sup>19</sup> Most of the literature focuses on horizontal differentiation assuming that individuals hold beliefs that they like to be confirmed and therefore tend to consume media with ideological position similar to their own, which reinforce their ex-ante opinions. Few papers focus on vertical differentiation (Battagion and Drufuca 2014, Gabsewitz and Wauthy 2014) and even less on vertical and horizontal differentiation (Ribeiro et al. 2016).

<sup>20</sup> Note that a pro-equal bias requires  $\Omega_M > 1$ , which is on the right-side of the ideology line.

Individuals have a taste for quality and *ceteris paribus* prefer a pluralist media. However, they hold beliefs that they like to be confirmed and therefore tend to consume media with ideological position similar to their own, which reinforce their ex-ante opinions.<sup>21</sup>

Thus, the utility of an individual who is located at  $\Omega$  and consumes media M located at  $\Omega_M$  is:

$$U_M = W - |1 - \Omega_M| - \theta|\Omega - \Omega_M|$$

where  $W$  is maximum willingness to pay for media content and  $\theta$  is the relative importance of horizontal vs vertical differentiation, that is ideology vs pluralism.

Having access to it, the individual consumes media M if  $U_M > 0$ .

If  $W$  is sufficiently high ( $W > \theta\bar{\Omega}$ ) then all individuals would consume a pluralist media, if they had access to it.<sup>22</sup>

On the other hand, although everybody has access to the free media, if it is “too biased”, some individuals will not consume it.

We are now in a position to define media M1’s audience loss as depending on its bias:

$$L(|1 - \Omega_{M1}|) = a[1 - au(\Omega_{M1})]$$

where  $a$  is advertising revenue per media-consumer and  $0 \leq au(\Omega_{M1}) \leq 1$  is audience share when the media position is  $\Omega_{M1}$ .<sup>23</sup>

**Assumption 4:** Audience loss is zero in case of a pluralist media and it is an increasing and concave function of the bias  $|1 - \Omega_M|$ , that is  $L(0) = 0$ ,  $L'(|1 - \Omega_M|) > 0$  and  $L''(|1 - \Omega_M|) < 0$ .<sup>24</sup>

To define media influence on an individual’s values, we have to check whether he has access to the pluralist media or not and if not, whether the free media is biased and whether the individual consumes it or not.

Since a pluralist media reports all opinions, it does not influence individuals’ values. Therefore, for all individuals who access M2, media influence is zero and  $V = V(\Omega, 0)$ . On the other hand, if an individual does not have access to M2 and if M1 is biased “but not too much” so that the individual still consumes M1, then we assume that his opinion is aligned with M1’s position: that is  $V = V(\Omega, 1) = \Omega_{M1}$ .<sup>25</sup> Lastly, if M1 is “too biased” and therefore the individual does not consume it, then again, his values are not influenced by media.

<sup>21</sup> Mullainathan and Shleifer (2005), Gentzkow and Shapiro (2006), Chan and Suen (2008), Iyengar and Hahn (2009).

<sup>22</sup> In fact, for a pluralist media  $\Omega_M = 1$ ; since  $|\Omega - \Omega_M| \leq \bar{\Omega}$  by definition and  $W > \theta\bar{\Omega}$  by assumption, these imply  $U_M > 0 \forall \Omega$  that is, all individuals would consume a pluralist media.

<sup>23</sup> Note that, since income and opinions are independently distributed, audience share is the same for each income level.

<sup>24</sup> The maximum loss is equal to the average advertising revenue ( $a$ ) and it is sustained when  $|1 - \Omega_M| = \bar{\Omega}$  which implies  $au(\Omega_M) = 0$

<sup>25</sup> For simplicity, we are assuming that media influence is either zero or the same for all. In the empirical model, we consider the time individuals spend on each media, thus allowing for asymmetric influence.

Summing up:

$$V = \begin{cases} V(\Omega, 0) & \text{if } y > \frac{p_2}{\gamma} \\ V(\Omega, 0) & \text{if } y < \frac{p_2}{\gamma} \text{ and } \theta|\Omega - \Omega_M| > W - |1 - \Omega_{M1}| \\ \Omega_{M1} & \text{if } y < \frac{p_2}{\gamma} \text{ and } \theta|\Omega - \Omega_M| < W - |1 - \Omega_{M1}| \end{cases}$$

Recall that, by assumption 2, under media neutrality “redistribution” ( $\tau = 1$ ) would still be the winning policy of a majority vote.

To be effective in changing the electoral outcome, media bias must be such that at least half of the population prefers  $\tau = 0$ . This share is composed of rich individuals, who have access to pluralist information, and poor M1’s consumers who, due to media influence, have a value-adjusted income higher or equal to average income. Thus, M1 must be sufficiently biased against equality ( $\Omega_{M1} < 1$ ) to induce the median-income individual to prefer no-redistribution, but not too biased to ensure that he consumes it. Let  $\widetilde{\Omega}_M$  be the threshold value that ensures consumption of M1 by the median-income individual.<sup>26</sup>

**Lemma 1:** *If  $\widetilde{\Omega}_M < \Omega_{M1} \leq \frac{y^m}{\bar{y}}$  then the median, even though his income is below the mean, prefers  $\tau = 0$ .*

Proof: By assumption 3 the median-income individual does not have access to M2 and given that the free media is not too biased ( $\widetilde{\Omega}_M < \Omega_{M1}$ ), he consumes M1 and  $V^m = \Omega_{M1}$ .

If  $\Omega_{M1} \leq \frac{y^m}{\bar{y}}$  then the median values-adjusted income is greater or equal to average income ( $x^m = \frac{y^m}{V^m} = \frac{y^m}{\Omega_{M1}} \geq \bar{y}$ ) and the median’s preferred tax rate is  $\tau = 0$ . ☺

Lemma 1 suggests that high-income individuals have an incentive to bribe the media outlet in order for it to partially report opinions and induce the median-income individual to prefer  $\tau = 0$ . Similarly, low-income individuals have an incentive to bribe the media outlet in order for it to be pluralist, or at least not “too biased”. Thus, in our framework there are two potential lobbies: the rich pushing for  $\Omega_{M1} \leq \frac{y^m}{\bar{y}}$  and the poor for  $\Omega_{M1} > \frac{y^m}{\bar{y}}$ .

#### 2.4. Media bias

To describe lobbying for media bias, we rely on Bernheim and Whinston (1986) common agency approach in which several bidders (principals) first announce a “menu” of offers for various actions that an “auctioneer” (agent) can implement and then pay the relevant bid. Knowing the

<sup>26</sup>That is such that  $W - \theta|1 - \widetilde{\Omega}_M| - |\Omega^m - \widetilde{\Omega}_M| = 0$ . Note that we have indicated with  $\Omega^m$  the ideological position of the median-income individual and not the median opinion, which is equal to 1.

contribution functions offered by the principals, the agent chooses an action to maximise his objective function, which includes the contributions paid by the principals. These monetary contributions can be interpreted as “bribes” offered by interested parties in the attempt to influence the agents’ decision.

Applied to our framework, individuals are the principals and M1 is the agent. Each principal would like the media outlet to report opinions such that the tax rate preferred by the median voter would be the same as its own preferred rate. For this reason, it offers monetary contribution to M1.<sup>27</sup> We assume that M1’s objective is to maximise the sum of audience-related revenues and bribes.<sup>28</sup> Thus, we posit:

$$\pi(\Omega_{M1}) = \int C(\Omega_{M1})dF - L(|1 - \Omega_{M1}|)$$

The timing of the game is as follows:

1. Individuals offer a bribe to M1, conditional on its choice of  $\Omega_{M1}$ .
2. Knowing the contribution functions, M1 decides what opinions to report, i.e. it chooses  $\Omega_{M1}$ .

The (subgame perfect Nash) equilibrium is found by backward induction.<sup>29</sup>

As suggested by Bernheim and Whinston (1986), we restrict attention to *truthful contribution functions* in which bribes offered reflect individuals’ true ‘willingness to pay’.

As noted above, there are two potential lobbies interested in influencing M1 position: the rich pushing for  $\Omega_{M1} \leq \frac{y^m}{\bar{y}}$  and the poor for  $\Omega_{M1} > \frac{y^m}{\bar{y}}$ .

To evaluate how much they are willing to pay, let us compute the gain (the loss in case of the poor) an individual receives (or pays) when moving from  $\tau = 1$  to  $\tau = 0$ :

$$W(0) - W(1) = [y + H(0)] - [0 + H(\bar{y})] = y - H(\bar{y}) = y - \bar{y}.$$

Thus, collectively, high-income individuals are ready to pay  $\int_{\bar{y}}^y [y - \bar{y}]dF$ .

Similarly, low-income individuals are ready to pay  $\int_0^{\bar{y}} [\bar{y} - y]dF$ .

**Result 3:** *If all interested individuals offer truthful contributions then information is unbiased.*

Proof: Note that since  $\int_{\bar{y}}^y [y - \bar{y}]dF = \int_0^{\bar{y}} [\bar{y} - y]dF$ , if all individuals offer truthful contribution functions, rich and poor would collectively offer the same amount. Therefore, given that the media outlet bears a loss in audience if  $\Omega_{M1} \neq 1$ , it will choose to be pluralist and report all opinions.

<sup>27</sup> These can be thought as bribes or as individuals buying a slot on TV.

<sup>28</sup> We are assuming a free media and only fixed cost of production, here normalised to zero.

<sup>29</sup> See Bernheim and Whinston (1986) for necessary and sufficient conditions that characterise the subgame perfect Nash equilibrium.

However, lobbying is a costly activity. Lobbying costs may be so high that only rich individuals can afford to organise a lobby.<sup>30</sup> Moreover, the effectiveness of the bribing process might be higher for richer individuals if they are “closer” to the media outlet. Therefore, we posit the following:

**Assumption 5:** *Only (very) rich individuals, i.e. those with  $y > 2\bar{y}$ , offer monetary contributions to influence M1.*

If only very rich individuals try to influence M1, then we can restrict attention to  $\Omega_{M1} < 1$ . Moreover, since the minimum value of the bias such that the median would prefer  $\tau = 0$  is  $1 - \Omega_{M1} = 1 - \frac{y^m}{\bar{y}}$ , we need only consider the audience loss  $\bar{L} = L \left(1 - \frac{y^m}{\bar{y}}\right)$ .

We are now in a position to prove our main result:

**Proposition 1:** Under assumptions 1 to 5 and if  $\int_{2\bar{y}}^y [y - \bar{y}]dF > \bar{L}$  then M1 will be bribed and will choose its “ideological position” to influence the median’s preferences and induce him to prefer  $\tau = 0$

Proof: If the lobby offers truthful contribution functions, then M1’s profit when  $\Omega_{M1} = \frac{y^m}{\bar{y}}$  is

$$\pi \left( \Omega_{M1} = \frac{y^m}{\bar{y}} \right) = \int_{2\bar{y}}^y [y - \bar{y}]dF - \bar{L}$$

which is greater than zero, i.e. the (maximum) profit it can get by not accepting the bribe. Thus, the rich lobby offers the bribe and M1 will choose  $\Omega_{M1} = \frac{y^m}{\bar{y}}$ . By Lemma 1 this will induce the median to prefer  $\tau = 0$ . ☺

Proposition 1 suggests that the likelihood of M1 having an anti-equal bias is the result of two conflicting forces related to the income distribution. On one hand the higher is the distance between median and mean income, the higher has to be the bribe to induce information bias (inequality reduces the likelihood of information bias). On the other hand the higher is the income share of very rich individuals, the higher is the lobby’s incentive to bribe M1 (inequality increase the likelihood of information bias).

Following Besley and Prat (2006), two natural extensions, which we do not formalise, would be to consider transaction costs in the bribing process ( $t$ ) and  $n$  (identical) agents (M1 outlets). In this case, for information to be biased, all agents would have to be bribed and the condition in proposition

1 would become  $\frac{\int_{2\bar{y}}^y [y - \bar{y}]dF}{nt} > \bar{L}$

Our model has several testable implications, which we will consider in section 3.

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<sup>30</sup> See Di Gioacchino et al. (1999) and Di Gioacchino and Profeta (2014).

- I. Media bias depends on the income distribution.
- II. Demand for media is influenced by socio-demographic characteristics and media markets features, including pluralism, market concentration and (internet) access costs.
- III. Socio-demographic characteristics and media influence shape individuals' values.
- IV. Preferences for redistribution depend on income and values.

### 3. Empirical analysis

#### 3.1 Data

The empirical part of the paper is based on the European Social Survey (round 5, year 2010).<sup>31</sup> The survey is implemented on a biannual basis and information is available for 27 countries, most of them make part of the EU.<sup>32</sup> Table A.1 in the Appendix provides the definition of the variables used. The dependent variable, which we call *inequality aversion*, has been coded in such a way that the higher values are associated to more pro-equal behavior in relation to both equality of opportunity and equality of incomes. The two-stage estimates assume that attitudes to the *equality of opportunity* (EO) are shaped at first place. They are then echoed in people's attitudes to the *equality of incomes* (EI).<sup>33</sup>

Among the explanatory variables, we include the time people spend watching TV and using internet.<sup>34</sup> For TV watching the available options range from 'no time at all' up to 'more than 3 hours' with an interval of 30 minutes. For Internet use the answers are less precise, ranging from 'no access at home or work' up to 'every day' (see Table A.1).<sup>35</sup> Higher values are associated to longer exposure to specific media.

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<sup>31</sup> Source: <http://www.europeansocialsurvey.org>

2010 is the latest year when information was collected on the four principle means of media: TV, radio, newspapers and internet. Starting from 2012 the survey included information only on TV watching.

<sup>32</sup> The countries considered include: Belgium, Bulgaria, Switzerland, Cyprus, the Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, the United Kingdom, Greece, Croatia, Hungary, Ireland, Israel, Lithuania, the Netherlands, Norway, Poland, Portugal, Russia, Sweden, Slovenia, Slovakia and Ukraine.

<sup>33</sup> The two questions read, respectively: 1) 'She/he thinks it is important that every person in the world should be treated equally. She/he believes everyone should have equal opportunities in life' [EO]; 2) 'Government should reduce differences in income levels' [EI].

<sup>34</sup> Most of available studies concentrate on news media, which is supposed to produce the major effect on voting behavior. For the purpose of this study we take into account the exposure to all kinds of information, since we believe that entertainment programs and advertisement, as well as social media can all produce side effects on pro-equal behavior, in line with DellaVigna and La Ferrara (2015).

<sup>35</sup> Measuring the use of internet is more complicated due to an evolving nature of Internet (see e.g. Lehr 2012, OECD 2012). The navigation time measure is bound to criticism, since the outcome depends on the speed of connection, the skills to orient in the bulk of information available etc.

There is a possibility to distinguish between the time spent watching all kind of TV programs versus politically oriented programs reporting news and current affairs. We will test whether political programs make any difference. For internet, we can only observe the total time of exposure.

To catch up country-specific effects, we use income Gini coefficient, the GDP per capita in PPP (in logarithmic form) and social protection expenditure in percentage of GDP.<sup>36</sup> In addition, we include a range of media market characteristics expressed by the risks to media pluralism corresponding to Basic protection, Market plurality, Political independence and Social inclusiveness domains<sup>37</sup> (for more details see Tab. A.1).

The personal characteristics considered include education, age, gender, family income, employment status (unemployed, retired, as well as working in the public sector), positioning within the left-right political spectrum, citizenship, and religiosity. Before getting down to the methodology and findings, we provide a descriptive analysis of the key variables. This allows to identify some cross-country differences which should be bared in mind when interpreting the results.

### *Country contexts*

As can be seen from Figure A.1.i in the Appendix, more than 60% of the Europeans watch TV for at least 1.5 hours per day, the percentage being particularly high in Bulgaria, Cyprus, the Czech Republic and Greece (around 80%), but also in the United Kingdom, Russia, and Slovakia (more than 70%). The age differences in terms of the time spent watching TV are minor (see Figures A.1.ii and A.1.iii), they rather manifest in the type of programs followed on TV.<sup>38</sup>

The audience is shifting towards internet (Figure A.2). More than 60% of the young population (under 35) and about 40% of those aged 35-60 use internet on an every-day basis.<sup>39</sup> Bulgaria, Cyprus, Greece, Portugal, but also Russia and Ukraine, are lagging behind with on average one third of the population using internet every day.

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<sup>36</sup> OECD, Eurostat (BG, CY, LT, HR), World Bank (RU), ILO (UA).

<sup>37</sup> In that we rely on the methodology proposed in the Media Pluralism Monitor report (2015).

<sup>38</sup> Another issue that has been raised in the literature is that younger generations often lack critical skills to assess the information received (e.g. limiting to viewing rather than reading). Exposure to the same media content might produce different outcomes in terms of forming opinion on certain issues for different age groups.

<sup>39</sup> The percentages are particularly high in Scandinavian countries (DK, NO, SE), reaching an almost 90% for those under 35 and 75% for those aged 35-60.



The ESS 2010 provides data also on the time spent listening to the radio<sup>40</sup> and reading newspapers.<sup>41</sup> But as can be grasped from Figures A.1- A4 the time of exposure is much lower. In this study we thus focus on two major media, TV and internet.

We take into account a range of media market characteristics by country represented by the composite indicators of risk to media pluralism derived from the Media Pluralism Monitor 2015.<sup>42</sup> They were constructed over four different domains of risk to media pluralism, due to the lack of: Basic protection (b), Market plurality (o), Political independence (p) and Social inclusiveness (s)<sup>43</sup> (for more details see Tab. A1 in the Appendix). These indicators are available for a subset of 19 countries.<sup>44</sup> Among them Poland is the country with the highest risk to pluralism along the gradient of Basic protection whereas Germany is characterized by the lowest value of this indicator. For Market plurality, the two extreme cases are Finland (highest risk) and Slovenia (lowest risk). For Political independence Slovenia (highest risk) and Sweden (lowest risk), for Social inclusiveness Cyprus (highest risk) and Sweden (lowest risk) respectively (see Tab. A.3 in the Appendix).

As for the observed levels of inequality aversion, Figure A.5 suggests that more than 90% of the representative population in Cyprus, Spain and Slovenia think that every person should be treated equally and have equal opportunities in life, versus less than 60% agreeing on that in Ukraine, Portugal and Lithuania.<sup>45</sup> For the remaining countries, the percentage ranges between the two benchmarks. France, Greece and Spain nevertheless show up as being more pro-equal with every second respondent being 'very much' in favour of equality of opportunity. Countries with the highest share of people opposing equality of opportunity include Ukraine, Lithuania and Estonia<sup>46</sup>, ironically the three post-communist economies. When it comes to income inequality, several countries swap the positioning in the graph (from panel A to panel B). Portugal, Ukraine and Lithuania, the three countries least favoring equality of opportunity are apparently the most supportive to the redistribution of incomes. And the opposite way around, the Netherlands where the idea of equality of opportunity finds support among people, is among the three countries least favoring the

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<sup>40</sup> Countries with far reaching radio broadcasting include Ireland and Slovakia, where about 50% of the population spend more than 1.5 hours per day listening to the radio. Relatively higher exposure is also achieved in Belgium, the Czech Republic, Estonia, the Netherlands, Poland, and Slovenia.

<sup>41</sup> The absolute majority of Europeans (around 90%) spend less than 1 hour per day reading newspapers, and about one third have no time at all for that. Ireland and Norway are the two countries where the tradition of reading newspapers is still alive, with about 10% of the population doing that for more than 1.5 hours per day. In addition, a non-negligible percentage of population continues spending more than 3 hours per day reading newspapers in the UK.

<sup>42</sup> <http://monitor.cmpf.eui.eu/mpm2015/results>.

<sup>43</sup> The four indicators range from 0 to 100%, increasing with the risk to media pluralism.

<sup>44</sup> The MPM 2016 is expected to provide the estimates for 30 European countries.

<sup>45</sup> These percentages include 'like me' and 'very much like me' answers to the question if 'She/he thinks it is important that every person is treated equally'. For more details see Table A.1 in the Appendix.

<sup>46</sup> Judging by the percentage of answers 'Not like me' and 'Not like me at all'.

redistribution of incomes (alongside to Norway and Denmark), probably because it has been exercised on a large scale.

The two measures considered (attitudes to EO and EI) are not identical, and are not strongly correlated.<sup>47</sup> By plotting them together in panel A of Fig. A.6 we show that for the majority of countries they nevertheless go in the same direction. Being more pro-equal in terms of EO implies favoring more redistribution of income, with few exceptions. In particular, Ukraine is the country characterized by the lowest mean of attitudes to EO and the highest mean of attitudes to EI. By bringing both in the picture we expect to shed more light on people's attitudes to inequality. Higher income inequality observed does not seem to generate strong moods in favour of equal opportunity for all (Figure A.6, panel B), whereas the association is stronger between income inequality and support for the redistribution of incomes (as in panel C).

Figure A.7 is completing the picture by providing two sets of graphs. In panel A we plot the data on the use of mass media (averaged by country) against the mean measure of attitudes to EO, whereas in panel B it is combined with the mean measure of attitudes to EI. The graphs suggest that overall the type of association between exposure to mass media and attitudes to inequality is not clear-cut. Nevertheless, there are groups of countries where mass media produce similar effects which warrants further investigation. In what follows we present our empirical strategy.

### 3.2 Methodology

We start by estimating an ordered probit model for the attitudes to inequality, first EO and then EI. The two latent variables behind are the perceived utility of EO and that of EI:

$$y_i^* = x_i\beta + \varepsilon_i \quad \varepsilon_i | x_i \sim \text{iid } N(0,1) \quad (1)$$

The model assumes there is an ordered structure of the following type in both the equations considered:

$$y_i = \begin{cases} 1, & \text{if } y_i^* \leq \alpha_1 \\ 2, & \text{if } \alpha_1 < y_i^* \leq \alpha_2 \\ 3, & \text{if } \alpha_2 < y_i^* \leq \alpha_3 \\ 4, & \text{if } \alpha_3 < y_i^* \leq \alpha_4 \\ 5, & \text{if } \alpha_4 > y_i^* \end{cases} \quad (2)$$

where  $y_i$  is the dependent variable measuring the attitudes to inequality. In our case, the higher it is the more person  $i$  cares about equality of opportunity/equality of incomes (for more details on variables definition see Tab. A.1 in the Appendix);  $x_i$  is a vector of personal/country characteristics,  $\beta$  is a vector of estimated coefficients. The negative estimated coefficients are interpreted as if the factor behind is reducing inequality aversion while a positive sign indicates a pro-equal effect.

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<sup>47</sup> The polychoric correlation coefficient stands at 0.17.

To tackle the issue of endogeneity of the key explanatory variables measuring the time spent watching TV and the time spent using internet, we use the method of two stage residual inclusion (2SRI). We first estimate the auxiliary equations of demand for media<sup>48</sup> and then use predicted residuals alongside other regressors in the equation for attitudes towards equality of opportunity, without replacing the endogenous variable. This method is considered to be more appropriate for non-linear settings (Terza et al. 2008).

The conditional mixed process estimator (CMP) (Roodman 2009) is applied, assuming that the attitudes to EO are being formed at first place and then entrenched in people's attitudes to EI. Attitudes to EO are thus meant to be a proxy for the more general value system typical of a person.

At the next stage, we tackle the time spent 'watching TV'/'navigating through internet' as a form of treatment (having in mind that mass media can be used to influence public opinion). The estimates of the average treatment effects require adjustment for differences in pre-treatment variables, and to this end we use the generalized propensity score (GPS).<sup>49</sup> GPS enters the equation used to construct the dose-response function which associates inequality aversion to a certain level of treatment T (Imbens 2000).<sup>50</sup> The dose-response function helps to understand how exposure to mass media translates in the changing attitudes to inequality, at each level of treatment.

### 3.3 Main findings

The estimates of the empirical model are provided in Tab. A5. TV in general appears to reduce inequality aversion in terms of the attitudes to EO. The latter then enters in the second stage equation for attitudes to EI, with a positive sign of estimated coefficient. This means that TV does also reduce support for income redistribution. The same table reports the estimates of the model where instead of the total time spent watching TV the exposure to political programs is used. The sign of the coefficient then turns positive but not significant, for both TVpol and internet. Stable results are obtained for women and non-citizens who both exhibit more pro-equal attitude, whereas right-wing politically oriented and religious people show less support to equality of opportunity for all. Countries with higher GDP per capita and higher income Gini show more support to the EO. As expected, belonging

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<sup>48</sup> Alongside to personal characteristics these equations include a range of media market characteristics as explained in the previous section (for definitions see Tab. A1 in the Appendix).

<sup>49</sup> GPS has the meaning of conditional probability of receiving certain level of treatment given pre-treatment variables. Once we have the estimate of GPS, instead of having to adjust for all pre-treatment variables, it is sufficient to adjust for GPS.

<sup>50</sup> The regression model behind is the following:  $Equal_i = \alpha + \beta_1 TV_i + \beta_2 TV_i^2 + \beta_3 GPS_i + \beta_4 GPS_i^2 + \beta_5 TV_i * GPS_i$ . The estimates of this model do not have direct interpretation and thus are not reported in the paper.

to wealthier families as well as living in a country with an already high share of social expenditure translates in less support to income redistribution.

The predicted residuals used to tackle the endogeneity of time spent watching TV and using internet are obtained from auxiliary equations of demand for media for which the estimates are reported in Tab. A.4. They suggest that higher educated people and non-citizens (most probably due to difficulties in language comprehension) watch less TV but use more internet, the opposite for women and retired. Unemployment status allows for longer exposure to TV, this effect being also positive but not significant for internet (due to higher costs involved). In countries with higher GDP per capita the use of both TV and internet is more extensive. At the same time, higher income inequality implies less demand to media.

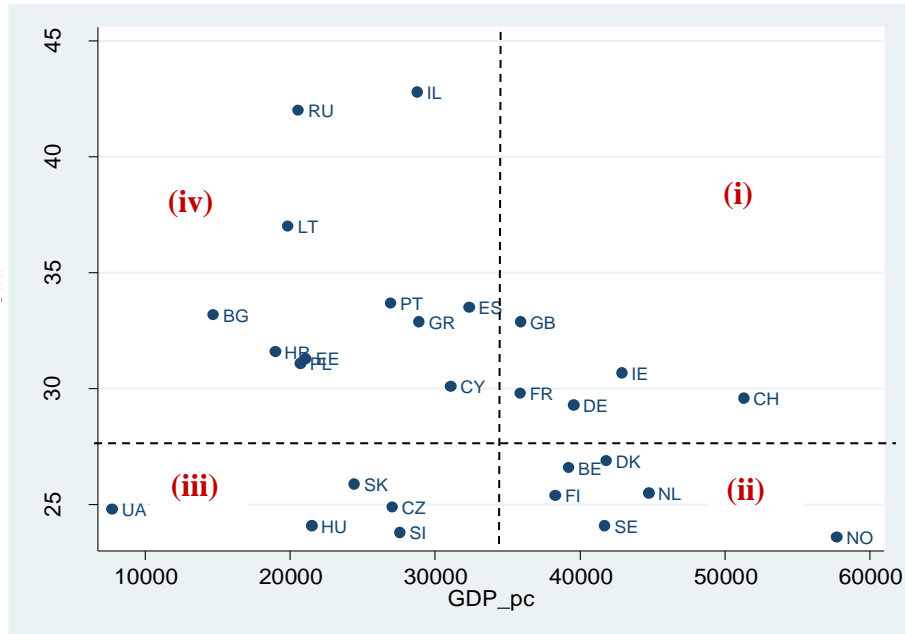
We also check how media market characteristics might influence the demand for media. It appears that in countries with higher risk to basic protection people tend to use less TV and more internet. Not surprisingly, since the latter is considered to be a more liberal source of information. The coefficient for the market plurality indicator turns to be positive, meaning that little transparency and high concentration of media ownership, creating risks to pluralism, are overlooked by the audience. The political independence indicator turns to be positive for TV. This could be another channel for media bias to work, since the attention of less sophisticated TV audience doesn't seem to be affected by information distortion due to politicization of control over media outlets. The internet users respond by reducing the time of media use, thus they are less prone to be affected by politically biased information. Finally, the social inclusiveness indicator does not appear to produce any negative affect on TV watching, the coefficient is in fact positive and significant. This could mean that technical difficulties in accessing TV and low media literacy are no longer an obstacle for the TV audience.

As already emphasized, country contexts count a lot, and to shed more light on this we repeat the estimates by groups of countries divided on the basis of the observed income Gini coefficients and the GDP per capita as in Figure 1. The first group of countries (GB, FR, DE, IE and CH) is characterized by relatively high Gini and GDP per capita; the second group (FI, SE, NO, BE, DK and NL) - similar GDP per capita and lower Gini; the third group (CZ, SI, SK, UA, HU) - relatively low Gini and GDP per capita; and the fourth largest group (BG, CY, EE, ES, GR, HR, LT, PL, PT, RU, IL) - high Gini coupled with low GDP per capita.<sup>51</sup>

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<sup>51</sup> For the moment, the number of countries considered is limited by the availability of data on media market characteristics. Only 14 countries (marked in bold in Tab. A.3) are thus entering the final estimates which should be taken with caution. The MPM 2016 report is expected to provide data on risks to media pluralism indicator for 30 European countries. This will allow for a better coverage.

**Figure 1. Clustering of countries alongside two dimensions: income Gini and GDP per capita**



Source: Author's elaborations.

As can be seen from Table A.6 in the Appendix, mass media produce different impact across groups of countries. The distortionary effect of TV watching is observed in low-income and low-inequality contexts (group III) manifesting via exposure to political programs (panel B). This could eventually drive inequality upwards. In rich countries with high income inequality (group I) the negative effect on inequality aversion is instead associated to TV in general (panel A). Internet appears to be influential with respect to group IV (low income and high inequality countries), where it tends to increase inequality aversion. Similar affect manifests for countries in group III when political TV programs are considered. Overall, mass media seem to be more influential in countries with high income inequality (groups I and IV).

The estimates also suggest some variations in the way other explanatory variables work in different contexts. In particular, only in the fourth group of countries education seems to create favorable attitudes towards equality. Religion too has different implications: it tends to support the idea of equality in the second and the third group of countries (with an observed low income inequality in fact); while it works the other way around in the first and the fourth group of countries, where the observed income inequality is high. Public sector employees are more supportive to equality of opportunity in the second and the third group of countries, again with an observed low Gini coefficient. It is worth noting that the coefficient for social expenditure is negative only for group IV, which is the most numerous though. This was probably driving the results in Tab. A.5 where the estimates were performed for the bulk of countries considered. The distinction between different

groups suggests that higher burden of social expenditure does not necessarily translate into lower support for inequality.

Finally, the estimates of the dose-response function (Figure A.8 in the Appendix) outline the non-linear relationship between the time spent 'watching TV' and 'navigating through the internet' and the attitudes to EO. The average values of exposure to different mass media (reported in Table A.2 of the Appendix) are close to the local minimum in the case of TV. For internet, most of the population would be positioned on the upward side of the dose-response function, but still far from the maximum.

The difference between the two patterns reported in panel A and B, respectively for the total time and the time dedicated to political content, is catching the eye. The potential of politically oriented mass media in terms of enhancing inequality aversion is notably higher. The fact that the positive coefficient never turns significant in our estimates could mean there are underlying forces which prevent it from working in this direction.

### **Concluding remarks**

The paper provides a framework to think about how mass media might shape people's attitudes to inequality. The theoretical model is laid down first to show there might be incentives for rich people to manipulate information transmitted through mass media, and its part related to income redistribution. The model suggests this influence might depend on the characteristics of media markets, it is also expected to manifest more in contexts with an already high economic inequality.

The process has been modeled in two stages. Since income redistribution is a very sensitive point which has always raised debates, we assume that mass media affects a more general value system of a person at first place. It was proxied by attitudes to equality of opportunity. The latter translates in people's attitudes to income redistribution. It is assumed that by changing attitudes to equality of opportunity mass media are able to influence people's attitudes to income inequality and redistribution.

The predictions of the model have been tested using data from the European Social Survey which offers information on the use of media. Here we focus on TV and internet, the first is assumed to be more easily manipulated whereas internet is seen as a pluralistic media offering the whole range of views. But there is a price associated to the use of internet being too high for everybody to be able to access this media. This leaves space for manipulation of public opinion, and it is expected to be more related to TV channel.

The empirical estimates suggest that TV indeed tends to reduce inequality aversion. This does not hold true for political TV programs, but their counterbalancing effect is not significant. Some cross-country heterogeneities can moreover be observed. The negative impact of TV is more pronounced in rich countries with high income inequality. In poorer countries with high income inequality the positive effect of internet shows up instead. This suggests that mass media can be effective in reducing inequality in less developed countries through pluralist forms of media (internet in particular), whereas it may be hard to redirect the influence of TV to support inequality aversion in most developed European countries.

We also highlight the non-linear relationship between exposure to mass media and attitudes to inequality. The longer exposure would not necessarily induce higher or lower support to equality. This is revealing of a complex set of factors behind, including the characteristics of media markets. By estimating the demand for media (which is instrumental to our major model) we test the role of factors able to create risks to pluralism (including private ownership and concentration of media, but also social inclusiveness and basics protection of freedom of expression and right to information). It appears that all of them are important in explaining the demand for media.

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## Appendix of Tables and Figures

**Table A.1. Variables definition**

<b>Variables</b>	<b>Description</b>
Equality of opportunity [EO]	Ranges from 1 to 6 [based on the original variable IPEQOPT, in reverse order]. The values correspond to the following answers to question: 'She/he thinks it is important that every person in the world should be treated equally. She/he believes everyone should have equal opportunities in life. How much this person is or is not like you? 1. Not like me at all; 2. Not like me; 3. A little like me; 4. Somewhat like me; 5. Like me; 6. Very much like me.
Equality of income [EI]	Ranges from 1 to 5 [based on GINCDIF, in reverse order]. The values correspond to the following answers to question: 'Government should reduce differences in income levels'. 1. Disagree strongly; 2. Disagree; 3. Neither agree nor disagree; 4. Agree; 5. Agree strongly.
<i>Use of Media</i>	
TV	Ranges from 1 to 7 [based on TVTOT]. The values correspond to the following answers to question regarding the total time spent TV watching, on average weekday: 0. No time at all; 1. Less than 0,5 hour; 2. 0,5 hour to 1 hour; 3. More than 1 hour, up to 1,5 hours; 4. More than 1,5 hours, up to 2 hours; 5. More than 2 hours, up to 2,5 hours; 6. More than 2,5 hours, up to 3 hours; 7. More than 3 hours.
TVpol	TV watching (news/politics/current affairs) [based on TVPOL]. Similar to TV.
NET	Ranges from 1 to 7 [based on NETUSE]. The values correspond to the following answers to question regarding the total time spent using internet/email/www: 0. No access at home or work; 1. Never use; 2. Less than once a month; 3. Once a month; 4. Several times a month; 5. Once a week; 6. Several times a week; 7. Every day.
<i>Personal characteristics</i>	
Education	Years of full-time education completed.
Fam._income	Household's total net income from all sources, the estimated decile.
Age	Age of respondent, calculated [at the time of the interview].
Woman	Dummy variable: =1 if a person is female, 0 otherwise.
Non-citizen	Dummy variable: =1 if a person is not a citizen of country of reference, 0 otherwise.
Public	Dummy variable: =1 if a person works in a public sector, 0 otherwise.
Right-wing	Placement on left-right political scale, ranges from 0 (Left) to 10 (Right).
Unemployed	Dummy variable: =1 if a person declares to be unemployed, 0 otherwise.
Retired	Dummy variable: =1 if a person declares to be retired, 0 otherwise.
Religious	Dummy variable: =1 if a person considers him/herself as belonging to any particular religion or denomination, 0 otherwise.
<i>Country characteristics</i>	
Gini	Gini coefficient for income inequality.
GDP_pc	GDP per capita, PPP (current international \$), in logarithmic format.
Social_exp	Social protection expenditure, % of GDP
<i>Risks to Media Pluralism (from 0% low to 100% high)</i>	
(b) Basic protection	Based on information about: 1) Protection of freedom of expression; 2) Protection of right to information; 3) Journalistic profession, standards and protection; 4) Independence of national authorities.
(o) Market plurality	Based on information about: 1) Transparency of media ownership; 2) Concentration of media ownership; 3) Concentration of cross-media ownership.
(p) Political independence	Based on information about: 1) Political bias in the media; 2) Politicization of control over media outlets; 3) Politicization of control over media distribution networks; 4) State advertising; 5) Independence of PSM governance and funding; 6) Independence of news agencies.
(s) Social inclusiveness	Based on information about: 1) Access to media for different social and cultural groups, and local communities; 2) Availability of media platforms for community media; 3) Access to media for the physically challenged people; 4) Centralization of the media system; 5) Universal coverage of the PSM and the Internet; 6) Media literacy

**Table A.2. Descriptive statistics**

<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Attitudes to EO	51,275	3.962282	1.016548	1	5
Attitudes to EI	51,591	3.006261	.9676586	1	4
TV	52,329	4.400982	2.092583	0	7
TVpol	50,080	1.916234	1.325495	0	7
NET	52,336	4.076028	3.085943	0	7
Education	51,829	12.29495	4.052927	0	55
Age	52,305	48.50511	18.78938	14	102
Woman	52,458	.5462465	.4978614	0	1
Public sector	52,458	.3127073	.4636006	0	1
Right-wing	52,458	.2988105	.4577409	0	1
Non-citizen	52,458	.0386023	.192647	0	1
Unemployed	52,458	.0795875	.2706561	0	1
Retired	52,458	.0386404	.1927383	0	1
Religious	52,458	.6418468	.4794621	0	1
Family income	39,838	5.048622	2.787532	1	10
GDP_pc	52,458	10.25927	.4174467	8.95	10.96
Gini	52,458	30.40417	5.2341	23.6	42.8
Social expenditure	52,458	22.70945	4.230785	15.7	31.7
Basic protection	26,651	20.73768	8.296293	6	33
Market plurality	26,651	51.9203	15.49262	25	75
Political independence	26,651	34.51638	12.06628	17	61
Social inclusiveness	26,651	36.73618	14.267	9	66

Source: Own elaborations

**Table A.3. Characteristics of media markets**

Country	Domain of risk to media pluralism			
	Basic protection	Market plurality	Political independence	Social inclusiveness
AT	25	38	41	31
BE	na	na	na	na
BG	na	na	na	na
<b>HR</b>	<b>29</b>	<b>28</b>	<b>40</b>	<b>55</b>
<b>CY</b>	<b>14</b>	<b>30</b>	<b>50</b>	<b>66</b>
<b>CZ</b>	<b>23</b>	<b>62</b>	<b>34</b>	<b>37</b>
DK	na	na	na	na
EE	na	na	na	na
<b>FI</b>	<b>16</b>	<b>75</b>	<b>26</b>	<b>30</b>
FR	na	na	na	na
<b>DE</b>	<b>6</b>	<b>44</b>	<b>19</b>	<b>21</b>
EL	na	na	na	na
<b>IE</b>	<b>29</b>	<b>54</b>	<b>40</b>	<b>41</b>
IL	na	na	na	na
LV	26	62	29	46
<b>LT</b>	<b>28</b>	<b>68</b>	<b>52</b>	<b>38</b>
LU	26	84	22	50
MT	17	18	41	51
<b>NL</b>	<b>10</b>	<b>53</b>	<b>25</b>	<b>16</b>
NO	na	na	na	na
<b>PL</b>	<b>33</b>	<b>70</b>	<b>40</b>	<b>52</b>
<b>PT</b>	<b>16</b>	<b>54</b>	<b>23</b>	<b>54</b>
RO	37	66	47	55
RU	na	na	na	na
<b>SK</b>	<b>23</b>	<b>30</b>	<b>44</b>	<b>35</b>
<b>SI</b>	<b>29</b>	<b>25</b>	<b>61</b>	<b>43</b>
<b>ES</b>	<b>25</b>	<b>69</b>	<b>34</b>	<b>34</b>
<b>SE</b>	<b>16</b>	<b>49</b>	<b>17</b>	<b>9</b>
CH	na	na	na	na
UA	na	na	na	na
UK	na	na	na	na

Note: 'na' - not available.

Countries marked in grey are those covered by the MPM, additional countries in black are those covered by the ESS but not MPM. Bold font stands for the 14 countries which enter both ESS and MPM.

**Table A.4. Demand for media (auxiliary equations)**

VARIABLES	TV	TV <sub>pol</sub>	NET
Education	-0.109***	-0.008***	0.329***
Woman	0.065*	-0.225***	-0.270***
Noncitizen	-0.193*	-0.160***	0.336**
Unemployed	0.525***	-0.064	0.100
Retired	0.791***	0.673***	-1.508***
GDP_pc	0.386***	0.454***	0.595***
Gini	-0.046***	-0.026***	-0.089***
Basic protection	-0.033***	0.001	0.021***
Market plurality	0.002*	0.003***	0.005***
Political independence	0.031***	-0.000	-0.024***
Social inclusiveness	0.008***	0.008***	-0.001
Constant	2.115*	-2.378***	-2.964*
Observations	26,206	25,245	26,193

Source: Own calculations

**Table A.5. Ordered probit estimates using CMP, all countries**

VARIABLES	EO	EI	EO	EI
	All TV programs		Political TV programs	
TV/ TVpol	-0.014**		0.014	
NET	0.005		0.006	
Education	0.027**		-0.004	
Age	0.001		0.000	
Woman	0.146***		0.257***	
Public	0.022		0.023	
Right-wing	-0.191***		-0.195***	
Non-citizen	0.210***		0.232***	
Religious	-0.049**		-0.051**	
GDP_pc	0.264***		0.167***	
Gini	0.030***		0.048***	
<i>Residual<sub>TV</sub> / Residual<sub>TVpol</sub></i>	-0.058		0.332***	
<i>Residual<sub>NET</sub></i>	-0.056		0.070*	
Attitudes to EO		0.133***		0.136***
Family income		-0.073***		-0.073***
Social expenditure		-0.028***		-0.028***
atanrho_12		0.036*		0.027
cut_1_1 / cut_2_1	1.509**	-1.749***	2.157***	-1.739***
cut_1_2 / cut_2_2	1.979***	-1.225***	2.634***	-1.215***
cut_1_3 / cut_2_3	2.659***	-0.140*	3.312***	-0.130*
cut_1_4	3.881***		4.538***	
Observations		46,012		45,754

Note: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1  
Both population and design weights have been applied.

Source: Own calculations

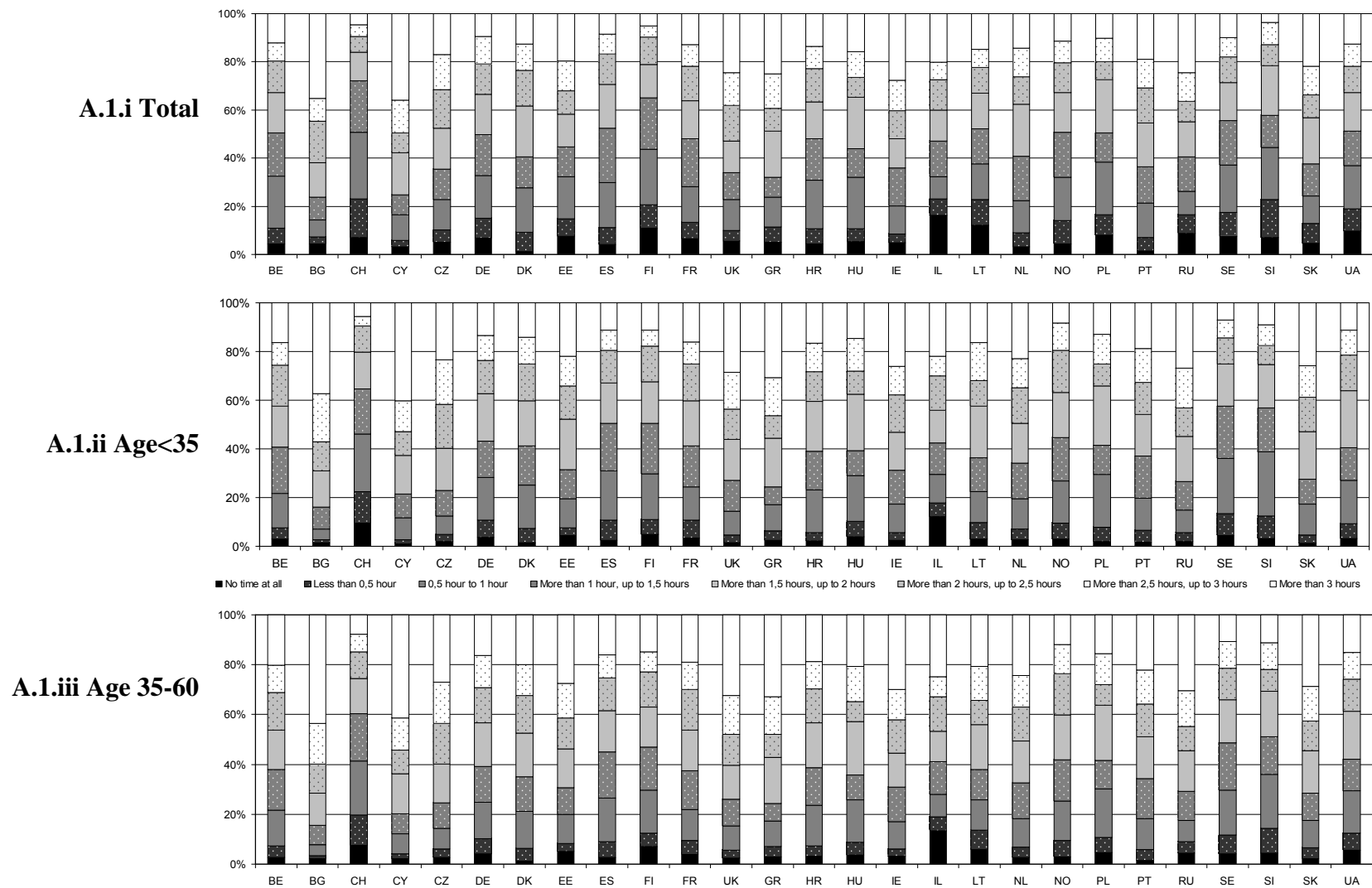
**Table A.6. Ordered probit estimates using CMP, by four groups of countries**

<b>A. All TV programs</b>								
VARIABLES	EO	EI	EO	EI	EO	EI	EO	EI
	I		II		III		IV	
<b>TV</b>	-0.029***		-0.004		0.006		0.005	
NET	-0.006		0.006		0.013		0.017**	
Education	0.041		-0.008		0.074***		0.151***	
Age	-0.000		0.001		-0.000		0.004***	
Woman	0.169***		0.208***		0.101**		0.021	
Public	-0.019		0.111***		0.122***		-0.086**	
Right-wing	-0.339***		-0.350***		-0.061		-0.107***	
Non-citizen	0.293***		0.157		-0.182		0.267***	
Religious	-0.083**		0.077**		0.144***		-0.204***	
<i>Residual<sub>TV</sub></i>	-0.063		-0.113**		-0.368***		-0.379***	
<i>Residual<sub>NET</sub></i>	-0.114		0.061		-0.274***		-0.464***	
Attitudes to EO		0.186***		0.261***		0.100***		0.144***
Family income		-0.072***		-0.079***		-0.057***		-0.068***
Social expenditure		0.057***		0.038***		0.147***		-0.039***
atanrho_12	-0.020		-0.131***		0.080**		0.034	
cut_1_1 / cut_2_1	-2.327***	0.847***	-2.096***	0.728***	-3.735***	1.650***	-3.724***	-2.042***
cut_1_2 / cut_2_2	-1.903***	1.320***	-1.640***	1.289***	-3.218***	2.241***	-3.177***	-1.435***
cut_1_3 / cut_2_3	-1.286**	2.560***	-0.955***	2.492***	-2.378***	3.097***	-2.447***	-0.345***
cut_1_4	-0.073		0.397		-1.195***		-1.227***	
Observations	10,031		9,142		8,091		18,748	
<b>B. Political TV programs</b>								
VARIABLES	EO	EI	EO	EI	EO	EI	EO	EI
	I		II		III		IV	
<b>TVpol</b>	0.028		0.023		-0.044**		0.014	
NET	-0.003		0.007		0.014*		0.022***	
Education	0.080**		0.022		-0.153***		0.179***	
Age	-0.001		0.000		0.001		0.004***	
Woman	0.052		0.177***		0.703***		-0.289***	
Public	-0.014		0.098**		0.147***		-0.055	
Right-wing	-0.330***		-0.351***		-0.085**		-0.083**	
Non-citizen	0.276**		0.231*		-0.112		0.227**	
Religious	-0.087**		0.078**		0.158***		-0.158***	
<i>Residual<sub>TVpol</sub></i>	-0.353*		-0.243*		2.047***		-1.053***	
<i>Residual<sub>NET</sub></i>	-0.209		-0.038		0.532***		-0.481***	
Attitudes to EO		0.192***		0.261***		0.103***		0.150***
Family income		-0.072***		-0.079***		-0.057***		-0.068***
Social expenditure		0.057***		0.038***		0.146***		-0.039***
atanrho_12	-0.040		-0.135***		0.061		0.014	
cut_1_1 / cut_2_1	-2.525***	0.869***	-2.310***	0.733***	2.282***	1.637***	-3.902***	-2.020***
cut_1_2 / cut_2_2	-2.093***	1.342***	-1.841***	1.295***	2.794***	2.227***	-3.348***	-1.412***
cut_1_3 / cut_2_3	-1.482***	2.582***	-1.155***	2.497***	3.626***	3.083***	-2.614***	-0.323***
cut_1_4	-0.265		0.204		4.805***		-1.384***	
Observations	9,976		9,119		8,041		18,618	

Note: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Both population and design weights have been applied.

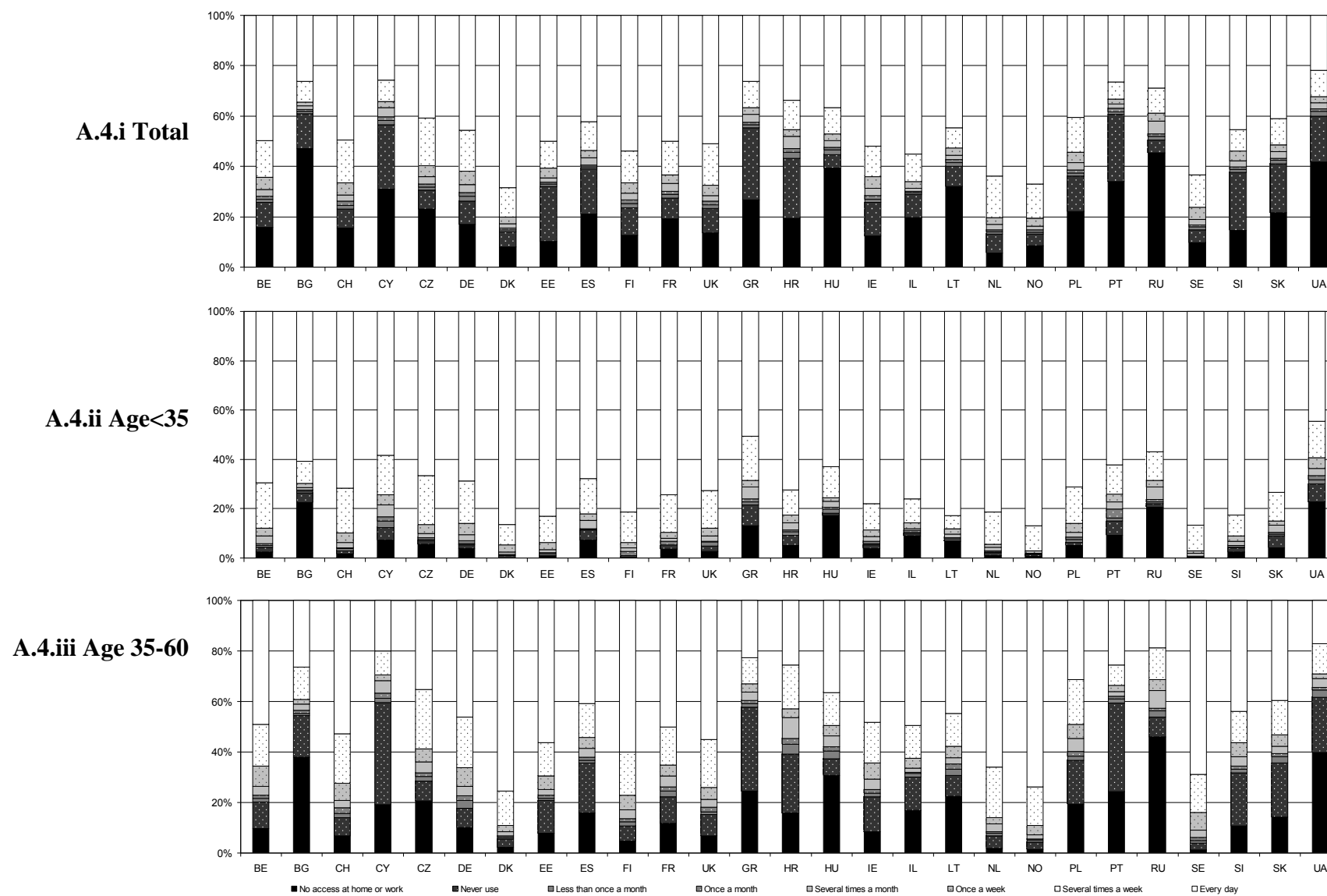
Source: Own calculations

**Figure A.1. TV watching, by country and age (2010)**



Source: Authors' elaborations, based on ESS 2010.

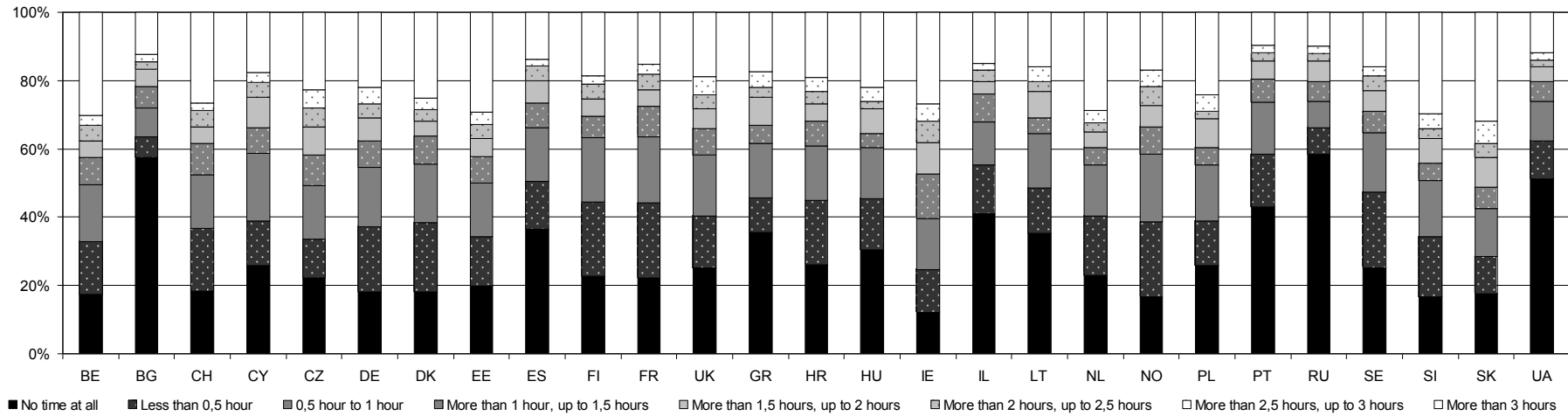
**Figure A.2. The use of Internet, by country and age (2010)**



Source: Authors' elaborations, based on ESS 2010.

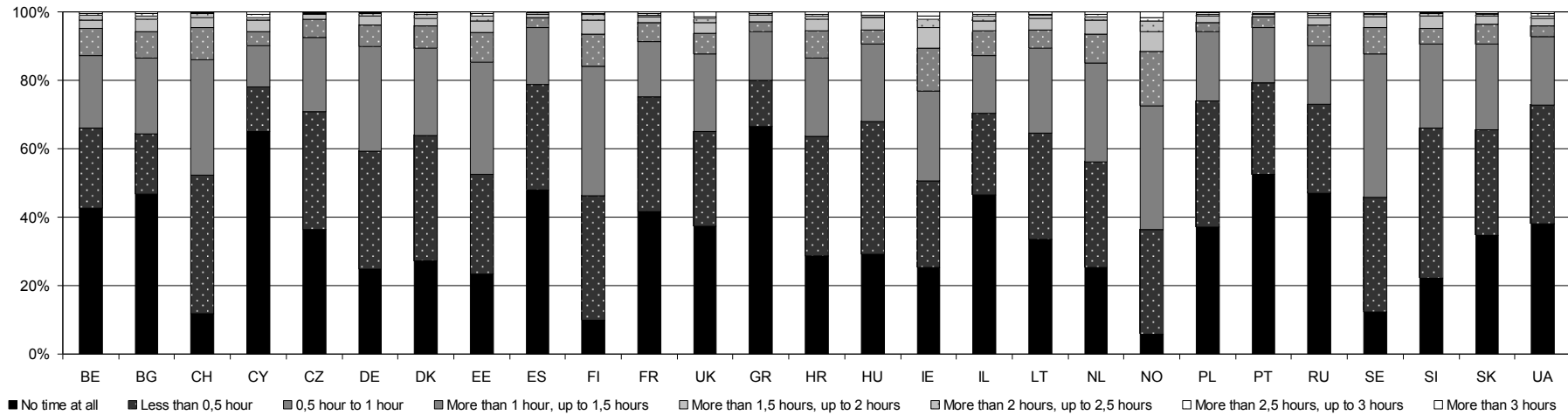


**Figure A.3. Radio listening, by country (2010)**



Source: Authors' elaborations, based on ESS 2010.

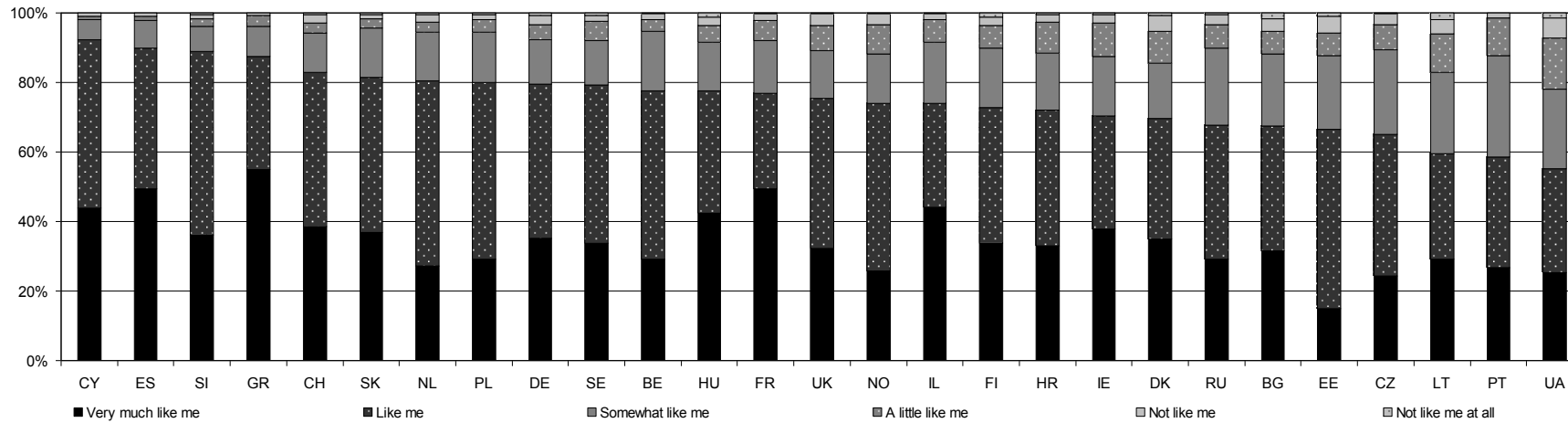
**Figure A.4. Newspaper reading, by country (2010)**



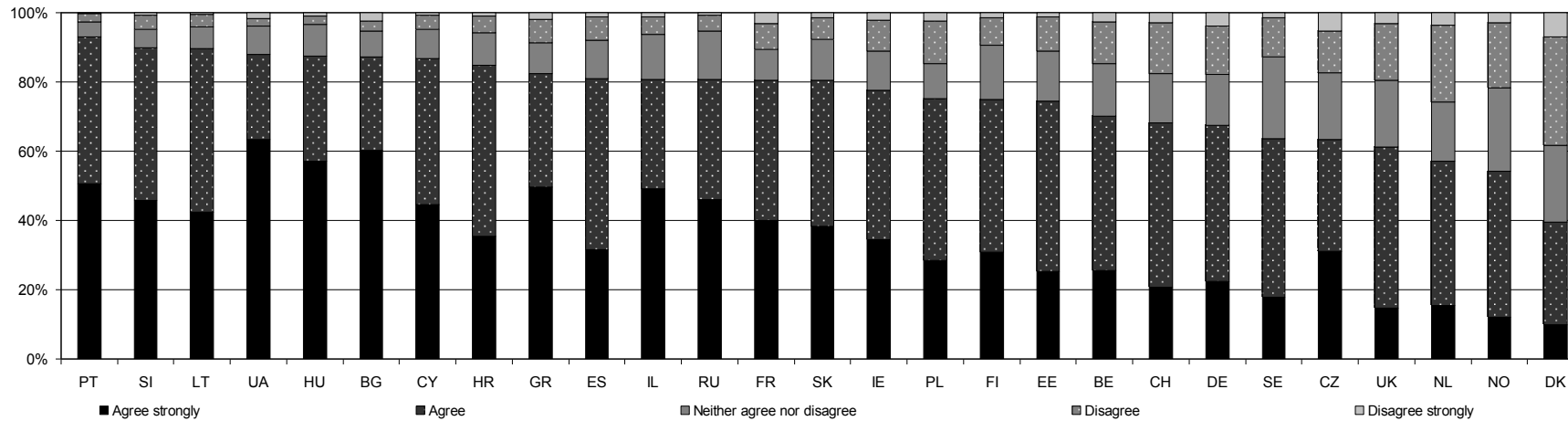
Source: Authors' elaborations, based on ESS 2010.

**Figure A.5. Pro-equal attitudes, by country (2010)**

**A. Equality of opportunity†**



**B. Equality of incomes‡**

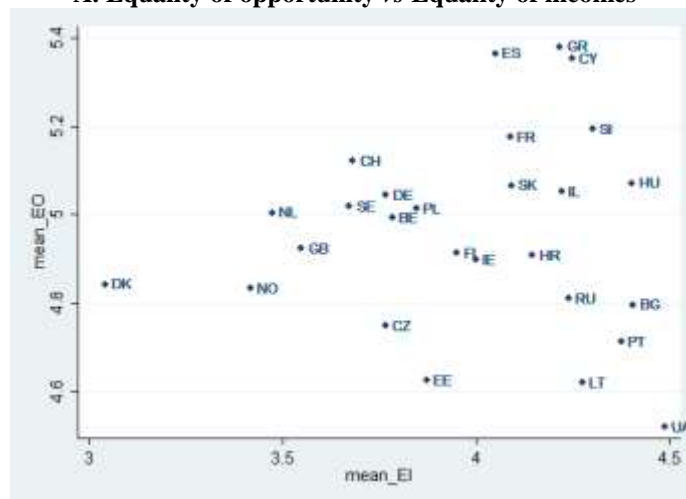


Note: Obtained from the answers to questions † 'She/he thinks it is important that every person in the world should be treated equally. She/he believes everyone should have equal opportunities in life. How much this person is or is not like you?'; ‡ Government should reduce differences in income levels.

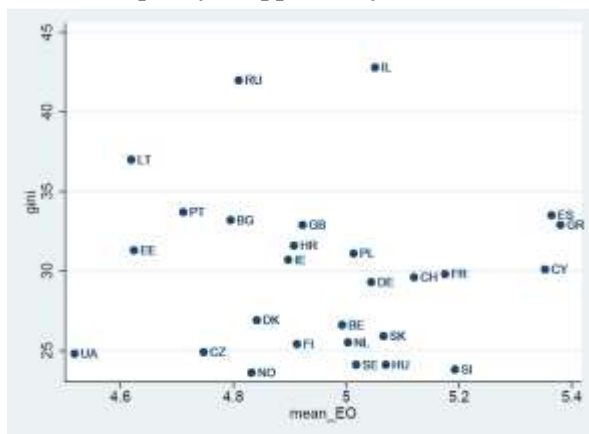
Source: Authors' elaborations, based on ESS 2010.

Figure A.6. Income Gini coefficient and the mean measures of attitudes to inequality, by country (2010)

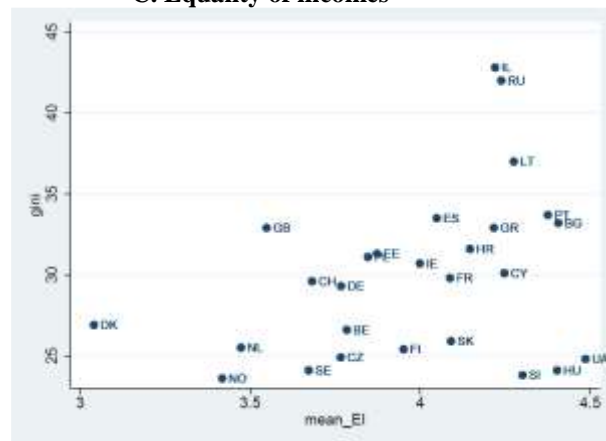
A. Equality of opportunity vs Equality of incomes



B. Equality of opportunity



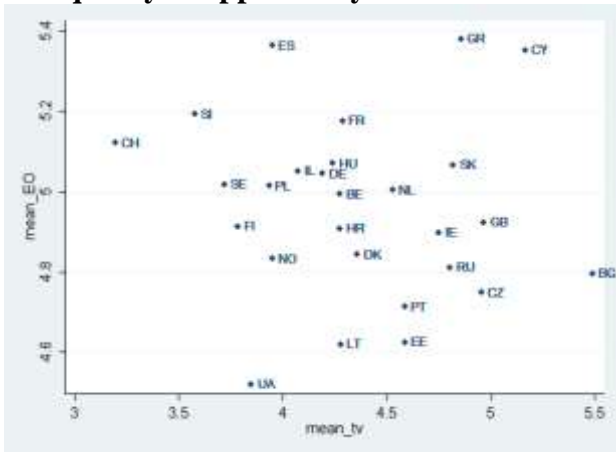
C. Equality of incomes



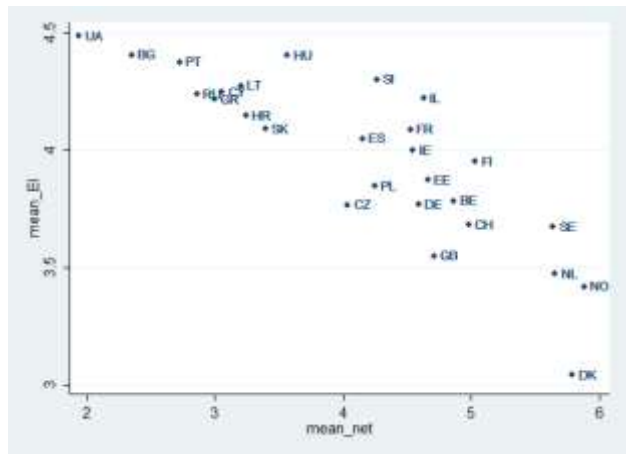
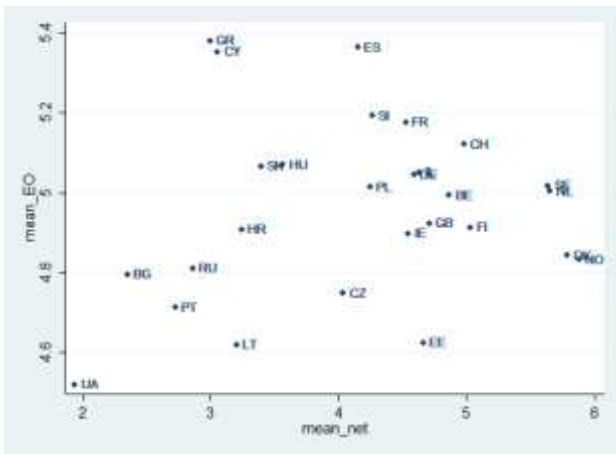
Source: Authors' elaborations, based on ESS 2010 and Gini coefficient from the World Bank database.

Figure A.7. The use of mass media against the attitudes to inequality, by country (2010)

A. Equality of opportunity



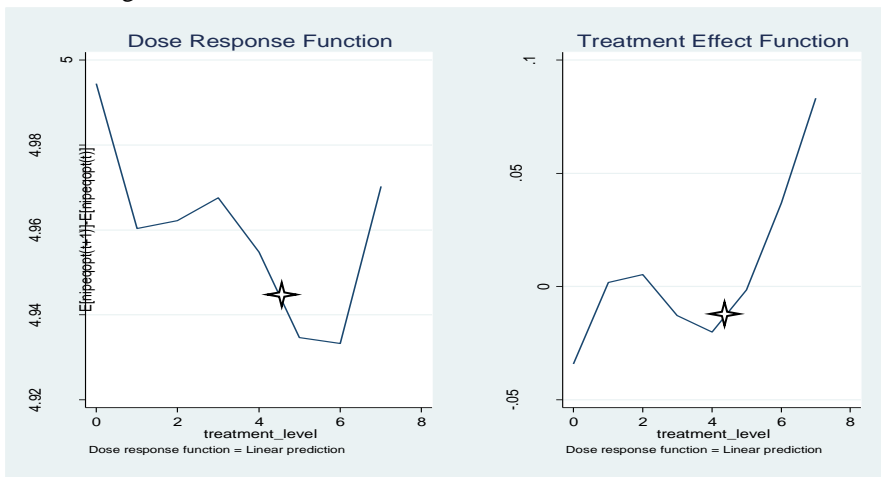
B. Equality of incomes



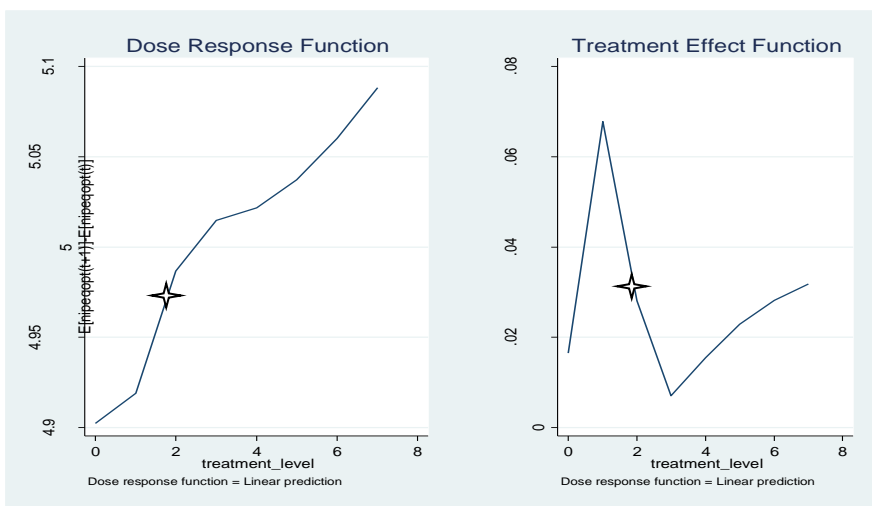
Source: Authors' elaborations, based on ESS 2010.

**Figure A.8 The estimated dose-response function: mass media and attitudes to the equality of opportunity (EO)**

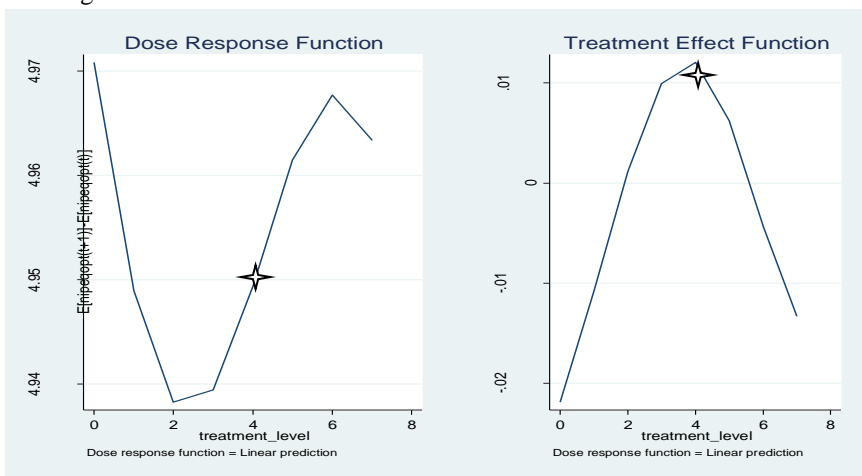
A. Watching TV



B. Watching political TV programs



C. Using internet



Note: ⬠ is used to mark the average level of exposure.  
 Source: Authors' elaborations

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