Egalitarianism and altruism in health

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Abstract.

Objectives: Egalitarianism and altruism are both attitudes that go beyond immediate selfish concerns. Theoretically, the two concepts are not the same thing, but empirically, they may be related. This paper explores the empirical relationship between egalitarianism and altruism, in the context of health.

Method: A representative sample of the Spanish population was interviewed (n=801). In order to elicit attitudes towards egalitarianism in health, we specify a model that explains the probability of a given respondent to choose between two health programmes: one that improves the health of those from high and low socioeconomic groups by the same extent (distribution-neutral programme), and another one that targets the health of those from the low socioeconomic group (egalitarian programme). Those selecting the latter programme are characterized as 'egalitarian'. To capture 'altruism', the same respondents are asked whether or not they are (or have been) regular blood donors. Other demographic and socioeconomic characteristics are also reported. Probit models are specified to estimate the relationship between egalitarianism and altruism, as defined above.

Results: Overall, the majority of respondents (80%) are found to support the egalitarian health programme. Furthermore, 24% of all respondents report themselves to be (or have been) regular blood donors, and are thus identified as 'altruists'. We find that being an altruist is significantly associated with being an egalitarian, once controlled for a wide range of socioeconomic, demographic and other individual characteristics.

Conclusion: There is a statistically significant relationship between egalitarianism and altruism in health.

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1. INTRODUCTION

Egalitarianism and altruism are both attitudes that go beyond immediate selfish concerns. Theoretically, the two concepts are not the same thing, but empirically, they may be related. This paper explores the relationship between egalitarianism and altruism, in the context of health. The first section presents the two concepts, and the second section then presents the methods of the empirical study. The third section reports the results and the final section concludes.

1.1 Altruism

Let us begin first with altruism, because this concerns the nature of individual preferences, and thus relates to a more fundamental concept for economic theory than egalitarianism. Standard microeconomic theory begins by assuming that *homo economicus* is 'selfish' and 'rational'. This does not carry any judgmental implications (i.e. it does not imply that the economic agent is morally suspect), but simply means that economics aims to model individual choice by assuming that individuals will make decisions aiming to maximise their own individual utility subject to their personal budget constraints.

However, real humans are capable of unselfish or selfless behaviour, which creates a challenge for economics. For instance, a parent may forego food in order to feed their offspring. In order to explain these anomalies, economists can take several approaches. One is to re-define the self. If the self is defined very narrowly, the behaviour of the parent above does not support the assumption that individuals are selfish. But by re-defining the notion of self to include intimate others, decisions can be modelled at the level of households, and thus the difficulty can be avoided. Households can be selfish, but what goes on inside the household will remain a black box to economists.

Some unselfish behaviour go beyond the immediate family group, and at the extreme, the beneficiary could be a total stranger. To accommodate this, economists can take a closer look at the individual utility function, and introduce the concept of 'caring externalities' (Culyer, 1980). This is when the utility of an individual (*i*) is a function of (amongst other things such as *i*'s own consumption) the welfare of another individual (*j*). This welfare of the other can be in terms of achieved utility, achieved health, capabilities, income, or consumption of goods and services. Either way, it is unlikely that caring externalities would be satisfied by improving the welfare of somebody who is already well off, so *j* is likely to be somebody regarded by *i* to be 'in need'. There is a related literature on 'interdependent utilities', which is where the

externalities are reciprocal (Roadway and Bruce, 1984; Johansson, 1991); but this also includes the case of envy (negative externality) and not just altruism (positive externality). Once such a utility function with caring externalities is built, economists can model and predict the decisions of an individual with such a utility function (for instance, see Jones-Lee, 1991). In a way, the individual with caring externalities remains selfish and rational in the sense that they maximise their own utility. We may call this instrumental altruism: behaviour that benefits others, but is fundamentally motivated by selfishness (see for example McGuire et al, 1988; Mooney, 1992).

If society is made up of just two individuals *i* and *j*, then this framework works well to explain altruistic behaviour. However, when society is made up of three or more individuals, the concept of public goods becomes relevant, and alongside this, the possibility of free-riding (Culyer, 1973, 1980). If *i*'s utility is affected by *j*'s welfare, then *i*'s utility can be improved if some third party (say, *k*) also with caring externalities took action to improve *j*'s welfare (unless the only way *i*'s utility improved from *j*'s welfare was when the improvement was due to *i*'s own action; see next paragraph). This means that, because *k* cannot stop *i* benefiting from *j*'s welfare improved by *k*, and vice versa, *j*'s welfare is now a public good. If this became common knowledge, then both *i* and *k* may not act to improve *j*'s welfare. Each may count on the other to act and try to free-ride, thus leading to the under supply of the public good. The implication of this is that if individuals are fully rational and information is complete, then altruistic behaviour in a world with more than three individuals becomes increasingly difficult to explain, even with caring externalities.

There are other approaches that aspire to go beyond instrumental altruism, and assume that human beings are capable of going above oneself and of behaving in line with another's welfare completely disregarding selfish interests because it is intrinsically 'the right thing to do'. The debate at this point becomes somewhat semantic. If the individual gains any satisfaction from knowing one is doing the right thing (or, if the individual is to suffer regret for not doing the right thing), then it becomes difficult to distinguish this from instrumental altruism. However, it may be noted that unlike its instrumental version, intrinsic altruism is not affected by the public good scenario above, because for the positive externality to arise for *i*, it is not enough to simply know *j*'s welfare has been improved; it needs to be attributed to *i*. Then, improving *j*'s welfare becomes a means to a more fundamental end, to do good, and in this respect, again, altruism can be regarded as being something instrumental rather than intrinsic (but in a different sense).

For practical purposes, it seems to make sense to define altruism as behaviour that aims to benefit another individual in need. It seems unnecessary to require altruism to be incompatible with self interest, or to demand that altruism involves bringing net loss to oneself. Just like the technical term 'selfish' does not carry any moral connotation, the technical term 'instrumental altruism' need not carry any implication that it is morally less worthy than an act of intrinsic value. Thus, we regard altruism as something that goes beyond immediate selfish concerns, but not necessarily something that goes against immediate selfish concerns, or something that is incompatible with wider selfish concerns.

In the context of health, donating blood for transfusion to total strangers has featured in the literature as a classic example of altruistic behaviour (Titmuss, 1970; Culyer, 1976; Collard, 1978). While blood donation entails some time costs, very mild pain, no health benefits, and possibly some self satisfaction donor, it can have substantial health benefits to the recipient.

1.2 Egalitarianism

Egalitarianism implies equality of something (i.e. the 'equalisand'), and thus involves comparing across at least two things. The key issue in any debate of egalitarianism concerns the question, equality of what? (Sen, 1979) It has been demonstrated that different definitions of the equalisand will lead to different policy prescriptions (for an example in health care resource allocation, see Culyer and Wagstaff, 1993). The objective of this paper is not to argue for a specific definition of egalitarianism, and we will start by simply taking 'equality of outcomes' as the relevant definition.

Even then, this may lead to some confusion, if egalitarianism is defined with respect to resulting distributions of outcomes alone, independently of the mechanism behind it. For instance, a distribution-neutral linear social welfare function (SWF) can lead to egalitarian outcomes if individuals are equally risk averse. This is because such a utility function has diminishing marginal utility, and social welfare will be maximised if the marginal good is distributed to the person with the largest marginal utility, which is the least well off person. Over time, this set up will result in everybody achieving an equal distribution of the equalisand, and thus an egalitarian outcome.

A somewhat less powerful but similar example is a distribution-neutral linear SWF combined with individuals with caring externalities towards those with low welfare. Then again, under certain conditions, social welfare maximisation and inequality reduction will coincide, and

over time an egalitarian distribution will be achieved. However, trying to base egalitarianism on individual-level preferences such as caring-based positive externalities seems contrived, because it is not clear why the type of externality should be restricted to those that are caring. A group of individuals with envy-based negative externalities will also achieve egalitarian distributions.

Such an apparent paradox where a distribution-neutral social welfare function leads to egalitarian distributions can be avoided if the concept of egalitarianism is reserved for the aggregate level. Then, egalitarianism will be about the functional form of the SWF, and not about the functional form of individual utility functions (e.g. diminishing marginal utility) or what is included in these (e.g. caring externalities). Then, there are two paths to take. One is to say because the above distribution-neutral SWF gives equal weight to everybody's welfare, it is itself egalitarian, and thus there is no paradox in the first place. However, taking this route is not compatible with egalitarianism defined as equality of outcomes. The other is to define egalitarianism as explicit efficiency-equality trade-offs, and to require diminishing marginal rate of social substitution (MRSS). This is the definition used in this paper.

The next issue then is the mechanism for determining the MRSS. One approach would be to base it on revealed (collective) preference. If data are available where analysts can compare numerous actual policy decisions made in the real world, then a SWF may be fitted to the data and an estimate of MRSS obtained. If successful, this would allow the identification of the SWF in the descriptive sense. Another approach is to base it on stated or expressed preferences of individuals using hypothetical states of the world, involving different distributions of outcomes, and asking the individuals to indicate their choices. Individuals faced with such an exercise may approach it in two ways.

One would be to form a view regarding which position one is likely to find oneself in, and to choose from this 'private or personal perspective' in line with what would be to one's own benefit (with or without caring externalities as may be the case). This is what happens under the Rawlsian setup of the veil of ignorance with extreme risk aversion (Rawls, 1972). However, this does not involve any reference to a SWF. In other words, the maximin rule is not derived from the so-called Rawlsian SWF. It is the other way round, and it is the Rawlsian SWF that is a product of maximin, which in turn is the rational choice of extremely risk averse individuals behind the veil of ignorance. Thus in our terminology, the maximin rule is only accidentally egalitarian. If individuals are completely risk neutral, then the veil of ignorance will lead to a distribution-neutral (and therefore non-egalitarian) SWF.

If we require egalitarianism to be defined by a SWF with diminishing MRSS and we wish to elicit this through stated preference, then we need respondents to engage in the exercise with reference to the 'societal or citizens perspective', in line with how, in their judgment, society should allocate resources. In other words, the parameters of an egalitarian SWF cannot be derived by looking at the individual's own utility function, but can only be captured by some meta-level preference along the lines of Sen's 'meta-ranking' (1978), or Hare's 'critical thinking' (1981).

In the context of health, defining egalitarianism in terms of equal outcomes means equalising health outcomes. There can be further variations to this: equalising health across individuals, or across population groups? And if across population groups, which groups? Or, what is the measure of health used? Is it inequality in health at any point in time, or in lifetime health? For the purpose of this paper, we will use reducing inequality in life expectancy at birth across socio-economic groups as the working example of egalitarianism in health.

1.3 Altruism and egalitarianism

Thus, we define both altruism and egalitarianism as something that go beyond immediate selfish concerns. The objective of this paper is to examine empirically how these two are related. At a theoretical level, there is no reason to assume that the two are associated with each other, since while altruism is about the nature of one's own utility function, egalitarianism is about the kind of SWF one has a meta-level preference for. However, the two concepts may be supported by the same people in the real world. One reason why this may happen is because both concepts are associated with social norms and practices. There are established social norms that prescribe individuals should be helpful to others and that equality should be promoted: indifference is regarded as disgraceful and inequality as reprehensible. More specifically in the context of health, on the one hand, the supply of blood in Spain (and in many other places in the world) is based on voluntary donations with no financial reward, and thus on altruism. On the other hand, the publicly funded health system in Spain (and in many other places in the world) holds as an important policy goal the reduction of health inequalities, and thus egalitarianism. At the same time, we know that while the majority of the Spanish general public support egalitarianism (Abásolo and Tsuchiya, 2004), only a minority donate blood regularly (Abásolo and Tsuchiya, 2009). So how would these two be related?

2. METHOD AND DATA

2.1. Method

We specify a model that explains the propensity for an individual to be egalitarian in the sense above. An underlying (or latent) variable (E^*) represents an individual's propensity to choose an *egalitarian* policy (as opposed to a distribution-neutral policy). We examine the association between this propensity for egalitarianism and *altruism* (*A*), controlling for a series of observable background characteristics. As a proxy for altruism, we use whether the individual is or has been a regular blood donor. This is not the only way in which altruism could be captured but we believe that this should be a reasonable proxy, particularly in the health context.

In order to control for the effect of individual background characteristics, other individual factors that might affect people's attitudes towards egalitarianism are taken into account in the model. Firstly, regarding demographic factors, age (*G*) and sex (*S*) and size of area of residence (*M*) are considered. Secondly, since we are dealing with attitudes regarding socio-economic inequalities, we may expect there to be some pattern by the respondent's socio-economic status; proxies used to explore this possibility are education (*D*), being in the labour market (*L*) and per capita income of the region of residence (*C*). Thirdly, we consider that people's attitude towards egalitarianism can be affected by both political affiliation or ideology (*I*) and religion practice (*R*).

Thus, the model can be written as:

$$E_i^* = E(A_i, G_i, S_i, M_i, D_i, L_i, C_i, I_i, R_i) + \varepsilon_i \qquad \text{[eq. 1]}$$

In model [eq.1], the *i* subscripts represent individual respondents, and ε_i captures unobserved influences, which are assumed to have a standard normal distribution with zero mean and constant variance. The model is built so that egalitarianism is 'explained' by altruism. However, while altruism concerns the nature of individual preferences and thus is regarded as more fundamental compared to egalitarianism which is a meta-preference, [eq.1] above should not be interpreted to represent any causal mechanism.

In practice, E^* is unobserved. Instead, we observe E_i, which is a dummy variable representing whether or not the individual actually chooses the egalitarian policy. Therefore, it is the realization of a binomial process defined by:

$$E_i = 1 \text{ if } [E_i^* > 0]$$

So, if the individual's propensity to be egalitarian is positive ($E_i^* > 0$) s/he will choose the egalitarian policy ($E_i = 1$), and if otherwise ($E_i^* \leq 0$) s/he will not ($E_i = 0$).

In order to select the functional form of this 'main egalitarian model', socio-economic and statistical criteria are used. Interactions between regressors are also included and tested in the model. In particular, in order to test whether *altruism* has a different effect on the propensity to be egalitarian across the different background characteristics specified in the model, we will test the joint hypothesis that the interactions of (A) with the rest of regressors are not significantly different from zero.

The estimation process will be undertaken through probit regressions. Likelihood ratio (LR) tests and Reset specification tests will be carried out to appraise the appropriateness of the different functional forms.

There are two econometric issues that we will tackle in this paper. The first issue is that model [eq.1] may be subject to selection bias due to incomplete survey data. In surveys of this sort respondents do not always provide answers to *all* the questions of the survey. It is the so-called "item non-response" issue in the co-variates. If the pattern of non-response is not at random, conventional estimators may be biased and inconsistent. Tests for selection bias and correction, if necessary, are undertaken estimating a probit with sample selection (Greene 1997). The probit with sample selection works in a manner very similar to the Heckman model except that the response variable is binary. This method requires additional exogenous variables (or identifying variables), which should explain the probability of participating but have no direct impact on the probability to select the egalitarian option.

For this 'participation model', let us assume an underlying (unobserved) variable P_i^* that determines the selection of individuals into participating groups, i.e. $P_i = 1$ when $P_i^* >$ threshold, and $P_i = 0$ when $P_i^* \leq$ threshold. P_i^* represents the inclination for the individual to participate and to answer all the relevant questions. It is assumed that P_i^* is a linear function of some of the exogenous variables in model [eq.1] in addition to some identifying variables as follows:

$$P_i^* = P(G_i, S_i, D_i, R_i, H_i, T_i) + u_i \qquad \text{[eq. 2]}$$

The identifying variables include H_i, which represents the health state of the individual and T_i representing the marital status of the individual. The main criteria used here for proposing both

sets of identifying variables are that the variables have an impact on the probability to participate but are unrelated to the individual's preference for egalitarian policies. u_i is a random error term normally distributed with zero mean and constant variance.

Selection bias occurs when there is correlation between P and ε (and therefore between ε and $\boldsymbol{u}$); in other words, when unobservable factors that influence the potential selection to participate are also influencing the probability to choose the egalitarian option. If so, selection bias will be corrected. To check whether selection bias is absent we will test, firstly, whether ρ (the correlation of residuals) is significantly different from zero: if the covariance between ε and $\boldsymbol{u}$ is significantly different from zero, then we cannot reject that there is no selection bias. In addition, a comparison of the estimates of both the main egalitarian model and the participation model with selection is undertaken: a large change in the coefficients, a change of the sign of the coefficients or a change in the statistical significance of the coefficients between the initial probit and the probit with selection will indicate the existence of selection bias.

The second issue also has to do with incomplete survey data, but this time refers to incomplete survey data for the main explanatory variable of the analysis: i.e. blood donation, which is the proxy we use for altruism. We have information to distinguish individuals who are (or have been) regular blood donors and those who are not (or have not been). Furthermore, we can also identify those individuals who are not blood donors due to medical or health reasons. While this last sub-population is captured as non-donors, it is inappropriate to interpret them as being non-altruists as well, since we do not know whether they would have been blood donors if their medical/health restriction did not exist. Thus, one approach is to treat their data on blood donation as missing and to exclude them from the *altruist* variable. If such medical restriction on blood donation applied at random, then amongst this sub-population the proportion of those who would otherwise have donated blood would be the same as the proportion of those who donate blood amongst the rest of the population. And therefore excluding them from the analysis would not introduce a bias. However, if this does not hold, then regression analyses that exclude respondents will be biased. To tackle this problem, a probit model explaining blood donation will be estimated using a range of background variables ('blood donation model'). Then for each individual who does not donate due to medical reasons, whether or not they would be a blood donor had they not had the medical reason will be imputed from the predictions from this blood donation model. And finally, the main egalitarian model will be estimated using these imputed values for those who do not donate due to medical reasons.

One further econometric issue is that of endogeneity caused by simultaneity. It arises when some of the right-hand-side variables are not determined exogenously but are influenced (at least in part) by the left-hand-side variable. While our model is built to analyse the effect of *altruism* on *egalitarian* attitudes of individuals, it could be the case that the other way round is also true, so that egalitarian attitudes have an effect on altruism. If this is the case, conventional estimators will be biased and inconsistent. (However we have not explored this issue in this version of the manuscript and this should be borne in mind when considering the results.)

2.2. Data and variables definition

The data were collected during 2004 in Spain. A survey of 801 individuals over 18 years of age was undertaken. Face to face interviews were assigned across the 17 "Comunidades Autónomas" ("Regions" for short), reflecting the local resident population proportionally. Within each of the Regions, interviews were randomly allocated so that the achieved sample will be representative of the general Spanish population in terms of socio-demographic characteristics. In general, 49% of the individuals were male, with average age of 45 (SD 17.9); and 51% female, with average age of 48 (SD 18.6). For further details, see Abásolo and Tsuchiya (2009).

The binary dependent variable, *egalitarian* has been built as follows. In the interview, the respondent is informed about the health of individuals by socioeconomic groups. Health is measured in terms of life expectancy at birth. Given the health of two socioeconomic groups, low class and high class, the question showed a 5-year difference in life expectancy between higher and lower socio-economic groups (78 and 73 years, respectively). Respondents were told to imagine that they are to help the health authority to choose between two health care programmes (A and B) which improve people's life expectancy. Both programmes have the same cost. Health programme A increased the life expectancy of both socio-economic groups by 2 years each (the distribution-neutral programme); and health programme B increased the life expectancy of the worse-off group by 4 years (the egalitarian programme). The Appendix reproduces the visual aid used in the interviews. The dependent variable *egalitarian* takes the value 1 if the individual prefers the egalitarian programme, and 0 if the individual prefers the distribution neutral programme.

The regressor of interest, *altruist*, is a dummy variable which takes the value 1 if the individual reports to be (or has been) a regular blood donor, 0 otherwise. Regarding the rest of factors that we have controlled for, age has been categorised in four dummy variables: *age_18_35*

(baseline category), *age_36_45*, *age_46_55*, *age_56_65*, *age_66_more.* The binary variable *female* indicates whether the individual is female or not. Population size of the area of residence is proxied by *small_area* indicating whether the individual lives in an area of 10,000 or less inhabitants. Regarding the socioeconomic variables, education is recorded by level of schooling and has been categorised in three dummy variables representing low education *primary_studies* (those with primary school education or less, the baseline category), middle education *secondary_studies* (those with secondary school education, and high education *university_studies* (those with higher and university education). The binary variable non-labour market *(nonlabmkt)* indicates whether the individual is not currently in the labour market (i.e. is retired, unemployed, homemaker or student) or is. Per capita income in the region of residence is captured by three dummies: high income regions *highreg* (those resident in Madrid, Navarra or País Vasco), low income regions *lowreg* (those who live in Andalucia or Extremadura) and middle income regions *midreg* (residents in the rest of Spain, the omitted category). Political affiliation is recorded, by two categorical indicators, *left* (those who report as being centre-left, left or extreme left wing) and centre-right (those who report as being centre, centre-right, right or extreme right wing, the baseline category). Finally, the binary variable *no_relig* indicates that the respondent does not practice a religion.

Regarding the identifying variables in the participation model, the self-reported measures of health include a categorical indicator that records whether individual considered their general health during the twelve months prior to the survey to be very poor, poor, fair, good and very good. So we have three dummies *h_fair* (which takes value one if the individual reports to have very poor, poor or fair health state, baseline), *h_good* (for those with good health state) and *h_vgood* (for those who report having very good health state). Marital status is indicated by *single* (baseline), *married* and *divorced_widowed.*

3. RESULTS

Descriptive statistics are reported in Table 1. Of the whole sample reported in the first three columns (N=801), 81.3% prefer the egalitarian policy. Of those who prefer the egalitarian policy, about half are men and the other half are women. On the other hand, 25.6% of the total report to be or have been regular blood donors: i.e. to satisfy our measure of altruism. Table 2 presents the results for the first main egalitarian model using probit. This is estimated with all the usable observations (i.e. including those who do not donate for medical reasons who are coded as non-altruists). Item non-response leads to 240 missing cases, which correspond to 30% of the entire data, leaving 562 observations (descriptive statistics are in columns 4-6 of Table 1). Estimates for the egalitarian model with sample selection [eq.2] can be seen in Table

3. The correlation coefficient (*rho*) is not statistically different from zero (p=0.24). In addition, the sign, the magnitude and the *t*-ratios of coefficients of this egalitarian model with selection are quite close to those of the initial egalitarian model without selection (eq.1; Tb.2). Overall, the results suggest that we cannot reject the null hypothesis that there is no selection bias.

The next issue is the treatment of the 147 individuals who are not regular blood donors (and therefore are so far classified as non-altruists) because of medical reasons. To address this, blood donating behaviour of these individuals are imputed based on the blood donation model (not shown; available on request). This is estimated excluding those individuals who do not donate for medical reasons (i.e. estimated on 415 valid cases; descriptive statistics are in columns 7-9 of Table 1). Only *egalitarian* and *university studies* have statistically significant coefficients ($p<0.05$). The predicted probabilities for the 147 individuals are mostly below 0.5, with only 8 above 0.5.

Probit re-estimations of the main egalitarian model with imputation can be seen in Table 4 (N=562). The new variable *new_altruist* takes the predicted probability of donating blood for those who cannot actually donate due to medical reasons, but takes the same value as the original *altruist* variable for all other individuals. Overall, the model is statistically significant ($p<0.05$) but the McFadden R-squared statistic is just 0.082; however, as is often the case when the probit is applied to cross-sectional data (with not huge sample size) the goodness of fit is low. The reset test shows that there is no evidence of mis-specification: the *chi*-squared test statistic is 0.87 with a *p*-value above conventional levels (p=0.351). Probit average effects evaluated at sample means show that altruism has a significant and positive effect on the propensity to support egalitarianism ($p<0.05$), once controlling for other factors. Particularly, the average effect is 0.152 indicating that on average, the probability of an altruist individual reporting to be egalitarian is 15% higher than for a non-altruist person.

Regarding other controls, those living in high per capita income regions (e.g. Madrid, Navarra or País Vasco) have a lower propensity to be egalitarian by about 10% compared to those living in middle income regions ($p<0.05$); in addition, those living in small areas also have about 10% lower probability to be egalitarian than those living in other not small areas ($p<0.05$). On the other hand, as expected, those who are politically left wing have a significantly higher probability to be an egalitarian compared to those who are centre-right. In particular, the probability of a left wing individual being egalitarian is on average 9% higher than the reference individual, other things being equal ($p<0.05$). Neither age, sex, or education

has a significant effect in the probability to be an egalitarian individual. None of the two-way interactions amongst the significant variables were found to have significant coefficients.

4. DISCUSSION

Egalitarianism and altruism are both attitudes that go beyond immediate selfish concerns. While the two concepts are not the same thing as theoretical constructs, however, there may be associations between the two at the empirical level. This paper explored the empirical relationship between egalitarianism and altruism in the context of health, using data from interviews of the general public in Spain. Egalitarianism was defined as equality of outcomes, and was measured by a question in the interview where respondents were asked help policy makers to choose between two programmes. One programme improved the health of those from the lower socio-economic group who have worse health and the other programme improved the health of both the lower and the higher socio-economic groups and maintained the initial inequality in health. Altruism was defined as behaviour that aims to benefit another individual in need, and was captured by a question in the same questionnaire that asked whether or not the individual is or has been a regular blood donor. We acknowledge that blood donation is only one of several possible altruistic behaviours, and is not a perfect measure. People may be unable to donate blood for medical/health reasons, and donating blood may have higher time costs than, say donating money to charity. However, it is a behaviour that has been used numerous times in the literature as an example of altruistic giving to total strangers in the context of health.

The data we have are based on an interview survey. As a result, we only have what the respondent has told the interviewer. Egalitarianism is measured by responses to a question based on a hypothetical choice between two policy scenarios, and one may criticise its substance. However, it should be noted that we define egalitarianism as a meta-preference. This means that there is no real-world opportunity where true preferences can be revealed through observable behaviours. Altruism on the other hand is measured by response to a question on respondent behaviour, asking whether the respondent is or has been a regular blood donor. This may be more valid than the question on egalitarianism, but there may be issues of interpretation and/or recall. For example, we have not given the exact definition of ‘regular’. Furthermore, if respondents were biased by social norms and were trying to appear pleasant to the interviewer, then this would affect the two key variables in the same way: social norms will inflate both egalitarian preferences and altruistic blood donation. Furthermore, the fact that the egalitarian question preceded the blood donation question in the interview may have influenced the responses to the latter.

Regarding the econometric analyses, there were two main concerns, both relating to respondent self selection. The first was with respect to item non-response, or missing values, which lead to 239 respondents dropping out. This effect was controlled for by the participation model and found to be not significant. The second was with respect to those respondents who could not donate blood even if they wanted to because of a medical reason. This was addressed by estimating a blood donation model and by imputing the predicted probability of blood donation in the absence of the medical reason for not donating.

However, the main econometric problem, that of simultaneity has not been tackled in this first manuscript. If, as a consequence of being egalitarian, the individual is more likely to behave altruistically and therefore to become a regular blood donor, then the values of our *egalitarian* and *altruist* variables will be determined simultaneously. If the *altruist* variable is an endogenous variable in the model, conventional estimators will be biased and inconsistent, so our results should be interpreted with caution. By constructing instrumental variables for this endogenous regressor, the problem of simultaneity bias may be tackled.

Overall, the main egalitarian models controlling for a series of background variables show that egalitarianism and altruism measured in these ways are indeed associated with each other. Those who are or have been regular blood donors appear to be 15% more likely to choose the egalitarian policy than another person who does not donate blood but who otherwise has the identical set of observed background characteristics.

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TABLE 1: SUMMARY STATISTICS

	WHOLE SAMPLE			SAMPLE EXCLUDING MISSING VALUES			SAMPLE EXCLUDING MISSING AND THOSE WHODO NOT DONATE FOR MEDICAL REASONS		
Variable	**Obs**	**Mean**	**Std. Dev.**	**Obs**	**Mean**	**Std. Dev.**	**Obs**	**Mean**	**Std. Dev.**
egalitarian	704	.8039773	.3972682	562	.8131673	.3901244	415	.8192771	.3852529
altruist	800	.24375	.4296122	562	.2562278	.436938	415	.346988	.4765864
female	801	.505618	.5002808	562	.5124555	.5002901	415	.4722892	.4998341
age_18_35	801	.3270911	.469444	562	.3185053	.4663117	415	.3686747	.4830278
age_36_45	801	.1947566	.3962606	562	.2135231	.4101589	415	.2361446	.4252247
age_46_55	801	.1323346	.3390659	562	.1316726	.3384357	415	.1156627	.320206
age_56_65	801	.1485643	.3558807	562	.1459075	.3533279	415	.1277108	.3341704
age_66_more	801	.1972534	.3981739	562	.1903915	.3929597	415	.1518072	.359267
primary_st~s	799	.3429287	.4749852	562	.3238434	.468358	415	.2795181	.4493041
second_stu~s	799	.5381727	.498853	562	.5498221	.4979548	415	.5855422	.4932228
university~s	799	.1188986	.3238719	562	.1263345	.332522	415	.1349398	.3420716
nonlabmkt	799	.5306633	.4993715	562	.5160142	.5001887	415	.4650602	.4993797
reghigh	801	.1922597	.3943222	562	.1601423	.3670647	415	.1638554	.3705911
regmid	801	.6054931	.4890499	562	.6619217	.4734768	415	.6626506	.4733759
reglow	801	.2022472	.4019265	562	.1779359	.3827995	415	.173494	.3791308
left	654	.5642202	.4962381	562	.5818505	.4936944	415	.60000	.4904893
centre_right	654	.4357798	.4962381	562	.4181495	.4936944	415	.40000	.4904893
small_area	801	.2421973	.4286807	562	.2224199	.4162422	415	.2337349	.4237163
no_relig	764	.4502618	.4978459	562	.4608541	.4989093	415	.5012048	.500602
h_fair	801	.2621723	.4400906	562	.227758	.4197592	415	.1638554	.3705911
h_good	801	.6342072	.4819527	562	.6654804	.4722426	415	.7204819	.4493041
h_vgood	801	.102372	.3033263	562	.1067616	.309085	415	.1156627	.320206
single	800	.2475	.4318296	562	.2335116	.4234425	415	.263285	.4409486
married	800	.6175	.4863017	562	.6470588	.4783111	415	.6449275	.4791143
divorc_wid	800	.135	.3419374	562	.1194296	.3245827	415	.0917874	.289075

TABLE 2: PROBIT FOR THE MAIN EGALITARIAN MODEL

egalitarian	Coef.	Std. Err.	z	[Conf. Interval]	
altruist	.4625967	.1645042	2.81	.1401743	.7850191
female	-.0607502	.1386821	-0.44	-.3325622	.2110617
age_36_45	.0880638	.1759402	0.50	-.2567727	.4329004
age_46_55	.0947872	.2102661	0.45	-.3173268	.5069012
age_56_65	-.0480146	.2183708	-0.22	-.4760135	.3799843
age_66_more	.4574897	.2377589	1.92	-.0085092	.9234886
second_stu~s	-.0243326	.1719533	-0.14	-.361355	.3126897
university~s	-.3477335	.2276989	-1.53	-.7940151	.0985481
nonlabmkt	.1299824	.1725905	0.75	-.2082887	.4682535
reghigh	-.3557208	.1697988	-2.09	-.6885205	-229212
reglow	-.1125471	.1735367	-0.65	-.4526727	.2275786
left	.3396558	.1313199	2.59	.0822734	.5970381
no_relig	.2612863	.1380339	1.89	-.0092552	.5318278
small_area	-.3682107	.1481558	-249	-.6585907	-.0778308
_cons	.5911537	.2383778	2.48	.1239417	1.058366

Number of obs = 562

Wald chi2(14) = 37.42
Prob > chi2 = 0.0006

Log pseudolikelihood = -251.09869

Pseudo R2= 0.0723

TABLE 3: PROBIT FOR MAIN EGALITARIAN MODEL WITH SAMPLE SELECTION

_	Coef.	Std. Err.	z	[Conf. Interval]	
Egalitarian					
Altruist	.4090573	.1464983	2.79	.1219259	.6961887
Female	-.0771226	.125757	-0.61	-.3236018	.1693566
age_36_45	-.0051219	.16721	-0.03	-.3328475	.3226037
age_46_55	.0480149	.1963033	0.24	-.3367324	.4327623
age_56_65	-.078932	.1970809	-0.40	-.4652034	.3073394
age_66_more	.3337035	.2263338	1.47	-.1099027	.7773096
second_stu~s	-.0869126	.1598993	-0.54	-.4003094	.2264842
university~s	-.4154886	.216248	-1.92	-.8393268	.0083496
Nonlabmkt	.1532088	.1456464	1.05	-.1322529	.4386706
Reghigh	-.3135726	.1486176	-2.11	-.6048578	-.0222875
Reglow	-.1224791	.1609866	-0.76	-.4380071	.193049
Left	.3036534	.1233887	2.46	.0618161	.5454907
no_relig	.2086478	.1340533	1.56	-.0540919	.4713875
small_area	-.3214331	.1302748	-2.47	-.5767669	-.0660992
_cons	.9239195	.2333847	3.96	.4664939	1.381345
z					
female	.085738	.1016719	0.84	-.1135352	.2850113
age_36_45	.2461114	.1636331	1.50	-.0746036	.5668263
age_46_55	-.008466	.1871736	-0.05	-.3753195	.3583875
age_56_65	.0726478	.1830361	0.40	-.2860964	.4313921
age_66_more	.1879302	.1940946	0.97	-.1924881	.5683486
second_stu~s	.1685428	.1280944	1.32	-.0825177	.4196033
university~s	.2566061	.1874846	1.37	-.1108569	.6240691
no_relig	.0738655	.10745	0.69	-.1367327	.2844636
h_good	.3375714	.1168146	2.89	.108619	.5665239
h_vgood	.5016927	.2047432	2.45	.1004034	.902982
married	.1420283	.1439747	0.99	-.1401571	.4242136
divorc_wid	-.0252977	.1981345	-0.13	-.4136342	.3630389
_cons	.0061312	.19348	0.03	-.3730827	.3853451
/athrho	-2.839747	51.30309	-0.06	-103.392	97.71246
rho	-.9931927	.6960956		-1	1
Nº obs.=761; censored obs.= 200; uncensored obs.=561					
LR test of indep. eqns. (rho = 0): chi2(1) = 1.36 Prob > chi2 = 0.2429					
Log likelihood=-677.4488					

TABLE 4. PROBIT FOR EGALITARIAN MODEL WITH IMPUTED VALUES FOR ALTRUIST
(AVERAGE EFFECTS)

			Robust		
egalitarian	**dF/dx**	**Std. Err.**	**z**	**[95% Conf**	**Interval]**
new_altruist*	.1517731	.0431453	3.43	.06721	.236336
female*	-.0143575	.0345705	-0.42	-.082114	.053399
age_3~45*	.0166222	.0427078	0.38	-.067084	.100328
age_4~55*	.0113632	.0513436	0.22	-.089268	.111995
age_5~65*	-.0267016	.0593261	-0.46	-.142979	.089575
age_66~e*	.0944031	.0450333	1.82	.006139	.182667
second~s*	-.0114169	.0425947	-0.27	-.094901	.072067
univer~s*	-.1097594	.071448	-1.70	-.249795	.030276
nonlab~t*	.0323759	.0430261	0.75	-.051954	.116706
reghigh*	-.0981376	.0521205	-2.07	-.200292	.004017
reglow*	-.0260635	.0460313	-0.58	-.116283	.064156
left*	.0899634	.0344704	2.65	.022403	.157524
no_relig*	.063617	.0337894	1.86	-.002609	.129843
small_~a*	-.0995295	.0438517	-2.44	-.185477	-.013582

obs. P .8131673
pred. P .8335551 (at x-bar)

(*) dF/dx is for discrete change of dummy variable from 0 to 1
z and P>|z| correspond to the test of the underlying coefficient being 0

Probit regression, marginal effects — Num. of obs = 562
Wald chi2(14) = 40.42 — Pseudo R2 = 0.0812
Prob > chi2 = 0.0002
Log pseudolikelihood = -248.67954

APPENDIX: The visual aid given to respondents