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Lan Gaiak

INCENTIVES WHEN ALTRUISM IS IMPURE: THE CASE OF BLOOD AND LIVING ORGAN DONATIONS

María Errea
Juan M. Cabasés
D.T. 1302

Departamento de Economía

Ekonomia Saila

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Incentives when altruism is impure: The case of blood and living organ donations

M. Errea, J.M. Cabasés
Universidad Pública de Navarra

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Abstract

The decision to donate blood and living organs is considered voluntary and altruistic. However, the shortage of donors has opened an interesting debate in recent years, considering offering economic incentives to donors. This paper analyzes theoretically and empirically, the effects of incentives over individuals when facing the decision of becoming donors. Results show that crowding-in of blood donors would be more likely by offering "Information concerning blood donations" or "Blood Tests". In both, blood and living organ donations, "Money" would be very likely to crowd-out individuals from donating. Concerning living organs, we do not find good evidence for crowding-in. We conclude donation policies, properly designed, could help to increase the number of donors, and more specifically suggest implementing non-monetary incentives.

Keywords: Social preferences, Incentives, Altruism, Blood and Living Organ Donations

1 Introduction

Blood and living organ donations are voluntary and altruistic. Donation in these cases is somehow particular, as individuals who donate are not expecting a compensation for donating (Fortin et al., 2010), but donate for altruistic reasons.

Blood cannot be artificially created and there is an increasing need of organs for transplantation. Evidence shows that even if all the deceased donors actually donate, unfortunately this would not be enough to cover the growing demand for organs (Israni et al., 2005) and, as a consequence, the waiting lists do not stop increasing. Encouraging blood and living organ donations is therefore necessary.

The effect of introducing incentives for pro-social activities has been analyzed by prestigious researchers, not only in the field of economics, but is also popular in psychology, sociology and other fields. Recently researchers concluded that incentives do influence social values, and also that social preferences are important influences on individuals' behavior (Bénabou and Tirole, 2006; Bowles and Polanía, 2012). However, there is not a common agreement about HOW they influence behavior and this is the question that has motivated this paper.

Behind this question is the *Motivation Crowding Theory* (Deci and Ryan, 1985; Frey and Jegen, 2001). This theory of crowding-effects stipulates a systematic interaction between intrinsic and extrinsic motivation, both influencing human behavior. For instance, this theory predicts that external interventions, via economic incentives or punishments, may undermine intrinsic motivation (Deci and Ryan, 1985; Frey and Jegen, 2001). However, experimental studies have demonstrated that there is not a generalized behavior towards incentives. It cannot be said that incentives always discourage pro-social activities.

The debate was introduced by Richard Titmuss (1971), who analyzed the effect of introducing economic incentives for donating blood. He concluded that economic incentives crowd-out (expel) more blood donors than they crowd-in (attract). According to this author, this may be due to the partial destruction of intrinsic motivation when

price mechanisms are introduced. But some researchers (Solow, 1971; Arrow, 1972; Bliss, 1972), attracted by these findings, reviewed Titmuss work discovering that results were not enough to conclude that incentives crowd-out blood donors.

Economic incentives sometimes may reduce the total supply (Frey and Oberholzer, 1997). However, other studies analyzing the introduction of incentives in the market for live and cadaveric organ donations (Becker and Elías, 2007) demonstrate that monetary incentives could increase the supply of organs for transplantation and even reduce the waiting lists for an organ. In the context of blood and living organ donations, Lacetera and Macis (2010) showed that some individuals, especially those who recently became donors, did not show aversion to direct cash incentives, while women -especially among active or regular donors- reported aversion to cash incentives. They concluded that offering monetary payments a high proportion of active donors would stop donating. However, other kind of incentives, like vouchers (indirect cash of the same nominal value than the monetary incentive) were better supported, and in another experiment they showed that symbolic incentives such as medals or publishing the name of donors in the journal where better motivators (Lacetera and Macis, 2008). In addition, other authors, in a field experiment, compare the effect of lottery tickets versus a free cholesterol test, showing that the lottery tickets significantly increased blood donations (Goette and Stutzer, 2009).

For some individuals, incentives may be perceived as signals of permissible behavior (Mellstrom and Johannesson, 2008), provide information about the policy makers or in general about the person who implements the incentive (Fehr et al., 2007; Irlenbusch and Ruchala, 2008; Ariely, Bracha and Meier, 2009); some of them even could adapt their preferences to incentives (Bowles and Polanía, 2010) or may react positively to incentives, and accept them as a compensation of a socially beneficial action adapting theirs preferences. But there is also evidence of crowding-in when using incentives, some individuals being attracted by the incentive (Falk, Gächter and Kovacs, 1999; Gächter and Falk, 2002; Lacetera and Macis, 2010).

The risk of existence of crowding-out suggests that, in some circumstances, it is

advisable not to use the market model to elicit a higher supply as sometimes incentives can have an effect which is the contrary to the one predicted by the conventional economic theory, according to which incentives increase supply. In such cases, and this could be the case of blood and living organ donations, it is recommended not to rely on monetary payments but on a different type of incentive (Frey and Jegen, 2001). Certain incentives could attract some self-regarding individuals who suddenly will be willing to become donors. For example, mechanisms based on information –sometimes called exhortation mechanisms– could be effective increasing individuals' willingness to donate (Thorne, 1998). The final result, net crowding-in or crowding out, depends on the type of incentive (monetary or non-monetary), the nature of the task to perform (individual/private versus social/public decisions), and on characteristics of the population involved (altruistic or self-interested).

We aim to analyze how incentives can influence behavior and decision making, specifically social preferences. We center this question, and focus on the specific context of blood and living organ donations. We analyze how individuals' behavior may be influenced by incentives, monetary and non-monetary, using theoretical approach and empirical research. From a policy making perspective, we look for the best incentive in case of being implemented, maximizing the gap between attracted and dissuaded individuals. We would be happy to suggest, according to our results, some incentive that would attract new donors at the same time that minimizes the crowding-out of active donors.

A theoretical model analyzes the crowding effects of incentives looking at the changes in individuals' utility when incentives are offered. The model is general for both kinds of donations. We assume that behind the decision of becoming or not a blood or living organs are social preferences. This means that individuals are not only self-interested but are also concerned about the others' payoffs (Charness and Rabin, 2002; Andreoni, 1990). Altruism, reciprocity or intrinsic pleasures in helping others are some examples of social preferences.

Empirically, we explore the agreement/disagreement with different incentive mecha-

nisms in a population of blood donors and staff from a university population.

The paper is organized as follows. In section 2, we study, through a model of expected utility, how incentives could affect individuals' behavior. We analyze the motivation crowding effects and provide the model results. In section 3 we present the questionnaire on attitudes towards blood and living organ donations, and analyze, through descriptive statistics and regression models, the relationship between incentives and individuals' willingness to donate blood or living organs. Section 4 opens a discussion and the paper concludes in section 5 where we comment the most relevant aspects and results of this study, and mention the implications for future research or public policies.

2 The Model

Denote by $I = 1, \ldots, n$ the set of individuals who face the decision of becoming or not blood/living organ donors, and $J = 1, \ldots, m$ the set of potential recipients (that is, the total number of individuals waiting for a transfusion or an organ transplantation of a kidney or a liver in a population of size P).

It can be observed that the number of individuals waiting for a transfusion or for an organ is strictly higher than the number of donors. This implies that the number of donors is lower than the number of existing recipients in the waiting lists for a transfusion or transplantation. Therefore, offering incentives to reduce the gap between supply and demand makes sense. Otherwise incentives will not be necessary.

We also assume that individuals do not decide only once to become or not donors, but they make the decision several times in their time horizon $t = A, \ldots, A + L_i$. The time horizon goes from the first time the individual decides if he/she is willing to become or not a donor ($t = A$, where A is the age of the individual at that time) until the last time the individual makes such a decision. The individual may stop to be willing to donate anymore or may be asked to stop donating because of age or health reasons at time $t = A + L_i$. However, this will not change any of the model results.

We propose a utility function for any individual $i \in I$ who faces the decision of

becoming or not a donor at time t. The expected utility of becoming a donor is a function of the following arguments: the consumption of goods and services, the expected costs and benefits for donating, and the external intervention (the incentive).

$$U_{i,t} := U_{i,t}\Big(X_{i,t}, C_{i,t}, S_{i,t}, G_{i,t}, U_{j,t}\Big) \tag{1}$$

The first two arguments represent the consumption of goods and services, X_i, and the expected costs of donation (C_i); S_i represents the incentive, G_i represents the very pleasure of giving, known as the "warm-glow" (Andreoni, 1990), and U_j the expected utility for the recipient $j \in J$. We assume j is unknown in the case of blood donations, and known in the case of living organ donations, focused the later on donation between relatives only. The realization of each variable (measured by utility units) will be represented by small letters, representing the benefits and costs that an individual observes at each time point.

We assume that individuals are in part self-interested so that they donate in part by egotistic reasons such as pride or social acceptation, but also that in part they donate because of altruistic reasons, such as the pleasure of the very fact of giving and the expected health improvements for the recipient when receiving the donation. In other words, individuals are defined by "other-regarding preferences". These models, considering altruistic individuals, other-regarding behavior and social values, have been analyzed previously in the literature (Becker, 1976, Simon, 1993, Bowles and Polanía, 2012).

The model that we propose is, as far as we know, the first considering that, an individual, when making a decision at a certain time point, considers not only the benefits and costs at that time but also makes expectations about the future benefits and costs, and these expectations also account for the decision of donating blood or living organs. The standard assumption of temporal positive preferences is made, and therefore the expected utility for donating at time t for the individual i is the discounted sum (the sum is represented by the integral and is the discount factor) of the expected utility along the time horizon. The following expression represents the expected utility of the

decision of becoming a donor at any time point on the time horizon that goes from $t = A$ to $t = A + L_i$:

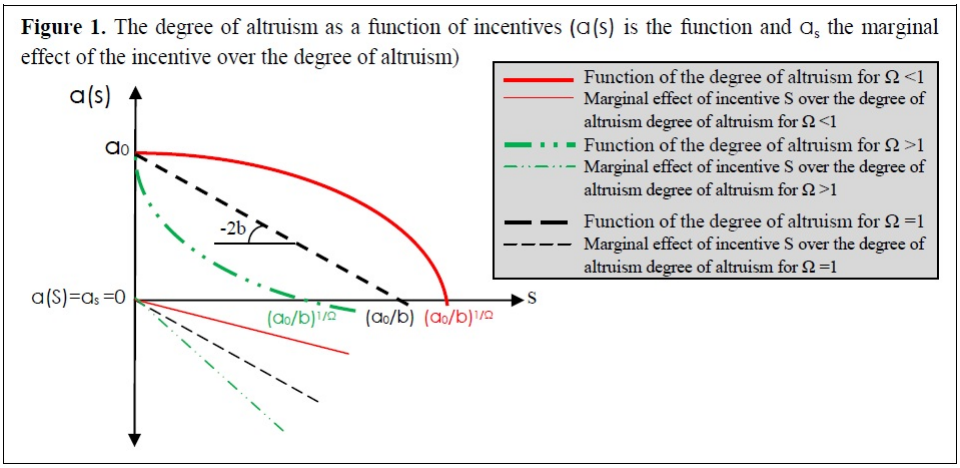
$$U_{i,t}(.) = \int_{t}^{A+L_i} e^{-\rho \cdot t} \cdot \left[x_{i,t} - c_{i,t} + s_{i,t} + a_{i,t}(S) \cdot \left(g_{i,t} + u_{j,t}^{\beta_i} \right) + \lambda_{i,t} \cdot s^{\alpha_i} \right] dt, \qquad \forall t \geq A \quad (2)$$

where A represents the age of the individual at the first time facing such a decision and L_i is the last time and individual faces that decision (either voluntarily or compulsorily for reasons of health or age); $a_{i,t}$ is the degree of altruism ($a_{i,t} \in \mathbb{R}^+$) which is a function of incentives, and $\lambda_{i,t}$ the propensity (+) or aversion (−) to accept incentives for that individual at that time, α_i and β_i are the elasticity of the utility of the i-individual from incentives and from the utility of the recipient, respectively, and the discount factor ρ indicates a positive depreciation of the total utility over the time.

Similar to other models in the literature (Bowles and Polanía, 2010), we assume altruism is a function of incentives. The difference is that we propose a non-linear function, assuming that not all the units of the incentive S affect equally to the degree of altruism. The function of altruism proposed is the following:

$$a_{i,t}(S) = a_{0,i,t} - b_{i,t} \cdot s_{i,t}^{\Omega_{i,t}} \quad (3)$$

We assume that $a'_s \leq 0$, so that receiving positive quantities of an incentive S reduces the individuals' degree of altruism from the initial degree of altruism. Only for simplicity, lets' give a value to parameters alpha and omega $\alpha_i = \Omega_i = 2$, such that each unit of incentive S provokes a reduction of the degree of altruism equal to $a'_s = -2 \cdot b \cdot s$, for b taking strictly positive values and with a random distribution in the support $b \in [\underline{b}, \bar{b}]$. The function for the degree of altruism and the marginal effects of incentive over that function is represented in figure 1 below. A result that is clear in that figure is that the lower (higher) the value of parameters b and Ω, the higher (lower) is the incentive that the individual would be willing to accept before the degree of altruism is zero.



Including the function proposed for the degree of altruism in the utility function, it can be rewritten as follows:

$$U_{i,t}(.) = \int_{t}^{A+L_i} e^{-\rho \cdot t} \cdot \left[x_{i,t} - c_{i,t} + s_{i,t} + \left(a_{0,i,t} - b_{i,t} \cdot s_{i,t}^2\right) \cdot \left(g_{i,t} + u_{j,t}^{\beta_i}\right) + \lambda_{i,t} \cdot s^2 \right] dt, \quad \forall t \geq A \tag{4}$$

Under the standard assumption that individuals are utility maximisers, they will decide to become donors if and only if the expected utility of becoming a donor is positive higher than the utility of deciding not to become a donor ($U_{i,t}^0$). For simplicity, we assume that this utility is zero, $U_{i,t}^0 = 0$.

2.1 Motivation Crowding Effects

We will focus first on analyzing all possible crowding-effects of incentives as variations in the individual's marginal and total utilities when incentives are offered.

The Motivation Crowding Effects are analyzed through the variations in the utility for each additional unit of incentive. By offering an incentive S three different effects on the marginal utility are possible:

- Crowding-in: for each additional unit of the incentive, utility increases in a higher proportion. That is $U_s > 0$ and $U_{ss} > 0$.

- Weak Crowding-out: for each additional unit of the incentive, utility increases in a lower proportion. That is $U_s > 0$ and $U_{ss} < 0$
- Strong Crowding-out: for each additional unit of the incentive, the utility from donating decreases ($U_s < 0$).

Depending on the values of the parameters of the model, the individual would be crowded-in or crowded-out. From the model, we can get the expression for the marginal utility from the incentive, which is:

$$U_s = e^{-\rho \cdot t} \cdot \left[1 - 2 \cdot b_{i,t} \cdot s_{i,t} \cdot (g_{i,t} + u_{j,t}^{\beta_i}) + 2 \cdot \lambda_{i,t} \cdot s_{i,t}\right]\Big|_{t=L_i} \tag{5}$$

Making that expression equal to zero we find the threshold incentive, s^*, for any individual.

$$s^* = \frac{1}{2 \cdot \left[b_{i,t} \cdot (g_{i,t} + u_j^{\beta_i}) - \lambda_i\right]} \tag{6}$$

It can be deduced from this result that the optimal incentive for individuals who are averse to incentives is lower than for individuals who are more prone to incentives (all the rest of the parameters being equal for both individuals).

$$s^*_{\lambda_i > 0} > s^*_{\lambda_i < 0} \tag{7}$$

This result can be generalized as it is done in the following proposition:

Proposition 1: For any pair of individuals $\{1, 2\} \in I$ with the same values of b, g, $u_j^{\beta_i}$:

- If individuals have propensity to incentives, so that $\lambda > 0$, it is true that those individuals with higher propensity would accept higher quantities of the incentive: $s^*_{\lambda_1} \geq s^*_{\lambda_2} \Leftrightarrow \lambda_1 \geq \lambda_2$
- If individual 1 has propensity to incentives and individual 2 is averse, it is true that the first will accept a higher quantity of the incentive than the second.

- If both individuals have aversion to incentives, and for the individual 1 more averse than the individual 2, the first individual would accept lower quantities of the incentive: $s^*_{\lambda_1} \leq s^*_{\lambda_2} \Leftrightarrow \lambda_1 \leq \lambda_2$

Also, according equation 6, the higher the value of b, the lower the incentive that would be accepted. This result leads to the following proposition.

Proposition 2: For any pair of individuals $\{1, 2\} \in I$ with the same values of λ, g, $u_j^{\beta_i}$, if individual 1 has a higher value of b than individual 2, being stronger the negative effect of incentives over the degree of altruism, the maximum incentive that individual 1 will be willing to accept is smaller than the incentive that individual 2 will accept.

Proof for propositions 1 and 2: We can write the expressions for the disutility of an individual who is propense (equation 8) or averse (equation 9) to incentives as follows:

$$\Delta^- U_i|_{S>0} = \int_t^{A+L_i} e^{-\rho \cdot t} \cdot \Big[- b \cdot s^{\Omega} \cdot (g + u_j^{\beta}) \Big] dt \tag{8}$$

$$\Delta^- U_i|_{S>0} = \int_t^{A+L_i} e^{-\rho \cdot t} \cdot \Big[- b \cdot s^{\Omega} \cdot (g + u_j^{\beta}) + \lambda \cdot s^{\Omega} \Big] dt, \forall \lambda < 0 \tag{9}$$

As the disutility for the individual who has aversion to incentives is higher than the disutility of incentives for the individual who has propensity to incentives, for the same quantity of incentive the individual who is averse has a stronger disutility. Therefore, the incentive that makes total utility equal to zero is smaller for the individual who has aversion to incentives. The same proof can be made for both individuals being averse, and for both individuals who are propense, in this case by showing the utility gains instead of disutility.

Proposition 2 is demonstrated as follows: the higher the value of b the higher the disutility of the incentive. For two individuals who show either propensity or aversion to incentives, the disutility of the individual who has a higher value of b is higher, and therefore, the incentive that is going to tolerate as maximum will be smaller.

3 Empirical Work

In a broad questionnaire on attitudes towards blood and living organ donations (see Cabasés, Errea; Working Paper, 2011) we include some questions on incentives for blood and living organ donations. The aim is to find the different perception that blood and non-blood donors and individuals with different willingness to donate living organs have concerning a list of incentives.

3.1 Data Collection

Data were collected between June and December 2010. Two different formats of the same questionnaire were distributed: a pen and pencil questionnaire to a selected population of 500 blood donors ($n_1 = 210$ is the number of questionnaires finally recruited, representing the 42% of the initially contacted), and an online questionnaire to the 2000 members of the staff community at the Public University of Navarre ($n_2 = 282$ questionnaires finally recruited from the university population, around the 15%). We finally have a total of $N = 492$ questionnaires recruited.

3.2 The Questionnaire

In those questions which refer to incentives, individuals may choose their level of agreement/disagreement with each of the incentives. We propose a 4-leveled likert scale, from "Completely Agree" to "Completely disagree". Individuals have also a NA (not answer) fifth choice.

We mix monetary, non-monetary and exhortation incentives in order to compare individuals' preferences for the different kinds of incentives. We also want to explore the preferences over incentives for blood and non-blood donors, and for individuals who would be willing to donate an organ in life and those who would not. The questionnaire begins asking about pesonal information and characteristics that allow us to classify individuals among blood/non-blood donors and other socio-demographic characteristics such as age, education and other. In the block of questions concerning living organ

donations a question on willingness to donate an organ in life to a relative helps to classify individuals in this aspect.

We ask individuals to choose their agreement with the following incentives:

- For blood donations: some reward, fiscal deductions, university credits for students, monetary payment, priority in health care, social recognition, information on blood donations, and blood tests.

- For living organ donations: some reward, money, fiscal deductions, preference in health care, and priority in the waiting list for an organ in the future.

The question made is *"How much would you agree/disagree with the incentive X?"*. Individuals have to choose a level of agreement/disagreement in a scale, for each of the incentives.

3.3 Descriptive Analysis

Among our individuals, 318 are blood donors (a 64.63%) and 174 are not blood donors (a 35.36%). We have to remark that from the blood donors there is a high proportion of regular donors (218) and also the population of blood donors is very different from the reality, as the percentage of donors in the spanish population is between 5% and 10%. However, this was done purposely, in order to be able to describe and to analyze the differences in preferences reported by blood and non-blood donors. The distribution of individuals according to age and gender is similar to that of the general population in Navarra in the same year that the data were collected, 2010.

Analyzing the responses given to incentives for blood donations, we find that there is a higher proportion in disagreement than in agreement with offering "Any reward" to blood donors. Individuals do not agree with fiscal deductions, university credits, monetary rewards and priorization. Exhortation mechanisms seem more plausible, agreeing individuals on the idea of rewarding blood donors by sending statistics on donations and blood test after each donation process. Results are shown in Table 1.

Table 1. Incentives and blood donations: Proportion of responses for each level of agreement for each of the incentives (N=453, missing values have been removed).

	Completely Disagree	Some Disagreement	Some Agreement	Completely Agree	N/A
Some reward	0.399	0.169	0.269	0.132	0.028
Fiscal Deductions	0.485	0.172	0.194	0.112	0.035
Money	0.713	0.110	0.101	0.057	0.017
Priority in health care	0.381	0.119	0.269	0.211	0.017
Social Recognition	0.231	0.158	0.298	0.278	0.033
University Credits	0.547	0.181	0.147	0.099	0.024
Information Blood Donations	0.039	0.026	0.309	0.591	0.033
Blood Tests	0.028	0.013	0.207	0.735	0.015

We checked the differences between blood and non-blood donors do not find strong differences in their agreement with many of the incentives between blood and non-blood donors, but only in a few of them, so results are the aggregation of answers from blood and non-blood donors. Only answers given to social recognition and priority in health care differ between both groups. Results suggest that for the non-blood donors, incentives such as "priority in health" care and "social recognition" are better accepted than for the blood donors, both of them achieving the 80% of the answers aggregating the two levels of agreement. Concerning economic incentives, it is true that the majority of the respondents show disagreement with "monetary payments". However, the percentage of individuals who agree with such an incentive is non-negligible among the non-blood donors, being the 27%. Both, blood and non-blood donors, accumulate a higher percentage in the completely agree/some agree levels for the non-monetary incentives such as "blood" tests and "information about blood donation". The regression analysis in the next section will provide reinforce this descriptive results by including some individual characteristics in the regression models.

For the whole sample, according to the proportion of answers we can establish the following order of preferences, from the most to the least preferred incentives:

Blood Tests $\succ$ Information $\succ$ Social Recognition $\succ$ Priority in Health Care $\succ$ Fiscal Deductions $\succ$ Money

For the sample of Blood Donors the order remains equal than for the full sample. However,

some slight differences can be observed for the sample of Non Blood Donors.

Blood Tests $\succeq$ Information $\succ$ Social Recognition $\succ$ Priority in Health Care $\succ$ Money $\succeq$ Fiscal Deductions

We cannot say that the ways blood and non blood donors order incentives are different, and then, we can say that, in global for our population, Blood Tests are the incentives that would report the highest utility to individuals, and money the lowest.

Concerning incentives for living organ donations (Table 2), we find that, in general, individuals agree on offering some reward to living organ donors. However, there is disagreement with offering a monetary payment for these donations. Concerning fiscal deductions there is a high disagreement but it cannot be ignored the sum of frequencies in levels 1 and 2 (completely agree and some agree) which is not small, involving more than 30% of the respondents. The incentive with the highest level of agreement is offering preference in the waiting lists for living organ donors.

Table 2. Incentives and living organ donations: Percentage of responses for each level of agreement for each of the incentives.

	Completely Disagree	Some Disagreement	Some Agreement	Completely Agree	N/A
Some Reward	0.256	0.140	0.267	0.308	0.028
Money	0.665	0.153	0.094	0.049	0.036
Fiscal Deductions	0.476	0.150	0.183	0.148	0.040
Preference in waiting lists	0.262	0.105	0.262	0.340	0.028
Priority in Health Care	0.446	0.204	0.174	0.127	0.047

We observe in this case that individuals are more prone to accept *Preferences in the waiting lists*, followed this incentive by *Some Reward*. The responses of individuals indicate the highest proportion of disagreement when asking about *Monetary payments*, followed by *Fiscal deductions* and *Priority in Health Care*.

3.4 Regression Analysis

We estimate ordered logit models (a different model for each of the incentives) in which the dependent variable is the level of agreement with the incentive, and the independent variables are individuals characteristics. Unconditional and conditional estimations will be shown separately for blood and living organ donations.

Concerning blood donations, we estimate one simple (equation 10) and one multiple ordered logit model (equation 11), the latter conditioned to k individual's characteristics X_i (being or not a blood donor, gender, age, predecessors who donate among relatives or friends).

$$Y_i^* = \alpha_1 \cdot BD_i + \epsilon_i \tag{10}$$

$$Y_i^* = \alpha_1 \cdot BD_i + \alpha_k \cdot X_i + \epsilon_i \tag{11}$$

Where $Y_i^* = Pr[Y = y]$ for $y = \{1, 2, 3, 4\}$ and the independent variable $BDi = \{0, 1\}$ takes value 1 if the individual is a blood donor, and value 0 otherwise.

Similar regression analysis is made to explore the perception of incentives for living organ donations: one simple and one conditional ordered logit model, conditioned to k individual's characteristics X_i (willingness to donate, gender, age, predecessors who donate among relatives or friends, having an organ donor card).

$$Y_i^* = \alpha_1 \cdot WTD_i + \epsilon_i \tag{12}$$

$$Y_i^* = \alpha_1 \cdot WTD_i + \alpha_k \cdot X_i + \epsilon_i \tag{13}$$

Where the independent variable $WTDi = \{0, 1\}$ takes value 1 if the individual is completely willing to donate, 0 otherwise. The dependent variable Y_i again takes four positive discrete values: $y = \{1, 2, 3, 4, 5\}$, where the responses are in ascending order of agreement, from *1= Completely Disagree* to *4=Completely Agree* and level 5 for *Not Applicable/Do not answer*.

The aim is to calculate the probability of individuals, for each of the incentives and according to certain individuals' characteristics X_i, of belonging to each of the agreement levels. For the case of blood donations, for each type of incentive, we can calculate after having estimated two models: One to estimate differences between blood and non-blood donors, $Pr[Y = y|BD]$, and a second model in which we condition not only to being or not a blood donor, but also we condition to individual characteristics, $Pr[Y = y|BD, X]$. Similarly we calculate the associated probabilities to the models estimated for the living organ donations' case. This will give us a measure of the risk of increasing the number of blood donors or encouraging individuals towards living organ donations (crowding-in), as well as the probabilities of loosing or dissuading individuals (crowding-out) from donating blood and living organs respectively.

3.5 Results of the Estimations

First regression model estimation results show that there are significant differences between blood and non-blood donors in the agreement/disagreement with respect to the following incentives:

some reward, university credits, money, social recognition, and blood tests. The sign of the coefficients tell the increase (+) or decrease (−) in the probability of being completely agree with that incentive for the blood donors with respect to the non-blood donors. We eliminate the NA responses (level 5) and missing answers for the analysis. Results are shown in Table 3 below.

Table 3. Logit Model Estimates for the case of Blood Donations (eliminating the NA responses)

DEPENDENT VARIABLES (Y)																
SIMPLE ORDERED LOGIT[1]	Some reward		Fiscal deductions		University credits		Money		Social recognition		Priority in Health Care		Information		Blood tests	
BD_i	-0.443** (0.115)		-0.018 (0.180)		0.950*** (0.518)		-1.958*** (0.032)		-0.402*** (0.118)		-0.230 (0.141)		-0.085 (0.181)		0.908*** (0.537)	
cut 1	-0.632 (0.151)		0.016 (0.151)		0.862 (0.166)		-0.120 (0.155)		-1.403 (0.160)		-0.611 (0.151)		-3.230 (0.272)		-3.053 (0.300)	
cut2	0.057 (0.148)		0.749 (0.155)		1.722 (0.181)		0.685 (0.160)		-0.644 (0.149)		-0.118 (0.148)		-2.622 (0.223)		-2.605 (0.251)	
cut3	1.555 (0.173)		1.999 (0.187)		2.892 (0.219)		1.950 (0.218)		0.651 (0.150)		1.147 (0.159)		-0.473 (0.158)		-0.536 (0.160)	
Probabilities	BD-0	BD-1	BD-0	BD-1	BD-0	BD-1	BD-0	BD-1	BD-0	BD-1	BD-0	BD-1	BD-0	BD-1	BD-0	BD-1
P(Y=1|BD)	0.34	0.45	0.50	0.50	0.70	0.47	0.46	0.86	0.19	0.26	0.35	0.40	0.03	0.04	0.04	0.02
P(Y=2|BD)	0.16	0.17	0.17	0.17	0.15	0.20	0.19	0.07	0.14	0.17	0.11	0.12	0.02	0.03	0.02	0.01
P(Y=3|BD)	0.31	0.25	0.20	0.19	0.09	0.19	0.21	0.04	0.31	0.30	0.28	0.27	0.31	0.32	0.30	0.16
P(Y=4|BD)	0.17	0.11	0.12	0.11	0.05	0.12	0.12	0.01	0.34	0.25	0.24	0.20	0.61	0.59	0.63	0.81
CONDITIONAL ORDERED LOGIT	Some reward		Fiscal deductions		University credits		Money		Social recognition		Priority in Health Care		Information		Blood tests	
BD	-0.509*** (0.187)		-0.135 (0.194)		0.866*** (0.212)		-2.051*** (0.242)		-0.504** (0.186)		-0.281 (0.186)		0.028 (0.207)		0.781*** (0.227)	
BLOOD DONOR PREDECESSORS	-0.278 (0.207)		-0.106 (0.215)		-0.354 (0.223)		-0.338 (0.263)		0.291 (0.202)		-0.023 (0.202)		0.083 (0.231)		0.172 (0.264)	
ORGAN DONOR PREDECESORS	-0.515 (0.373)		0.178 (0.367)		0.116 (0.394)		-0.338 (0.452)		-0.070 (0.377)		-0.048 (0.383)		0.280 (0.427)		-0.421 (0.412)	
BLOOD & ORGAN DONOR PREDECESSORS	-0.375 (0.245)		0.046 (0.255)		-0.421 (0.272)		-0.320 (0.323)		-0.155 (0.247)		-0.111 (0.246)		-0.667*** (0.267)		-0.141 (0.306)	
MAN	0.482*** (0.185)		0.606*** (0.194)		0.711*** (0.202)		0.512** (0.240)		0.262 (0.183)		0.293 (0.182)		-0.110 (0.205)		0.471*** (0.234)	
AGE	-0.035*** (0.009)		-0.036*** (0.009)		-0.041*** (0.009)		-0.038** (0.012)		0.007 (0.009)		-0.022*** (0.009)		-0.012 (0.010)		-0.004 (0.011)	
cut 1	-2.107		-1.287		-0.720		-1.691		-0.953		-1.477		-3.929		-3.103	
cut2	-1.408		-0.539		0.148		-0.861		-0.181		-0.971		-3.300		-2.653	
cut3	0.118		0.725		1.368		0.425		1.152		0.316		-1.071		-0.577	

****, **, * refer to 0.01, 0.05 and 0.1 significance levels respectively. Standard errors are shown in brackets.*

Blood donors have a lower probability than the non-blood donors of agreeing completely with the idea of offering "some reward" to blood donors ($P[Y = 4|BD = 1] = 0.11 < P[Y = 4|BD = 0] = 0.17$) . The same effect is observed for "social recognition" and for "money", in which we find specially a difference between blood and non-blood donors (notice that for blood donors the probability of complete agreement is zero). On the contrary, blood donors have a higher probability than non-blood donors of agreeing completely with compensations such as offering "university credits for students" and "free blood tests".

Looking at results for the conditional logit model, we observe that same results are obtained when looking at differences between blood and non-blood donors. The sign of the coefficients does not change, indicating a more robust estimation when including control variables. We

observe that those individuals who report having blood and organ donors' predecessors have a lower probability of agreeing with "Information" than those who do not have predecessors. This difference appears to be significant. In addition, there is a difference between men and women that is significant for some incentives: some reward, fiscal deductions, money, university credits and blood tests. Men have a higher probability of agreement with those incentives than women. In general, we observe that the elder a respondent is, the lower the probability of agreeing with any of the incentives.

The estimation of each of the model allows calculating the probabilities for blood and non-blood donors of being in each of the level of agreement. This is reflected in the table, down to the estimation model results.

We now explore the differences in level of agreement/disagreement with each of the incentives for living organ donations. Results are shown in Table 4.

Table 4. Logit Model Estimates for the case of Living Organ Donations (eliminating the NA and missing answers)

SIMPLE ORDERED LOGIT	DEPENDENT VARIABLES (Y)									
	Some reward		Money		Fiscal Deductions		Preference in health care		Priority in the Waiting lists	
WTD$_i$	-0.182 (0.176)		-0.085 (0.209)		0.194 (0.186)		-0.329* (0.179)		0.051 (0.181)	
cut 1	-1.144 (0.157)		0.763 (0.169)		0.114 (0.155)		-1.124 (0.161)		-0.102 (0.149)	
cut2	-0.498 (0.148)		1.690 (0.188)		0.769 (0.159)		-0.749 (0.154)		0.803 (0.153)	
cut3	0.653 (0.150)		2.868 (0.253)		1.820 (0.182)		0.389 (0.151)		1.894 (0.181)	
Estimated Probabilities	WTD-0	WTD-1	WTD-0	WTD-1	WTD-0	WTD-1	WTD-0	WTD-1	WTD-0	WTD-1
P(Y=1|WTD)	0.241	0.276	0.682	0.700	0.528	0.479	0.223	0.285	0.474	0.461
P(Y=2|WTD)	0.136	0.145	0.162	0.154	0.154	0.159	0.097	0.110	0.216	0.218
P(Y=3|WTD)	0.279	0.275	0.101	0.095	0.177	0.195	0.275	0.275	0.178	0.183
P(Y=4|WTD)	0.342	0.302	0.053	0.049	0.139	0.164	0.403	0.327	0.130	0.136
CONDITIONAL ORDERED LOGIT[2]	Some reward		Money		Fiscal Deductions		Preference in health care		Priority in the Waiting lists	
WTD$_i$	-0.148 (0.180)		-0.033 (0.218)		0.200 (0.192)		-0.381** (0.183)		0.005 (0.185)	
DONOR CARD	-0.210* (0.110)		0.071*** (0.132)		0.039 (0.114)		0.185* (0.109)		0.107 (0.113)	
BLOOD DONOR PREDECESSORS	0.183 (0.207)		-0.298 (0.240)		-0.106 (-0.377)		-0.056 (0.203)		-0.193 (0.210)	
ORGAN DONOR PREDECESORS	-0.215 (0.359)		-1.167*** (0.569)		-0.193 (0.250)		0.139 (0.372)		-0.732* (0.398)	
BLOOD & ORGAN DONOR PREDECESSORS	-0.427* (0.242)		-1.017*** (0.321)		0.698 (0.192)		-0.283 (0.239)		-0.398 (0.251)	
MAN	0.592*** (0.186)		0.328 (0.222)		0.698*** (0.192)		0.431** (0.180)		0.382** (0.187)	
AGE	-0.053*** (0.009)		-0.065*** (0.011)		-0.038*** (0.009)		-0.023** (0.009)		-0.022** (0.009)	

Significant differences are found between individuals who state to be completely willing to donate and those who don't through the simple ordered logit for the *Preference in health care*. In that case individuals who would be completely willing to donate are less likely to agree with that kind of incentive than those individuals who report a weaker willingness to donate. Including additional characteristics, the conditional ordered logit detects some significant differences related to *having a donor card* and *organ donor predecessors among relatives* (the probability of agreeing with monetary payments is lower for individuals who are completely willing to donate), *gender* (men are more likely to agree with many incentives than women) and *age* (the older an individual is, the lower the probability of agreement with that incentive).

4 Discussion

The economic model for the decision of becoming or not a donor is general for both kinds of donations considered in this paper (blood and living organ donations). This does not avoid that the values for the arguments in the utility function differ depending on the decision context is donating blood or an organ in life: for example, the value for the expected costs will be, in general, higher when the individual is thinking about donating an organ. We think that the arguments included describe well the decision making process in the two contexts: there should be a per-se benefit, an expectation of well-being due to the expected improvement in the recipient, unknown in the case of blood donations, and possibly very different in magnitude to that of donating an organ to a relative, and some expectation of costs (in terms of health, time dedicated to the donation process, or other).

We consider a specific hypothetical situation in which some compensation is offered for donating. Therefore, incentives are also an argument of the utility function, influencing individuals' final decision. Incentives affect the selfish and altruistic parts of the utility. The total effect of the incentive over utility depends on the weight that the individual gives to the impact of incentives to the degree of altruism and self-interest. However, as we said before, incentives are one of many other arguments influencing the final decision. Therefore, even the result of introducing incentives is negative (a decrease in utility) the individual may decide to become a donor for other reasons (high per-se benefit, high expectations of improvement for the recipient...).

In the questionnaire we explore the opinion of individuals concerning different incentives. Individuals had to report their level of agreement/disagreement with each of the incentives proposed. There were monetary and non-monetary incentives. The incentives are hypothetical,

so that they were not evaluating real incentives. Responses, therefore, should be interpreted as how happy an individual would be with each of the incentives, if applied.

Our results are descriptive but could be a clue for policy making. Relating the degree of agreement and disagreement with incentives to the fact of being a blood/non-blood donor, or to the degree of willingness to donate an organ, we observe which incentives could be more attractive for the non-blood donors, and for individuals with a weaker willingness to donate, and also which incentives would be less attractive to blood donors and to individuals with a stronger willingness to donate an organ. This information should be contrasted (field experiment), but could be a clue of which incentives would be more likely to crowd-in new donors and also to identify the incentives with higher risk of crowding-out donors.

5 Conclusions

Individuals' decision may be influenced by external interventions. Individuals' preferences may not be stable, but may change, essentially depending on the effects of external interventions over individuals' intrinsic and extrinsic motivation.

This paper explores how individuals' behavior, and specifically the decision of becoming or not a donor, could be influenced by incentives.

The theoretical model analyzes the effect of introducing incentives into the utility function of impure altruistic individuals. When incentives exist there is always, for altruistic individuals, a crowding-out effect of offering incentives. However, there can also be a crowding-in effect, as incentives do not affect only the altruistic part of the utility but also the egoistic part, and individuals could be attracted somehow by incentives. The difference between these two effects determines the total effect for each quantity of the incentive offered. The main result, and contribution, of this model is that each individual has a different willingness to accept a different compensation, depending on his or her propensity or aversion to receive incentives. A limitation is that, in practice, it is impossible to individualize the incentives, offering a different compensation for each individual. However, having knowledge about the willingness to accept in a certain society, a social planner could use that information to decide which would be the best incentive in terms of individuals attracted (crowding-in) versus dissuaded (crowding-out).

The questionnaire allows calculating the probabilities of different types of individuals of agreeing or disagreeing with each kind of the incentives. Concerning blood donations we find that Crowding-In of non-blood donors becomes more likely if we offer Statistics or Blood tests, while

Crowding-Out of active blood donors would be more likely if we offer Money, Fiscal Deductions or Some Reward in general. Concerning living organ donations we do not find good evidence for Crowding-In. Crowding-Out of individuals who are completely willing to donate could happen if we offer Money, Fiscal Deductions or Priority in Health Care.

We conclude that donation policies should be focused on non-monetary incentives rather than on monetary payments as the later imply a higher risk of losing donors.

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