Effectiveness of Charitable Lottery Design: Experimental Evidence from the Czech Republic and Russia

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Abstract

The paper presents the results of a multicultural economic experiment executed in the Czech Republic and Russia. The experiment was focused on studying the behaviour of economic agents in a situation simulating a charitable lottery. From Dale's (2004) experimental design, we adopted the fixed-prize lottery (raffle) structure, in which tickets are sold for chances of winning a prize. This means that the more tickets one buys, the higher probability to win he gains. We introduced a new scheme – the modified fixed-prize lottery - within which the chance of winning was equal for all contributing individuals. Our results show that such a structure is not effective, that is, that individuals contribute considerably less under the modified fixed-prize lottery than under the classic raffle.

Keywords: *public goods, experiment, lottery, free riding*

JEL Classification: C72, D70, H41

1. Introduction

One of the classic arguments emphasising the need of state intervention in economy arises from the concept of *market failure*. The most typical examples of market failures are externalities and public goods.

In addition to national defence, the legal system or street lamps, charity is ranked among goods fulfilling two classic characteristics of public goods – non--rivalry and non-excludability.

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The attractiveness of studying charity or charitable contributions[1] is related to their special characteristics. Charity is usually considered as good and lively example of a privately provided public good. If individuals are altruistic and donors wish to support people in need, then the recipients' wellbeing enters into the utility functions of the donors in a non-rival way (Robledo, 2000). The Samuelsonian approach to public goods presumes that in large economies (groups) the existence of a public good results in massive free riding. People do not voluntarily contribute to public goods because of the ability to consume them without paying for them. The total value of contributions collected is therefore very small (or at least smaller than the Pareto effective level), and the public good is not provided.

The opposite behaviour is, however, observed for real charities. There are a large variety of charitable organisations that raise their funds from people on a voluntary (i.e., private) basis.[2] The empirical data have also impugned the assumption that only rich people contribute to charity. Hall et al. (2009) presents Canadian data showing that in 2007, 81% of unemployed people contributed to charity. Such contributions – again impugning the traditional model – are not (or are to a very little extent) crowded-out by state or government funding (Robledo, 2000).

Studying charity and the motivations of people to contribute to charity can be very informative for public policy making. Raising funds on private principle without (or with very little) need for state intervention could help to address the increasing gap between demand for public services and budget constraints.

Lotteries and gambling can be used as charitable tools in two ways. The first way, which is traditional in the Czech Republic, is treating gambling as a *bad thing* and forcing the providers of such games to pay a share of profit to not-for--profit (or charitable) organisations.[3] In this case, the relationship between gambling and charity is not very clear to people. The support of charitable projects, through the payment of a share of profit, could be seen as taxation rather

[1] The contribution could take various forms; besides monetary contributions (within charitable collections), people donate their free time while preparing or undertaking charitable activities, volunteer in not-for-profit organisations, or take care of elderly people. Private firms support research activities (e.g., provide rooms, appliances, and capital). People also contribute to international public goods (e.g., peacekeeping efforts and disaster relief). For more examples, see Batina and Ihori (2005).

[2] The most famous example is the charitable sector in the U.S.A. For example, Independent Sector (2001) shows that 89% of American households donated to charity (in the form of money, property, stocks or bonds) in 2000. The average contribution of a household was 1,620 USD (3.1% of household income). Similar results can be found in Canadian data (see Hall et al., 2009). In 2007, 84% of individuals contributed to charity, with the average contribution of 437 CAD in Canada.

[3] According to the Czech Lottery Act, every provider of a lottery (or other gambling activity) must pay 6-20 per cent of the lottery revenue for the public benefit. The largest lottery company in the Czech Republic, SAZKA, has paid more than 400 million CZK (14 million Eur) to (mainly) not-for-profit sports clubs and associations.

than as a provision of public goods. We argue that people (gamblers) in this case do not take into account the charitable aspect of their gambling activity and do not derive any utility from it.

The second type of relationship between charity and lottery is more traditional in Western countries (mainly in the U.S.A.) and is more closely related to our research. In this case, a lottery is treated as a fundraising tool, and people are encouraged to voluntarily contribute to a charity by offering them the possibility of winning a prize. According to the Cornes' and Sandler's (1994) model, a lottery serves as a private good provided in complement with the public good (charity).

Our paper attempts to contribute to the huge amount of literature studying the motivations of individuals and trying to help not-for-profit organisations derive the most effective way to raise their money through voluntary contributions. Our experiment was to a great extent inspired by Dale (2004). In accordance with Dale's study, we examined the effectiveness of various lottery structures.

An important issue is which design a charitable organisation should use to make the charity the most effective, i.e., to increase its funds as much as possible. In our paper, we discuss two charity designs, which are then compared to the (traditional) voluntary contribution mechanism (VCM). The VCM represents the ordinary design of charitable giving – collecting money from contributors without any reward (*collecting money in a hat*).

From Dale's experimental design, we adopted the FPL – the *fixed-prize lottery* (raffle) structure – where tickets are sold for a chance to win a prize. In Dale's study, this structure appeared to be the most effective one, with this conclusion being confirmed by both the theoretical model and by the experimental results.

Our second lottery structure is a modification of this design. We call this structure the *modified fixed-prize lottery* (MFPL). It differs from the classical raffle in a way that an individual's chance of winning the prize is not affected by the amount of his/her contribution (as it is in Dale's FPL model). The winner of the MFPL raffle is simply one of the contributors, regardless of the amount he/she contributed. Our proposed modification might seem easier to manage to a subject who is trying to increase its resources by means of a charitable lottery. The fundraiser simply selects one subject from the set of contributors, regardless of the amount he or she contributed. The question is what the effectiveness of such a modification would be.

In this respect, we formulated our main hypothesis as follows:

H1: Using a *Modified fixed-prize lottery* is an ineffective modification of the classical raffle. Here, people contribute less than in a fixed-prize lottery.

Besides the main hypothesis, we were interested in the question of whether Central and Eastern European university students behave differently than their Western colleagues. In relation to this question, we state the following hypothesis:

H2: When voluntarily providing a public good, American students contribute considerably higher amounts than their Central and Eastern European counterparts.

Comparing the behaviour of different nationalities is usually referred to as country effect. This field ranks among the most interesting and exhausting ones studied in experimental economics. In one of the most influential studies, Herrmann, Thöni and Gächter (2008) show that there might be different contribution patterns in different countries. The above hypothesis follows one of possible explanations of these differences: *"people in collectivist societies might be more inclined than people in individualistic societies to perceive other participants as out-group members"* (Herrmann, Thöni and Gächter, 2008). We argue that due to different historical backgrounds (e.g. experience with the collectivist society in Central and Eastern Europe (CEE) countries), there should be some differences found between behaviour of the Czech, Russian and American students.[4] The choice of participating universities also enables us to test another question – whether any differences could be observed between the behaviours of Czech and Russian participants (again, due to slightly different historical experience, but also because of present political situation in both countries).

2. The Model

As our experiment aims to replicate to a great extent the one published by Dale (2004), we used the same model. The model combines the voluntary contribution mechanism model (first published by Isaac and Walker, 1988) and the model of the fixed-prize (charitable) lottery presented by Morgan (2000). We adopted the notation used in the model presented by Dale (2004). A more detailed and complex model of a charitable lottery can be found in Lange, List and Price (2007). Maeda (2008) discusses the optimal lottery design under the assumption that people regard lotteries only as a source of entertainment.

2.1. Standard Voluntary Contribution Mechanism (VCM)

As stated above, the VCM model was first employed by Isaac and Walker (1988). The model is based on the assumption of linear utility functions of individuals (both in wealth and the quantity of public good provided). We further assumed a linear one-for-one relationship for transforming wealth into the public good.

[4] Such differences did not play an important role in previous studies comparing behavior of Czech (Slovak) students with others in simple public good games (Šeneklová and Špalek, 2009; Bačo, Gazda and Horváthová, 2008; Špalek and Berná, 2011).

An individual solves the following maximisation problem:

$$\max_{g_i} U_i = w_i - g_i + \beta_i \left[\sum_j g_j \right] \tag{1}$$

where

w_i – the wealth of an individual *i,*

g_i – *i's* contribution to public good,

$\sum_j g_j$ – the quantity of the public good provided,

β_i – the marginal benefit of public good to individual *i*.

Assuming $\beta_i < 1$ for all individuals, we get βi-1 < 0 standing for an individual's marginal utility from investing a unit of wealth in the public good.[5]

The fact that $\beta_i < 1$ for all individuals *i* results in total free riding as all individuals contribute $g_i = 0$. Free riding is present, even though $\sum_i \beta_i > 1$, suggesting that the public good is socially desirable. *Equilibrium is found at the corner solution due to the linear nature of the technology and utility functions* (Dale, 2004).

2.2. Fixed-Prize Lottery (FPL)

The second mechanism we employed simulates a lottery (raffle) with a fixed prize (F). This fixed prize is awarded to one randomly chosen individual. The total amount of public good provided equals the sum of contributions collected minus the prize *F*. This design means that negative revenue from the lottery is possible.

The formal design of the FPL model is based on Morgan (2000).

First, we assume that the organiser of the lottery (fundraiser) is endowed with a small amount of money[6] ε. The organiser then holds the lottery if, and only if, the amount collected is greater than $F - \varepsilon$. If the sum of contributions is less than $F - \varepsilon$, the lottery is cancelled, and the contributions are (usually) given back to contributors. As we assume the positive amount ε and the money-back mechanism, an equilibrium where nobody contributes does not occur.[7]

The general form of charitable lottery (according to Morgan, 2000) is

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[5] This risk-neutral assumption enables us to concentrate only on the influence of lottery structure on the rate of contribution of the public good.

[6] This means that the organiser has a budget of this amount coming from external sources.

[7] When there is an initial capital ε, zero contribution cannot provide equilibrium, as one can profit from being the only contributor. If he or she contributes $F - \varepsilon$, he or she is selected and wins the prize (and his or her utility increases).

$$U_i = w_i - g_i + \pi(g_i, g_{-i})F + \beta_i\left(\sum_j g_j - F\right) \quad (2)$$

where the expression $\pi(g_i, g_{-i})$ is the probability of winning by individual *i*, given that contributions of other economic agents are fixed. For FPL, the probability π equals the share of individual's *i* contribution in the group's total contribution. Specifically,

$$\pi^{FPL}(g_i, g_{-i}) = \frac{g_i}{\sum g_j} \quad (3)$$

The individual thus maximises the following utility function:

$$U_i = w_i - g_i + \frac{g_i}{\sum g_j}F + \beta_i\left[\sum_j g_j - F\right] \quad (4)$$

As Dale states: "*The value g_i, which maximises the function as a function of F, β_i, and the sum of other's contributions $\sum_{j\neq i}\beta_j$, is the potential contributor's Nash best response function.*" The best response function takes the form

$$g_i\left(F, \beta_i, \sum_{j\neq i} g_j\right) = \left(\frac{F\sum g_j}{1-\beta_i}\right)^{0.5} - \sum_{j\neq i} g_j \quad (5)$$

Assuming homogenous preferences (meaning $\beta_i = \beta$ for every individual *I*), the individual's contribution g_i satisfying Nash condition is

$$g_i^{**} = \frac{(N-1)F}{N^2(1-\beta)} \quad (6)$$

For every $\beta > 0$, we obtain $g_i^{**} > 0$, meaning that the fixed-prize lottery results in equilibrium with total contributions greater than zero. Compared to VCM equilibrium, the FPL design leads to decreased free riding. On the other hand, even for the FPL design, the problem of the under-provision of the public good remains.

The improvement in the effectiveness of the FPL design is connected to a particular characteristic of charitable lotteries. The model of lottery as voluntary provision of public goods presented above can be regarded as being parallel to Cornes' and Sandler's (1994) model of the impure public good. These authors showed that an increase in voluntary contributions to the public good can be achieved by the joint production of public and private goods.[8]

2.3. Modified Fixed-Prize Lottery (MFPL)

A lottery where the winner is selected from the group of contributors regardless of the amount he or she contributed is called a modified fixed-prize lottery. The motivation for using such modification of the classic raffle could come from practical reasons. It could be easier for a fundraiser, in some cases, to randomly choose a winner from the list of contributors, without the necessity of monitoring the precise amounts of individual contributions. As the MPFL does not simulate the classic raffle, it can be treated rather as a simulation of a single (for instance, annual) reward to supporters (i.e., contributors).

The MPFL model uses the same equation (2) that we adopted from Morgan (2000). The probability of winning the prize is now related only to the number of individuals who contributed to the public good. If a person is the only contributor in the group, his or her probability of winning is equal to one. Formally,

$$\pi^{MFPL}(g_i, g_{-i}) = \frac{A_i}{\sum_{j=1}^{N} A_j} \tag{7}$$

where A_i = 1 for $g_i \neq 0$ and A_i = 0 for g_i = 0.

Individual *i* then seeks to maximise his/her utility function

$$U_i = w_i - g_i + \frac{A_i}{\sum_{j=1}^{N} A_j} F + \beta_i \left[\sum_j g_j - F \right] \tag{8}$$

Knowing that every non-zero contribution to group account will result for a subject in equal chance of being drawn, she or he considers only two strategies: *not to contribute* and *contribute one token*. Utility functions related to these strategies are as follows:

$$U_i^1(g_i = 1) = w_i - 1 + \frac{1}{\sum_{j=1}^{N} A_j} F + \beta_i \left[\sum_j g_j - F \right] \tag{9}$$

[8] The truth is that Cornes and Sandler (1994) apply the model of impure public good also for the VCM. For the VCM, the private good is represented by a warm glow experienced by an individual for having done the right thing (contributing to a charity). However, the private nature of a warm glow can be decreased by publishing the names of donors to a charity. The lottery prize, on the other hand, is a private good. Moreover, as shown in Maeda (2008), when asked, people confirm that they play the lottery (including the charitable lotteries) mostly because they expect to win the prize (60.4% of the surveyed Japanese), or for their fun (41.6%).

$$U_i^0(g_i = 0) = w_i + \beta_i \left[\sum_j g_j - F \right] \quad (10)$$

The strategy *not to contribute* yields greater utility if and only if the prize is smaller than number of contributors (i.e. $F < \sum_{j=1}^{N} A_j$). Otherwise strategy *contribute one token* is always the most profitable one.

In our experimental setting, $\sum_{j=1}^{N} A_j \in [0,\ 4]$ and F = 2000, so the only equilibrium strategy for each subject is to contribute one token. Formally:

$$g_i = 1 \quad (11)$$

As one may observe, equilibrium individual contribution in case of MFPL is greater than in case of VCM where it is equal to zero. However, as in case of FPL, under the MFPL raffle one cannot expect attaining of efficient level of provision of public good.

As far as comparison of effectiveness of MFPL and FPL models is concerned, we are interested in relation between (6) and (11). Logically, this relation depends upon *N, F* and β. In our setting, these parameters are equal to following values: N = 4, F = 2000 and β = 0.75. This means that equilibrium contribution under FPL equals 15 tokens while for MFPL it is only one token.

Overall, comparing the three models, we argue (following Morgan, 2000 and Dale, 2004) that the highest contribution level to a public good will be attained in the FPL model. According to the equilibrium contribution level, one can expect that individuals will contribute more under the MFPL model than under the VCM model.

3. The Experiment

We reported the results of a set of experimental sessions conducted using Czech and Russian students during the academic year 2009/2010. Our experiment consisted of three experimental designs: VCM, FPL and MFPL. In the Czech Republic, the experiments were held at Masaryk University in Brno. Subjects were recruited via an advertisement published on the University's Information System website. The Russian experiments were carried out by our colleagues at N. I. Lobachevsky State University in Nizhniy Novgorod. Russian students were informed of the proceedings during classes and via a notice board at the faculty building. Students in both countries were informed that they were going to participate in an economic experiment regarding their decision-making *"in a certain modelled situation"* and that they could earn a considerable amount of money for their participation.[9] In total, nine sessions were conducted, three for each model (VCM, FPL, MFPL). Each session was carried out with 12 participants, with 108 subjects participating in our experiment in total.

All sessions consisted of 17 rounds: two practice rounds that enabled participants to understand the process and during which they could not increase their total earnings and 15 game rounds, during which participants played for money. At the beginning of the experiments, instructions were distributed among participants (instructions for each session are available in the Appendix). Subjects studied the instructions on their own initially, and then the instructions were recapitulated by the experimenters and discussed with the participants. After the monitors made sure that participants understood the game rules and mechanics, the decision-making stage of the experiment was started. However, participants were allowed to ask questions even during the first two (practice) rounds. In the course of the following 15 rounds, participants were forbidden to discuss or coordinate their behaviour in any way. Participants revealed their decisions via computer terminals,[10] which informed them continuously about their payoffs. At the end of the experiment, participants were given the amount of money they had earned during the game. No session took longer than one hour.

Average earnings were different for Czech and Russian students. The average Czech participant earned 205 CZK (8 EUR), whereas the average Russian student earned 95 RUR (4 EUR). Part of this difference is a reflection of the different exchange rates used for exchanging tokens (points)[11] for money. The second factor was the different behaviours of Czech and Russian participants exhibited during a session; these behaviours are reported in the following section.

All 17 rounds of a particular session were identical. At the beginning of each round, subjects were randomly divided into groups of four players. Because the composition of a group changed in each round, participants were not able to know or guess who they were playing with.

Each subject was given 20 tokens and asked to decide whether he/she would contribute to the group account, and if so, what proportion of his or her income.

[9] The earnings were set to follow a conventional rule saying that participants should earn roughly the equivalent of the average hourly wage in the country. Due to this rule and different wage levels in the Czech Republic and in Russia, we set different exchange rates for deriving monetary reward from tokens. In the Czech Republic, it was 4 CZK for 1,000 tokens (points), and in Russia, it was only 2 RUR for 1,000 tokens (points).

[10] All experimental designs were programmed and conducted using the z-Tree software (Fischbacher, 2007).

[11] A token (point) is an experimental unit. In our experiments, the value of the token in Czech crowns or Rubles had been set according to price power parity.

Subjects could contribute any number of tokens from 0 to 20 to the group account or keep them in a private account. Once all subjects in a session had made their decisions, the computer calculated payoffs and subsequently displayed the following information to each player (1) the amount contributed to the group account (recapitulated information); (2) the total amount of contributions collected within his/her group (by himself/herself and his/her 3 co-players); (3) the benefit from the group account to every group member and (4) the individual profit at the end of a period. Subjects had the ability to record their earnings (in a table on the other side of the sheet with instructions) throughout the course of the experiment.

The three different sessions varied in their calculations of individual payoffs. The first two (VCM and FPL) were adopted from Dale (2004). In the **VCM** model, each token kept in a private account yielded 100 points to its owner, whereas each token allocated to a group account yielded 75 points to each subject in a given group (which represents an MPCR of 0.75).

In the **FPL** model, participants had a chance to win a supplementary 2,000 points if selected. A lottery took part after each round in which at least 19 tokens had been collected in a group account. In this case, the computer randomly chose a winner, who received a prize of 2,000 points. At the same time, each member of the group (including “the winner”) was given 75 points for each token allocated to the group account in excess of 20 tokens. An individual’s chance of winning the lottery was equal to his/her contribution to the group account divided by the total amount of contributions of a given group. If the minimum amount of contributions in a group account was not reached by the players, the lottery did not take place, and each individual received 2,000 points in total as if he/she had kept all tokens in his/her private account. As stated in Dale (2004), the “public goodness” of the public good in this model is the same as in the VCM model above.

The only difference between the FPL and the **MFPL** models lies in the drawing mechanism. In the FPL model, an individual’s chance of winning the lottery rose in relation to the amount he/she contributed to a group account. In the MFPL, the chances of all subjects who contributed to the public good were equal, without regard to the amount contributed to the group account by each of them. Therefore, once the total contribution to a group account reached at least 19 tokens, each individual who contributed at least one token received 75 points for each token collected in the group account in excess of 20 tokens. In addition, he/she had the chance of being selected and awarded an additional award of 2,000 points. If the subject did not contribute anything to the group account, his/her probability of winning the drawing was equal to zero. If the total contributions to a group account did not reach 19 tokens, the lottery did not take place, and each individual in the group was given 2,000 points as his/her total earnings in the period. Again, we can state that the "public goodness" (Dale, 2004) of the public good within this setting is the same as in two preceding models.

4. Results

Table 1 reports average contributions to group accounts by subjects within the different treatments.

Under the VCM, the results are in accordance with those presented by our foreign colleagues (see, for instance, Dale, 2004; Ledyard, 1995). The average contributions within this structure were between 40% and 60% of disposable income, and they decreased considerably in final rounds of the VCM. Average contributions in the FPL treatment, on the other hand, demonstrated a moderately increasing trend during all rounds.

Table 1

Average Contributions by Treatment

	VCM		FPL		MFPL	
Round	mean	standard deviation	mean	standard deviation	mean	standard deviation
1	10.39	6.79	10.25	4.51	9.75	4.56
2	12.03	6.50	9.97	5.61	9.50	5.62
3	10.25	6.67	11.36	5.54	8.89	6.14
4	9.47	6.82	11.25	5.49	8.53	5.71
5	8.75	6.18	11.92	6.43	7.83	6.34
6	8.94	7.23	10.25	6.36	8.67	5.80
7	10.22	7.40	12.11	5.77	10.08	5.58
8	8.39	6.63	11.08	6.16	7.94	5.39
9	10.11	7.20	11.56	6.64	8.61	5.94
10	12.22	7.78	10.72	6.17	6.44	4.02
11	10.28	8.03	12.44	6.51	8.81	5.35
12	10.53	7.13	11.36	6.57	8.47	5.31
13	9.36	7.74	12.14	6.33	7.89	4.82
14	9.14	7.18	12.22	6.72	7.92	5.06
15	9.44	6.69	13.11	6.01	6.94	5.79
16	9.17	7.24	12.22	6.61	7.56	5.63
17	6.58	6.98	12.83	6.61	8.06	5.66

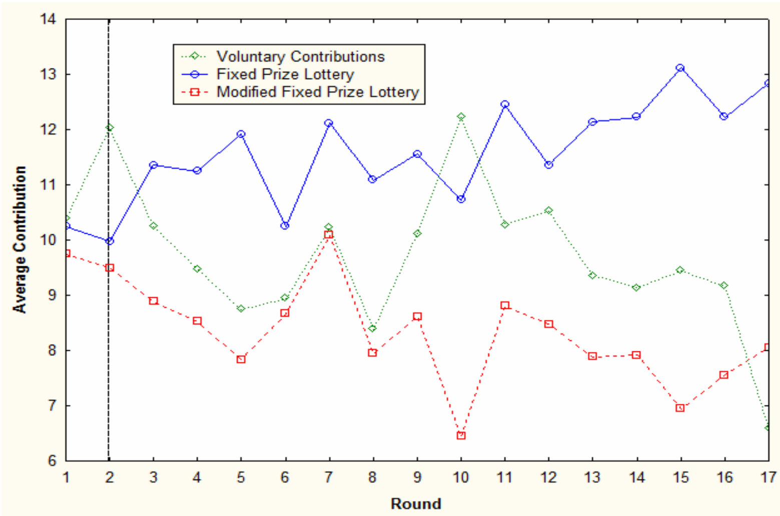
Source: Authors.

At first glance, we notice that average contributions in the MFPL were considerably lower than in other two treatments. Regarding predicted outcomes under different collection structures, this result is in accordance with theoretical predictions concerning effectiveness of FPL and MFPL raffles. On the other hand, average contributions under VCM were substantially higher compared to MFPL which is in contrary with theoretical predictions presented in section 2.

The differences in average contributions can be seen in Graph 1.

G r a p h 1

Average Contributions to the Group Account According to Treatment



Source: Authors.

4.1. FPL vs. MFPL

Graph 1 clearly shows that the most effective structure with regard to the level of contributions to a public good is the FPL. The average contributions within this treatment were above those collected in the MFPL during all rounds of a game. Additionally, except in one case (round 10), they were above the average contributions in the VCM during all non-practice rounds. The modified fixed-prize lottery structure is thus the least effective one of those examined here, a conclusion that is in accordance with our main hypothesis. The Mann-Whitney rank-sum test confirms that average contributions to a group account during non-practice periods under the modified fixed-prize lottery were significantly lower (at the 95% and even the 99% confidence level) than under the classical raffle. According to these results, we can formulate a recommendation concerning the system used for drawing: if the aim of a lottery is to collect a maximum amount of money (which we suppose it is), the chance of being drawn should depend on the actual level of contribution by individuals.

4.2. Western vs. Eastern Students

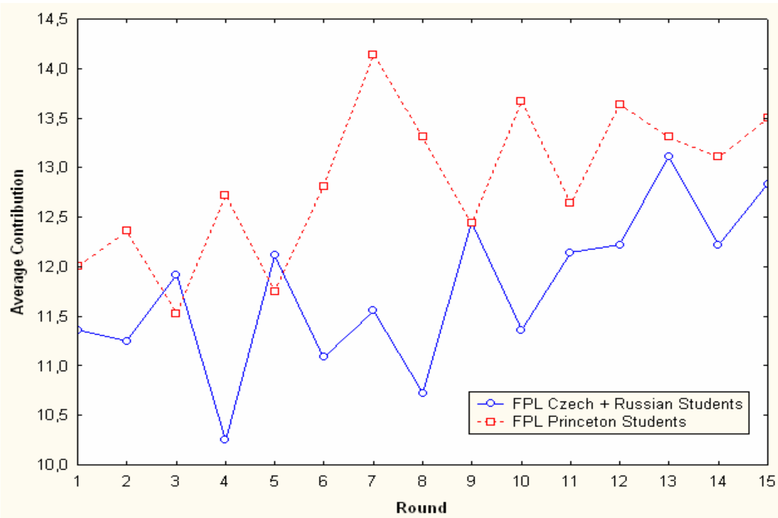
Aside from testing our main hypothesis, we were also interested in possible differences in behaviours of our (Central and Eastern European) participants and their Western colleagues. To detect such diversity, we compared the data from our set of experiments with the results published by Dale (2004). This comparison provided us with interesting findings.

As stated above, our results under the VCM structure did not differ from the conclusions of other experiments with this design published to this date. Minor observed differences were not statistically significant (at the 95% level). As far as the classical voluntary contribution is concerned, we cannot confirm our hypothesis that students from former communist countries contribute less than their Western colleagues.

We also compared the results of the fixed-prize lottery. In this case, the situation was quite different from that above; this difference is evident in Graph 2.

Graph 2

Average Contribution under FPL "by Continent"



Source: Authors.

Graph 2 shows the average contributions under the FPL treatment during the 15 non-practice rounds. At first glance, we can observe the considerably smaller contributions of the Czech and Russian participants; only in two rounds were they above Dale's results. This finding is confirmed by the Mann-Whitney rank-sum test (at the 95% confidence level and, again, even at the 99% level).

What is the conclusion of these two different results? Czech and Russian students contribute more-or-less the same level of their disposable income to a public good under the classical VCM; however, if voluntary contribution is complemented by the possibility to win an additional "money", they contribute considerably less than the Princeton students. Could this mean that participants from post-communist countries are more "gambling averse"?

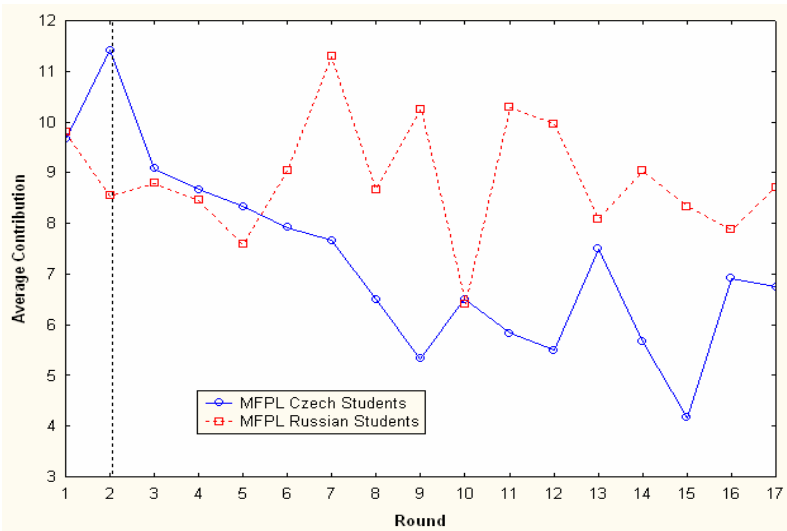
The ANOVA analysis of the data showed no effect of factor “origin” [12] while it demonstrated statistically significant (at the 99% level) effect of factor “treatment” (which we anticipated). However, this analysis demonstrated also significant interaction effect between the tested factors.

4.3. Czech vs. Russian Students

Another object of our interest was a possible disparity in the behaviours of Czech and Russian students. The Czech and Russian students all were exposed to three identical designs – VCM, FPL and MFPL – and we can thus compare their behaviours within each of them. The results from the first two variants (VCM and FPL) do not demonstrate any statistically significant difference between the Czech and Russian students. In the MFPL treatment, on the other hand, Russian students contributed considerably higher amounts to a group account than did Czech student (see Graph 3).

Graph 3

Average Contribution to a Group Account under MFPL by Czech and Russian Students



Source: Authors.

As we have already stated, the modified fixed-prize lottery was the least effective structure. We could thus conclude that Russian students were “less sensitive” to changes in the drawing system than were Czech students; Russian students contributed significantly larger amounts (at the 95% level) of their disposable income than did Czech students.

[12] We tested effects of factors “origin” (i.e. Western vs. Eastern data) and “treatment”.

The ANOVA analysis brought similar results as in previous case: factor “nationality” (Czech vs. Russian) didn’t have significant effect on average contributions while effect of factor “treatment” was statistically significant (at the 99% level). Analysis demonstrated again significant interaction effect between these two factors.

Conclusions

Although the classic model of free riding in voluntary contribution to a public good predicts no participation of any subject (i.e. complete free riding), the reality is different. People do contribute in these situations, even though this behaviour contradicts their pure rationality in the economic sense.

Economic experiments dealing with public goods traditionally aim to answer the question of why individuals contribute voluntarily and to identify which factors or design modifications to the contribution mechanism could increase the contribution rate. Our analysis focused on the effectiveness of one of the typical fundraising alternatives to the simple voluntary contribution mechanism – the charitable lottery. We adopted the research question of Dale (2004), and we tested Morgan’s (2000) model of a lottery (raffle). In agreement with Dale’s results, we found that using a lottery has a significantly positive impact on the contribution rate. As our results show, this behaviour is quite universal – we can observe the same behaviour in subjects from Princeton (according to the results published by Dale), in Czech students and in Russian students.

In addition to the classic raffle, we tested its alternative (the modified FPL (MFPL)). In a MFPL, each contributor has an equal chance of winning the prize regardless of the amount he or she has contributed. This kind of reward for the contributors might be easy for fundraisers to manage.

We found that under the MFPL – in accordance with theoretical predictions – there is a strong and significant drop in the contribution rate compared to the FPL. Our results show that the MFPL lottery design yields a contribution rate that is even lower than that of the VCM. This finding is in contrary to the theoretical assumptions. In contrast to what we expected, Czech and Russian students contributed considerably less to the public good when there was a possibility of additional reward (independent of the actual level of their contribution). Should we interpret this result as a country effect, for example, by concluding that Czech and Russian students are more gambling averse than their Western colleagues? This could be an interesting conclusion; however, we should be cautious about such a statement. This hypothesis should be the subject of further experimental testing.

Our results in the classic VCM demonstrated no country or cultural effects; the Czech and Russian students, who have grown up in post-communist system with a very small (Czech Republic) or practically non-existent (Russia) not-for--profit sector, contributed amounts to the public good that were comparable to the amount contributed by American students living in the country with one of the largest not-for profit sectors. In the FPL model, the Czech and Russian students contributed significantly less than their American colleagues (which would again be in accordance to our new hypothesis concerning different levels of aversion to gambling); however, the Czech and Russian students still contributed considerably more in the FPL model than they did in the classic VCM. From this finding, we can derive one simple but important recommendation. Using a lottery can bring considerably more money into an organisation's funds than collecting money in a hat, as is the common means of collecting contributions in the Czech Republic. However, the design of a lottery should make people care about the amount of money they contribute. Otherwise, people will not be motivated to increase their contributions.

Furthermore, by adopting a concept of producing complementary private and public goods, the public sector could easily overcome the problem of ineffective free riding without forcing individuals to contribute through taxes and without the need for any kind of punishment of non-contributors. Such a conclusion could be inspiring not only for fundraisers but also for all policy makers.

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Appendix A

Instruction for the Treatments (VCM, FPL, MFPL)

Thank you for following these general rules:
- It is not permitted to communicate with other participants during the game. Do not show in any way your decision even to your nearest neighbor. Do not discuss your strategy with other participants.
- If you have any question, please raise your hand and a experimenter (one of us) will come over to where you are sitting and answer your question in private (do not ask aloud).

Rules of the Play

This is an experiment in the economics of decision making. If you follow the instructions carefully and make good decisions, you can earn a considerable amount of money. You will be paid in cash at the end of the session.

The experiment will consist of 17 rounds. In each round, you will be assigned to one of three groups. Each group will consist of four people. The assignments will change from round to round. You will not know which of the other people in the room are assigned to your group; similarly, the other people in the room will not know which of the other people in the room are assigned to their group.

In each round you will have an opportunity to earn points. At the end of the session you will receive 2 rubles in cash for every 1,000 points you earn in total. Rounds one and two are practice rounds: what you do in these rounds will not affect your earnings.

Description of Each Round

At the beginning of each round, you will have 20 tokens. You will choose how many of these tokens to place in a private account and how many to place in a group account.

You will make your decision by indicating how many tokens you wish to place in the group account. You can enter any whole number between 0 and 20, inclusive. Any tokens you do not place in the group account are placed in your private account. If you are not satisfied with your choice you can use the backspace key to change it. When you have made your decision you will enter the decision on the "Record Sheet", which you will find on the other side of the Instructions.

You will record your decision in column (B), under the heading "Tokens I place in the Group Account". At this time you will also record the number of tokens you place in the private account in column (A) under the heading "Tokens I Place in Private Account".

When everyone has made his or her decision, you will be informed of the total number of tokens placed in your group account. You will record this number on your "Record Sheet" in column (C) under the heading "Tokens in Group Account".

Next, the computer will calculate and inform you of your point earnings for the round according to the rules we will discuss below. You will record this information on your record sheet and press the enter key when you are ready to continue. When everyone is ready, the next round will begin.

How Your Earnings are Determined

VCM

The number of points you earn in the round will depend on (i) the points you earn from your private account and (ii) the points you earn from your group account. These will be determined as follows.

(i) For each token in your private account, you will earn 100 points. You will record these earnings in column (D) of your record sheet, under the heading "My Points from Private Account". This will be the number in column (A) multiplied by 100.

(ii) For each token placed in the group account by ANY member of the group, ALL group members earn 75 points. You will record these earnings in column (E) under the heading "My Points from Group Account". This will be the number in column (C) multiplied by 75.

FPL

The number of points you earn in the round will depend on (i) the points you earn from your private account, (ii) the points you earn from your group account, and (iii) the outcome of a random drawing, which may award you bonus points. These will be determined as follows.

(i) For each token in your private account, you will earn 100 points. You will record these earnings in column (d) of your record sheet, under the heading "My Points from Private Account". This will be the number in column (a) multiplied by 100.

(ii) For each token in excess of 20 tokens placed in the group account, you will receive 75 points. If a total of 19 or more tokens are placed in the group account, then 2,000 bonus points will be awarded by a random drawing. Each token you place in the group account earns you one chance in the drawing; therefore, your chance of winning the drawing is the number of tokens you contribute to the group account divided by the total number of tokens placed in the group account by all members of your group. If you win the drawing, enter the number of bonus points you receive in column (F). If you do not win, enter a zero in this column.

(iii) If a total of fewer than 19 tokens are placed the group account, then no bonus points are awarded, and you will receive 100 points for each token YOU and only you contributed to the group account.

MFPL

The number of points you earn in the round will depend on (i) the points you earn from your private account, (ii) the points you earn from your group account, and (iii) the outcome of a random drawing, which may award you bonus points. These will be determined as follows.

(i) For each token in your private account, you will earn 100 points. You will record these earnings in column (D) of your record sheet, under the heading "My Points from Private Account". This will be the number in column (A) multiplied by 100.

(ii) For each token in excess of 20 tokens placed in the group account, you will receive 75 points. If a total of 19 or more tokens are placed in the group account, then 2,000 bonus points will be awarded by a random drawing. You can enter the drawing if and only if you place at least one point in the group account. If you win the drawing, enter the number of bonus points you receive in column (F). If you do not win, enter a zero in this column.

(iii) If a total of fewer than 19 tokens are placed the group account, then no bonus points are awarded, and you will receive 100 points for each token YOU and only you contributed to the group account.

Appendix B

Instruction Record Sheet (FPL, MFPL)

		A	B	C	D	E	F	G
	round	tokens I place in private account (20 – B)	tokens I place in group account	tokens in group account	my points from private account (100 x A)	my points from group account	my bonus points	my total earnings D + E + F
Example	0a	9	11	38	900	1 350	0	2 250
	0b	12	8	18	1 200	800	0	2 000
	0c	9	11	38	900	1 350	2 000	4 250
Practice rounds	1.							
	2.							
From these rounds your earnings will be derived	3.							
	4.							
	5.							
	6.							
	7.							
	8.							
	9.							
	10.							
	11.							
	12.							
	13.							
	14.							
	15.							
	16.							
	17.							

Source: Authors.