MODELLING THE EFFECT OF INCENTIVES OVER THE DECISION TO DONATE BLOOD AND LIVE ORGANS

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Is there an incentive mechanism that could attract individuals to donation?

Is there an incentive mechanism that could attract **more** individuals **than it would dissuade** to donation?

MODELLING THE EFFECT OF INCENTIVES OVER THE DECISION TO DONATE BLOOD AND LIVE ORGANS

- **Theoretical model**
  - Individuals are impurely altruistic
- **Empirical Work**
  - Questionnaire on attitudes and incentives to Blood and Living organ donations

MODELLING THE EFFECT OF INCENTIVES OVER THE DECISION TO DONATE BLOOD AND LIVE ORGANS

- **Literature review**
  - *Impure* Altruism (Andreoni, 1990)
  - MCT (Deci and Ryan, 1975) & Crowding-Effects (Titmuss, 1978)?
    - **Crowding-in vs Crowding-out** of Financial & Non-Financial Incentives (Becker and Elias, 2007; Frey and Jegen, 2001; Thorne, 1998 ; Lacetera and Macis, 2008, 2010, 2012)

MODEL

An individual, partly self-interested, partly altruistic, faces the decision of becoming or not a blood/living organ donor

$$U_{i,t} = \int_{t}^{t+L_i} e^{-\rho \cdot t} \cdot \left[(1 - a_{i,t}(S)) \cdot (x_{i,t} - c_{i,t} + s_{1t}) + a_{i,t}(S) \cdot \left(g_{i,t} + u^{\beta_i}{}_{j,t} \right) \right] \cdot dt \quad , \forall t \geq A$$

Degree of Self-interest → S = (s1, s2) financial & non financial Incentives

Standard set g&s

Expected costs of donation

Financial Incentives

Degree of altruism → S = (s1, s2)

Warm glow

Recipient's utility

MODEL

The degree of altruism may be affected by incentives!

$$a(S) = a_0 - b \cdot s_1^{\Omega} + (\lambda \cdot s_2)^{\alpha}$$

FIG. 1. CROWDING-IN & WEAK CROWDING-OUT

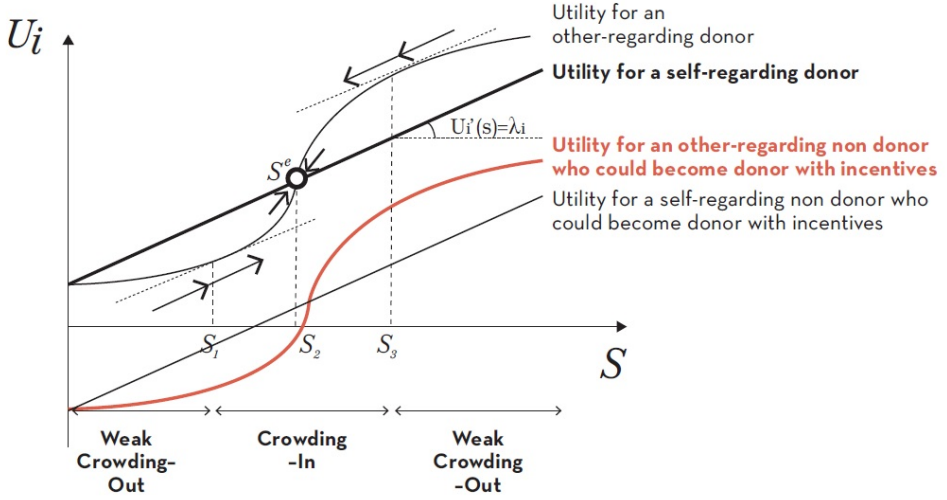
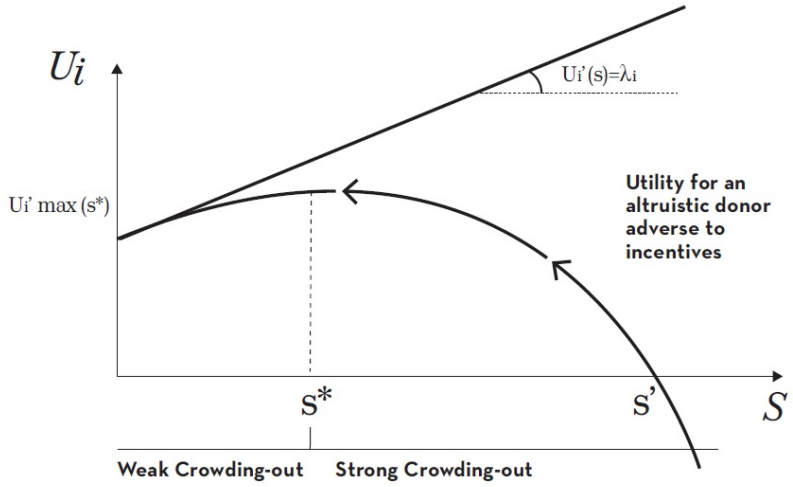


FIG.2. STRONG AND WEAK CROWDING-OUT



MODEL

When incentives are offered, an individual would decide to donate (**attracted to donation)** if and only if:

1. U(donating|S>0) is positive

2. U(donating|S>0) is higher than U(donating|S=0)

3. The utility from donating must be higher than the utility of not donating (or **if utility of not donating is negative then the individual would be attracted**)

MODEL SOLUTIONS

Incentives attract individuals to donation	Comments
Condition 1: utility from donation when incentives are offered must be positive $U(S>0)>0 \Leftrightarrow \frac{(1-a(S))}{a(S)} > \frac{-\left(g+u^{\beta_i}{}_j\right)}{(x-c+s_1)}$	For all $\left(g+u^{\beta_i}{}_j\right)>0$, the higher the degree of altruism, the lower the financial incentive that would result into positive values of the utility from donation.
Condition 2: The marginal utility from incentives must be positive. This implies that the utility with incentives must be higher than the utility without incentives. $U'(s_1>0)>0 \Leftrightarrow \Omega \cdot b \cdot s_1^{\Omega-1} \cdot \left(x-c+s_1-\left(g+u_j^{\beta}\right)\right)+\left(1-a_0+b \cdot s_1^{\Omega}-(\lambda \cdot s_2)^{\alpha}\right)\Big\|_{t=L_i} > 0$ $U'(s_2>0)>0 \Leftrightarrow \lambda^{\alpha}>0 \;\&\; s_2=1$	*Depending on the value of* Ω the relationship between b and λ is crucial to determine who will and who will not be attracted. Non-financial incentives increase utility only for individuals who are prone to incentives, in that case the best option is to offer non-financial incentives. Otherwise it is better not to offer non-financial incentives, so that $s_2=0$.
Condition 3: The utility from not donating without incentives must be negative. $U(S=0)<0 \Leftrightarrow \frac{1-a_0}{a_0} < -\frac{g+u^{\beta_i}{}_j}{x-c}$ or what is similar: $-(1-a_0)\cdot(x-c) > a_0 \cdot (g+u^{\beta_i})$	For all $\left(g+u^{\beta_i}{}_j\right)>0$, the higher the degree of initial altruism the smaller the utility from warm glow and from the recipient must be for this individual to decide not to donate without incentives.

MODEL SOLUTIONS

Incentives expel individuals from donation	Comments
Condition 1: utility from donation when incentives are offered must be negative $U(S>0)<0 \Leftrightarrow \frac{(1-a(S))}{a(S)} < \frac{-\left(g+u^{\beta_i}{}_j\right)}{(x-c+s_1)}$	For all $\left(g+u^{\beta_i}{}_j\right)>0$, the higher the degree of altruism, the lower the financial incentive that would result into negative values of the utility from donation.
Condition 2: The marginal utility from incentives must be negative. This implies that the utility with incentives must be lower than the utility without incentives. $U'(s_1>0) \Leftrightarrow \Omega \cdot b \cdot s_1^{\Omega-1} \cdot \left(x-c+s_1-\left(g+u_j^{\beta}\right)\right)+\left(1-a_0+b \cdot s_1^{\Omega}-(\lambda \cdot s_2)^{\alpha}\right)\Big\|_{t=L_i} < 0$ $U'(s_2<0) \Leftrightarrow \lambda^{\alpha}<0 \;\&\; s_2=1$	*Depending on the value of* Ω the relationship between b and λ is crucial to determine who will and who will not be attracted. Non-financial incentives decrease utility only for individuals who are averse to incentives, in that case the best option is not to offer non-financial incentives.
Condition 3: The utility from not donating without incentives must be positive. $U(S=0)>0 \Leftrightarrow \frac{1-a_0}{a_0} > -\frac{g+u^{\beta_i}{}_j}{x-c}$ or what is similar: $-(1-a_0)\cdot(x-c) < a_0 \cdot (g+u^{\beta_i})$	For all $\left(g+u^{\beta_i}{}_j\right)>0$, it is necessary that $x<c$, but also the higher the degree of initial altruism the smaller the utility from warm glow and from the recipient needs to be for this individual to decide to donate without incentives.

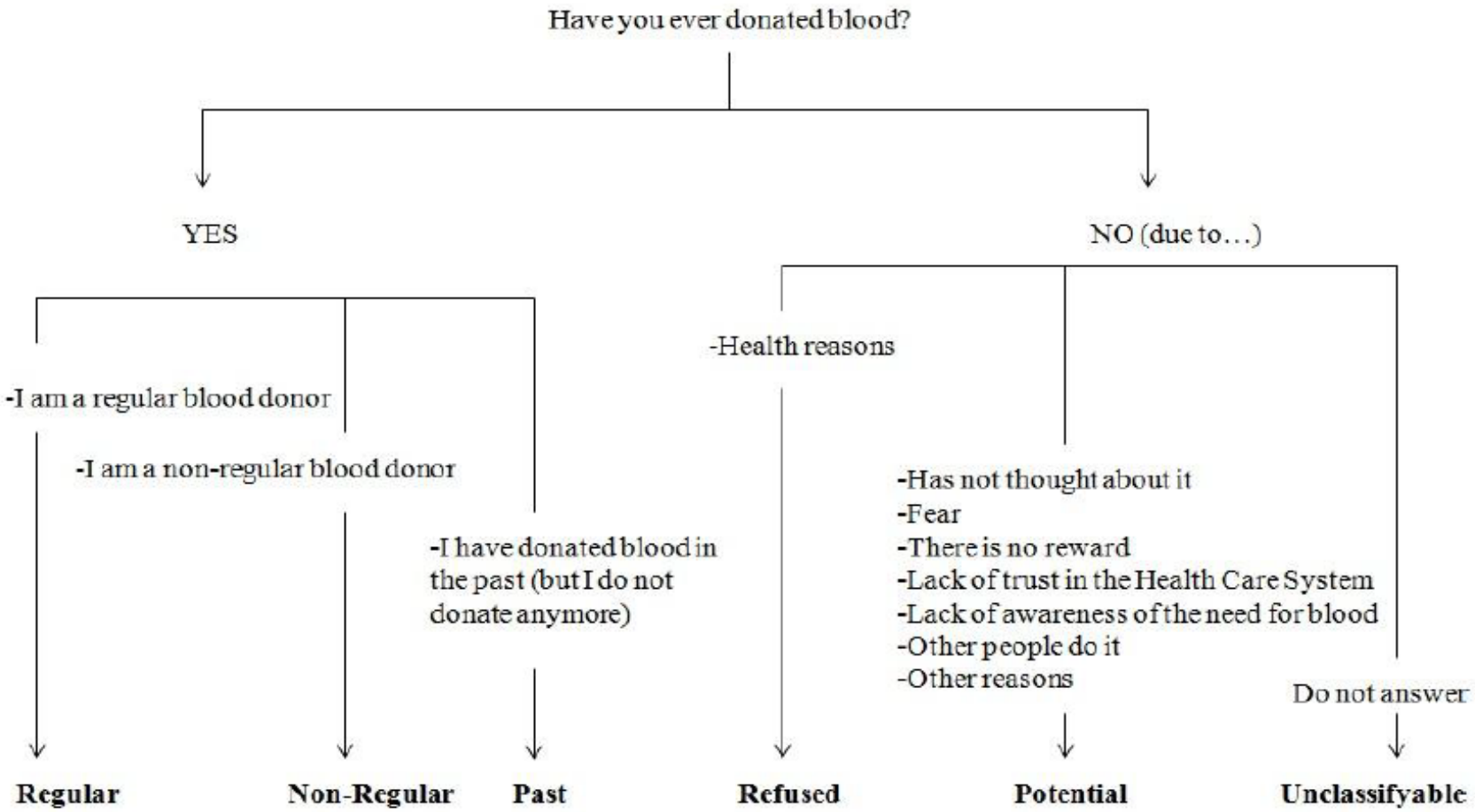
EMPIRICAL WORK

- **Questionnaire**
  - Staff of a University (UPNA, Spain)
  - Population of Blood Donors from Blood Donors Association

- **Method for analysis**
  - Probit model: dependent variable are groups of blood/living organ donors
  - Independent variables are the level of agreement/disagreement with each of the incentives

EMPIRICAL WORK

- **Classification of blood donors by groups**



EMPIRICAL WORK

- **Classification of living organ donors by groups**
  - Willingness to donate an organ in life to a relative?
    - Completely agree (Max WTD)
    - Somewhat agree/disagree (Mid WTD)
    - Completely disagree (Min WTD)

EMPIRICAL RESULTS

Incentive	Dependent Variable	Active (1) vs Potential (0)	All Blood Donors (1) vs Potential (0)	Regular (1) vs Non-Regular (0)
	Sample Analyzed	dy/dx	dy/dx	dy/dx
Fiscal deductions	Somewhat Agree	-0.122**	-0.108**	-0.032
	Somewhat Disagree	-0.145***	-0.144***	0.177
	Completely Disagree	-0.260***	-0.231***	0.150
	Does not know	-0.051	-0.186	0.157
Money	Somewhat Agree	0.093	0.085	-0.029
	Somewhat Disagree	0.354***	0.377***	-0.039
	Completely Disagree	0.771***	0.774***	-0.078
	Does not know	0.441**	0.429**	-0.316
Social Recognition	Somewhat Agree	0.011	0.024	-0.144**
	Somewhat Disagree	0.050	0.050	-0.232**
	Completely Disagree	0.026	0.022	-0.001
	Does not know	-0.126	0.036	(empty)
Information	Somewhat Agree	0.079*	0.059	-0.015
	Somewhat Disagree	0.054	0.025	-0.187
	Completely Disagree	0.039	0.016	-0.169
	Does not know	0.239***	0.172**	0.101
Blood Tests	Somewhat Agree	-0.215***	-0.178***	-0.015
	Somewhat Disagree	-0.189	-0.130	-0.444**
	Completely Disagree	-0.256**	-0.253**	-0.417**
	Does not know	-0.423**	-0.226	-0.155
N		398	443	257
Log likelihood ratio		166.83	164.17	32.59
Pseudo R2		0.3508	0.305	0.118

EMPIRICAL RESULTS

		Max WTD (1) vs Mid-Low WTD (0)		
		All	Age < 40	Age >= 40
Incentive	Variable	dy/dx	dy/dx	dy/dx
Fiscal Deductions	Somewhat Agree	-0.013	0.065	0.146
	Somewhat Disagree	-0.059	0.009	0.054
	Completely Disagree	-0.082	0.045	0.082
	Does not know	-0.153	0.220	-0.070
Money	Somewhat Agree	0.154	-0.040	-0.026
	Somewhat Disagree	0.082	-0.004	-0.161
	Completely Disagree	0.113	-0.027	-0.149
	Does not know	0.125	-0.163	-0.366
Preference in WL	Somewhat Agree	0.166***	0.191**	0.099
	Somewhat Disagree	0.243***	0.260**	0.180*
	Completely Disagree	0.202***	0.171	0.175**
	Does not know	0.141	0.262	0.320*
Priority in HC	Somewhat Agree	-0.112	-0.001	-0.208**
	Somewhat Disagree	-0.222***	-0.139	-0.285***
	Completely Disagree	-0.166**	-0.026	-0.250***
	Does not know	-0.090	-0.367	0.135
N		513	236	266
Log Likelihood ratio		25.22	17.89	32.34
Pseudo R2		0.038	0.060	0.093

CONCLUSIONS

- By offering incentives we may increase the risk of loosing blood and living organ donors that where WTD altruistically

- Some incentives are more risky than others. Results suggest relying on non-financial incentives

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¡Muchas gracias!

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