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of Donors to A Students Voluntary Organization

Juan-Camilo Cárdenas
Miguel Espinosa
Sandra Polanía Reyes

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Carrera 1 Este No. 18 A – 12, Bloque W.
Bogotá, D. C., Colombia
Teléfonos: 3394949- 3394999, extensiones 2400, 2049, 2474
infocede@uniandes.edu.co
http://economia.uniandes.edu.co

Ediciones Uniandes
Carrera 1 Este No. 19 – 27, edificio Aulas 6, A. A. 4976
Bogotá, D. C., Colombia
Teléfonos: 3394949- 3394999, extensión 2133, Fax: extensión 2158
infeduni@uniandes.edu.co

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HELPING THE HELPERS: ALTRUISM AS A RATIONAL CHOICE OF DONORS TO A STUDENTS VOLUNTARY ORGANIZATION

Juan-Camilo Cárdenas*¹, Miguel Espinosa*, Sandra Polanía Reyes**

* Facultad de Economía – CEDE, Universidad de Los Andes, Bogotá, Colombia,

** Università di Siena, Italia.

Abstract

Altruism, understood as the individual disposition to sacrifice personal income to improve someone else's income can be a rational choice strategy which responds to different motivations, incentives and institutions, in a consistent way with the donor's optimization logic. In this article we extend the Andreoni and Miller's experimental design (2002) using a modified Dictator game and we applied it to 470 students from several universities and different majors, years of study and level of income who can donate part of their income to the Bella Flor Foundation (<http://www.bellaflor.org/>), a real nonprofit organization founded by a group of college students whose mission is “*to promote the integral development of the children from Bella Flor, Paraiso and Mirador neighborhoods through social activities in education, health care, recreation, and exalting human values*”. We test the consistency of the player's decisions with the axioms of revealed preferences, and with the effects of relative prices and income. We also evaluate the violation of consistency of the axioms and estimate the demand functions for altruism towards this charity, with policy implications related to the optimal design for fundraising strategies. Our results confirm that a significant fraction of individuals show consistent decisions, i.e. that donations to these charities behave as “normal goods” in price and income effects and with rather small number of violations of the axioms of revealed preferences. However, the experimental data suggests that revealing the identity of the donor can decrease altruism and induce more violations of the axioms of consistent behavior mentioned.

Key words: altruism, experimental economics, consistency, GARP, Charity, dictator game, Bella Flor.

JEL Classification: D03, D64, C93.

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AYUDANDO A QUIENES AYUDAN: ALTRUISMO COMO UNA ELECCIÓN RACIONAL DE LOS DONANTES A UNA ORGANIZACIÓN VOLUNTARIA DE ESTUDIANTES

Juan-Camilo Cárdenas*, Miguel Espinosa*, Sandra Polanía Reyes**

* Facultad de Economía – CEDE, Universidad de Los Andes, Bogotá, Colombia,

** Università di Siena, Italia.

Resumen

El altruismo, entendido como la disposición individual a sacrificar ingreso personal para mejorar el ingreso de otra persona, puede ser una estrategia racional de elección que responde a diferentes motivaciones, incentivos e instituciones, de una manera consistente en la lógica del donante. En este artículo extendemos el diseño experimental de Andreoni and Miller (2002) usando un juego del Dictador modificado y lo aplicamos a 470 estudiantes de varias universidades y en diferentes programas, años de estudio y nivel de ingreso, quienes pueden donar parte de su ingreso a la Fundación Bella Flor (<http://www.bellaflor.org/>), una organización sin ánimo de lucro fundada por un grupo de estudiantes cuya misión es “*promover el desarrollo integral de la población infantil de los barrios Bella Flor, Paraíso y Mirador mediante la realización de labores en las áreas de educación, salud, recreación y de exaltación de valores humanos*”. En el análisis probamos la consistencia de las decisiones de los jugadores contra los axiomas de preferencias reveladas y contra la teoría económica del efecto precio y el efecto ingreso. Además de evaluar las violaciones a los axiomas, estimamos las funciones de demanda por altruismo hacia esta fundación, con implicaciones de política relacionadas con el diseño óptimo de estrategias de búsquedas de fondos y donantes. Nuestros resultados confirman que una fracción significativa de los individuos muestra decisiones consistentes, i.e. que las donaciones a la fundación se comportan como “bienes normales” en sus efectos precio e ingreso con una cantidad mas bien pequeña de violaciones de los axiomas. Sin embargo, los datos experimentales también sugieren que revelar la identidad de los donantes decrece las donaciones y aumenta las violaciones de los axiomas de preferencias reveladas.

Palabras clave: altruismo, economía experimental, ONG, consistencia, GARP, Juego del Dictador, Bella Flor.

Clasificación JEL: D03, D64, C93.

I. Introduction

Altruism has always been present in human choice and is part of our evolutionary heritage. Solidarity and generosity among peers has provided the possibilities of many to have access to resources in harsh times and to face the challenges of collective action within societies (Gintis et.al 2003). The level of donations to charities in the U.S. by the average individual at end of the twentieth century was greater than what they spent on “*electricity, telephones or car insurance*” (Andreoni, 2001). Altruism in non industrialized societies also plays a major role although less studied and reported. On a daily basis citizen of developing nations face the opportunities to donate cash and labor to various philanthropic causes or to vulnerable groups in the streets and the country side.

In this study we aim at exploring how rational is altruism among college students who can donate part of their income to a charity also formed and run by students. By rational we mean consistent choices with respect to the axioms of revealed preferences and to the usual positive income and negative price effects predicted by theory for the case of normal goods.

We adapted the Andreoni and Miller (2002) design of a modified Dictator Game with relative prices and income effects to a game of donating income to an actual foundation that was founded and is run by college students. The subject pool is also recruited from a natural pool of college students who may or may not know of the work of this foundation and to which they could donate part of their earnings. Within our experimental design we introduced two treatments of interest. One treatment variable involved the possibility that the donation was made anonymously, or on behalf of the particular student and in front of the rest of the class. Secondly, we wanted to explore the effect of providing more information about the charity’s goals and programs. As expected we found a significant effect of providing more information about the foundation’s programs. However, releasing the name of the actual donor in front of a class seemed to decrease the level of donations if compared to the anonymous treatment, bringing up interesting implications with respect to harnessing the altruistic motivations of students among social groups and ages where visibility seems to play a significant behavioral role.

In the following section we will develop the formal model that addresses altruism within the canonical model in which agents behave according to the axioms of revealed preferences and respond to altruism as if it were a normal good with a demand that is increasing in income and decreasing in price. We also use such framework to explore different “types” of prosociality or altruistic preferences from purely selfish to purely generous and the possibilities in between of utility functions in which altruism and self-interest behave as partially complementary goods.

To test the predictions from the theoretical model we adapt the modified version of the Dictator Game by Andreoni and Miller (2002) by making the recipient of the altruistic offers an actual student run charity aimed at helping the poor in Bogotá, Colombia. With the collected data we analyze the validity of the theoretical predictions and will classify the experimental subjects according to “types” identified in the model. The data will also allow us to confirm how consistent individuals are under the axioms of revealed preferences when the demanded good is altruism towards charities.

II. A revealed-preferences approach to Altruism

a. Choice sets and budget constraints.

In our basic framework an individual has an income level available to her, which is allocated between personal consumption of a private good and an altruistic cause, in this case a charity. For each unit of the good the individual wants to consume she pays a unit price so that the multiplication of the vectors of prices and quantities will reach the income available. Each unit consumed of the altruistic cause means a transfer of money to the charity equivalent to the multiplication of the units consumed at the unit price at the moment. The rest of the income available remains for the individual’s private consumption. Therefore, as in the Andreoni and Miller (2002) design, an individual receives a number of tokens that when multiplied by a price represent an amount of cash transferred to the charity or kept for the individual’s private consumption. Table 1 shows the same scenarios used by these authors in terms of the tokens endowment (\mathbf{d}) and the hold values (\mathbf{p}_m) and the pass value (\mathbf{p}_{bf}) for each of 11 possible cases used in both theirs and our design. The last column shows the relative price of giving as an indicator of the multiplier which ultimately will reflect the marginal rate of substitution of

selfish to altruistic choices. The higher this value the higher the opportunity cost of giving and therefore the higher the marginal utility of an altruistic transfer to the charity.

Budget	Token Endowment	Hold Value	Pass Value	Relative Price of Giving
1	40	3	1	3
2	40	1	3	0,33
3	60	2	1	2
4	60	1	2	0,5
5	75	2	1	2
6	75	1	2	0,5
7	60	1	1	1
8	80	1	1	1
9	100	1	1	1
10	40	4	1	4
11	40	1	4	0,25

Table 1. Allocation Choices

More formally, suppose a couple of sets $\mathbf{x}_{bf} \in \mathbb{R}_+^n \wedge \mathbf{x}_m \in \mathbb{R}_+^{n^2}$, where the sub-index *bf* and *m* mean the donation to the *Fundación Bella Flor* (FBF) and the total quantity which is kept by the participant, respectively. Suppose a set of initial endowments $\mathbf{d} \in \mathbb{R}_{++}^n$, that need to be split between the two allocations, that is, $\mathbf{x}_{bf} + \mathbf{x}_m = \mathbf{d}$ and two vector prices $\mathbf{p}_{bf} \in \mathbb{R}_+^n \wedge \mathbf{p}_m \in \mathbb{R}_{++}^n$, where \mathbf{p}_{bf} represents the value of each unit donated to the FBF, and \mathbf{p}_m is the value of each unit kept by the individual. In the concrete case of this experiment, we used the same values as Andreoni and Miller (2002):

$$\mathbf{d}' = [40, 40, 60, 60, 75, 75, 60, 80, 100, 40, 40] \quad \text{and}$$

$$\mathbf{p} = [\mathbf{p}'_m \ \mathbf{p}'_{bf}] = \begin{bmatrix} 3 & 1 & 2 & 1 & 2 & 1 & 1 & 1 & 1 & 4 & 1 \\ 1 & 3 & 1 & 2 & 1 & 2 & 1 & 1 & 1 & 1 & 4 \end{bmatrix}$$

Notice that as Andreoni and Miller (2002) point out each of the 11 cases is a convex budget set. We follow the same setup that those authors because we want to compare our results to theirs. Furthermore, we can compare some of the results with the canonical dictator game, for the cases where the relative prices of giving are 1, according to Forsythe et al (1994).

We will be using a vector notation as follows: $\mathbf{x}(3)$ represents the pair of choices for the endowment of 60 tokens in the third case. Each token out of the endowment given for the

² We constrain our choice sets to nonnegative numbers and therefore considering the possibility of corner solutions. Both sets are row-vectors of 1x11 dimensions.

charity will be multiplied by 1 monetary unit whereas each token kept will be multiplied by 2. These choices are the tokens transferred to the charity and the transfer to herself. In general, $\mathbf{x}(i) = \{\mathbf{x}_{bf,i}, \mathbf{x}_{m,i}\}$, where $\mathbf{x}_{bf,i}$ represents the choice that the individual passed to the foundation in the i -th round. If we use the same notation for the prices, then we define $\mathbf{x}(i) \cdot \mathbf{p}(i) = \mathbf{x}_{bf,i} \cdot \mathbf{p}_{bf} + \mathbf{x}_{m,i} \cdot \mathbf{p}_m$

With these data we can represent the budget sets faced by the agents of the experiment in each of the 11 cases or rounds.

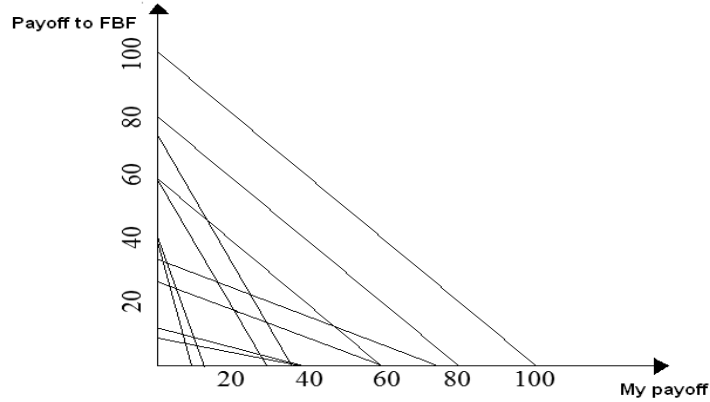


Figure 1: Budget Set Representation

b. Revealed Preferences

Suppose a consumption set $\mathbf{X} \subseteq \mathfrak{R}_+^n$, prices \mathbf{p}_j and two vectors of quantities $\mathbf{x}_j, \mathbf{x}_k \in \mathbf{X}$.

Definition 1: $C(\mathbf{x}_j R^d \mathbf{x}_l) = \{\mathbf{x}_l \in \mathbf{X} \mid \mathbf{p}_j \mathbf{x}_j \geq \mathbf{p}_j \mathbf{x}_l\}$, is the set of bundles \mathbf{x}_l that multiplied by the prices \mathbf{p}_j are not bigger than $\mathbf{p}_j \mathbf{x}_j$. Then the bundle \mathbf{x}_j is *directly revealed preferred* to the bundle \mathbf{x}_k (i.e. $\mathbf{x}_j R^d \mathbf{x}_k$), if $\mathbf{x}_k \in C(\mathbf{x}_j R^d \mathbf{x}_l)$.

Definition 2: $C(\mathbf{x}_j R^s \mathbf{x}_l) = \{\mathbf{x}_l \in \mathbf{X} \mid \mathbf{p}_j \mathbf{x}_j > \mathbf{p}_j \mathbf{x}_l\}$, is the set of bundles \mathbf{x}_l such that multiplied by the prices \mathbf{p}_j are strictly smaller than $\mathbf{p}_j \mathbf{x}_j$. Then the bundle \mathbf{x}_j is *strictly and directly revealed*

preferred to the bundle \mathbf{x}_k (i.e. $(\mathbf{x}_j R^s \mathbf{x}_k)$), if $\mathbf{x}_k \in C(\mathbf{x}_j R^s \mathbf{x}_l)$.³ Then $C(\mathbf{x}_j R^s \mathbf{x}_l) \subseteq C(\mathbf{x}_j R^d \mathbf{x}_l)$.

Definition 3: \mathbf{x}_j is revealed preferred to the bundle \mathbf{x}_k (i.e. $(\mathbf{x}_j R \mathbf{x}_k)$) if $(\mathbf{x}_j R^d \mathbf{x}_n R^d \dots R^d \mathbf{x}_o R^d \mathbf{x}_k)$.

Definition 4: (WARP) An individual satisfies the weak axiom of revealed preference (WARP) if $(\mathbf{x}_j R^d \mathbf{x}_k)$, then $\mathbf{p}_k \mathbf{x}_k < \mathbf{p}_k \mathbf{x}_j$.

Definition 5: (SARP) An individual satisfies strong axiom of revealed preference (SARP) if $(\mathbf{x}_j R \mathbf{x}_k)$, it is not the case that $(\mathbf{x}_k R \mathbf{x}_j)$.

Definition 6: (GARP) An individual satisfies strong axiom of revealed preference (GARP) if $(\mathbf{x}_j R \mathbf{x}_k)$, it is not the case that $\mathbf{x}_j \in C(\mathbf{x}_k R^s \mathbf{x}_l)$.

The Revealed Preferences theory helps us understand the preferences of the consumer by using information about the demand choices at different prices and income levels. According to Afriat's theorem (1976) a data set satisfies GARP only if there is a well behaved utility function which rationalizes the data. Because in real life the preferences of the agents are either very difficult or impossible to be observed, we use several methodologies in order to infer and find out the preferences by seeking the observable data. The common assumption in these methodologies is that the agent preferences are stable over the rounds of the study, in this case the experiment. By observing the behavior of a sufficiently representative sample of individuals who each faces the 11 scenarios or cases, we can try to infer their consistency with the axioms of revealed preferences and reconstruct back their preferences regarding altruism towards a charity in our case.

c. Deriving testable hypotheses about preferences and choices.

Let's start by assuming that an individual has a complete, transitive, continuous and strictly monotonic binary relation. According to Jehle and Reny (2000) this individual has a real valued function which represents the binary relation. Furthermore, if the preferences are

³ For clarity the reader could see the figure 2. The only difference between definition 1 and 2 is that $(\mathbf{x}_j R^s \mathbf{x}_k)$ does not have frontier points on the budget curve.

strictly convex on the complete space of the real valued function, this latter function is continuous, strictly increasing and quasi-concave. This implies that the consumer demand function is homogeneous of degree zero in all prices and income and it satisfies budget balance.

On the other hand, if the individual does not violate WARP and satisfies budget balance the choice function (i.e consumer demand function) should be homogeneous of degree zero in all prices and income. His Slutsky matrix is negative semi definite and then, if we can prove that the matrix is also symmetric, we can say that this choice's function is though a consumer demand function. It is also important to say that if the agent never violates WARP in the two goods context, then WARP implies the existence of a well behaved utility function which rationalizes the data.

Let's suppose an agent who is facing the choice between spending some of his budget d in a good, which will be hold only for his personal consume x_m , and one good which be consumed for "unknown" people x_{bf} . Both goods could give "happiness" to the individual through a mathematical function $u: \mathbb{R}_+^2 \rightarrow \mathbb{R}_+$. This mathematical function is justified because the happiness that could receive the agent A by having certain amount of each one of the goods could be different to the happiness that could receive agent B for the same amount of goods.

The problem for the agent is reaching the maximum level of satisfaction by choosing combinations of these two goods. Additionally, this is less trivial because the agent has to spend his entire budget in the choices (i.e. $x_{bf} + x_m = d$). The problem becomes more interesting when each donated unit has a different objective valuation with respect to the unit that the consumer get for himself (i.e. p_{bf}/p_m). When this ratio is greater than 1 we have a case in which one unit passed to the charity is more valuable to the individual than the same unit kept to herself. To sum up, the problem is to find $x_{bf}, x_m \in \text{argmax } u(x_{bf}, x_m | p_{bf}, p_m)$ subject to $x_{bf} + x_m = d$. If the agents are faced t times the same problem, the solution is to find a 2^*t -vector of optimum quantities. We expect that the goods are normal goods in the

sense $\partial x_i / \partial d$ for $i = bf, m$. For the objective valuations' case the analysis is more complex because $\partial x_{bf} / \partial p_{bf} > 0$ does not mean that the agent considers the donations as a *giffen* good.

In this context we can identify several possibilities of functional forms for the utility function, five of which are represented in Figure 3, depending on the valuation that a rational individual may have of the trade-offs between giving and keeping out of an endowment or income constraint⁴. We represent in the vertical axis the amount of income transferred to the charity and in the horizontal the income kept by the individual for her own private consumption. Notice, the units in this graph are the multiplication of the tokens that an individual passes/keeps for the respective unit prices of giving/keeping.

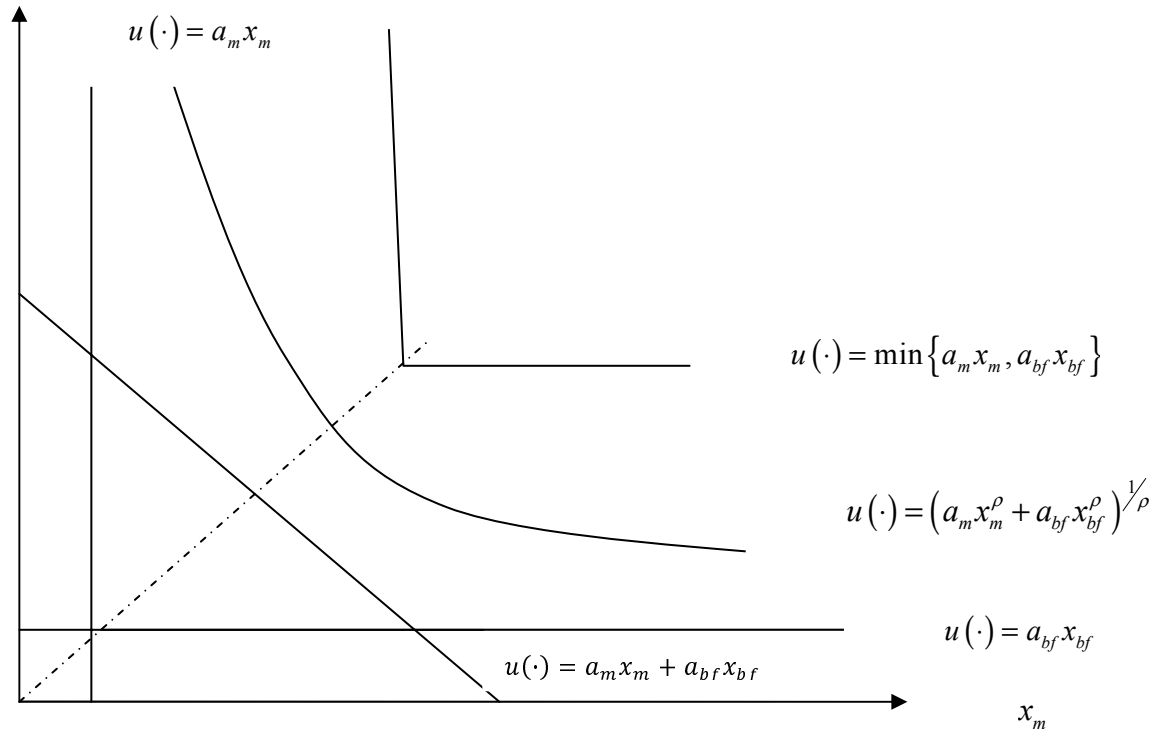


Figure 2: Well known utility functional forms

⁴ Notice that figure 3 shows only five indifference curves. However, in our analysis we identify in fact seven functions. The reason for this is because the Cobb-Douglas indifference curve is very similar to the CES one, as the former is a special case of the latter. On the other hand, it is not possible to illustrate graphically the differences between two possible cases of perfect substitutes.

In figure 3 there are 5 utility functional forms derived from the general theory. If the agent always keeps the entire endowment for herself, we call this a pure selfish utility function $u(x_{bf}, x_m) = a_m^{ps} x_m$. (i.e $x_m = d$), represented by the perfectly vertical indifference curves. The reverse case, represented by the perfectly horizontal indifference curves, shows agents only interested in giving $u(x_{bf}, x_m) = a_{bf}^{pa} x_{bf}$ regardless of the relative prices or income constraints. We call this function the pure altruist utility function (i.e $x_{bf} = d$). When the agent divides her endowment in exact equal shares between the charity and herself, we have a perfect complements utility function, that is $u(x_{bf}, x_m) = \min\{a_{bf}^{pc} x_{bf}, a_m^{pc} x_m\}$ where $a_{bf}^{pc} = a_m^{pc}$ or in an equivalent way the expansion path is over the 45 degrees line (i.e $2x_{bf} = d$). As we noted before, the agent can consider that the objective valuations are prices or compensation (that is negative prices). At the first case we expect that the goods are behaved as an ordinary goods, at the latter case we expect that the agents prefer the goods with higher objective valuation.

In the first case we expect that: $[p_{bf} < p_m \rightarrow x_{bf} = d] \vee [p_{bf} > p_m \rightarrow x_m = d]$, this is if the individuals consider the objective valuations as prices, and they choose a corner solution of the cheaper good. The latter case $[p_{bf} > p_m \rightarrow x_{bf} = d] \vee [p_{bf} < p_m \rightarrow x_m = d]$ take the good with higher objective valuation.

Both cases are characterized as $u^k(x_{bf}, x_m) = a_{bf}^k x_{bf} + a_m^k x_m$ where $k = tps, ps$. If $k = tps$ we denote the function as traditional perfect substitute's utility function, and that is the first case. The latter case is when $k = ps$ and the name is perfect substitute's utility function.

Finally we have the remaining cases that do not belong to these particular characteristics but are still cases of a CES utility function $u(x_{bf}, x_m) = (a_{bf}^{ces} x_{bf}^\rho + a_m^{ces} x_m^\rho)^{1/\rho}$ which has the properties of quasi-concavity and convexity of indifference curves.

Therefore, to test these theoretical possibilities we will assign one of these preferences for each of our participants, if every one of her 11 observations is behaved in the same way. That is, consistency over the choices for one type of preferences.

III. Experimental design.

a. The case of the *Bella Flor* Foundation

For this experimental design we were mainly interested in the case of a non-profit organization, The Bella Flor foundation (<http://www.bellaflor.org>), founded by people with similar socio-demographic characteristics to the participants in our experiment namely college students who have organized for raising funds to improve the well-being of a particular group of the population of Bogotá. The *Bella Flor* Foundation (FBF) is a non-profit social organization, formed by students, professionals and the community members from the neighborhoods of *Bella Flor* and *Paraíso* of the locality of *Ciudad Bolívar*, one of the poorest areas of Bogotá⁵. According to Pening (2005) in a study carried out about the poverty and inequality conditions, the income or consumption of 98 percent of the population in this neighborhood is below the poverty line or not being able to afford a basic basket of goods. The FBF aims to improve the quality of life of more than one hundred children by implementing programs of education, child care, health, nutrition and education in values.

The FBF was formed in 2003 by a group of college students which had found that their voluntary work could be an agent of change in the area by working with children in the community. The FBF has used the same funding strategy as several other non-profit organizations raising donations from individuals and businesses to sponsor the foundation's programs. The difficulties in raising the sufficient funds for maintaining the programs raised a discussion within its members on what kind of information and incentives are necessary to motivate contributions from potential donors. Although the support of this organization is founded on the motivations or altruistic preferences of a group of students who contribute in kind (voluntary work and professional skills), the funding strategy also depends on the potential altruistic preferences of its donors, in many cases other students. We can have then the possibility of different types and degrees of pure and impure altruism among the potential donors, which we will explore in our experimental design.

First, the available information about the FBF, its target population and the resources allocation can identify positively the individual decision to donate in individuals with altruistic

⁵ Bogotá is divided into 19 sub-municipalities or *localidades*. The locality of Ciudad Bolívar has the highest percentage of people who live below the poverty line.

social preferences (Brañas, 2006). Secondly, anonymity in individual decisions can generate other emotions, i.e. Shame, guilt, satisfaction on reputation and recognition; thus, affect the decision to donate and the amount allocated (Bowles and Gintis (2003), Andreoni (1990) and Andreoni and Petrie (2004).

b. Experimental set up

Our goal is to test experimentally the consistency of choices by individuals when facing the possibility of donating part of their income to a charitable organization. If individuals show consistency with the theoretical predictions of the previous sections we could move a step further and explore the microeconomic factors that drive the demand for altruism such as prices and income, and the role of contextual variables that can trigger or constrain altruism.

For this, we replicate the experimental design by Andreoni and Miller (2002) in which a sample of subject play a modified dictator game for 11 rounds with the different levels of relative prices and income levels described in Table 1, and have to decide how to allocate an amount of money between herself and a recipient. In our design the participants divide their endowments between themselves and a recipient that is not longer an anonymous person but an actual charity organization run by students, the *Bella Flor Foundation*.

In addition to Andreoni and Miller’s design, we tested the effects of two treatments concerning a) the information about the programs of the recipient i.e. the non profit organization or FBF, made available to the subjects before making the allocation decision; and b) the information about the donor that was available to the entire group after making the allocation decision. The analysis of these results is discussed in (Polania, Espinosa and Cardenas, 2009) but these treatment variables will be included in the present statistical analysis as control variables.

For all treatment conditions we implemented the dictator game described at the beginning of this section. The participants used a numeric code to maintain their anonymity. The currency rate was the same for all the sessions. The exact wording of the instructions for the experiment is available upon request⁶. Differently from Andreoni and Miller we selected a

⁶ The instructions were read by the subjects and then read at loud by the experimenter. Subjects filled the questionnaires in and the experimenter collected them, shuffled them and took them to a neighboring room. After the decision to be paid was selected, payments for each subject were calculated. According to the treatment,

subgroup of the subjects for actual payments.

Subjects' pecuniary payoff varied across sessions. Before the session (for sessions 5 and onwards) started the experimenter announced that at the end of the session, half of the total number of students would be chosen randomly to be paid and one of the eleven decisions would be chosen to be paid. In the first four sessions the payment was given by a randomly chosen decision and a randomly chosen participant. Both earnings were paid to the FBF and the students in private.

c. The sample of participants in the experiments

The student data were collected in different classes from six universities between March, 2005 and January, 2007 in Bogotá. This sample gives us enough variation in demographic variation in the level of income and student status because of the differences within universities.

In table 2 is shown the composition for the total group of 470 students which participated in eleven sessions in five universities. These students attended to diverse programs such as: Economics, Management, Business, Industrial Engineering, Mechanical Engineering, Political Science, Literature, among others. Most of our sample's agents come from the Universidad de los Andes. However there is a lot variation among the students in variables as course taken in the moment of the experiment, program and degree level. The most common course was microeconomics, from an introductory level until advanced microeconomics. Because it is interesting to see the changes which cause the degree level in the behavior of the participants we have included a course of graduate level.

In addition, a survey was applied at the end of each session. The participants were asked about standard demographic information including age, sex, semester (education level), program, and whether or not the respondent was volunteer in a NGO in the last year, number of hours working as a volunteer, number of times the respondent has donated to *El Minuto de Dios*⁷, whether the participant have heard of FBF before, and if yes, how he/she knows FBF⁸.

the amount given to the NGO was public or kept anonymous. Then earnings were paid in private.

⁷ *El Minuto de Dios* is a Catholic organization which looks for the improvement of poor families' housing and the way to donate a certain amount of money to this NGO is when the donor is withdrawing money from any ATM. At this electronic transaction the ATM ask the person if they want to donate certain little amount of money, if they decide to donate, then the money is discounted form his bank account.

To get the income data from students we asked them to rank their own monthly expenditures (food, transport and social life) excluding all the basic expenditures (rent, student fees and public service fees)⁹ and the socio economic level of their household¹⁰.

Session no.	University	Course	Program	Degreee
1	Universidad de los Andes	Microeconomics	Engineering	Undergrad
2		Advance Microeconomics	Economics	
3		Microeconomics	Engineering	
4		Intro Micro	Management, Business, Economics and others	
5			Economics	
6	Universidad Nacional	Microeconomics	Business	Undergrad
7	Universidad del Rosario		Industrial Engineering	
8	Universidad Externado			
9	Universidad de los Andes		Various	
10	Universidad de los Andes	Random Sample		
11	Politécnico Gran Colombiano	Microeconomics	Management	

Table 2. Sample.

As we mentioned above, we conducted eleven sessions, each one with 43 subjects in average. In table 3 we see the socio economic composition of each session. In total we had 470 participants with 5170 observations in total.

Table 3 shows the summary statistics for our control variables by session and overall for the whole sample. The socio demographic characteristics are very similar among sessions. The sample is characterized by young, middle class students and most of them are sophomore. Most of them were taking an economics course, but belonged to different programs. Although this Foundation is formed by students from several universities, there were students (11%) from the Universidad de los Andes who knew about the FBF before the session. That is because the FBF has used to launch its fund-raising campaigns mainly at the Universidad de los Andes. In the other hand, only 10% in the sample has been volunteers in any NGO. A variable which is not shown in the table is the contributions to the organization “*Minuto de Dios*”, which is equally distributed among session and has a overall mean of 2,423 with a standard deviation of 8,68. There are 5148 observations.

⁸ The options were: By fund-raising campaigns at the university, by internet, magazines, TV, radio, newspaper, by a friend and other.

⁹ The rank was from 1 to 9. See appendix.

¹⁰ The socio economic level in Colombia is the stratum for the tariff of access to public services from 1 to 6, where 1 is the lowest level where the poorest people usually belong and 6 is the highest level, where the richest people usually belong.

Session no.	Session Size	Age	Women (%)	Income Level ¹	Stratum	Semester (Class)	Volunteer (%)	No. Hours Volunteer	Knew FBF before the session (%)
1	72	19	48.6	3.8	4.5	3.8	5.6	10.6	13.9
2	86	19	41.9	4.3	4.9	4.2	8.1	2.6	7.0
3	30	24	36.7	4.7	4.2	10.2	13.3	3.8	40.0
4	69	19	40.6	4.2	4.6	3.8	13.0	13.7	8.7
5	96	19	44.8	4.3	5.0	2.8	16.7	7.0	16.7
6	24	21	25.0	3.1	3.5	6.5	20.8	62.1	0.0
7	30	19	56.7	3.5	4.4	3.5	6.7	11.7	0.0
8	22	19	42.9	3.7	3.8	4.3	0.0	0.0	0.0
9	11	21	45.5	3.2	4.2	5.2	9.1	2.7	18.2
10	11	19	63.6	3.8	4.6	2.8	9.1	10.9	18.2
11	19	26	52.6	5.6	3.5	6.8	10.5	1.5	0.0
Mean	45.1	19.9	44.6	3.9	4.4	4.7	10.9	10.1	11.5
Std. Dev.	28.9	2.5	0.5	1.7	1.1	2.5	0.3	58.8	0.3
Total	470		208				51		54

¹¹

Table 3 Summary Statistics by session (average).

As the figure 4 of the appendix 1, from the whole survey, 28% of the surveyed people who knew about the foundation was exposed to campaigns at Universidad los Andes, 25% knew about the foundation through publicity, while 19% by a friend. The remaining percentage is explained by TV, radio and magazines and other different ways.

The probability of two individuals knowing each other and the size of a class may vary across our sessions as we recruited subjects in different types of courses. One might expect that such blindness would annul the effect of impure altruism in these courses than in courses where there were students who knew each other. For example, in an economics course only for students from that program, it is possible that the public announcement of the decisions would determine the individual decision to donate and the amount donated (Harbaugh, 1998).

IV. Results and analysis

Based on the theoretical framework developed before and the experimental strategy designed to test some of the hypotheses about altruism and rational choice, we explore in this section four main questions. The first relates to the factors that motivate the donations to the

¹¹ The expenditure rank is the proxy for level of income.

Bella Flor foundation by comparing our results with those founded in Andreoni and Miller (2002). The second empirical question regarding consistency in behavior relates to the confirmation or violations of the axioms of revealed preferences and the detection of types in the preferences of individuals that face trade-offs between self interest and altruism. Based on the analysis of the drivers of altruism and the consistency of behavior we pursue our third goal, that is, to attempt a reconstruction of the utility function of the individuals that is coherent with the possible models of preferences and with the observed types detected in the sample.

Finally we want to confirm the theoretical predictions about the behavior on the demands that considers price and income effects in altruism towards a philanthropic organization.

We begin by describing the patterns of behavior of our sample of individuals according to the 11 rounds or bundles of budget and relative prices. We will compare the observed behavior with that found in the baseline study of Andreoni and Miller (2002) and also compare the differences across our treatments

a. The Allocation choice: what drives donations?

A first look at the amounts of tokens passed to the foundation (See figures 4, 5 y 6) suggest that our results replicate the pattern reported by the original work of Andreoni and Miller (2002) with a visible difference. The amounts passed in our samples are larger. This makes sense as our framing should trigger higher levels of altruism towards the recipient, a non-profit organization working for the poor.

Figure 4 compares the average of tokens passed in our experiment and in Andreoni and Miller`s. Remarkably is that the average of tokens passed for the dictator game (that is when the relative price of giving is 1) is 35% for our experiment, while for Andreoni and Miller (2002) is 23% and for Forshythe et al (1994) is 22,75%. We confirm that for this experiment the amount passed are larger than other experiments.

Figure 4 shows the difference between the amounts allocated by the player to the other (i.e. the foundation) for each round by treatment in our sample and Andreoni and Miller`s results. The graphs also show some differences to be explored later on regarding our treatment effects. We can see that for all permutations of prices and income across the 11 choices, the availability of information about the foundation increased donations in average.

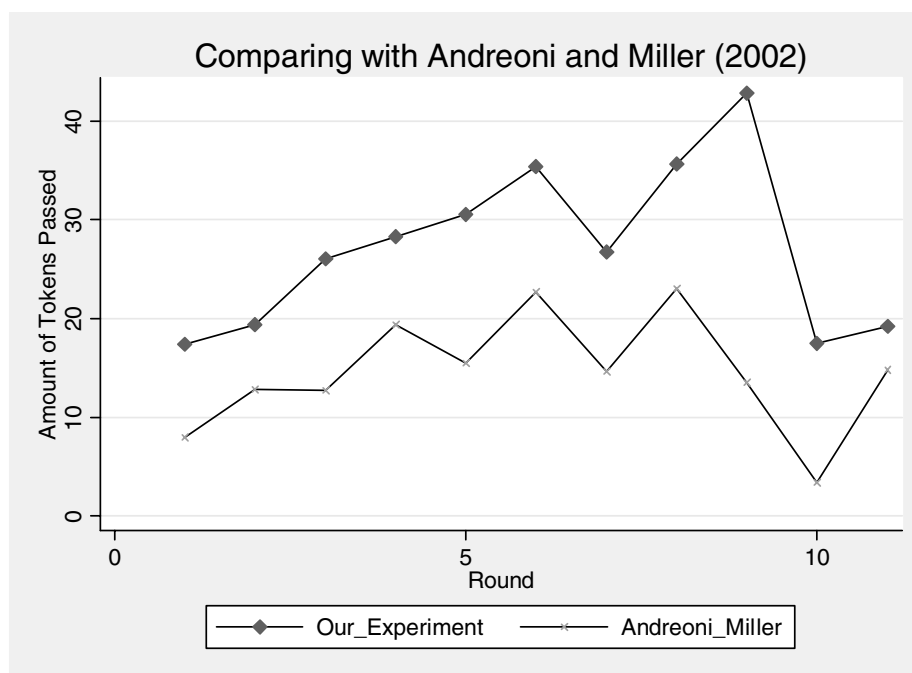


Figure 4: Comparing with Andreoni and Miller, 2002, by the treatment P and I in each round

There is a lot of variation in the choices that participants made about their allocations, suggesting the variation among the participants and the importance of relative price of giving (value) and the number of tokens.

b. Extreme Cases of Utility Functions

At this section we will classify the observations in 5 well known utility functions. We can classify these observations in units (*that is tokens passed and hold*) or points (*that is each observation multiplied by its objective valuation (i.e. prices or compensation values)*). Additionally we allow that this categorization is not so strict by classifying the data with different levels of requirements. The next only have in account 409 players who did not make any mistake.

i. *Perfect Complements*: We have found 907 observations (from the observation without any mistake). We found 16 (4%) players with this type of preferences. When we make the analysis with points instead of endowments ((i.e. $2 \cdot x_{bf}(j) = p_{bf}(j) \cdot \mathbf{x}_{bf}(j) + p_M(j) \cdot \mathbf{x}_M(j)$)) we found 794 choices (17.65% from the choices without any mistake) and no player. An

alternative way to analyze this behavior is to make flexible the classification's conditions, that does not restrict the choices to the 50%, but a number very close to 50%. For example if the players have to decide how to share out 30 units with $p_{bf} = 2$ and $p_M = 1$, the choice $x_{bf} = 10$ and $x_M = 20$ makes $p_{bf} \cdot x_{bf} = 20 = p_M \cdot x_M = 20$. However a flexibility way to analyze is $p_{bf} \cdot x_{bf} \in \left[\frac{(p_{bf} \cdot x_{bf} + p_M \cdot x_M)}{2} * (1 + \gamma), \frac{(p_{bf} \cdot x_{bf} + p_M \cdot x_M)}{2} * (1 - \gamma) \right]$. When

we make flexible the decision in points, we have found 3 players (0.8%) and 8 players (1.6%) for $\gamma = 0.05$ and $\gamma = 0.1$. On the other hand, when we make flexible the decision in units if $\gamma = 0.05$ we can classify 41 players (10%) and if $\gamma = 0.1$ we found 77 players (19%)¹².

ii. *Perfectly Selfish*: We found 329 observation and 5 players (1%). When we relax the margin we find 6 and 8 players for 5% and 10% respectively. For the points analysis there were 293 observations (6.51%) and 5 players. With the relaxing of the threshold we still have five and seven players for $\gamma = 0.05$ and $\gamma = 0.1$ respectively.

iii. *Perfectly Altruist*: We found 338 observations (7.51%) and 6 players. When we make the flexibilization the number of players with this type of preferences remains invariable. If we analyze the point's case we found 329 observations (7.31%, just slightly different from the unit's analysis). Additionally the number of players with this type of preferences remains invariable.

iv. *Perfect Substitutes*: We found 419 observations (8.4%) and 395 observation for the points and quantities cases, respectively. We have no found any player with these characteristics.

v. *Traditional Perfect Substitutes*: We found 89 observations (1.98%) and 76 observations (1.69%) for the units and points cases, respectively. We have no found any player with these characteristics, even when we flexibilize the limits.

¹² For 30 units $x_{bf} \in [14.25, 15.75]$ with $\gamma = 0.05$ and $[13.5, 16.5]$ with $\gamma = 0.1$.

Units	Choices	%	Players (with gamma equals to)		
			0	0,05	0,1
Leontief	907	20,16	16	41	77
Perfect Selfish	329	7,31	5	6	8
Perfect Altruist	338	7,51	6	6	6
Perfect Substitutes	419	9,31	0	0	0
Tr. Perfect Substitutes	89	1,98	0	0	0
Total over Experiment			27	53	91
Points	39%		6,60%	12,96%	22,25%
Leontief	794	17,65	0	3	8
Perfect Selfish	293	6,51	5	5	7
Perfect Altruist	329	7,31	6	6	6
Perfect Substitutes	395	8,78	0	0	0
Tr. Perfect Substitutes	76	1,69	0	0	0
Total over Experiment	40%		11	14	21
			2,69	3,42%	5,13

Table 5. Classification of the preferences

Remark 3: We can classify about 40% of the observations in any of these preferences, 6,6% of players according to the units' classification and 2,7% players in points' analysis.

The table 6 shows this classification by session but including the whole sample (470 players). The percentages are the quantity of observations that we have found within a session. The last column shows remain observations, which we have assumed could be represented by a CES utility function. However, we will show further that this is possible.

Session	Observations	Leontief	Selfish	Altruism	Substitutes	Tr. Substitutes	CES
							(inc. Cobb douglas)
1	781	14.86%	6.64%	8.95%	11.26%	4.43%	53.9%
2	924	18.18%	5.05%	6.06%	8.96%	3.87%	57.9%
3	326	12.46%	8.42%	6.40%	8.42%	3.70%	60.6%
4	748	20.86%	4.47%	5.37%	9.09%	4.02%	56.2%
5	1028	16.41%	7.32%	11.31%	11.86%	4.93%	48.2%
6	260	20.45%	13.64%	0.45%	5.45%	4.40%	55.6%
7	317	21.68%	2.45%	3.85%	4.20%	3.35%	64.5%
8	239	20.91%	9.55%	3.18%	10.00%	4.62%	51.7%
9	118	15.15%	12.12%	0.00%	0.00%	2.72%	70.0%
10	121	15.70%	11.57%	0.00%	4.96%	3.63%	64.1%
11	208	17.68%	1.01%	21.72%	0.51%	4.09%	55.0%
Mean	460.91	17.67%	7.48%	6.12%	6.79%	3.98%	58.0%
Total	5070						
Min	118	12.46%	1.01%	0.00%	0.00%	2.72%	48.17%
Max	1028	21.68%	13.64%	21.72%	11.86%	4.93%	70.01%

Table 6. Classification of the preferences by sessions

c. Violating the budget restriction.

There are 470 players (5170 observations) at the 11 experimental sessions. In average each session had 43 players. 12.9% of the players (61 players, but only 100 observations) showed inconsistencies in their choices, that is $\mathbf{x}_{bf} + \mathbf{x}_m \neq \mathbf{d}$ in at least one of the 11 choices. That means that there are only 409 (4499 observations) players to analyze. (Remember that budget balance is a necessary condition in the analysis).

The figure 7 is the density function of the mistakes for the 61 players that showed at least one violation of the GARP axiom. Clearly, the density is concentrated in just a few mistakes, then we can say that most of the 61 players made a few mistakes (*the mean is 1.64 errors*). The maximal number of errors is 9, which can be interpreted as if all the players at the experimental sessions understood the rules.

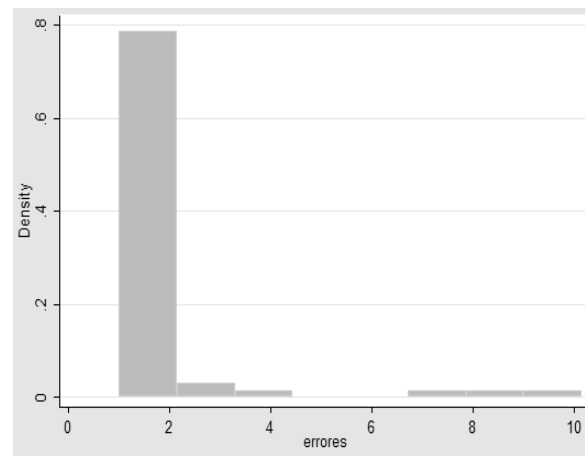


Figure 7 Distribution of mistakes for 61 players

d. Revealed Preferences Violations

Although there are 61 players who made at least one error in their decisions, 55 players of them made only one or two (then we work this section with 464 players, and for those 55 players we make the axioms violations analysis with the choices which holds budget balance (only ten or nine)). Rose (1958) shows that in the case of two goods a necessary and sufficient condition in order to prove consistence in the choices is to verify WARP. Rose showed that in the bi-dimensional choice the non-transitivity on the preferences is not possible, even though

the chaining among the choices is high. Then, to verify WARP is equivalent to verify GARP¹³. That means that if the data satisfies WARP (or equivalently any of the other two axioms) the choices come from a monotonic, concave, continuous and non-satiable locally utility function; then the choices could be treated as demands well behaved.

Of the 464 players, 61 of them violated one or more of the revealed preference axioms that is 13.1% of the survey. This ratio is 10,22% for Andreoni and Miller (2002), 24% in Sippel (1997) and Harbaugh et al (2001) has a ratio higher. We can conclude with this data that our experimental setup is behaved in an almost similar way to other experiments.

The next table shows the main descriptive statistics for the violations of the three revealed preferences axioms. The fourth column represent the proportion over the 55 possible interception of the budget, the numeral ii (*Maximal number of violations*) of the next section provides further details.

Axiom	Observations	Mean	/55 obs	St.De.	Min.	Max
WARP		4,4	8,0%	8	0	22
SARP		9,9	18,0%	10	0	45
GARP	464	6	10,9%	7	0	29

Table 7. Descriptive Statistics for the revealed preferences axioms

The figure 2 in the appendix 2 shows the distribution of the violations for the WARP and SARP axioms. The figure 8 shows the distribution for the GARP violations. In the table 1 of this appendix we confirm the strong, positive and significant Pearson’s correlation with a significance level of 95% among the three violations of the axioms. According to the definitions exposed in the section II.b, every violation of WARP is also a violation of SARP, and if an observation violates GARP, then also violates SARP. However, the reverse is not true.

The mode of the number of violations is 2. We have found that there is a non significant difference between the violation rate among men and women. Until here we can try to calculate the utility function of the 403 players, because they showed perfectly consistencies in their choices. In the next subsection we want know how severe the violation were for the

¹³ Note that if there are more than two goods and the budget constraint is linear, GARP’s satisfaction is a necessary and sufficient condition for the preferences are well behaved.

players who had at least one violation (61). We will implement CCEI or Chalfant and Alston rate, ratio with the maximal number of violations and Famulari's violation rate

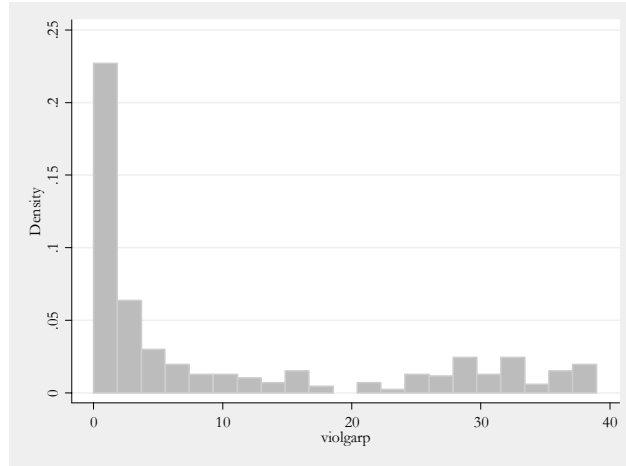


Figure 8: Distribution for GARP violations

e. Violations Tests

Although we have found some violations, we cannot decide yet how strong the violation was. In order to do it we follow some literature in which the researchers review the severity of the violations.

i. CCEI (Critical Cost Efficiency Index) (Afriat 1973):

Suppose two rounds i and j involved in a violation. Then $x(j) \cdot p(j) \geq x(i) \cdot p(j)$ and $x(i) \cdot p(i) \geq x(j) \cdot p(i)$. Multiplying both sides for a $e \in [0,1]$, a violation occurs when $e \cdot x(i) \cdot p(i) \geq x(j) \cdot p(i)$ and $e \cdot x(j) \cdot p(j) \geq x(i) \cdot p(j)$. Then e could be interpreted as the maximum value such that any of the inequalities do not hold. In other words CCEI is the amount which is required in order to avoid violations. Following Varian (1991) if the index is lower than 0,95 then the violations could be considered as a serious violation. We have found that only 14 players from the 61 players who violated at least once any of the three axioms, have a CCEI lower than 0,95. In other words 22.95% (about 3.4% of the players who hold perfectly the budget balancedness condition) of the subject who violated any of the axioms are really inconsistent in their choices. Chalfant and Alston (1988) show that this index could be also calculated by calculating $\max \left\{ \frac{x(j) \cdot p(i)}{x(i) \cdot p(i)}, \frac{x(i) \cdot p(j)}{x(j) \cdot p(j)} \right\}$.

ii. *Maximal number of violations*

Swofford and Whitney (1987) and Mc.Millan and Amoako-Tuffour (1988) compare the maximal number of violations with the number of violations made. The maximum number of violation is equivalent to each intersection of the budget. Then if n are observations the maximal number of violations is $\binom{n}{2} = \binom{11}{2} = 55$. We construct an index (the proportions of the violations over 55) that as higher is worse for the player is. If the index is 1 it means that the individual does not rationalize the data. On the other hand, a lower number means more rationalizing preferences. We found that the proportions in means over the 61 players who violated at least once one axiom are quite similar to the findings with the CCEI. We have found that 14 players with an index so close to 1 (over 0,96), the other 47 players had an average index below that 0,24. These fourteen players are the same who had an CCEI lower 0,95 ; the fifteenth player had an index over 0,9, because had about 50 violations.

iii. *Famulari violation Rate (1995)*

There are three types of relations in couples. Ones denoted by V , which shows one violation; C when one observation is revealed to another and the observations which are not necessary information to say something. According to Famulari (1995) the rate is $V / V + C$. We have found that our study is quite consistent in the confirmation of the severity on the axiom violations, because we have found that the same 14 players that we could detect to with the CCEI index are the individuals who have the maximal rate for the Famulari's rate. For the 47 rest players the average index is below to 0,16.

In order to sum up, 470 players were in the experimental sessions. 61 of them committed any violation of the budget restriction, but 55 of them did it in only one or two budgets. Then we can include them in the analysis. To the 464 players we tested the revealed preference axioms and we have found that only 61 had at least one violation. From them only 14 did a several violation according to CCEI, maximal number of violations and Violation Famulari's rate.

Then we can recover the utility function for 450 players. Who were those 14 players who commit a serious violation?. We have found that 8 players (57,1%) are men, while the rest are women. There is not a significant difference across genders in the level of of violations¹⁴.

An interesting finding from the analysis of the violations data is that out of the fourteen people who violated severely the axioms, 12 were exposed to the public announcement, and 13 had no additional information about FBF. It may suggest that violations could be induced by the emotional charge of the public announcement and the poorer information about the destination of the donation.

V. Reconstructing the utility function of the players

This section wants to verify the intuitions developed in the last sections. We want to confirm that the players that were classified in any of the preferences really belong to that. On the other hand, for the players who are not possible to classify to, we want to know if they could be classified in other utility function, in particular the CES function.

Following the Andreoni and Miller's econometric methodology we try to recover the utility function for the players who do not made any mistake, and they are not violating GARP. Although we follow their econometric methodology we amplify the analysis by allowing more utility functions. We make the analysis with 450 players.

Basically from the CES utility function $u(x_{bf}, x_m) = (a_{bf}^{ces} x_{bf}^\rho + a_m^{ces} x_m^\rho)^{1/\rho}$ where we assume without any loss of generality $a_{bf}^{ces} + a_m^{ces} = 1$, we can estimate two parameters from the marshallian demand estimated as budget shares (in order to avoid heteroskedastic

problems) using a two-limit tobit maximum likelihood $r = \rho/\rho - 1$ and $A = \left[\frac{a_m^{ces}}{(1 - a_m^{ces})} \right]^{1/1-\rho}$.

Having the last two parameters we can find ρ and a . As the literature says when $\rho \rightarrow -\infty, \rho \rightarrow 1$ and $\rho \rightarrow 0$ the preferences are perfect complements, perfect substitutes and

¹⁴ We also have found that there is no a significant difference for variables as session, age, stratum, program studied, semester, knowing about FBF, number of hours as volunteer. No one of the fifteen players were classified in any of the extreme cases of utility functions.

Cobb Douglas, respectively. Additionally when $a_m^{CES} \rightarrow 1$ we are in the perfect selfish's case, while $a_m^{CES} \rightarrow 0$ we are in the perfect altruist's case.

The first step is to classify the players in any of those 5 classifications. In order to do that, we make a flexibilization (as it was used in the section IV.b) by allowing that γ reaches 30. Then we found 38, 66, 145 and 35 players who are classified as players having a Perfect Selfish, Perfect Altruist, Leontief, Perfect Substitutes preferences¹⁵, respectively.

The table 8 shows this data in percentage. This table also shows the coefficients founded for the classification of those 284 players.

The second and third rows show the parameters estimated by the tobit regression (all of them were significant at 5%). This methodology allows us to replicate the intuition developed in the last paragraph. As we expected for the perfect self-regarding's case a_m^{CES} is close to 1, and for the perfect altruist's case a_m^{CES} is very low, tending to 0. For the Leontief's case ρ is negative and high, while for the perfect substitutes ρ is close to 1. (Notice that $0 < |\rho| \leq 1, 0 \leq a \leq 1$).

Because 166 players remain we apply the same methodology in order to classify the utility function for these players. We apply a 2- k cluster analysis and a minimization of within-group variance, in order to classify the remain players in one of two categories (Cobb Douglas and CES) evaluating their relative donations to the foundation. When we test those remain players via Tobit regressions, then we classify 88 players with Cobb Douglas preferences (because $\rho \rightarrow 0$) and 78 remain players with CES preferences.

	Selfish	Altruist	Leontief	Tr. PS	CD	CES
1/1-p	21.739	15.267	0.5291	14.29	10.989	2,857
A	73.002	0.0908	169.258	6929	13.815	3,185
r	-1.174	-0.5267	0.4709	-13.29	-0.0989	-1,857
a	0.878	0.172	0.73	0.65	0.573	0,6
p	0.54	0.345	-0.89	0.93	0.09	0,65
Cases	38	66	145	35	88	78
%	8,4%	14,7%	32,2%	7,8%	19,6%	17,3%

Table 8. Results of the Probit Regression

¹⁵ We have mix both types of the perfect substitutes types, because the prediction of the tobit model is not able to discriminate among them.

Remark 4: We can classify 100% of the observations which not committed any mistake and did not make any severe violation of revealed preference in any of the 6 preferences.

Now that we know which individuals have a well behaved preferences we can make the last step, by verifying the predictions of microeconomic models.

VI. Estimating the demand functions of altruism.

Our regression analysis in table 9 provides a last attempt to test the hypotheses of rationality and consistency of individuals regarding the demand function for altruism measured as the levels of payments to the *Bella Flor* foundation (expressed as monetary transfers to the foundation, in log terms). The different regression models are aimed at exploring the robustness and sensitivity to several specifications, especially with respect to our treatment variables and to the identification of the preferences “types” identified from the data. In general, the specifications reported here suggest that we can have a significant predictive power and that we confirm to a large extent major predictions of the theory. Thus, the following OLS regressions showed in table 9 are aimed to explain the determinants of the payoff to the Foundation Bella Flor. These results are consistent with literature on altruistic behavior (Andreoni, Gale and Scholz, 1996, Andreoni and Scholz, 1998, Andreoni and Vesterlund, 2001, Andreoni, 1990 and Andreoni, 1996). Recall that decisions considered as mistakes were not considered in the analysis. The results are robust to including mistaken decisions.

The first set of rows of the regressions confirms, as expected, a robust result for a negative effect of the relative price (cost) of giving and a positive effect of the income constraint, that is, we confirm the theoretical prediction that $\frac{\partial x_i(p, m)}{\partial p_i} < 0$, and that $\frac{\partial x_i(p, m)}{\partial m} > 0$. When the relative price of giving is higher the return of keeping the tokens for himself is higher and a efficiency regarding subject will give less to the foundation. On the other hand, the higher the level of income (tokens hold*hold value)+(tokens passed*pass value), the higher the amount given to Bella Flor. We should note that the coefficient values for both price and income decrease in their size when we include the types fixed effects (models 7 and 8). However, the signs and significance remain.

The next set of variables capture the effects of control demographics. It is worth noting that we do not find a strong gender effect, although it becomes significant and positive for women when we include the fixed effects of the preferences types. These effects have been also studied by Andreoni and Vesterlund (2001). The socio-economic (stratum) level and age effects are positive and significant although small in size if we compare to other factors that seem to contribute with a stronger impact to donations. In the specification (2) we check for the effects of the attributes of the players and confirm that players give more when they have previous information about the foundation, they have experience as a volunteer in any kind of NGO and currently work more than 1 hour per month as volunteers (Andreoni et al, 1996). This result validates our measure of altruism in the experiment and it is consistent with previous evidence on altruism. Notice that the level of education of the player increases donations, and older students show higher generosity. Although less robust statistically, we also find that graduate students and students of economics present lower donations compared to other students.

One of our goals in the research design was to explore the effect of providing information about the foundation and also the effect of having anonymous or public donations within the students' classes. Providing de donors with details about the goals and activities of the foundation has a very robust and effective impact, while making donations public to the rest of the class in fact decreases the donations. The different model specifications (3) to (6) explore different configurations of these effects all confirming this conclusion. These specifications check for the basic treatments, with additional information and public announcement. Controlling for experimental and subjects features, providing additional information about the recipient increases donations and the existence of a public announcement diminishes them. The previous results are robust to different specifications and controlling for session, player and round, that is specifications (5) and (6).

Finally we explore the effect of a dummy variable for each of the types of the subjects we were able to identify using the preferences configuration explored in section I where we identify five possible utility function possibilities, namely, perfect selfish, perfect altruist, leontieff, perfect substitute and imperfect substitute. We find that being Leontief and perfect altruist seem to trigger higher donations whereas being perfect substitute decreases donations,

illustrating the fact that ceteris paribus, the fact the recipient is a NGO is not relevant for the decision. Such result seems more robust to different specifications.

Method		OLS							
	Fixed effects	No	No	No	No	Yes	Yes	Yes	Yes
	by session	No	No	No	No	Yes	Yes	Yes	Yes
	by decision	No	No	No	No	Yes	Yes	Yes	Yes
Dependent Variable		Log(Pagos Bella Flor)							
Independent Variables		1	2	3	4	5	6	7	8
Demand variables	Constant	1.325*** [0.220]	0.619* [0.338]	0.585* [0.332]	0.551* [0.332]	1.257*** [0.400]	1.198*** [0.400]	1.321*** [0.430]	1.232*** [0.430]
	Relative price of giving	-0.345*** [0.011]	-0.343*** [0.011]	-0.343*** [0.011]	-0.343*** [0.011]	-0.449*** [0.019]	-0.448*** [0.019]	-0.437*** [0.017]	-0.437*** [0.017]
	log (Budget Income) ¹	0.591*** [0.049]	0.585*** [0.049]	0.575*** [0.047]	0.576*** [0.047]	0.404*** [0.066]	0.405*** [0.066]	0.365*** [0.080]	0.371*** [0.080]
Socio demographic variables	Woman=1		0.016 [0.022]	0.012 [0.022]	0.015 [0.022]	0.018 [0.022]	0.021 [0.021]	0.046** [0.020]	0.050** [0.020]
	Stratum		0.023** [0.010]	0.026*** [0.010]	0.025** [0.010]	0.033*** [0.010]	0.032*** [0.010]	0.014 [0.009]	0.013 [0.009]
	Age		0.033** [0.014]	0.035** [0.013]	0.035** [0.014]	0.047*** [0.014]	0.049*** [0.014]	0.049*** [0.012]	0.051*** [0.012]
	Semester		0.01 [0.045]	0.01 [0.043]	0.012 [0.043]	0.108** [0.044]	0.111** [0.044]	0.096*** [0.037]	0.100*** [0.037]
	Semester*Age		-0.001 [0.002]	-0.001 [0.002]	-0.002 [0.002]	-0.006*** [0.002]	-0.006*** [0.002]	-0.006*** [0.002]	-0.006*** [0.002]
	Program: Economics=1		-0.063* [0.036]	-0.032 [0.036]	-0.035 [0.036]	0.120** [0.051]	0.116** [0.051]	0.055 [0.047]	0.051 [0.047]
	Program: Managment=1		0.114*** [0.032]	0.114*** [0.032]	0.113*** [0.032]	0.083 [0.052]	0.079 [0.052]	0.062 [0.048]	0.057 [0.048]
	Graduate=1		-0.325** [0.131]	-0.263** [0.125]	-0.267** [0.127]	0.241 [0.161]	0.245 [0.162]	0.09 [0.143]	0.096 [0.144]
	Volunteer=1		0.139*** [0.036]	0.134*** [0.036]	0.140*** [0.036]	0.083** [0.035]	0.091** [0.036]	0.027 [0.032]	0.037 [0.032]
	Knew FBF=1		0.162*** [0.032]	0.157*** [0.031]	0.161*** [0.031]	0.183*** [0.032]	0.188*** [0.032]	0.141*** [0.029]	0.147*** [0.030]
no. hours volunteer=1		0.000*** [0.000]	0.000** [0.000]	0.000** [0.000]	0.000*** [0.000]	0.000*** [0.000]	0.000*** [0.000]	0.000*** [0.000]	
Treatments variables and player types	Treatment PI=1			0.120*** [0.026]		0.108*** [0.026]		0.060** [0.024]	
	Treatment AI=1			0.169*** [0.027]		0.161*** [0.026]		0.090*** [0.024]	
	Treatment PNI=1			-0.151*** [0.031]		-0.171*** [0.030]		-0.173*** [0.028]	
	with additional info=1				0.222*** [0.021]		0.222*** [0.020]		0.164*** [0.019]
	Public announcement=1				-0.100*** [0.021]		-0.112*** [0.020]		-0.102*** [0.019]
	if the decision was a leontief type=1							0.354*** [0.021]	0.356*** [0.021]
	if the decision was a perfect altruist type=1							1.028*** [0.031]	1.020*** [0.031]
	if the decision was a perfect substitute type=1							-0.087* [0.052]	-0.085 [0.052]
	if the decision was a perfect substitute trasn. type=1							0.083 [0.055]	0.09 [0.055]
	Observations		4746	4656	4656	4656	4656	4656	4656
R-squared		0.248	0.268	0.29	0.289	0.336	0.335	0.431	0.429

Table 9. Demand Function for Altruism

Those identified as having perfectly altruistic preferences (a horizontal indifference curve if the payment to self is in the horizontal axis) show a positive and large effect in

donations, reflecting the concept of pure altruism explored by Andreoni (2006) and by Andreoni and Petrie (2004). Also of interest is the positive and large effect of those showing a “leontieff type” preferences which also are compatible with a strong preference for fairness. In other words, those favoring a fair split of the amount being divided also show a strong preference for larger transfers to the Bella Flor foundation. This complementarity of fairness and altruism should come at no surprise as they may have evolved simultaneously as ways of sustaining norms of reciprocity and prosociality. Henrich et.al. (2006) have reported experimental results where altruism and third-party sanctioning correlate across small scale societies.

Although we show the regressions with the whole data we also have done two additional sets of regressions, one only with the players who holds the balancedness budget requirement and another one without the 14 players who violated severely the axioms of revealed preferences. Both sets have the same results than the one showed here. However, in both sets of regressions the income and price effects are higher, the level of significance of the variables increased and the F and the adjusted R^2 gained significance.

VII. Conclusions

We have adapted an experimental design for testing the rationality of giving to a context in which students can donate to an actual charitable foundation that was created and is run by students to help vulnerable groups in the poorest areas of a large city in the developing world. The design allowed us to achieve several analytical goals. First, we replicate the results of Andreoni and Miller (2002) from who we borrow the design and confirm that giving can behave as a normal good in the decision making of individuals with the expected negative price effect and the positive income effect on donations. Further, the observed behavior also allowed us to obtain an estimate of the marginal effects of certain demographic characteristics of the potential donors, and of possible framings and information made available to them.

We have however extended further this design and analysis to explore the violations of the axioms of revealed preferences, and classify the subject pool among categories of consistent behavior, from pure selfish to pure altruism and several consistent rationalities within the broad range of CES type utility functions. With our sample of 470 participants, we

test the configurations of utility functions derived from the theory. Of at least five possible configurations of preferences from purely selfish to pure altruistic types, including those with perfect and imperfect substitutes between self-interest and altruism, we found that a very large fraction of the people showed consistent behavior within these possible types and that the rates of violations of the axioms of revealed preferences were very small. Only about 7% of the participants seem to show consistency with the pure selfish model, and the rest of individuals showed a large variation of behaviors worth exploring within other possibilities of utility functions. With the low levels of violations of the revealed preferences axioms from their choices, we pushed the analysis one more step further and made an attempt to estimate the coefficients of a general form of a CES utility function that can predict the different types of agents.

We recognize that our design cannot be extended without caution to more generalized samples of the population since we used only decisions from college students. Extending the design to other demographic segments of society as potential donors could enhance the analysis. However, there is a special value in this particular sample of participants since the foundation that we use as a recipient of the donations is founded and run by students and the main source of donations and voluntary work comes from such population.

The results could provide also practical lessons for these non-profit organizations. Targeting people with certain traits such as voluntary work, and providing people with detailed information of what the foundation does seems to offer a significant effect in the way they exercise their altruistic behavior towards the foundation. The price effect may suggest also that matching grants strategies could be an effective way of triggering more altruism. Finding institutional donors willing to match individuals' donations and offering these ways of multiplying an individual's donation could yield higher levels of giving. Of particular interest is that at least within this population of students, anonymity remains an important factor and that making public donors and donations may fire back.

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APPENDIX 1. Experimental Protocol

Instructions

You are going to participate in a exercise of decisions in which you can win a quantity of money in cash. The money comes from funds obtained for this research. It is important that you read these instructions carefully and **silent. It is not allowed to chat with someone else during the experiment.** If you have any question please raise your hand at the end of reading these instructions. To fill in blank

Decisions: **You have to divide up the number of tokens between yourself and the tokens passed to a non-profit social foundation.** These tokens will become points that will be given to you and to the foundation according to the distribution that you choose. Each point has a \$100 value. In order to decide you have to divide up a quantity of tokens among both options (yourself and the foundation) and fill each line. For example:

Divide 10 tokens: Hold _____ tokens @ 3 points, and give to the Foundation _____ tokens @ 1 point.

At this example you must to divide up 10 tokens. Every token that you hold will become three points and every token passed will be one point for the foundation. For example, if you save 10 tokens, you receive 30 points, that is, you receive \$3000 for this choice, and the foundation receive \$0. If you hold 0 tokens and pass 10 tokens, you receive \$0 and the foundation receive $10 \times 1 = 10$ points = \$1000. If you decide to save 4 tokens and pass 6 tokens, you receive $4 \times 3 = 12$ points = \$1200 and the foundation receive $6 \times 1 = 6$ points = \$600.

You must to fill in every blank space for every option that will be presented to you in the next page. In each case you have to be sure that the sum of the tokens for yourself and the foundation is the total of tokens that you have.

At the end of the experiment we will randomly select 50% of the participants and only one of the eleven possible decisions. We will pay to those people and to the foundation this quantity of money in cash and in a private way.

Please fill in all the blanks for every option of the next page. Make sure the number of tokens listed under *Hold* plus the number listed under *Pass* equals the total number of tokens available

Treatment**

The game was embedded in four different treatment conditions:

1. An anonymity treatment (henceforth A-treatment) in which the information about the donor's decision is kept anonymous to the people in the room.
2. A public treatment (P-treatment) in which donors' decision is announced to the people in the room.
3. An information treatment (I-treatment) in which subjects has additional information about the FBF.
4. A non information treatment (NI-treatment) in which subjects only know that the money will go to a non profit organization.

There were four different groups equally distributed in each session, PI, AI, PNI and ANI. The letter “P” at the beginning of the first and fourth group means “public announcement”, while the letter “A” means “anonymous announcement”. On the other hand, the letter “I” means “additional information”, while “NI” means “without additional information”. Then each group which was exposed to the public announcement had the next sentence: “*The money donated to the Foundation will be delivered on behalf of the participant chosen to be paid, and his name and the amount donated will be announced to the panel*”. The anonymous treatment said: “*The money donated to the Foundation will be delivered as an anonymous donation, that is, his name won’t appeared as a donor*”. On the other hand, if the individual had an additional information treatment his sheet said: “*The Bella Flor Foundation is a non-profit organization which aims to improve the quality of life of 85 children of 40 families from the Bella Flor, Paraíso and Mirador neighborhoods of Ciudad Bolívar by implementing health, education , nutrition and recreation programs. It’s formed by community leaders from the area and a group of students and professionals in different areas. Its goal is to build a model of self-sustainable development within the community and the main scope is the children. Its mission is to promote the integral development in a group of 85 children in the neighborhood Bella Flor with several programs on education, health, recreation, nutrition and education in values*”. In the case that “NI” was the treatment was not any additional information available to the respondents.

For every player, the second page contains the next:

Decisions Sheet

1. Divide 40 tokens: Hold _____@ 3 point each, and give to the Foundation _____@ 1 point each.
2. Divide 40 tokens: Hold _____@ 1 point each, and give to the Foundation _____@ 3point each.
3. Divide 60 tokens: Hold _____@ 2 point each, and give to the Foundation _____@ 1 point each.
4. Divide 60 tokens: Hold _____@ 1 point each, and give to the Foundation _____@ 2 point each.
5. Divide 75 tokens: Hold _____@ 2 point each, and give to the Foundation _____@ 1 point each.
6. Divide 75 tokens: Hold _____@ 1 point each, and give to the Foundation _____@ 2 point each.
7. Divide 60 tokens: Hold _____@ 1 point each, and give to the Foundation _____@ 1 point each.
8. Divide 80 tokens: Hold _____@ 1 point each, and give to the Foundation _____@ 1 point each.
9. Divide 100 tokens: Hold _____@ 1 point each, and give to the Foundation _____@ 1 point each.
10. Divide 40 tokens: Hold _____@ 4 point each, and give to the Foundation _____@ 1 point each.
11. Divide 40 tokens: Hold _____@ 1 point each, and give to the Foundation _____@ 4 point each.

Make sure the number of tokens listed under *Hold* plus the number listed under *Pass* equals the total number of tokens available

Please answer the next questions. Remember that your name cannot be appear in any place of this sheet.

1. Number Code of Player _____

2. Gender Male Female

3. Semester _____

4. Age _____

5. Program _____

6. In which range are your total monthly expenditure =(transport+feeding+social life) excluding rent, student fees and public service fees

- | | |
|-----------------------|-----------------------|
| 1. 0-\$100.000 | 6. \$500000-\$600.000 |
| 2. \$100000-\$200.000 | 7. \$600000-\$700.000 |
| 3. \$200000-\$300.000 | 8. \$700000-\$800.000 |
| 4. \$300000-\$400.000 | 9. over \$800.000 |
| 5. \$400000-\$500.000 | |

7. Which is your stratum? 1 2 3 4 5 6 No stratum

8. Have your work as volunteer in any social organization in the last ten years?

Yes _____ No _____ (go to question 10)

9. How many hours did you work in this social organization last year?

_____ hours

10. In the last year, how many times did you donate to the *Minuto de Dios Foundation* through ATM's? _____ times

11. Have you heard about the Bella Flor Foundation before? Yes ___ No ___

12. How did you know about this foundation?

1. Campaigns at Universidad los Andes _____,
2. Through publicity at Universidad los Andes _____
3. By TV, radio or magazines _____
4. By a friend _____
5. Other ways _____

APPENDIX 2. Figures

Figure 1. Students' Participation in the session

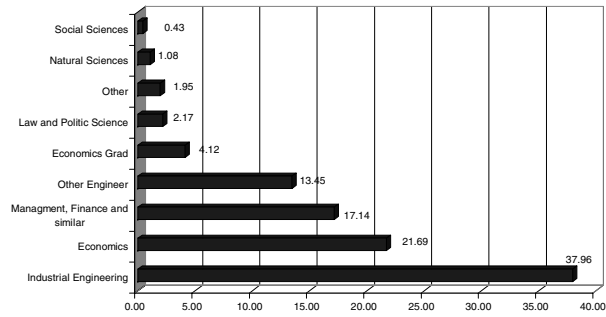


Figure 2. Students' degree distribution (semester)

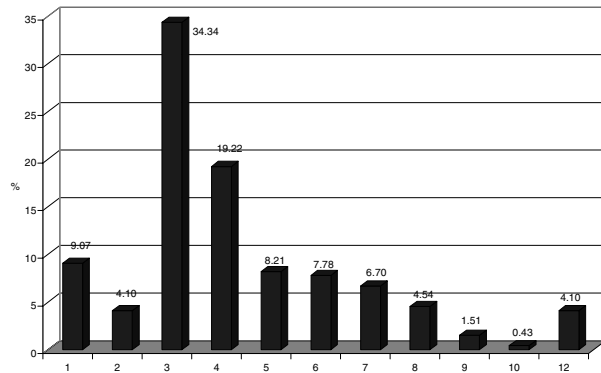


Figure 3. Stratum

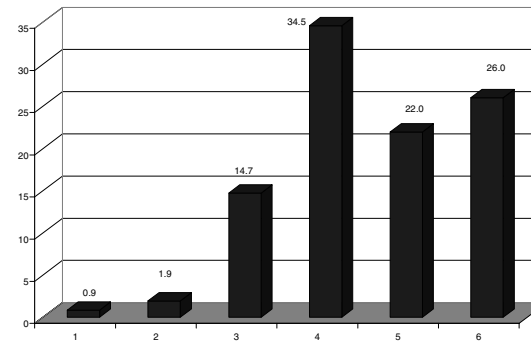
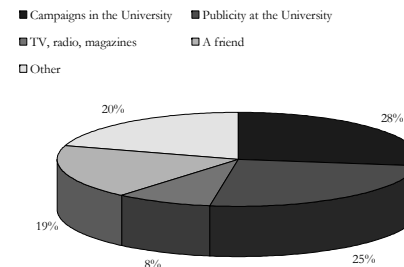


Figure 4. How do you know Bella Flor?



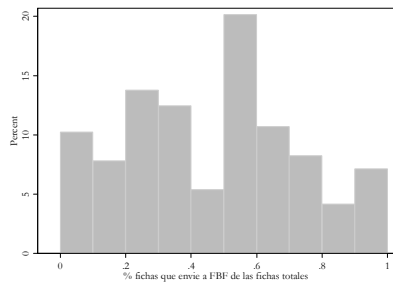


Figure 5: Histogram of allocations to FBF

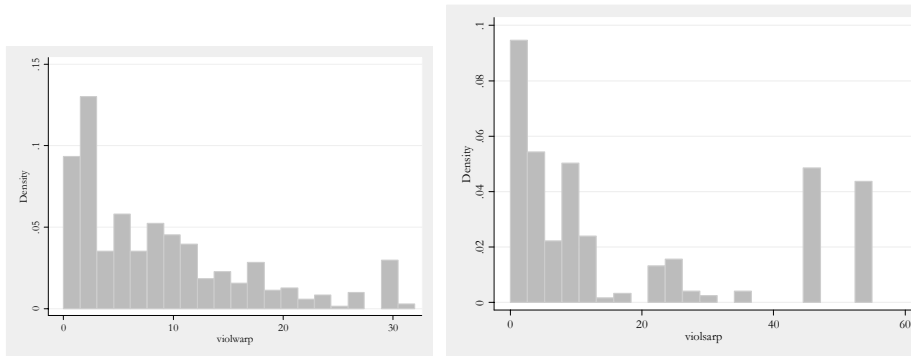


Figure 6: Distribution for WARP and SARP violations

Axiom	WARP	SARP	GARP
WARP	1		
SARP	0.91*	1	
GARP	0.91*	0.98*	1

Table 1. Pearson Correlations among number of violations

Table 2. Descriptive statistics for variables in the regression analysis:

variable	mean	sd	min	max
Total Payoffs	93.122	27.917	35	330
PayoffP	41.551	34.399	0	300
My Payoff	51.566	36.705	0	300
Genre	0.441	0.497	0	1
Stratum	4.529	1.132	1	6
Age	19.796	2.461	16	39
Sem	4.343	2.472	0	12
Econ	0.213	0.409	0	1
Industrial	0.372	0.483	0	1
Admon	0.168	0.374	0	1
Post	0.04	0.197	0	1
Volunteer	0.109	0.311	0	1
Bfco	0.115	0.319	0	1
Hours	10.092	58.843	0	1000