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An experimental study on the effect of co-payment in public services

Aurora García-Gallego[1]

LEE and Economics Department, Universitat Jaume I, Spain

Avda. Sos Baynat s/n, 12071-Castellón, Spain

Nikolaos Georgantzis

School of Agriculture, Policy and Development, U. of Reading, UK

LEE and Department of Economics, Universitat Jaume I, Spain

Tarek Jaber-López

Department of Public Economics, University of Innsbruck, A-6020 Innsbruck, Austria

Laboratorio de Economía Experimental (LEE), Universitat Jaume I, Spain

Gianandrea Staffiero

CRES – Centre for Research in Economics and Health, U. Pompeu Fabra, Spain

Financial Conduct Authority, London, UK

* Corresponding author: Aurora García-Gallego, Avda. Sos Baynat s/n, 12071-Castellón, Spain. Tel. +34964387631, E-mail: mgarcia@uji.es

Abstract

This paper aims to shed light on the impacts of imposing co-payment on public services, a strategy increasingly employed in the realm of publicly provided healthcare. We analyze the effect of imposing a charge for the individual appropriation of common resources. In our design, withdrawing the maximum amount is the dominant strategy for every player, but the resulting equilibrium is socially inefficient. We find that the presence of a price that is small enough to leave intact the conflict between individual incentives and collective welfare is not effective in reducing appropriation among agents who have previously been acting without it. In fact, the upward trend in the average extraction of common funds continues after the introduction of a price. In an alternative treatment in which we impose copayment from the outset of the experiment, withdrawals are lower than in the free-access baseline. Our results provide insights on the conditions for the effectiveness of co-payment in curbing the over-consumption of public resources.

Keywords: Common-pool resources; co-payment; public services; consumer choice.

JEL Classification: C91, C92, H41, I11, I18

1. Introduction

We propose an experimental investigation of the effect of imposing a price for the subtraction of resources from a common fund. Our evidence sheds light on some relevant aspects related to the effectiveness of co-payments in curbing the over-consumption problem, most notably in healthcare services.

The conflict between individual and collective welfare in common pool extraction problems has received attention since the early works by Gordon (1954) and Ostrom et al. (1994), among others. We use the common pool resource paradigm as a metaphor for publicly available services, whose excessive use by the individuals entitled to access it may lead to a collectively inefficient outcome. In other words, the level of individual appropriation is detrimental to social welfare. In this context, our main question is: does the introduction of a *small* co-payment reduce individual extraction levels, thereby increasing efficiency and social welfare? The limited magnitude of the price is designed so that the resulting context preserves intact the social dilemma-type of conflict between individual and collective incentives. Can the focus on the price and/or the sheer “pain of paying” help maintain a high level of common resources? Or, on the contrary, could a “crowding-out” effect arise, whereby potentially prosocial subjects feel legitimated by the price to extract *more* out of the common resource?

The present policy context in Europe characterizes by efforts to reduce public deficits. User charges, often in form of “co-payments”, have been introduced for services that were previously provided for free, and exemptions to these charges have been reduced. These measures, frequently applied in healthcare policy, entail a direct effect of a transfer from users to the public administration, while the main stated goal is to reduce the over-consumption of public resources. As we focus on this second aspect, we explore the appropriation of resources following the introduction of co-payments in comparison with *i)* a situation in which the co-payment is not introduced and *ii)* a situation where co-payment has always existed, i.e. the resource was never available for free. The first comparison relates to many dilemmas currently faced by European policy-makers in contexts of socialized healthcare. The second comparison serves multiple purposes. On one hand, it shows the effect of the introduction of co-payment as a novelty compared with a stable rules regime. On the other hand, it isolates the effect of the habit to consume the good for free. Our evidence also provides insights on whether co-payment would be more effective for new goods and services that were never publicly available free of charge.

2. Background

Co-payments in healthcare, implying patients' obligation to pay a small part of the cost of service, represent one of the main examples of access charges in public services. They are frequently imposed on primary care visits, on specialized care, and on the purchase of pharmaceuticals. In European countries, there are wide variations in terms of amounts, calculation methods (percentages, fixed fees, etc.) and with respect to which healthcare services are subject to co-payment (Espin and Rovira, 2007). Even bigger differences arise when considering the US and Canada (Mas et al., 2011).

The rationale of co-payments is twofold. First, they *might* improve the financial situation of the payer. In the European context of socialized medicine, this argument makes co-payments look unfair, as they cause a transfer of resources from those who need more care to the rest of the population. Furthermore, as patients may be unable to distinguish the actual benefits, they could reduce the use of effective and ineffective healthcare in similar proportions, as shown in the famous RAND experiment in the U.S. (Manning and Newhouse, 1987). This may lead to negative health impacts and overall higher long-term healthcare expenditure (Gemmill et al., 2008). The second purpose consists of tackling the excessive use of resources. Standard economic theory points out that rational and selfish people use free services up to the point that they provide individual benefits above individual non-monetary costs (e.g. time). From the societal perspective, individual incentives lead to over-consumption, as social welfare would be maximized if resources were consumed up to the point that marginal benefits (usually assumed to be decreasing) equal the social marginal costs of providing them. Thus, imposing an access price in public services can contribute towards a better alignment of individual and social incentives, thereby ameliorating the over-consumption problem.

In our experimental design, we observe whether the introduction of a price can enhance social efficiency, in a context where experimental subjects have perfect information on their own benefit from appropriating public resources, and the corresponding cost for the group they belong to. The size of the price is small, in order to preserve the typical trade-off between individual and collective benefits. An example of a small co-payment is the "euro-per-prescription" applied by the government of the Spanish Autonomous Community of Catalonia in 2012.

In this context, the introduction of a price may modify behavior. As a price is obviously higher than zero, if the usage of resources is a "normal" good, the demand effect should be negative. The presence of a price may also trigger a "pain of paying" effect, whereby the sheer act of paying diminishes the pleasure of consuming a good (Prelec and Loewenstein, 1998).

Possibly, a crowding-out effect may also be triggered by a copayment, whose results go towards the opposite direction. As described in Frey and Oberholzer-Gee (1997), such effects arise whenever people are, in principle, willing to cooperate and take socially oriented choices but when confronted with a price, become more "selfish". The presence of a price may shift the focus away from collective costs and suggest that the individual can "legitimately" compare her own benefit with the amount she would have to spend to access a public resource (Gneezy and Rustichini, 2000). In this case, the individual appropriation of common resources would increase.

3. Experimental design, procedures and predictions

The experiment took place during the first week of July 2012 at the Laboratory of Experimental Economics (LEE) of the University Jaume I, located in Castellón, Spain. A total sample of 125 students participated: 35 in the "Baseline" (B) treatment, 30 in the "Copay" (C) treatment, and 60 subjects in what we will refer to as the "Baseline+Copay" (BC) treatment. Presentations and instructions given to the students made no use of the word "co-payment". Experimental sessions were programmed using z-Tree (Fischbacher, 2007).

In order to avoid possible doomsday effects, subjects did *not* know *ex ante* the total number of rounds (30 in each session). At the beginning of each round, subjects were put into groups of five subjects each. No subject knew the identity of her fellow group members. Subjects *did* know that, after each round, they would be randomly re-matched and that, at the end of the experiment they would be paid according to the payoff achieved in a single, randomly selected round. The random selection of a single round as the basis for payment implies the removal of past accumulated wealth effects. Before the beginning of the experiment, we tested subjects' comprehension of the rules with easy questions on payoffs arising from possible combinations of choices among group members.

In treatment B, at the beginning of each round every group is assigned a common fund worth 100 euro. Each one of the five group members has the option of withdrawing an integer amount between 0 and 10 euro. Each euro withdrawn is transferred to her private fund and reduces the common fund by 2 euro. At the end of each round, what remains of the common fund is equally shared among the members of the group. Therefore, the payoff of a group member is the sum of her private fund and 20% of the amount left in the common fund. For example, if X_i is the amount extracted by player *i* from the common fund, player *i*'s payoff in any given round equals:

$$Payoff_i(B) = X_i + \frac{1}{5}\left(100 - 2\sum_{j=1}^{5} X_j\right) \qquad i, j = 1,\ldots,5$$

At the end of each round, each subject knows her own payoffs only, without any information regarding the payoffs of the other members of her group.

In this context, the payoff-maximizing strategy for each player is to withdraw the maximum amount permitted, i.e. 10 euro, as each euro taken away from the common fund only reduces her share by 2/5, i.e. 0.4 euro. Assuming rationality and selfishness, in the Nash equilibrium, each group member withdraws 10 euro so that no amount is left in the common fund and each subject gets a payoff of 10 euro in each round, including of course the one randomly selected for the final payment. Clearly, the Nash equilibrium is not Pareto efficient. In particular, if all members refrain from extracting resources from the common fund, they enjoy a payoff of 20 euro each, i.e. twice as much as that obtained in the Nash equilibrium.

In treatment C, for each euro withdrawn from the common pool, the subject has to pay 0.1 euro. All the co-payments enter the common fund and are re-distributed among group members. Therefore, player *i*'s payoff is:

$$Payoff_i(C) = X_i - 0.1X_i + \frac{1}{5}\left(100 - 2\sum_{j=1}^{5} X_j + 0.1\sum_{j=1}^{5} X_j\right) \qquad i, j = 1,\ldots,5$$

It is easy to see that the payoff-maximizing strategy for each subject is still to withdraw 10 euro. The Nash equilibrium strategy profile is the same as in treatment B, while the payoff per subject is still 10 euro per round (recall that the revenues from co-payment are redistributed). In the case where no subject withdraws anything from the common fund, each subject gets a 20 euro payoff like in the baseline treatment.

In the BC treatment, during the first 15 rounds subjects play under the same rules as in the baseline. Before round 16, all subjects are informed that during the rest of the session they will have to pay 0.1 euro per each euro *withdrawn*, and that all acess payments enter the common fund, precisely as in the C treatment.

4. Results

Figure 1 shows the evolution of average withdrawals in the three treatments. The line in the middle corresponds to the split of the session between the first 15 rounds and rounds 16-30, where copayment is introduced in the BC treatment.

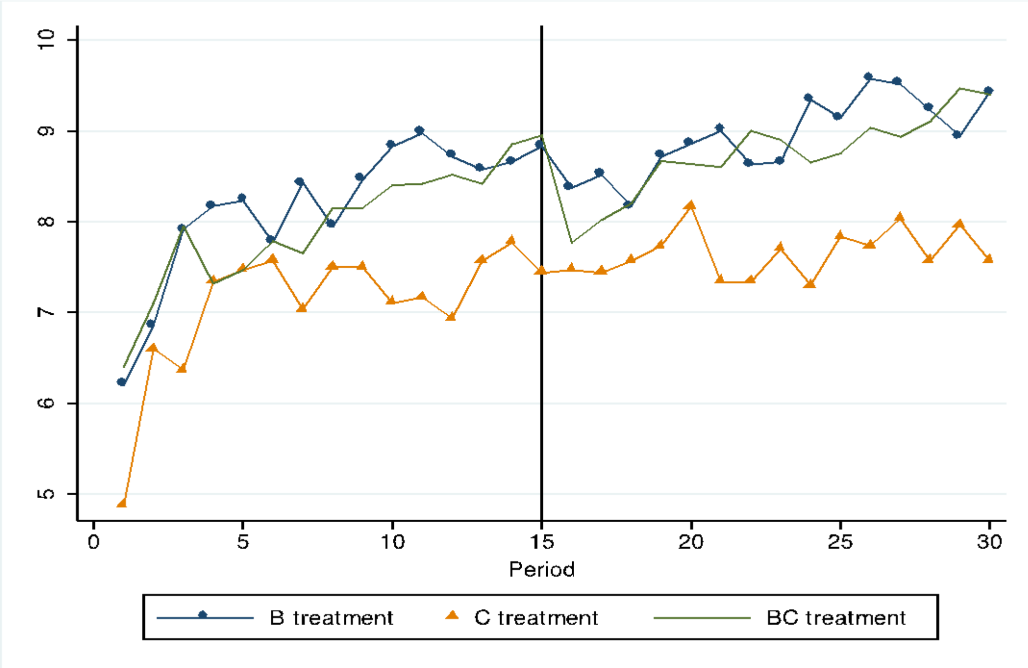

Figure 1: Evolution of average extraction, by treatment.

Considering that in this experiment the cooperative choice consists in refraining from withdrawing funds from the common pool, it is immediate to observe that the pattern during the first rounds mirrors the one typically observed in public good games (Ledyard, 1995), where cooperation is relatively high in the first round and then decays progressively. Figure 2 shows the decreasing trend in the evolution of the common fund.

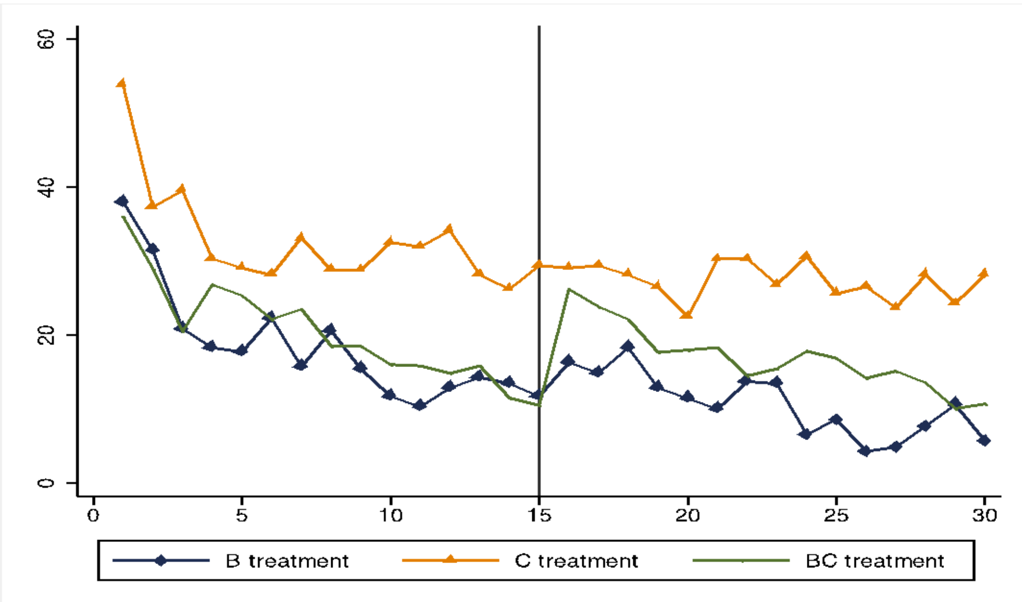

Figure 2: Evolution of the common fund after extraction, by treatment.

An already expected pattern of our data is that no significant differences are observed between treatments B and BC along the first 15 rounds, where the rules are the same. More interestingly, there are no differences in rounds 16-30 either. A Kolmogorov-Smirnov (K-S) non-parametric test in table 1, showing the differences among distributions[2], confirms this result.

Result 1: *There are not significant differences in withdrawal levels across treatments B and BC.*

Table 1: Kolmogorov-Smirnov test for differences in distributions among treatments

Treatments	D	p-value
BC vs B	0.0414	0.191
BC vs C	0.1322	0.000***
B vs C	0.1637	0.000***

Note: asterisks used for significance at 10% (*), 5% (**) and 1% (***) levels.

This result is noteworthy, as one could expect some impact from changing the rules of the game. This evidence, instead, shows that the introduction of the co-payment does not help curbing the inefficient appropriation of funds by group members or, at best, has a very short-lived effect.

On the other hand, behavior in treatment C does differ from the other two treatments, as also shown by K-S tests in table 1 above.

Also in figure 1, we observe the evolution of extractions levels. In particular, when a co-payment exists from the beginning (treatment C), average extraction increases substantially in the first periods (namely from 4.867 units in period 1 to 7.333 units in period 4) and then oscillates around 7.5 units, with a minimum of 6.933 units in round 12 and a peak of 8.167 units in round 20. There is no evidence of an upwards trend of extraction in this treatment after the period 6.

[2] Null hypothesis that the samples are drawn from the same distribution.

In the other two treatments, B and BC, the increase is by no means limited to the first rounds and, in particular, goes on in the second part of the session (rounds 16-30), as shown in table 2 below.

The fact that extraction levels remain lower in treatment C during periods 16 to 30 is remarkable, especially as rules in periods 16 to 30 are the same in treatments BC and in C.

Result 2: *In treatments B and BC withdrawal levels exhibit an increasing trend also during the last 15 periods of the session. The level of extraction does not increase significantly in treatment C as compared to the other two treatments.*

Table 2 shows an Ordinary Least Square group of panel data models, one for the first 15 periods (aggregating treatments B and BC[3] to compare with C, the only treatment with a price) and three models for the last 15 periods, each one aiming at studying the statistical significance of treatment differences in individual extraction per period. Hence, the dependent variable in each model is individual extraction, including dummy variables for each treatment as the main explanatory variables.

The first regression explores behavior in the first 15 periods. It shows that average extractions increase over time (the impact of "Period" is positive) and are significantly higher in B+BC than in C. These results are in line with the expectation that co-payments entail a negative impact on appropriation behavior. The variable Period*B+BC captures the time trend in B+BC with respect to that in C. The upward trend is slightly stronger in B+BC as compared to the C, but not to a statistically significant level.

The second regression shows that average extractions during the last 15 periods are significantly higher in B and BC than in C.

Result 3: *Withdrawal levels are lower over time in treatment C than in the other two treatments, both during periods 1-15 and during periods 16-30.*

[3] Henceforth B+BC.

Table 2: O.L.S. with dependent variable: y= individual extraction

Treatment	(1) Period<15	(2) Period>15	(3) Period>15	(4) Period>15
B + BC treatments	0.9393			
	(3.26)***			
B treatment		0.8614	0.2583	
		(2.98)***	(1.02)	
C treatment			-0.6031	-0.8614
			(-2.27)**	(-2.98)***
BC treatment		0.6030		-0.2583
		(2.27)**		(-1.02)
Period	0.1000	0.0170	0.0959	0.0771
	(3.68***)	(0.73)	(5.84)***	(3.59)***
Period * B		0.0601	-0.0187	
		(1.90)*	(-0.69)	
Period * C			-0.0788	-0.6011
			(-2.77)***	(-1.90)*
Period *BC		0.0789		0.0187
		(2.77)***		(0.69)
Period*B+BC	0.0417			
	(1.34)			
R^2 within	0.0901	0.0811	0.0811	0.0811
R^2 between	0.0142	0.0007	0.0007	0.0007
R^2 overall	0.0533	0.0580	0.0580	0.0580
Wald chi2(2)	176.71	159.19	159.19	159.19

Z-score in parentheses

Note: asterisks used for significance at 10%(*), 5%(**) and 1%(***) levels.

Variable Period*BC captures the time trend in BC with respect to that in treatment C. Results show that the upward trend is significantly stronger in BC compared to the C.

Regression (3) shows that average extractions are significantly lower in C than in BC. The impact of the variable Period*C is negative and significant, indicating that extractions increase slower over time in C compared to treatment BC.

Result 4: *The extraction level in treatments B and BC increases at a higher rate than in treatment C.*

Results from regression (4) show that the average extraction is significantly lower in C, and non-significantly different in BC, than in treatment B. Variable Period*C indicates that the extraction increases at a lower rate over time in treatment C compared to the baseline B.

To summarize, in the last 15 periods, we observe that the level of individual extraction in treatment C is significantly lower, at 1% level of significance, in comparison to treatment B (-0.86 units) and treatment BC (-0.60), while there are no significant differences between B and BC. These results confirm the findings stated previously.

A non-parametric analysis of the three treatments show that the distributions of strategies has remained mostly invariant along the 30 period-horizon. In fact, a Kolmogorov-Smirnov test comparing extraction distributions between periods 1 and 5, 5 and 10, 10 and 15, 15 and 20, 25 and 30, reveal significant differences only between periods 1 and 5 of treatments B and C (KS, p=0.019 and p=0,012, respectively) while all other comparisons strongly reject distributional differences (KS, p>0.19).

Figure 3 shows the distributions of the extraction levels over time by treatment. It is clear that, in treatment C, there is a higher frequency of zero extraction and a lower frequency of full appropriation in comparison with the other two treatments.

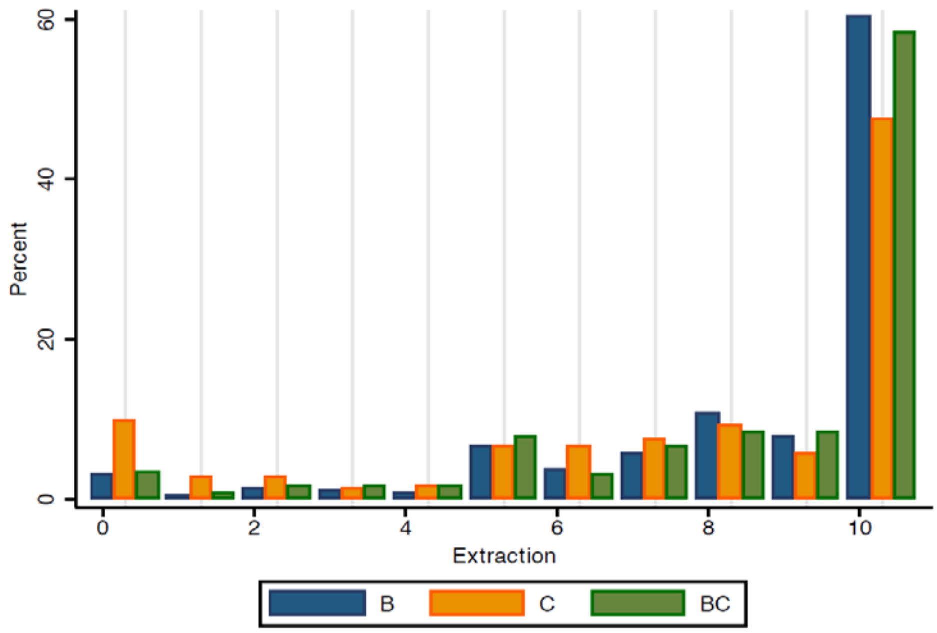

Figure 3: Distribution of the extraction levels, by treatment

Figures 4 and 5 explore more in detail the evolution of the two extreme choices, no extraction and full extraction, in the three treatments.

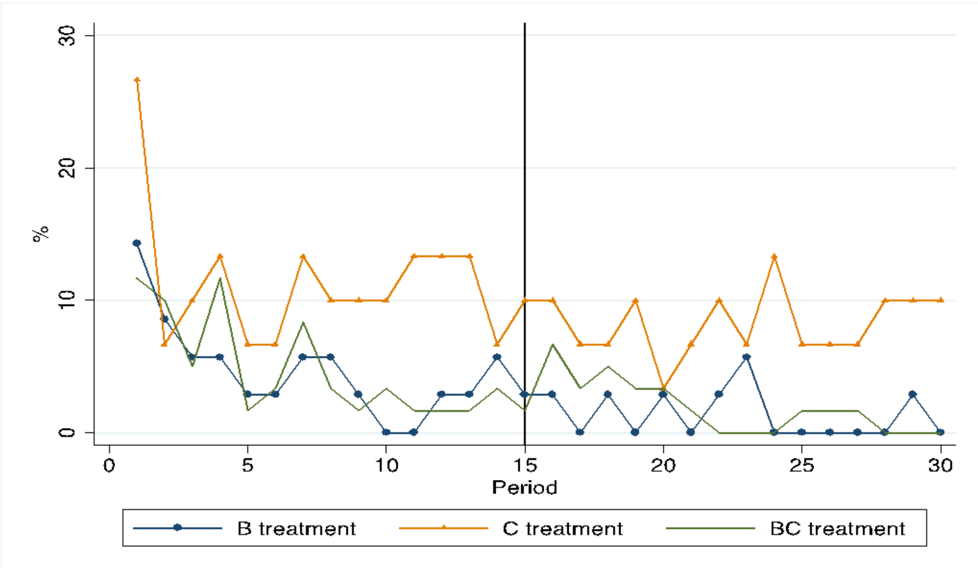

Figure 4: Frequency of “0 extraction” by treatment

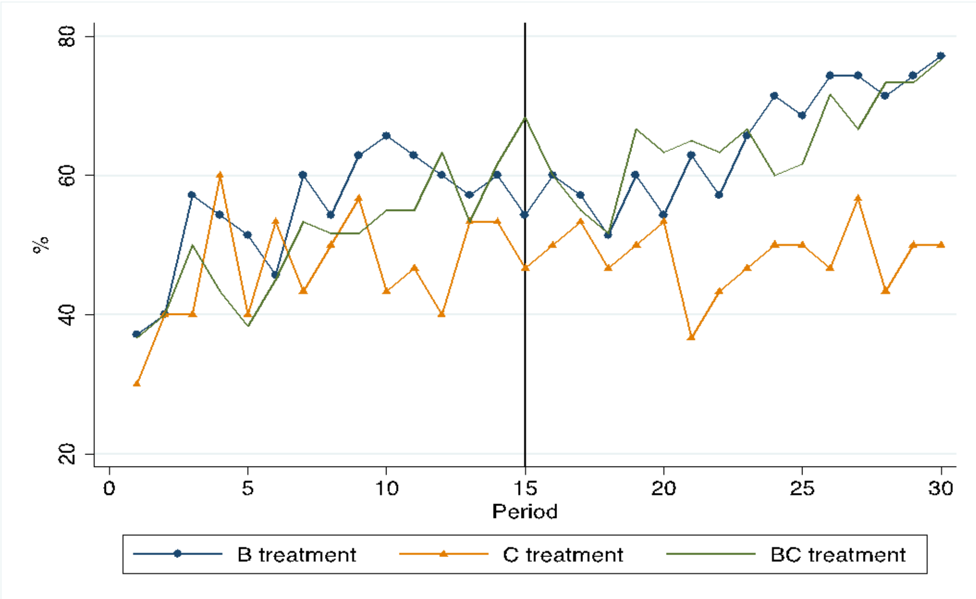

Figure 5: Frequency of "full extraction" by treatment

Once again, we observe that behavior in treatment C differs significantly from treatments B and BC: Full (zero) extraction choices are more (less) frequent. Furthermore, the evolution of strategies shows that the difference tends to increase during the second half of the experiment (rounds 16 to 30). We note, in particular, that the frequency of full extraction remains roughly stable around 50% in treatment C, while it exhibits a clear upward trend in treatments B and BC, indicating the convergence to fully non-cooperative outcomes.

5. Discussion

There is a lively debate on the pros and cons of introducing user charges for access to public services, especially in relation to healthcare, traditionally financed by taxes and social security contributions in most European countries.

The most appealing argument in favor of imposing co-payment is the need to reduce over-consumption. In our experiment, we explore how subjects behave when they can easily perceive that *i)* their own payoffs increase in their appropriation of public resources and *ii)* societal costs are higher than their individual benefits from this appropriation.

Our evidence shows that the introduction of a price for each unit extracted from a common fund does not reduce withdrawals, unless subjects have never been granted before free access to the common resource.

While we do not observe any negative demand effect, there is also no sign of a "crowding-out" of potential cooperation due to the presence of a price. Results in the BC treatment show that, under a small co-payment, keeping intact the conflict between individual and collective incentives, cooperation decays following a similar path as in the Baseline and, in general, with a trend compatible to what is observed in most voluntary contribution mechanism public good experiments.

Extraction levels are lower in the C treatment, with prices from the first round, so that the rules are the same as in rounds 16-30 of the BC treatment. While we may expect convergence when the rules become identical in treatments C and BC, differences in withdrawals remain significant in rounds 16-30.

We can conclude that even a small price, which leaves intact the individual incentive to appropriate common funds, can curb over-consumption *provided that it exists from the outset*. Otherwise, we do find a negative demand effect on the private appropriation of common funds, despite the fact that payoff maximization would still drive towards the complete depletion of common resources, as the price in this case should discourage appropriation among some subjects.

Seeing the same issue from another point of view, the habit formed while having extracted from the resource at no cost in the first place undermines the potential effectiveness of introducing a co-payment.

These observations and the current upwards trend in the imposition of user charges leads to a potential research question on the impact of future policy considerations to remove co-payments, for instance when and if sustained growth allows to ease budgetary pressures. A new "CB" treatment would show whether restoring free access would lead to more, or less, selfish appropriation in comparison both to alternative contexts in which charges are preserved, and in those where they were never introduced.

6. Conclusions

Our experimental design isolates the effect of co-payments in a context where subjects have complete information regarding the rules of the game and a conflict exists between individual and collective incentives, potentially leading to full depletion of common funds.

We find that, following a history of free access, the introduction of a small per extraction unit price does not reduce the amount an individual withdraws from a common resource, neither in comparison with a case in which an access price is never introduced nor with a case in which extraction is initially free of charge and then becomes costly. Hence, our evidence indicates that imposing co-payments on previously free services does not foster “social cooperation”, in the sense of limiting selfish over-consumption.

On the other hand, an access price does lead to lower extraction levels when it exists from the beginning of the session. Remarkably, extraction levels in the Copay treatment remain roughly constant after the first few rounds until the end of the experiment (round 30). On the contrary, extraction increases steadily in the other two treatments, most notably in the last rounds of treatment BC, in which the price is introduced after round 15.

Field experiments by Cárdenas and Ostrom (2004) have inspired a plethora of studies showing that a decision maker’s past experience from the real world determines behavior in common pool extraction settings. Our findings show that experience from the early periods of the experiment can also affect behavior in subsequent periods. Specifically, exposure to a completely free access regime renders the use of co-payment ineffective as a means of reducing over-exploitation of public resources. On the contrary, a copayment achieves the desired objectives if not preceded by free access regimes. As said above, it appears that free extraction spoils the future effectiveness of a co-payment in reducing over-consumption.

Some caveats of the present study are in order. First, we do not address the possibility that individual benefits are smaller than the co-payment imposed. Of course, in this case there would be no conflict, because refraining from using public resources would be both individually and collectively optimal.

Our design does not address the risk of *under-consumption*. Some people, especially the poor, may refrain from using healthcare resources despite the fact that their benefits could compensate the social costs of providing healthcare services. In this case, not only would equity be hampered but also long-run public expenditure could actually increase, for instance through higher costs of hospital services due to worsening health conditions in the population.

Some features of our design may limit the external validity of our findings. In particular, for the sake of simplicity, we have chosen a linear payoff function, despite the fact that the marginal societal costs of over-consumption may well be increasing rather than constant, while marginal benefits could be decreasing. However, we think that our simple design is adequate for the analysis of behavior in a situation where users understand the key aspects of the trade-off between individual and collective interests.

The investigation on the effects of introducing a price to services previously offered free of charge is clearly relevant for policy-making. Our findings indicate that relying on the focal effect of price and on the pain of paying *per se*, even if the quantity is low, does not appear justified. On the other hand, our experimental data highlight the effectiveness of imposing a price to reduce excessive use of services that have *never* been provided for free. It appears that, in those cases, the presence of co-payments does provide an effective nudge to refrain from the full appropriation of a common resource.

Further research is required to ensure the robustness of these findings, for instance by varying the payoff parameters or the group size. Another potential research development would focus on the interplay of co-payments with other factors such as income inequality and the launch of campaigns to make people aware of the social cost of funding healthcare services. Experimental analysis may also shed light on behavioral impacts of policy options to remove existing co-payments.

We believe that experiments can complement both theoretical advances and the collection of empirical evidence in relation to the funding of public services affecting citizens´ welfare. The possibility to isolate relevant aspects in the lab can help developing sound policy-making towards the sustainable provision of high-quality services. In this perspective, our evidence casts doubts on the effectiveness of the introduction of co-payments on existing, free-of-charge public services for cost-containment purposes, while setting prices on access to new services could instead succeed as a means of limiting over-consumption.

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References

Cárdenas, Juan Camilo, Ostrom, Elinor. (2004). "What do people bring into the game: Experiments in the field about cooperation in the commons." Agricultural Systems 82, 307-326.

Espin, Jaime, Rovira, Joan. (2007). "Analysis of differences and commonalities in pricing and reimbursement systems in Europe." Final Report. Brussels: European Commission.

Fischbacher, Urs. (2007). "z-Tree: Zurich toolbox for ready-made economic experiments." Experimental Economics 10, 171-178.

Frey, Bruno S., Oberholzer-Gee, Felix. (1997). "The cost of price incentives: An empirical analysis of motivation crowding-out." American Economic Review 87, 746-755.

Gemmill, Marin C., Thomson, Sarah, Mossialos, Elias. (2008). "What impact do prescription charges have on efficiency and equity? Evidence from high-income countries." International Journal for Equity and Health 7, 12.

Gneezy, Uri, Rustichini, Aldo. (2000). "A fine is a price." Journal of Legal Studies 29, 1-18.

Gordon, H. Scott. (1954). "The economic theory of a common property resource: The fishery." Journal of Political Economy 62, 124-142.

Keser, Claudia, van Winden, Frans. (2000). "Conditional cooperation and voluntary contribution to public goods." Scandinavian Journal of Economics 102, 23-39.

Ledyard, John O. (1995). "Public goods: A survey of experimental research." In: Kagel, J. and Roth, A. (eds.), The Handbook of Experimental Economics, Princeton University Press, 111-194.

Manning, Willard G., Newhouse, Joseph P., Duan, Naihua, Keeler, Emmett, Benjamin, Bernadette, Leibowitz, Arleen, Marquis, M. Susan, Zwanziger, Jack. (1987). "Health insurance and the demand for medical care: Evidence from a randomized experiment." American Economic Review 77(3), 251-257.

Mas, Nuria, Cirera, Laia, Viñolas, Guillem. (2011). "Los sistemas de copago en Europa, Estados Unidos y Canadá: Implicaciones para el caso español." Working Paper, IESE Business School.

Ostrom, Elinor, Gardner, Roy, Walker, James. (1994). "Rules, games, and common pool resources." University of Michigan Press, Ann Arbor.

Prelec, Drazen, Loewenstein, George. (1998). "The red and the black: Mental accounting of savings and debt." Marketing Science 17, 4-28.

Appendix

Instructions[4] (translated from Spanish)

Welcome to this experiment, thanks a lot for your participation.

From this moment, please turn off your mobile and you shall not communicate in any way with the other participants during the session. Please read these instructions carefully and raise your hand if you have any doubts. Your questions will be answered privately by one of the organizers of this experiment.

Depending on your decisions and the decisions of the other participants, you may earn an amount of money that will be privately paid to you in cash at the end of the session.

In each round, each participant will be assigned to a group of 5 members of the room. None of the members will know the identity of the other members of the group. The group formation process will be carried out randomly and independently at the beginning of each round.

This session will consist of a series of rounds. These instructions are valid throughout all rounds. In case something changes during the session, you will be given specific instructions.

Decision-making

- At the beginning of each round, the group is given a common fund worth 100 euro.
- Each group member can withdraw from the common fund an integer between 0 and 10, to take in into his/her private fund. Each euro transferred to a private fund reduces the common fund in 2 euro.
- [Only for *co-payment*] For each unit you withdraw from the common fund, you have to pay 0.1 p. (a tenth of a euro). For example, if you withdraw 5 euro from

[4] These are the instructions for the Baseline. The instructions for treatment BC are the same as in the Baseline for the first 15 periods. After round 15, an announcement is given that, from the following round, the subject has to pay 0.1 per unit and the amount collected enters the common fund.

the common fund, you have to pay 0.5 euro. This quantity is subtracted from your private fund and it goes to the common fund, which will be shared among the five members of the group.

- This decision is taken each round simultaneously by each member of the group.
- Therefore, at the end of each round the quantity in the common fund will equal 100 minus the double of all the amounts withdrawn by group members plus one fifth of the amounts extracted by the five members of the group.

  Defining as X_1, X_2, X_3, X_4, X_5 the amounts withdrawn by the five members of the group, the common fund will be:

  $$\text{Common Fund} = 100 - 2X_1 - 2X_2 - 2X_3 - 2X_4 - 2X_5 + 0.1\cdot[X_1 + X_2 + X_3 + X_4 + X_5]$$

- At the end of each round, the quantity left in the common fund will be shared equally among the five members of the group.
- Your outcome in the round will be equal to the sum of your private fund and a fifth of the quantity left in the common fund. For example, if you are member "1" your payoff will be:

  $$X_1 - 0.1\cdot X_1 + 1/5\ [100 - 2X_1 - 2X_2 - 2X_3 - 2X_4 - 2X_5 + 0.1(X_1+X_2+X_3+X_4+X_5)]$$

- At the end of each round, the experimentalist will inform you about your payoff, indicating how much of it comes from your private fund, and how much from the common fund.

Payoffs

At the end of the session a random selection will pick the round that will determine your payoff in the experiment. The amount will be privately paid in cash at the end of the session.

The instructions for the Baseline are the same except the parts making reference to the 0.1 euro that is paid and its impact on the common fund. The instructions for the Baseline+Copay are the same as in the Baseline. After round 15 an announcement is given that, from the following round, the subject has to pay 0.1 per unit and the amount collected enters the common fund.

QUESTIONS

1. If you withdraw €7 from the common fund, how much is the reduction in the common fund?
2. For each unit you withdraw from the common fund, how much does each group member lose assuming that the rest of the members do not withdraw? How much do you gain, considering the impact on your share of the common fund and on your private fund?
3. If each member withdraws €0 from the common fund, how much does each group member get at the end of the round?
4. If each member withdraws €5 from the common fund, how much does each group member get at the end of the round?
5. If each member withdraws €10 from the common fund, how much does each group member get at the end of the round?

Biografical authors' information

Aurora García-Gallego. Professor of Economic Theory at the Universitat Jaume I, Castellón (Spain). She holds a PhD in Economics from the EUI (Florence, Italy). She has been a visiting professor in Crete, Cyprus, Colombia and UK. She has participated in over 20 research projects. She is the coordinator of the PhD program of Economics and Business at her University. Her main research interests include microeconomics, experimental, behavioral economics and industrial organization. She has published in *Frontiers in Behavioral Neuroscience*, *Organizational Behavior and Human Decision Processes*, *Journal of Economic Behavior and Organization*, *International Journal of Industrial Organization*, among other journals. She is co-director of the Laboratorio de Economía Experimental (LEE).

Nikolaos Georgantzis is Professor in Behavioural Economics at the School of Agriculture Policy and Development at the University of Reading, UK. Research focuses on different applications of Microeconomics with special emphasis on Behavioral Economics. Founder of two experimental economics labs in Spain; one in Granada (EGEO) and a larger one in Castellón (Laboratorio de Economía Experimental). Published work covers a range of areas, like Labour Economics, Preference Elicitation and Evaluation, Economic Psychology, Industrial Organization (Theoretical and Experimental), Internet Economics, International Economics, etc. Main supervisor to 16 completed PhD theses. Academic Editor for *PLoS One* and Associate Editor for the *Journal of Behavioral and Experimental Economics*.

Tarek Jaber-López received his Bachelor's Degree in Economics in 2008 from the University of Valencia (Spain). He completed his MSc in 2009 at the University of Valencia. His PhD thesis focused on studying the behavior and emotional arousal of people in a bribery game, using the experimental and psychophysiological methods. He got his PhD in Economics from the University Jaume I of Castellón in 2015 and published articles in the *Journal of Economic Behaviour and Organization* and in *Frontiers in Behavioral Neuroscience*. He is currently a Postdoc researcher in the Department of Public Finance at the University of Innsbruck and an external collaborator of the LEE-UJI, Spain.

Gianandrea Staffiero earned his Ph.D. at the IDEA (International Doctorate in Economic Analysis) program of the Universitat Autònoma de Barcelona. He published his research in *Public Choice, Journal of Economic Behavior and Organization, Global Competition Review, Economics Letters, European Journal of Health Economics,* and in a chapter of the book "Cases in European Competition Policy". As a consultant, he recently managed projects for the European Commission and Eurofound, focused on health impacts of economic conditions and on tobacco-related health inequalities, and presented results in conferences and workshops. Since June 2015 he works for the Financial Conduct Authority in London.