Private provision of a public good: cooperation and altruism of internet forum users

Ros-Galvez, Alejandro and Rosa-García, Alfonso

Universidad Catolica San Antonio de Murcia

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Alejandro Ros-Gálvez and Alfonso Rosa-García[2]

Abstract

We run an experiment with users of internet message boards. We find that forum users cooperate more with partners of their own forum than with partners from a different forum but they are equally altruistic when they made a gift to a partner of their forum or from another one. We also find that individuals are more active in the forums, the more altruistic they are; however, we find no relation between activity in the forum and cooperation. These results suggest that the public good provided in internet forums is mainly provided by a group of unconditional altruistic group of users, and that the feeling of community supports the cooperation in that provision.

Keywords*:* internet forums; public good provision; altruism; cooperation

JEL Codes: C90; H41; L86

1. Introduction

Millions of people around the world spend a significant part of their lives participating in virtual communities. From the beginning of the internet (Rheingold, 1993), many users share information and have virtual social relationships with other people. In recent years, social interaction in the internet through social media like Facebook or Twitter has become a phenomenon of first order importance, but internet chats and forums have put individuals in contact for a long time.

These virtual communities work because of the participation of many users who share conversation and put knowledge in common. Kollock (1999) studied how an economy of gifts and cooperation allows to sustain these communities. Importantly, when these communities are open access, the information they provide is a public good, which is privately provided through the participation of a myriad of individuals, who do not receive any monetary contribution for their participation.

The large literature on private provision of public goods (Ostrom, 2000) has identified a set of required conditions in order to sustain that provision. A fundamental requirement is the development of adequate institutions. Moreover, the personal characteristics of the individual are fundamental in providing the public good. Heterogeneity in the society has become well established, showing the existence of conditional cooperators as well as rational egoists (Fischbacher et al., 2001; Kocher et al., 2008).

Use of IT's, at the same time, has been related with pro-social behavior (even the use of Computer Games, as shown in Mengel, 2014). Some recent studies have explored some of these aspects in internet users. Bravo (2010) explores why this voluntary contribution emerge in the case of mutual-help forums. Many recent studies focus on the motivation to write in Wikipedia (Forte and Bruckman, 2005; Wagner and Prasarnphanich, 2007). Zhang and Zhu (2011) find in a field experiment that people contribute more to Wikipedia because of the social impact of the contributions, thus explaining why contribution increases when users of the public good increase. It gives empirical support to the experimental evidence of group size having an ambiguous but possibly positive effect on contributions (Isaac et al., 1994). A recent study shows that size group has nonlinear effects, with an optimal intermediate size (Yang et al., 2013).

As far as we know, we are the first study that uses the methodology of experimental economics in order to disentangle motivations of these users. With this aim, we have run public good game and the dictator game with a sample of two large internet message boards.[3]

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[3] Some recent studies have shown the validity of virtual laboratories, getting results compatible with those obtained in traditional laboratory experiments (Horton et al., 2011; Hergueux and Jacquemet, 2012).

We analyze the behavior of internet forum users, and explore if it is related with their altruism and tendency to cooperate. Although many internet forums are privately owned, it has been found that users feel that they are sharing information in a true public good (McLure Wasko and Faraj, 2000). Our hypothesis is that if online communities survive, their core users should be likely to contribute to a public good and/or to be altruistic people.

There is few evidence on the relation between laboratory and real life behavior. Karlan (2005) shows how the Trust game is able to predict real behavior in microcredit takers. Thöni et al (2012) find that most (69%) of the population are conditional cooperators and that cooperation choices are driven by preferences and beliefs. They also find that survey measures of social capital are significant predictors of cooperation behavior in the Danish population.

We find that level of participation in the community is significantly related with altruism, while the relation is weaker with the participation in the public good situation. These results suggest that altruism is a more relevant characteristic that tendency to collaborate in core participants in this type of communities. This is consistent with an altruistic explanation for the cooperation in public goods (Anderson et al., 1998), explaining preferences on altruism the cooperation levels in public goods (Anderson et al., 2011). Laury and Taylor (2008) found that altruism measured in the lab explained contribution to a real public good, but it was also asked to the participants in the lab. We relate altruism measured experimentally with the contribution to the real public good provided in the forum.

We run the experiment in both communities asking participants to make a gift or to cooperate in the public good with people of the same or of a different community. Levels of cooperation and gifts were bigger inside the community, although the community effect is significant only for cooperation.

We find that the role of the community increases levels of cooperation and that more participating users tend to be more altruistic, both with people of their community and of the other community.

2. The experiment

We want to study if the subjects who provide the public good of the content of internet forums feel themselves likely to establish higher levels of cooperation with other members of their (of a different) community, as well as the relation between their activity in the forum and their altruism and tendency to cooperate. With this idea, we ran an experiment in two Spanish forums, whose users were invited to participate. We proposed them two situations:

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- Gift game. In this game the subject had to decide which part of its endowment gives to an anonymous partner. We considered this answer as a measure of altruism.

- Public good game. In this game the subject had to decide how much to invest with an anonymous partner. The investment of each individual generated a public good shared equally. We considered this answer as a measure of the tendency to cooperate.

Subjects decided under two different treatments: half of the sample was informed that they were playing with individuals from the same forum, and the other half that they were playing with individuals from another forum. For each participant, we took also the number of messages written in the forum as well as for how long they had been registered.

We recruited 200 users from two different Spanish internet forums. Forocoches.com (Forum 1 from now on) is probably the most popular Spanish forum. Originally directed to car users, it has evolved in a general debate forum, where people talk about a wide set of topics, mainly with an entertainment objective. Burbuja.info (Forum 2) is probably the most popular Spanish forum focused on economic topics. 50 volunteers were recruited on Forum 1 with a thread looking for participating in an experiment that would allow winning a prize.[4] This thread was posted on June 27th 2013, and a new thread was posted on July 7th looking for additional 50 volunteers. In the case of Forum 2, we posted a thread looking for 100 volunteers on July 8th. In both forums, we were surprised by the high level of responses we received.

The message in the thread was equal in both forums. In that message, users with an account registered in 2012 or earlier were kindly asked to respond the thread if they were willing to take part in an experiment where they should answer a short questionnaire and in which, depending on their answers, they could win a variable prize. Making groups of 50 people, each one of them would be assigned with 2 different two-digit numbers, such that the one with the same ending number than in the First Prize of the following Spanish National Lottery event, would win a prize depending on their answers and on the answers of others.

In the case of Forum 1, we included in the title of the thread the tag "Serious topic", which is used when trolling behavior is not allowed, which is respected usually by the users. In the case of Forum 2, we asked for permission for initiating the topic by the moderators' team, who warned in the first answer to our thread that they would not allow troll behavior in the topic, which was "officially" authorized by the team of moderators.[5]

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[4] Instructions are in the Appendix.
[5] We strongly acknowledge the readiness of the users of both forums, as well as the respect they showed along all the time of the experiment. We also kindly thank the help of the moderator "ransomraff" in Forum 2.

When people applied for participation, we wrote their names as well as the number assigned for the lottery in the initial post of the thread, making transparent this information. After that, we sent to each participant a private message through the forum including a hyperlink to a Google Form, where they answered seven questions step by step.

Once they clicked in the hyperlink, they entered in a webpage where we explained once more the experiment and the prize. We informed them that in the case of winning the lottery, their prize would be of €5 (show-up fee) plus an amount depending on the decisions taken by her/him and the rest of participants. After that they were required to introduce their nickname of the Forum. Then, they were presented first with a public good game situation and later with a dictator game (framed as a gift situation), or vice versa, in order to control for order effects. In both cases, the situation was initially explained and the user was asked to continue only if she/he had understood everything. After clicking, they were allowed to answer.

In the public good game, they were asked to freely allocate up to €10 to a project with a random anonymous partner, which had the same option, such that each euro invested would pay €0.75 to both members of the pair. These questions were entitled as "Your investment". We framed the dictator game as a gift situation, saying to the participant that she/he was allowed to freely give to an unknown participant up to €10 for her/his potential prize, different from the one paired in the public good situation. These questions were entitled as "Your gift". In both cases, the part of the money neither invested nor given remained as part of the prize of the user. Half of participants read that their pairs were members of the same forum, while the other half read that their pairs were members of a different forum (not specified which one) where the experiment was also being conducted.

Then, subjects were informed that their prize would be also increased by the gift of another random user. Finally, they had to fill a short questionnaire, where they were asked how many Euros they thought that their random partners had invested and given, and they would get one additional euro for their prize if they matched the answer of their partner. In the questionnaire they also had to answer if they participated in other forums, and how active they were.

When all subjects completed the experiment, we made random pairs and compute the potential prize for each one, and posted it in the first message of the thread, next to the nickname of the user and the two numbers of two digits, which were the equivalent to their lottery tickets.

There were a total of 200 volunteers. Half of them played with partners from the same forum and half of them with partners from a different forum. Half of them played initially the public good game and later the dictator game, and half of them in the reverse order.

From each participant, we obtained their decisions in the Google Form, as well as the date in which they registered in the forum and the number of messages they had written up to the moment in which they applied for participation. This information is publicly displayed in the forum, next to the nickname of the user. With it we generated the variables Age, which accounted for the number of months since the users registered in the forum, and Messages, with the number of messages written until then. With these two variables we controlled for the implication and participation of the user in the virtual community.

Given the rules proposed to the subjects, the potential prize was theoretically between a minimum of €12.50 (show-up fee, full investment and no investment of the pair, all money given as gift, no money received and failed prediction about the partner behavior) and a maximum of €44.50 (show-up fee, no investment and full investment of the pair, no money given as gift and €10 received, and answering correctly the prize of the partners). In the experiment, the minimum and maximum potential real prizes were of €14.50 and €42.50, respectively. The prizes that won the lottery were of €25, €26.50, €28.75 and €30.25. The prizes were given trough Amazon Gift Cards.

3. Hypothesis

Users of forums spend a significant part of their time reading and writing in them. Participation varies strongly, but there is typically a core group of users who participate very often (Arthur, 2006). These users are the main responsible for generating a public good, the content included in the forum, which many other users can freely enjoyed. Why do these users contribute?

We expected that the more active individuals in the forums, more altruistic and more they would cooperate in the public good. We propose therefore the following hypothesis, expecting to reject it:

H.1 *Subjects with more messages do not give and invest more.*

Those individuals registered for a longer time in the forum should be more conscious of the fact that they belong to an informal institution where they are cooperating. This leads to our following hypothesis, which we also expect to reject:

H.2 *Subjects registered for a longer time do not invest more.*

We also expect that people is more confident with respect to their forum partners, so that investment level should be higher when the partner is from the same forum. At the same time, if agents decide to give in a purely altruistic manner, they do not treat differently people from the other forum. Thus we expect to reject the first part and to accept the second of the following:

H.3 *Subjects invest and give the same when partners are from the same forum or from other forum.*

We think that people who have spent more time in a given forum should have a sense of belonging to a community. Therefore we expect that beliefs on others' behavior are strongly for those people registered for a longer time and more participative.

H.4 *Subjects with more messages and registered for a longer time believe that partners will invest and give more.*

Finally, we hypothesized that people believe that partners of their own forum is more likely to invest and give more, so we expect to reject:

H.5 *Subjects believe that people do not give and do not invest more when partners are from the same forum.*

4. Results

In Table 1, we present some descriptive statistics of our data.

	Age	Messages	Investment	Gift	Other Investment	Other Gift
Mean	43,94	2966,33	6,69	5,09	5,57	3,73
Std Dev	24,54	4692,43	3,19	3,10	3,25	3,10
Median	41	1238	7	5	5	4
Max	110	28217	10	10	10	10
Min	7	4	0	0	0	0

Table 1

Our experimental subjects had been registered in the forums for an average of 44 months, with a standard deviation of 24 (2 years) and a median of 41 months. The subject with the oldest forum account was registered for 9 years and 2 months when we run the experiment. The average accumulated number of messages was of almost 3000, which means that our experimental subjects, in average, had written around 67 messages monthly. This is a measure of how active each user is in the forum, and the data had a large variability, with a maximum of a user with more than 28000 messages.

In a first approximation to the data, we find that subjects invest and give a relatively high proportion of their endowmen, 6.69 and 5.09, in average. As expected, and due to that it partially returns to the subject, the investment is in average higher than the gift, €1.60. Only 14% of the subjects gave more than they invested. It is also relevant that they believe, in average, that they have invested €1.12 more than their partners and given €1.36 more. In the Appendix A we present these descriptive statistics disaggregated by Forum and depending on whether the pairs were of the same or of a different forum.

With respect to decisions, we observed a weak relation between gift and investment, both the own and the predicted by the partner. We observe a stronger relation between the investment of the subject and the users' beliefs of the investment of the partner, and between own gift and the belief on the gift of the partner, as we show in Figure 1.

We find a difference in decisions between the same and a different forum in all cases. As it can be observed in Figure 2, individuals invested and gave less when the partner was from a different forum. Consistently with this fact, we also observe that beliefs on actions of the partner are systematically smaller when the partner was from a different forum. In Figure 2 we plot the mean of each decision, with the associated standard errors. Although the difference between a partner from the own forum and an unknown one is systematic, we point that it is significant only in the case of investment.
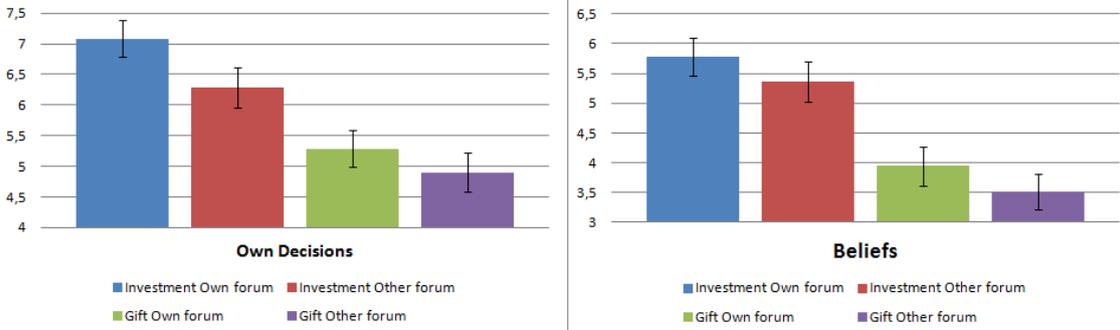
Figure 2

In order to disentangle if decisions of investment and gift can be explained by the experience in the forum of each user, we run a regression analysis. We explore using OLS if the level of Investment and Gift can be explained by the level of participation of the user (Messages, in thousands) and the time the user was registered in the forum (Age, in months). Moreover, we include in this regression three dummy variables. *Forum 1* takes the value 1 if the user belonged to Forum 1 (0 otherwise), and we use it to capture forum-specific conditions. *Own* takes the value 1 when the user was playing with a partner of the same forum. *InvGift* takes the value 1 when the subject answered in the first place to the Public Good game.
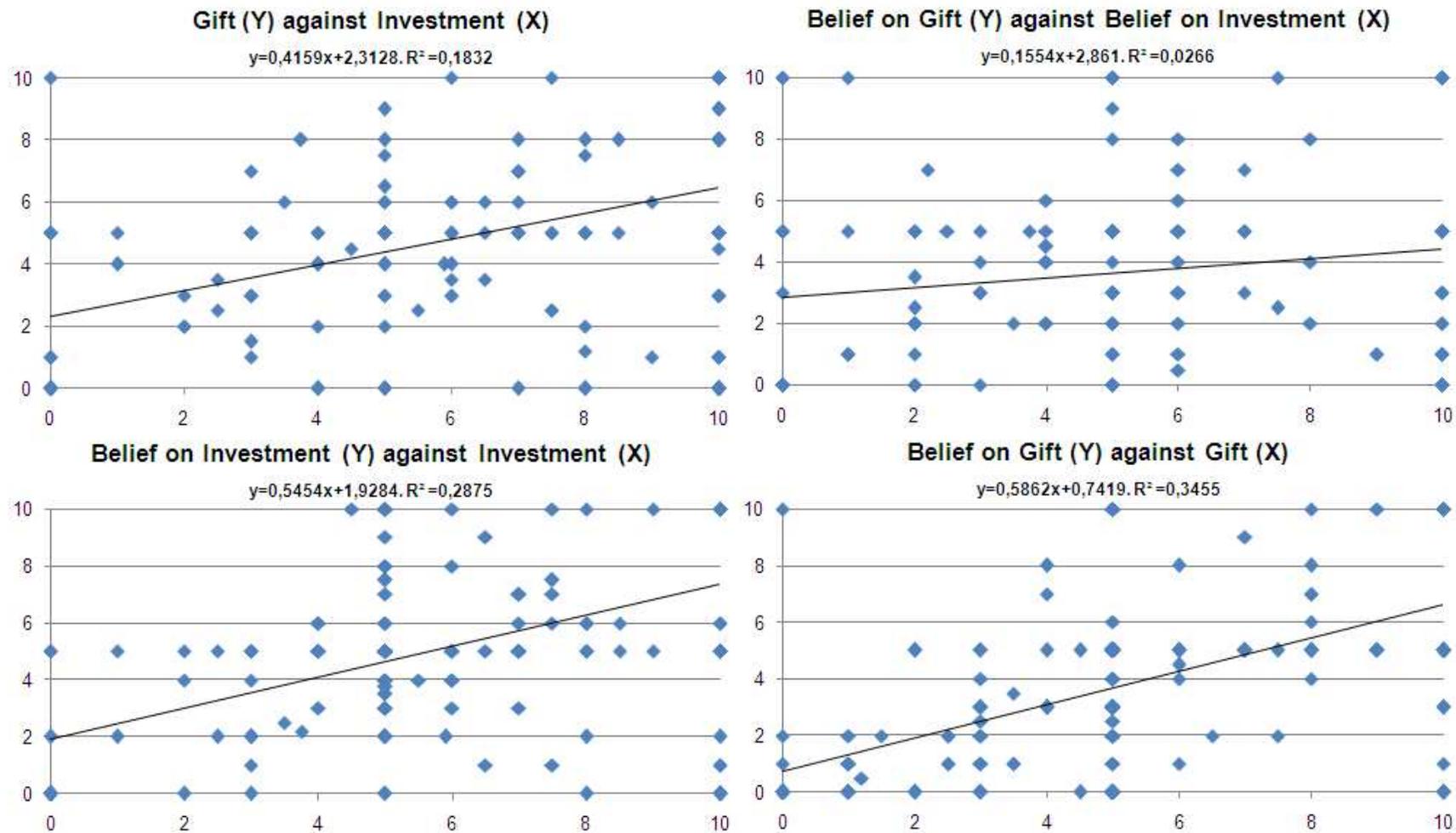
Figure 1

In Table 2 we report the results of these regressions in Models (1) and (3). Models (2) and (4) include as explanatory variable the belief of the subject on the action of the associate partner. For each model we report the coefficients of the initial regression on the left and those coefficients that survive after removing the non significant ones on the right.

	Investment				Gift			
	(1)		**(2)**		**(3)**		**(4)**	
Forum 1	**0,846***	**0,842***	0,274		0,215		0,14	
	0,463	0,446	0,401		0,441		0,367	
InvGift	-0,078		-0,135		-1,363***	-1,380***	-0,604	
	0,462		0,395		0,441	0,438	0,375	
Own	0,743	**0,792***	0,581		0,209		0,363	
	0,459	0,446	0,393		0,438		0,365	
Age	0,005		0,000		0,015	**0,016***	0,009	
	0,01		0,008		0,009	0,008	0,008	
Messages	0,011		-0,004		0,078	**0,083***	0,031	
	0,05		0,043		0,048	0,046	0,04	
BeliefInv			**0,515***	**0,527***				
			0,061	**0,059**				
BeliefGift							**0,559***	**0,589***
							0,06	**0,058**
Cons	**6,573***	**6,711***	**3,757***	**3,747***	**4,898***	**4,839***	**2,858***	**2,896***
	0,573	0,387	**0,597**	**0,38**	0,554	0,466	**0,51**	**0,279**
F	1,39	3,35	13,64	79,88	2,9	4,72	18,11	104,53
P-Value F	0,23	0,037	0,000	0,000	0,0151	0,003	0,000	0,000
R^2	0,035	0,033	0,298	0,288	0,0695	0,067	0,36	0,346
Adj R^2	0,01	0,023	0,276	0,284	0,0456	0,053	0,34	0,342

Significant coefficients in bold. ***, ** and * means significantly at 1%, 5% and 10%, respectively. N=200.

Table 2

When we include beliefs on actions of other as explanatory, the model increases dramatically its explanatory power (adjusted R^2 is multiplied by 7 or more). However, we consider that we measure very closed concepts when we use the actions of the subject and their beliefs on actions of the partner; second, we ask their opinions immediately after their decisions, thus using these beliefs as exogenous in the explanation of own decisions is not fully sensible. In fact, when we include it, the beliefs eliminate any possible explanatory power of the rest of variables.

When we focus our attention in the models that exclude beliefs, we find significant effects of several variables. In the case of Investment, we find that members of Forum 1 invested significantly more, and also that individuals invested more when their partner was of the same forum. According to this result, we reject our

Hypothesis 3. But we do not find evidence that supports a strong level of cooperation in the public good game among more active users of the forums or between users who were registered for a longer time, so we only reject the first part (related to giving) of our Hypothesis 1 and we accept our Hypothesis 2. We do find evidence of a higher altruism of these more active users. We find each 1000 thousand messages in the forum implied a gift 8 cents higher, and that for each month registered in the forum, subjects gave 1.6 cents more (19.2 cents for each year).This supports the hypothesis of a higher level of altruism of those subjects that form the core of the users in the forum. Therefore we obtain the following results:

R1. *More active internet forum users do not tend to cooperate more but are more altruistic.*

R2. *Users participating in internet forums for a longer time do not tend to cooperate more. However, they are more altruistic.*

R3. *Users of internet forums have a higher level of confidence in their community, so that they invest more with their partners. They are not more generous with people in the same forum, so that they are not conditionally altruist.*

We also note that we had an order effect in our data that affected level of altruism. Subjects who decided initially the public good, were later more likely to give to an unknown partner. Remarkable, we find that explanatory power of these models is in general very low, represented by a low R^2. It indicates that there are many other factors that we did not take into account in our study.

It is possible that in both communities Messages and Age have different meanings, i.e., the sense of belonging could differ between communities. However, if we intersect Age and Message with Forum 1 and Own, the intersected variables are not significant in any regression (see Appendix B). This suggests that there is no difference in the behavior that depends on Message and Age between both forums, and that these variables do not affect differently the behavior with respect to people in the same or from the other forum.

Finally, in Table 3 we explore the beliefs of the participants over the actions of others. We assume that they were strongly influenced by their own actions, but the fact of being an incentivized question may generate a more sensible answer.

We find that beliefs on others' investment do not differ depending on age or messages, as expected after observing that these variables did not affect investment decisions. This shows that neither individuals with a longer history in the forum nor more active users have higher levels of confidence on others. However, we find that more active users do believe that others are more altruistic, while it is not true for individuals who had been registered for a longer time. This is consistent with more

active people having a nicer view of their partners in the forums, while it is not necessarily true for people registered for a longer time.

	Investment of the partner				Gift of the partner			
	(1)		(2)		(3)		(4)	
Forum 1	1,109**	1,12**	0,662	0,672*	0,134		0,0136	
	0,469	0,454	0,404	0,39	0,441		0,367	
InvGift	0,112		0,153		-1,357***	-1,275***	-0,596	
	0,468		0,4		0,44	0,431	0,375	
Own	0,316		-0,078		0,309		0,192	
	0,465		0,401		0,438		0,364	
Age	0,011		0,008		0,01		0,001	
	0,01		0,008		0,009		0,008	
Messages	-0,013		-0,008		0,082*	0,093**	0,039	
	0,051		0,043		0,048	0,046	0,04	
Investment			0,529***	0,531***				
			0,062	0,061				
Gift							0,559***	0,586***
							0,0597	0,057
Cons	5,465***	6,135***	1,987***	2,358***	3,647***	4,09***	0,911*	0,742**
	0,589	0,321	0,649	0,514	0,554	0,321	0,545	0,432
F	1,68	6,09	13,97	41,82	2,71	5,75	17,89	104,53
P-Value F	0,141	0,015	0,000	0,000	0,022	0,004	0,000	0,000
R2	0,042	0,03	0,303	0,298	0,065	0,055	0,357	0,346
Adj R2	0,017	0,025	0,281	0,291	0,041	0,046	0,337	0,342

Significant coefficients in bold. ***, ** and * means significantly at 1%, 5% and 10%, respectively. N=200.

Table 3

R.4 *Subjects registered for a longer time believe neither their partners will invest nor give more. More active subjects do not believe that their partners invest more, but believe that their partners are more altruistic.*

4.1 The forum is not generated by the rational egoists

Up to now we have found that messages (cooperation in the creation of the real public good) are correlated with altruism but not with the cooperation level in the public good game. As Figure 2 shows, there is a dramatic difference between the level of participation in the forum between those users who gave nothing and a positive amount, and it also exists between those who invested 0 or a positive amount, although differences in this case are smaller. However, there are no differences between those who gave or invested everything and the rest of people.

Posts by "extreme" subjects

	Gift=0	Gift>0		Gift=10	Gift<10		Inv=0	Inv>0		Inv=10	Inv<10
Posts	1089	3222		3168	2925		1724	3067		2943	2980

Posts by month by "extreme" subjects

|	Gift=0	Gift>0		Gift=10	Gift<10		Inv=0	Inv>0		Inv=10	Inv<10
PostxMonth	43,39	85,39		72,94	81,86		59,81	82,01		72,24	85,21
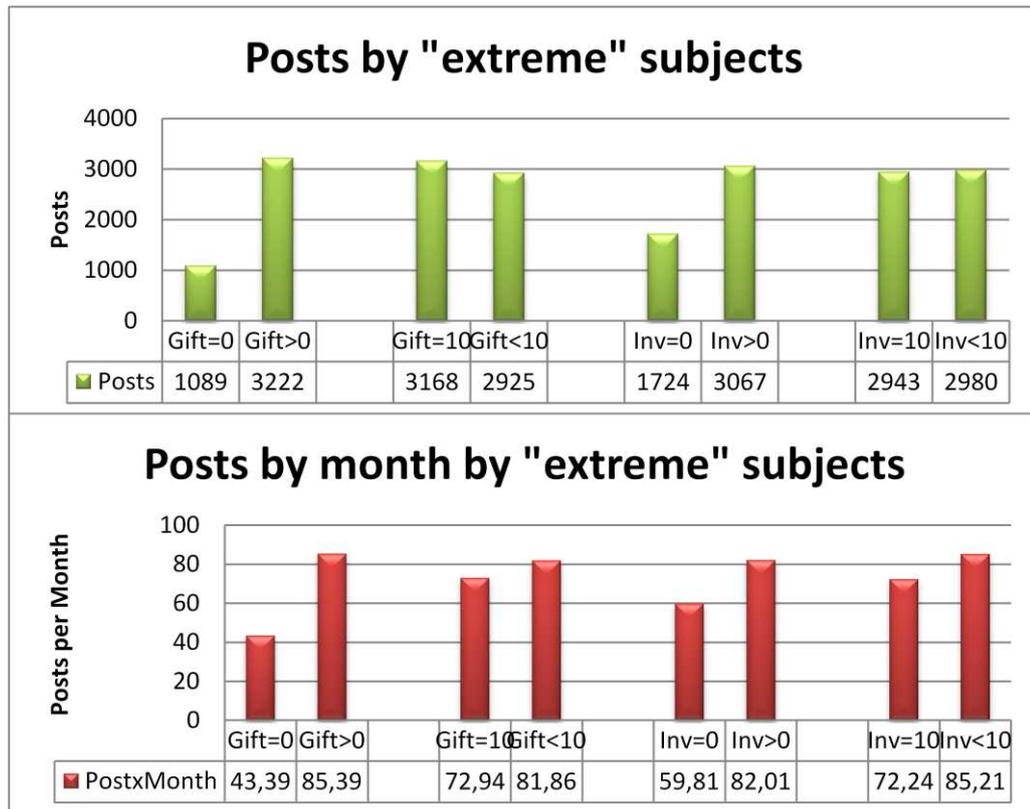
Figure 2

These figures suggest that it is not a matter of being rational egoist which drives the non cooperation in a real public good; what we observe is that the people who are completely non altruistic are those who more clearly do not cooperate.

5. Conclusion

Users of internet forums generate a public good when they provide free content that can be accessed by other users. We run an experiment in order to study cooperation and altruism between forum users, as well as how belonging to a community determines these behaviors.

We find that forum users do not tend to cooperate more in a public good experiment when they contribute more to the forum. However, we find that those users more active in the forum have a higher level of altruism and believe also that other individuals are more altruistic. These results suggest that one relevant explanation of the success of internet forums is the existence of a core group of altruistic users.

We also find evidence of a feeling of community inside the forums. It makes people more likely to cooperate with partners from the same forum. Therefore, the construction of such an identity seems also important for the success of the forum in the provision of its public good. Altruism of the participants is not conditioned on being directed to members of their own community.

This experiment sheds light on how internet forums work and continuously provide a completely privately generated public good. We expect in the future to make a more detailed and general study of the behavior of internet forums, using other standardized experimental methods.

6. Bibliography

- Anderson, S. P., Goeree, J. K., & Holt, C. A. (1998). A theoretical analysis of altruism and decision error in public goods games. *Journal of Public Economics*, 70(2), 297-323.

- Anderson, L. R., DiTraglia, F. J., & Gerlach, J. R. (2011). Measuring altruism in a public goods experiment: a comparison of US and Czech subjects. *Experimental Economics*, 14(3), 426-437.

- Arthur, Charles (2006). What is the 1% rule?. *The Guardian*. http://www.theguardian.com/technology/2006/jul/20/guardianweeklytechnology section2

- Bravo, G. (2010). Voluntary contribution to public goods in mutual-help forums: reciprocity or group attachment?. *Socio-Economic Review*, *8*(4), 709-733.

- Fischbacher, U., Gächter, S., & Fehr, E. (2001). Are people conditionally cooperative? Evidence from a public goods experiment. *Economics Letters*, 71(3), 397-404.

- Forte, A., Bruckman, A. (2005). Why do People Write for Wikipedia? Incentives to Contribute to Open-Content Publishing. *GROUP 05 workshop position paper.*

- Hergueux, J., & Jacquemet, N. (2012). Social preferences in the online laboratory: a randomized experiment. *Experimental Economics*, 1-33.

- Horton, J. J., Rand, D. G., & Zeckhauser, R. J. (2011). The online laboratory: Conducting experiments in a real labor market. *Experimental Economics*, 14(3), 399-425.

- Isaac, R. M., Walker, J. M., & Williams, A. W. (1994). Group size and the voluntary provision of public goods: experimental evidence utilizing large groups. *Journal of Public Economics*, 54(1), 1-36.

- Karlan, D. S. (2005). Using experimental economics to measure social capital and predict financial decisions. *American Economic Review*, 1688-1699.

- Kocher, M. G., Cherry, T., Kroll, S., Netzer, R. J., & Sutter, M. (2008). Conditional cooperation on three continents. *Economics Letters*, 101(3), 175-178.

- Kollock, P. (1999). The economies of online cooperation. *Communities in cyberspace*, 220.

- Laury, S. K., & Taylor, L. O. (2008). Altruism spillovers: Are behaviors in context-free experiments predictive of altruism toward a naturally occurring public good?. *Journal of Economic Behavior & Organization*, 65(1), 9-29.

- McLure Wasko, M., & Faraj, S. (2000). "It is what one does": Why people participate and help others in electronic communities of practice. *The Journal of Strategic Information Systems*, 9(2), 155-173.

- Mengel, F. (2014). Computer Games and Prosocial Behaviour. *PloS One*, 9(4), e94099.

- Ostrom, E. (2000). Collective action and the evolution of social norms. *The Journal of Economic Perspectives*, *14*(3), 137-158.

- Rheingold, H. (1993). The virtual Community: Homesteading on the Electronic Frontier. New York: Addison-Wesley.

- Thöni, C., Tyran, J. R., & Wengström, E. (2012). Microfoundations of social capital. *Journal of Public Economics*, 96(7), 635-643.

- Wagner, C., & Prasarnphanich, P. (2007, January). Innovating collaborative content creation: the role of altruism and wiki technology. In *System Sciences, 2007. HICSS 2007. 40th Annual Hawaii International Conference on System Sciences* (pp. 18-18).

- Yang, W., Liu, W., Viña, A., Tuanmu, M. N., He, G., Dietz, T., & Liu, J. (2013). Nonlinear effects of group size on collective action and resource outcomes. *Proceedings of the National Academy of Sciences*, 110(27), 10916-10921.

- Zhang, X., & Zhu, F. (2011). Group size and incentives to contribute: A natural experiment at Chinese Wikipedia. *American Economic Review*, 101(4), 1601-1615.

7. Appendix A

Here we present the descriptive statistics of each subgroup:

Partners of Own Board

Forum 1		Age	Messages	Investment	Gift	Other Investment	Other Gift
	Mean	55,42	4518,26	7,54	5,54	6,38	4,22
	Std Dev	27,43	7007,99	2,34	2,97	3,08	3,23
	Median	55	1216	7,5	5	5	5
	Max	110	28217	10	10	10	10
	Min	11	53	3	0	0	0

Partners of Other Board

Forum 1		Age	Messages	Investment	Gift	Other Investment	Other Gift
	Mean	35,94	3572,18	6,67	5,08	5,89	3,58
	Std Dev	22,63	4680,91	3,30	3,13	3,19	3,06
	Median	30	1930,5	7	5	5	4
	Max	104	20154	10	10	10	10
	Min	7	19	0	0	0	0

Forum 2		Age	Messages	Investment	Gift	Other Investment	Other Gift
	Mean	42,22	1795,20	6,62	5,03	5,19	3,67
	Std Dev	23,37	2377,93	3,55	3,44	3,24	3,17
	Median	39	848,5	7,75	5	5	4
	Max	90	13429	10	10	10	10
	Min	8	4	0	0	0	0

Forum 2		Age	Messages	Investment	Gift	Other Investment	Other Gift
	Mean	42,22	1979,66	5,91	4,72	4,84	3,44
	Std Dev	23,37	2742,49	3,33	2,89	3,35	2,94
	Median	39	1001,5	5	5	5	3
	Max	90	13668	10	10	10	10
	Min	8	7	0	0	0	0

Partners of Own Board   **Partners of Other Board**

8. Appendix B

Regressions where we intersect Message and Age with Forum 1 and Own:

	Investment			Gift	
Forum 1	-0,37			-0,303	
	1,039			*0,992*	
InvGift	-0,064			**-1,329*****	**-1,380*****
	0,473			*0,451*	*0,438*
Own	1,51	**0,792***		1,056	
	1,154	*0,449*		*1,102*	
Age	0,011			0,025	**0,016***
	0,018			*0,169*	*0,008*
Messages	0,075			0,117	**0,083***
	0,094			*0,09*	*0,046*
ForumXOwn	-0,301			0,057	
	0,97			*0,926*	
ForumXAge	-0,008			-0,003	
	0,02			*0,189*	
ForumXMessages	-0,007			0,058	
	0,141			*0,135*	
OwnXAge	-0,006			-0,015	
	0,02			*0,926*	
OwnXMessages	-0,134			-0,078	
	0,109			*0,104*	
Cons	**6,032*****	**6,29*****		**4,443*****	**4,839*****
	0,827	*0,318*		*0,79*	*0,466*
N	200	200		200	200
F	0,89	3,1		1,61	4,72
P-Value F	0,542	0,08		0,106	0,003
R2	0,045	0,015		0,079	0,067
Adj R2	-0,005	0,011		0,03	0,053

9. Appendix C

Initial thread

We reproduce here, in English, the initial message posted on the thread where we were recruiting volunteers and where we posted the prizes. Original threads (in Spanish) can be visited in Forocoches.com (first thread: http://goo.gl/EzK7Ao; second thread: http://goo.gl/oFZEVv) and in Burbuja.info (http://goo.gl/pdtSy2).

Title: Collaborate in an experiment and participate in a lottery (2012 accounts or before) (serious topic)

Message: Good morning mates,

I would like you help me with a small experiment. Among the 50 participants I will give a prize of a a minimum of 5 and a maximum of 42.5 euros, depending on your decisions, and that the winner will receive with an Amazon Gift Card.

The process will be as follows:

1. If you want to participate, ask it by answering this thread, and I will do a list editing this message with all of you, ordered by time. Only users with accounts from 2012 or before are allowed to participate.
2. Once the inscription process finishes, every participant (the first 50 people) will receive 2 correlative numbers (the numbers 00 and 01 for the first one, the numbers 02 and 03 for the second one,… and so on).
3. I will send a private message to each participant with a hyperlink, in order to fill a questionnaire, only with 6 short questions (2-3 minutes).
4. When everyone answers, I will calculate the prize that everyone may win and I will post it in this message.
5. The prize that each one may obtain will be posted before the day of the lottery. The person with the two last digits of the first prize of ths Spanish National Lottery on the next Saturday [date] will be the winner, and I will contact her/him in order to give her/him the gift card.

The prize will depend on the decisions you take and that will be detailed in the questionnaire.

Finally, make it clear that we will not distribute any private information.

Thank you very much for your attention and ¡good luck!

P.D.- Remeber that only the first 50 people will participate.

Private message

Participants received a hyperlink to a Google Form. An example of the private message received by each user follows:

Title: Experiment and lottery

Message: Good morning,

I give you the hyperlink to the questionnaire and lottery, in order to fill it:

[Hyperlink]

Thank you very much for your participation

Questionnaire

There were eight different forms, depending on: the message board of the subject; if her/his partners were of the same/different forum; if the user answered first the public game or the dictator game. An example of the questionnaires (in Spanish) can be visited here: http://goo.gl/J1Cg2

We reproduce now the screens observed by each subject:

FIRST SCREEN:

Experiment

*Compulsory

¡Wellcome!

Thank you very much for your participation. As you know, you have received two numbers that will allow you to be able to win a prize if the two last digits of the first prize of the National Lottery next Staurday [DATE] coincide with your numbers. If you win, the prize will be of 5 euros plus an additional money that will depend on your decisions and on decisions of other participants. The prize will be given with an Amazon Gift Card. In the experiment are also participating users from a message board different from [Message board of the subject]. We are going to assign you random pairs among the participants of the other message board, such that your decisions will affect the final prize you will opt.

Please, introduce your nickname *

> [   ]

This question is compulsory.

Continue

SECOND SCREEN:

Experiment

Your gift

Now you will be assigned a random participant from a message board different from [Message board of the subject]. You have 10 euros to decide how many you want to give to this random mate. The money you give him will increase her/his prize if she/he is the winner. The money you do not give will remain as part as your prize. The only connection between the individual you are paired and you will be the gift that you send her/him. If you have understood how this works, click to continue.

Back - Continue

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THIRD SCREEN:

Experiment

*Compulsory

Your gift

Remember, each euro you give will go to your mate of the message board different from yours. Each euro you do not give will remain as part of your prize if you are the winner.

Introduce the amount of money you want to give, from 0 to 10 euros. You can introduce decimal numbers. *

[   ]

This question is compulsory.

Back - Continue

FOURTH SCREEN:

Experiment

Your investment

You and another participant, from the message board different from [Message board of the subject], and different from the previous participat you were paired, that will be assigned to you at random, have 10 euros each one in order to decide how much to invest. The money that both of you decide to invest will multiply by 1.5 and will be split equally among both of you. That is, for each euro that you decide to invest, 0.75 cents will come back to you and 0.75 cents will be received by your random partner. The money that you do not invest will be yours. If you have understood correctly, click to decide.

Back - Continue

FIFTH SCREEN:

Experiment

*Compulsory
Your investment
Remember, for each euro you invest, 0.75 will come back to you and 0.75 euros will go to your mate from the message board different to [Message Board of the subject], and the same will occur with her/his investment.

Introduce your Money to invest, from 0 to 10 euros. You can introduce decimal numbers. *

This question is compulsory.

Back - Continue

SIXTH SCREEN:

Experiment

WARNING
Your potential prize will be increased also by the gift from a random participant, from the message board different to [Message board of the participant], and different to that participat that will receive your gift. Soon, and previous to the date of the Lottery, we will edit in the thread we opened in the forum the potential prizes for each one of you, once all participants have taken their decisions.

Back - Continue

SEVENTH SCREEN:

Experiment

Final Questionnaire

We have almoust finished. Now we would want you answer a short questionnaire.

How many Euros do you believe that your mate has invested? *

If you match it, your prize will be increased in 1 additional euro:

[   ]

This question is compulsory.

How many Euros do you believe that has given the mate that will increase your prize? *

If you match it, your prize will be increased in 1 additional euro:

[   ]

This question is compulsory.

Do you participate in other internet boards? Which ones? *

This question is compulsory.

[   ]

How many messages has you approximately posted in those boards? *

If you do not participate in other boeards, just write "No".

[   ]

This question is compulsory.

Back - Continue